

August 13, 2001

Mr. Jeffrey Hamel
Senior Project Manager
Woodard and Curran
188 Main St. - Suite 201
Wilmington, MA 01887

Subject: General Dynamics, Former Shipyard Facility, Groton, Connecticut. Technical Review of the September 14, 2000, Draft Environmental Indicator CA750 Evaluation Sheet, Migration of Contaminated Groundwater Under Control.

Dear Mr. Hamel:

We have reviewed the January 19, 2001, RCRA Corrective Action Environmental Indicator (EI) RCRIS Code CA750 Migration of Contaminated Groundwater Under Control Evaluation Sheet (CA750 Evaluation Sheet), and the March 12, 2001, revised Question No. 5 prepared by General Dynamics for their Shipyard Facility located in Groton, Connecticut.

The review considered the information provided in the October 1998, Draft RCRA Facility Investigation (RFI) Report as well as additional data and analyses submitted by General Dynamics. The CA750 Evaluation Sheet was reviewed to determine whether migration of contaminated groundwater is currently under control. For ease of review, the information in this letter follows the format of the information provided in General Dynamics' CA750 Evaluation Sheet.

The results of our review, which is included below, indicate that the groundwater contaminant plume at the General Dynamics Shipyard facility appears stabilized and that "YE" is the appropriate CA750 RCRIS status code for this facility.

Review

In response to Question No. 2 of the CA750 Evaluation Sheet, General Dynamics indicates that groundwater is contaminated above appropriately protective risk-based levels. Specifically, General Dynamics identified groundwater contamination above the Connecticut Department of Environmental Protection (CTDEP) Surface Water Protection Criteria (SWPC), and the CTDEP Industrial/Commercial Volatization Criteria (I/C VC). Note that a comparison to drinking water standards was not conducted as the groundwater underneath the Shipyard facility is classified by the CTDEP as GB, not suitable for drinking water. The constituents identified as exceeding the I/C VC include: 1,1-dichloroethene (1,1-DCE) and vinyl chloride.

The constituents identified as exceeding the SWPC include benzo(a)anthracene, benzo(b)fluoranthene, and phenanthrene. In addition, the following metals were identified as exceeding the SWPC: arsenic, cadmium, copper, lead, nickel, mercury, silver, and zinc. General Dynamics has also provided an appropriate listing of measured concentrations of these and other relevant contaminants in tables attached to the CA 750 Evaluation Sheet. These tables include the identification of maximum contaminant levels detected in groundwater at the site.

In response to Question No. 3, General Dynamics has indicated that the migration of contaminated groundwater has stabilized. In support of this contention, General Dynamics has discussed the groundwater flow patterns identified on the site, the discharge of the contaminant plume to surface water bodies, and trend analyses of historical groundwater data that indicate no increasing trends of contaminant concentrations within the contaminant plume. Based on these factors, the conclusion that the plume has stabilized appears appropriate.

In response to Question No. 4, General Dynamics has correctly responded that contaminated groundwater discharges into a surface water body. Specifically, contaminated groundwater discharge to the Thames River.

In response to Question No. 5, General Dynamics has indicated that the discharge of contaminated groundwater to surface water is insignificant. In support of their position, General Dynamics relies on monitoring well data from wells screened in close proximity to the Thames River. Using these data, General Dynamics indicates that only two constituents exceed ten times the CTDEP SWPC. Specifically, these two constituents are phenanthrene and zinc. Phenanthrene (9.6 ug/L) was detected in monitoring well SH16-MW02, while zinc (1300 ug/L) was detected in monitoring well SH28-MW02. Ten times the SWPC for phenanthrene is 3.0 ug/L, whereas for zinc ten times the SWPC is 1230 ug/L. General Dynamics reasonably argues that both monitoring wells, SH16-MW02 and SH28-MW02, are not actually adjacent to the Thames River but upgradient, so that some decrease in contaminant concentration would be expected before reaching the Thames River. Specifically, SH16-MW02 is located approximately 200 feet from the Thames River, while SH28-MW02 is located approximately 70 feet from the Thames River. Furthermore, General Dynamics points out that there is significant tidal mixing that occurs between the wells and the Thames River which dilutes the contaminant concentration that discharges to the Thames River. General Dynamics also argues that the detections of zinc and phenanthrene are limited and localized detections.

General Dynamics also indicates in their response to Question No. 5, that no other site-specific conditions would significantly increase the potential for unacceptable impacts to the Thames River. Specifically, General Dynamics reports that the Thames River is not used for drinking water, there are no beaches for recreational use, and the area adjacent to the facility is closed to shell fishing.

With regards to surface water, General Dynamics also provides surface water sampling results in their response to Question No. 5. Specifically, all SVOCs and metals detected in the

surface water samples were below the CTDEP Water Quality Standards and Ambient Water Quality Guidelines with the exception of mercury and arsenic. Mercury was detected in 3 of the 19 nearshore samples and 2 of the 12 farfield samples, while arsenic was detected in 13 of the 19 nearshore samples and 6 of the 12 farfield samples. The average concentration of mercury in the nearshore surface water samples was 0.22 ug/L, whereas the farfield concentrations averaged 0.24 ug/L. The actual standard used for comparison of the mercury results is 0.15 ug/L. The average concentration of arsenic in nearshore samples was 7.8 ug/L and in farfield samples the average concentration was 6.4 ug/L, while the standard is 0.14 ug/L. In addition, General Dynamics points out that mercury was detected in only 1 of 44 monitoring wells on site, and that arsenic was detected in only 6 of the 44 monitoring wells on site. Furthermore, the average concentration of arsenic detected in monitoring wells on site was 9.0 ug/L, while the mercury concentration detected on site was 0.4 ug/L. General Dynamics reasonably argues that because the results of the nearshore and farfield surface water samples were similar, it does not appear likely that the site is the cause of the surface water contamination. This argument is supported by the low concentrations and frequency of detections of the two constituents on site in the groundwater wells.

General Dynamics also provides a discussion of the sediments in their response to Question No. 5. SVOCs and metals were detected in the sediment samples adjacent to the facility. Specifically, SVOC and metal concentrations exceed ecological screening criteria at two locations (SD04 and SD07). However, General Dynamics points out that since the immediately upgradient monitoring wells have not detected SVOCs or metals, the source of these contaminants are not likely a result of groundwater discharge, but more likely surface water runoff and sediment accumulation from the nearby marine railway and other historic operations.

Based on the information provided by General Dynamics, the conclusion that the discharge of contaminated groundwater to surface water is insignificant appears appropriate.

Based on the response to Question 5, a response to Question 6 was not required.

In response to Question No. 7, General Dynamics indicates that a monitoring program will be conducted to verify that contaminated groundwater has remained within the horizontal and vertical dimensions of the existing area of the contaminated groundwater. Groundwater and surface water samples will be collected from 23 monitoring wells located throughout the site. Analyses for volatile organic compounds will be conducted at five locations, analyses for SVOCs will be conducted at eight locations, and analyses for total metals will be conducted at 17 locations. Sampling will be conducted on an annual basis. The planned monitoring program appears sufficient to verify that the plume is not expanding and that trends of increasing concentration do not develop.

Finally, General Dynamics has responded "YE" to Question No. 8, indicating that the migration of groundwater is under control. As stated above, our review of the CA750 Evaluation Sheet and relevant characterization data indicate that the groundwater contaminant plume at the

General Dynamics Shipyard facility appears stabilized and that "YE" is the appropriate CA750 RCRIS status code for this facility. Please note, however, should changes at the facility effect present groundwater conditions, the "YE" RCRIS status code for CA 750 may need to be re-evaluated.

If you have any questions, please feel free to contact me at (617) 918-1360.

Sincerely,

Robert A. O'Meara
RCRA Facility Manager

cc: Donna Frechette, EB Environmental Resource Manager



March 12, 2001
Project 205223.01

Mr. Robert O'Meara
US EPA New England
Office of Site Remediation and Restoration
1 Congress Street
Suite 1100 (HBT)
Boston, Massachusetts 02114-2023

Re: Environmental Indicator CA750
Electric Boat Corporation - Shipyard Facility

Dear Mr. O'Meara:

On behalf of the Electric Boat Corporation (EB) and consistent with our discussions during our February 27, 2001 meeting, please find attached a revised Question 5 to the Documentation of Environmental Indicator Determination, RCRA Corrective Action, Environmental Indicator RCRIS Code CA750 prepared for EB's Shipyard facility (previously submitted January 19, 2001).

The attached pages provide additional clarification with regard to the presence of mercury in surface water samples and a discussion regarding groundwater discharge not being a significant contributor to sediment contamination at sampling stations SD04 and SD07. It should be noted that our response also includes a discussion of arsenic concentrations in surface water given that the arsenic concentrations represent a similar condition as mercury.

The page numbers to the response have been numbered in sequence with the January submittal to facilitate binding into the original document. Given the additional information provided, the pages have been numbered 7, 8, and 8A (with Question 6 remaining on Page 9). We have also included a revised Drawing 5, on which the nearshore surface water and sediment sampling stations have been added.

If you have any questions or require additional information, please call me at (978) 657-0555.

Sincerely,

Woodard & Curran Inc.

Jeffrey A. Hamel
Senior Project Manager

Attachments

cc: Ms. Connie Crossley, Booz, Allen & Hamilton (2 copies)
Ms. Donna Elks, EB
Ms. Rose McBride, EB

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 5

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

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

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

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

Rationale and Reference(s)

As indicated in the response to Question 2, a total of 47 monitoring wells have been used to evaluate potential impacts from “contaminated” groundwater discharging to surface water (refer to Drawing 5). Groundwater samples from each of these wells were collected and analyzed by an off-site laboratory. The “appropriate groundwater level” used in this evaluation was the CTDEP’s Surface Water Protection Criteria (SWPC).

The CTDEP RSR SWPC were developed as a general default standard to be protective of an average surface water body in the State of Connecticut. As described in detail in the Draft RFI report, the Thames River is a large, navigable, tidally-influenced surface water body. The depth of the river adjacent to the site varies between 7 feet (North and South Yards) and 40 feet (Main Yard and Dock Areas). The width of the river adjacent to the facility ranges from 2500 to 4000 feet. The average of the maximum tidal fluctuations in the river measured adjacent to the facility is approximately 2.5 feet.

With respect to SVOCs in groundwater and as summarized on Table 5, only 4 of the 45 wells detected concentrations of SVOCs in excess of the CTDEP RSR default SWPC. As presented in the discussion provided on Table 5, current concentrations in two of these four wells were non-detect (laboratory’s minimum reporting limits were below the SWPC standard). In both of the other wells (SH18-MW02 and SH16-MW02, see Drawing 5 for locations), phenanthrene was the only SVOC detected in excess of the SWPC. In both wells, separate phase product was present prior to sampling (0.14 feet on SH16-MW02 and present in SH18-MW02, but non-measurable due to the weathered nature of the product). Given the limited thickness, the product was removed from the well/purge water prior to sample collection; however, the results may be influenced by the presence of the petroleum product (diesel).

With respect to SH18-MW02, data collected from monitoring well SH18-MW08, which is located immediately downgradient (approximately 30 feet) from SH18-MW02 and adjacent to the river, was evaluated. Phenanthrene was not detected above the laboratory’s minimum reporting limit (which was below the SWPC standard) in SH18-MW08; therefore, the SH18-MW02 data is not considered to represent groundwater conditions which discharge to the river.

Non-detect

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

Monitoring well SH16-MW02 is located approximately 200 feet from the river and was only included in the evaluation because no wells are located between this location and the river (due to access and physical restraints for well installation). The concentration of phenanthrene was 9.6 ug/l, which is slightly higher than 10 times the SWPC (3.0 ug/l), but below 100 times the SWPC. Given the reduction in phenanthrene concentration between SH18-MW02 and SH18-MW08, the general findings of the RFI investigation which predominantly detected isolated, localized contaminant releases, and the high degree of mixing (tidal influences) that occurs between the well location and the river, it is not expected that the phenanthrene concentration detected in SH16-MW02 is representative of groundwater conditions which discharge to the river.

Although the concentrations of phenanthrene detected in SH18-MW02 and SH16-MW02 are greater than 10 times the SWPC, based on the discussion presented in the preceding paragraphs and the hydrologic properties of the Thames River, the discharge of "SVOC contaminated" groundwater to the Thames River is likely to be insignificant.

With respect to metals in groundwater and as summarized on Table 6, 17 of the 44 monitoring well stations detected metals concentrations in excess of the CTDEP RSR default SWPC; however, only one monitoring well (SH28-MW02) detected concentrations of metals in excess of 10 times the CTDEP RSR SWPC. Monitoring well SH28-MW02 is located approximately 70 feet from the River. Zinc (1300 ug/l) was detected in the well at a concentration slightly in excess of 10 times the SWPC of 1230 ug/l. This well is currently covered by a storage container and inaccessible for resampling. However, given that the concentration is only slightly in excess of 10 times the standard, it is considered insignificant with respect to the response to this question.

Other site-specific conditions relating to the "contaminated" groundwater discharge to surface water that demonstrate that no other conditions exist which would significantly increase the potential for unacceptable impacts to surface water systems include:

- There are no beaches in the areas of the groundwater discharge; therefore, recreational swimming is not likely in these areas.
- The Thames River is not used for drinking water purposes.
- The river adjacent to the facility (area of primary groundwater plume discharge) is closed to shellfishing; however, further offshore locations are open to shellfishing (lobstering).
- No SVOCs were detected in surface water samples and concentrations of metals detected in surface water samples were below the Connecticut Water Quality Standards and Ambient Water Quality Guidelines with the exception of mercury and arsenic, which were detected above these standards in both nearshore and farfield samples. Mercury was detected in 3 of the 19 nearshore samples (average concentration of 0.00022 mg/l compared to a standard of 0.00015 mg/l) and 2 of the 12 farfield samples (average concentration of 0.00024 mg/l). Mercury was only detected in excess of the SWPC in site groundwater from 1 of the 44 monitoring wells used to evaluate SWPC (concentration of 0.0005 mg/l compared to a SWPC of 0.0004 mg/l), but the concentration is less than 10 times the SWPC. Arsenic was detected in 13 of the 19 nearshore samples (average concentration of 0.0078 mg/l compared to a standard of 0.00014 mg/l) and 6 of the 12 farfield samples (average concentration of 0.0064 mg/l). Arsenic was detected in excess of the SWPC in groundwater from 6 of the 44 monitoring wells used to evaluate SWPC (average concentration of 0.009 mg/l compared to a SWPC of 0.004 mg/l), but the concentrations are less than 10 times the SWPC. Given that similar concentrations of mercury and arsenic were detected in both nearshore and farfield surface water samples and mercury's and arsenic's low detection frequency and low concentrations in site groundwater collected from wells located along the shoreline, the potential discharge of arsenic and mercury in groundwater to surface water is not anticipated to have unacceptable impacts to the receiving surface water body.

- Concentrations of SVOCs were detected in 12 of the 15 nearshore sediment sampling stations ranging in total SVOC concentration from 2.5 to 239 mg/kg. The highest concentrations were detected in the North Yard (Investigation Area SH-06, former Marine Railway – SD04) and in the Main Yard adjacent to Storm Drain Outfall No. 10 (Investigation Area SH-17, SD07) (refer to Drawing 5 for the sediment sample locations). In general, higher concentrations of SVOCs were detected in nearshore sediment samples than the farfield samples. Similar to the SVOC sediment results, the two locations with the highest SVOC results also detected the highest metal concentrations. Concentrations of copper, lead, and zinc were slightly higher in the nearshore samples than the farfield samples. The SVOC and metal concentrations at the two locations mentioned above (SD04 and SD07) exceed ecological screening criteria (effects range low and medium concentrations – ER-L and ER-M) (USEPA Ecotox thresholds, 1996). Immediately upgradient monitoring wells at these two locations (SH06-MW02/MW02R and SH06-MW01/MW01R for SD04 and SH18-MW08/MW08R and SH17-MW01/MW01R for SD07) did not detect SVOC or metal concentrations in groundwater in excess of the SWPC (refer to Table 2 [SVOCs] and Table 3 [Metals]). The likely predominant contributors to these concentrations in sediment relate to historic operations. For example, the Marine Railway operated from the 1920s to the 1970s in an area immediately adjacent to the sample SD04 location. The Marine Railway was an inclined stretch of track on a wooden platform with one end dipping into the water and used to withdraw vessels out of the water for cleaning, blasting, painting, and general overhaul on a variety of vessels including submarines and commercial vessels. In addition, 3 (SD04) and 2 (SD07) stormwater drain system outfalls discharge to the river in the vicinity of these two locations. As shown on Drawing 3, extensive historic filling has also occurred in both areas where samples SD04 and SD07 were collected. Additional evaluation of the sediment conditions will be performed as part of the RFI response-comment process. Given the information discussed above and the properties of the Thames River (volume of water, flow system, tidal fluctuation, etc.), it is unlikely that the discharge of “contaminated” groundwater in these areas would significantly increase the potential for unacceptable impacts to sediments.

Based on this information and in response to this question, the discharge of contaminated groundwater into surface water is likely to be insignificant and there are no apparent conditions which would significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations.



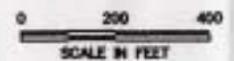
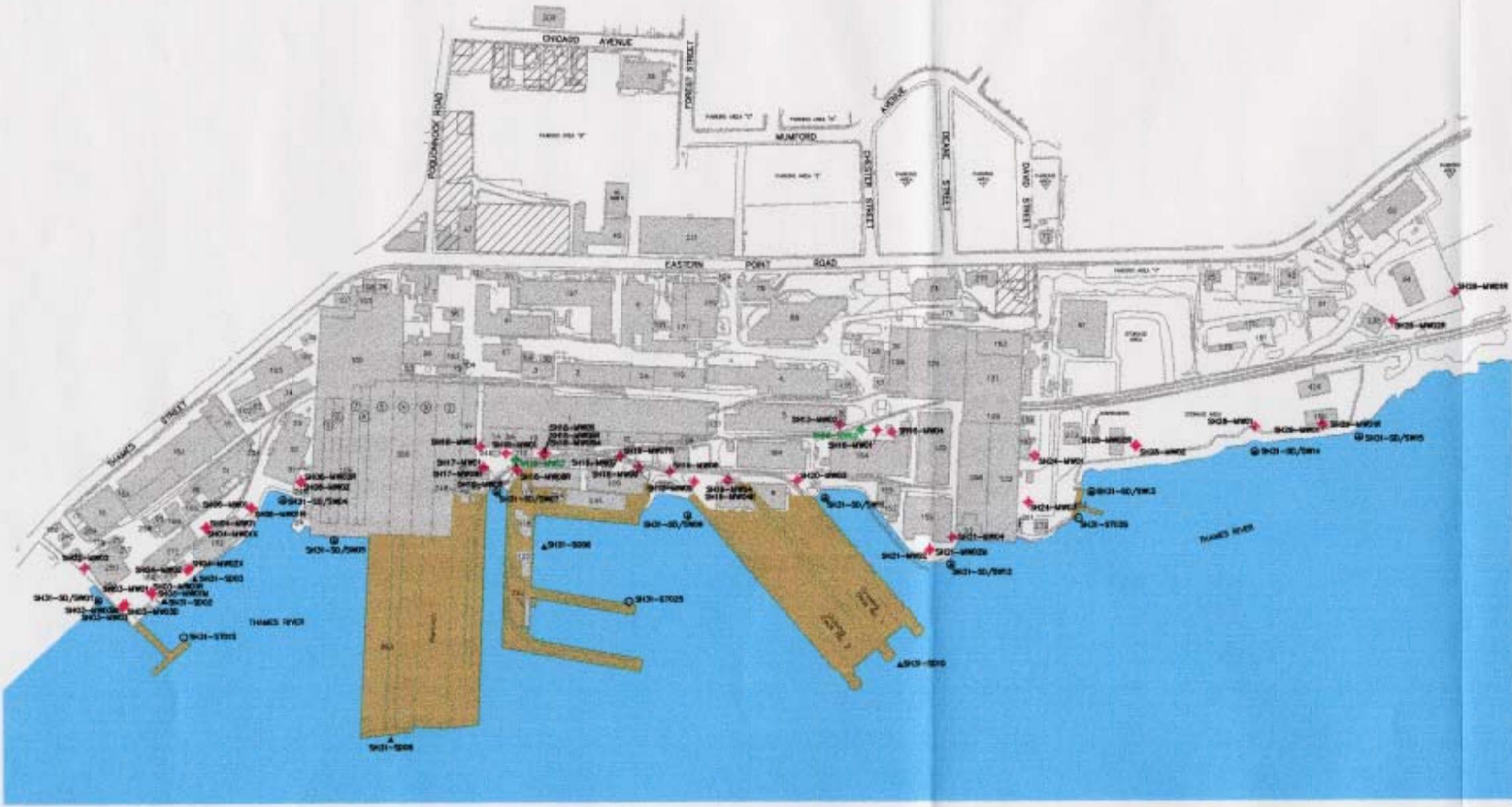
LEGEND

- SH26-MW01R MONITORING WELL LOCATION AND IDENTIFIER
- SH16-MW02 MONITORING WELL WITH CONSTITUENTS DETECTED IN EXCESS OF THE SWPC (PHENANTHRENE ONLY)
- SH31-SD03 SEDIMENT SAMPLE LOCATION AND IDENTIFIER
- SH31-SW15 SURFACE WATER AND SEDIMENT SAMPLE LOCATION AND IDENTIFIER

INACCESSIBLE/RESTRICTED ACCESS AREAS

- BUILDINGS/STRUCTURES
- GRAVING DOCKS/WET DOCKS/PIERS

CONDITIONS DEPICTED AT TIME OF RFI FIELD INVESTIGATION (1993-1998).



REV	DATE	DESCRIPTION	DES BY	CHK BY	APP BY
1	1/2/01				



ELECTRIC BOAT CORPORATION
SHIPYARD FACILITY
GROTON, CONNECTICUT

MONITORING WELL LOCATIONS
USED IN THE COMPARISON TO THE SWPC

DRAWING NO.
5
PROJECT NO.
308223

1" = 100' (Horizontal)
 1" = 200' (Vertical)
 DATE PLOTTED: 1/2/01
 PLOTTER: HP DesignJet 500C
 DRAWING: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



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January 19, 2001
Project 205223.01

Mr. Robert O'Meara
US EPA New England
Office of Site Remediation and Restoration
1 Congress Street
Suite 1100 (HBT)
Boston, Massachusetts 02114-2023

Re: Environmental Indicator CA750
Electric Boat Corporation - Shipyard Facility

Dear Mr. O'Meara:

On behalf of the Electric Boat Corporation (EB) and consistent with our discussions during our August 17, 2000 meeting, please find attached a revised Documentation of Environmental Indicator Determination, RCRA Corrective Action, Environmental Indicator RCRIS Code CA750 prepared for EB's Shipyard facility.

If you have any questions or require additional information, please call me at (978) 657-0555.

Sincerely,

Jeffrey A. Hamel
Senior Project Manager

Attachments

cc: Ms. Connie Crossley, Booz, Allen & Hamilton (2 copies)
Ms. Donna Elks, EB
Ms. Rose McBride, EB

**ENVIRONMENTAL INDICATOR
RCRIS CODE CA750 SUBMITTAL**

**ELECTRIC BOAT CORPORATION
SHIPYARD FACILITY
GROTON, CONNECTICUT**

 **WOODARD & CURRAN**
Engineering • Science • Operations
188 Main Street Suite 201
Wilmington, MA 01887
978-657-0555
January 2001

PREFACE

This document provides responses to the eight questions that comprise the Documentation of Environmental Indicator Determination, Environmental Indicator (EI) RCRIS code CA750, Migration of Contaminated Groundwater Under Control. The responses follow each question with supporting tables and drawings attached.

TABLES AND ILLUSTRATIONS

Appendix A - Tables

- 1 Summary of Compounds which Exceed CTDEP RSR Volatilization Criteria – Industrial/Commercial Settings
- 2 Concentrations of Semi-Volatile Organic Compounds Detected in Groundwater Samples from Monitoring Wells Installed along the Facility's Perimeter
- 3 Concentrations of Metals Detected in Groundwater Samples from Monitoring Wells Installed along the Facility's Perimeter
- 4 Concentrations of Constituents Detected in Groundwater Samples from Select Wells
- 5 Summary of Semi-Volatile Organic Compounds Detected in Monitoring Wells Installed Immediately Upgradient of the Thames River in Excess of the CTDEP RSR Surface Water Protection Criteria
- 6 Summary of Metals Detected in Monitoring Wells Installed Immediately Upgradient of the Thames River in Excess of the CTDEP RSR Surface Water Protection Criteria
- 7 Proposed Groundwater Monitoring Program

Appendix B - Drawings

- 1 Site Location
- 2 Site Plan and Investigation Areas
- 3 Historic Waterfront Fill Areas
- 4 Monitoring Well Locations Used in the Comparison to the Volatilization I/C Criteria
- 5 Monitoring Well Locations Used in the Comparison to the SWPC
- 6 Investigation Areas with Separate Phase Product
- 7 Approximate Configuration of the Water Table Surface at High and Low Tide – November 20, 1997
- 8 Hydrogeologic Section B-B'
- 9 Proposed Monitoring Program – Sample Locations

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: Electric Boat Corporation's Shipyard Facility
Facility Address: 75 Eastern Point Road, Groton, CT
Facility EPA ID #: CTD001147842

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?

- 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).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

Page 2

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?

- 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):

Several rounds of groundwater sampling have been conducted from the monitoring well network at the site. The majority of the data was included in the Draft RCRA Facility Investigation (RFI) report submitted to EPA in October 1998. Following the Draft RFI submittal, additional groundwater samples were collected from select wells in 1999 and 2000. All groundwater data collected at the site has been included in this evaluation.

The Shipyard facility consists of approximately 100 acres of developed property located along the eastern shoreline of the Thames River (see Drawing 1). The Thames River is a large, navigable river with an average width of about 2,000 to 3,000 feet and a navigation channel approximately 40 feet deep. A site plan of the facility, depicting site features (i.e., buildings, parking areas, etc.) and the Investigation Areas developed as part of the RFI, is presented as Drawing 2. The first component of the identification numbering system for all sampling points refers to these Investigation Areas (i.e., SH06-MW03R is located in Investigation Area SH-06).

As discussed in the Draft RFI report, significant portions of the operational areas of the Shipyard have been filled-in. Areas of historic waterfront filling across the site are presented as Drawing 3. Groundwater beneath the facility and surrounding areas is classified by the State for non-drinking water uses (GB areas). In addition, no private or public water supply wells are located within the area of the facility.

Appropriate “levels” (i.e., appropriate for the protection of the area’s groundwater resource and its beneficial uses) used in this evaluation included: CTDEP Remediation Standard Regulations (RSRs) Volatilization criteria - industrial/commercial setting (Vol-I/C) for groundwater beneath the facility represented by wells screened across the water table surface and CTDEP RSRs Surface Water Protection Criteria (SWPC) for groundwater represented by wells installed immediately upgradient of the point of groundwater discharge to the Thames River. A comparison of the site data to drinking water standards was not conducted due to the GB groundwater classification, brackish nature of the Thames River and immediately adjacent groundwater, local board of health restrictions on new water supply wells in the area, and the availability of a municipal water supply.

A total of 74 monitoring wells were included in the wells compared to the Volatilization I/C criteria. The locations and identifiers of these monitoring wells are shown on Drawing 4. A total of 47 monitoring wells (30 water table wells, 12 bedrock wells, and 5 intermediate screened wells) were included in the wells compared to the SWPC. The locations and identifiers of these monitoring wells are shown on Drawing 5.

A summary of the results of the comparison of site groundwater data to the Vol-I/C is presented on Table 1. As indicated on this table, 6 of the 74 wells detected concentrations of VOCs (1,1-dichloroethene or vinyl chloride) in excess of the standard (based on any of the events). The table also indicates that concentrations in the majority of the wells have been decreasing with time to current levels close to or below the standards.

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).

A summary table of the analytical results from each of the wells installed immediately upgradient of the river and analyzed for SVOCs (45 of the 47 wells) compared to the CTDEP RSR SWPC is presented as Table 2 and a summary table of each of the wells analyzed for metals (44 of the 47 wells) compared to the CTDEP RSR SWPC is presented as Table 3. As indicated on these tables, constituents were not detected above the laboratory's minimum reporting limits in the majority of the wells.

A review of Table 2 indicates that concentrations of SVOCs in excess of the standard were only detected in 4 of the 45 wells analyzed for SVOCs (based on any of the sampling events). Benzo(a)anthracene, benzo(b)fluoranthene, and phenanthrene were the only SVOCs detected above the SWPC. It should be noted that the reporting limits for some of the SVOCs were above their respective SWPC. However, the laboratory was instructed to report all detected compounds even if they were below the minimum reporting limits. These compounds are indicated on the table in parentheses and have been qualified as estimated. Different analytical techniques have been performed for the later sampling rounds, which allow the reporting limits to be below the respective SWPC. At many of the wells which were sampled in later rounds (with lower reporting limits), SVOCs were still reported as non-detect. As such, the SVOC data is considered representative for the purposes of this evaluation.

Both total (unfiltered) and dissolved concentrations of metals are presented on Table 3; however, in accordance with CTDEP guidance, only total (unfiltered) samples were used in the evaluation of compliance with the SWPC. A review of Table 3 indicates that concentrations of metals in excess of the standard were detected in 17 of the 44 monitoring well locations analyzed for metals (based on any of the sampling events). Arsenic, cadmium, copper, lead, nickel, mercury, silver, and zinc were the unfiltered metals detected above the SWPC.

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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)?

- 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 groundwater quality beneath the Site was evaluated through an extensive 100 monitoring well network (72 overburden wells and 28 bedrock wells). To aid in evaluating contaminant migration with groundwater flow, the following data was collected: water level measurements from on-site monitoring wells and surface water stations under both high and low tide conditions; single well response tests to determine hydraulic conductivity; physical characteristic testing of saturated soils (grain size distribution, specific gravity, etc.); and groundwater and surface water samples for laboratory analyses.

Based on the results of the investigation phases, petroleum hydrocarbons (expressed as TPH or SVOCs) were the predominant contaminant detected in the subsurface across the site followed by metals, and PCBs. The source(s) for the majority of the contamination was attributed to petroleum storage areas (e.g., former USTs); historic Shipyard operations; historic fill material placed mainly along the waterfront; and former transformers which had contained PCBs. Interim Corrective Measures, consisting of excavating the more elevated concentrations of TPH, metals, and PCBs detected in accessible unsaturated soils in several areas on the facility and installing/operating a petroleum product recovery system, have been conducted at the facility.

Separate phase petroleum product has also been detected in two main areas on the facility (Investigation Areas SH-15 and SH-16, and SH-17 through SH-19, refer to Drawing 6). Investigation Areas SH-15 and SH-16 are located in the middle portion of the facility and at locations of former fuel oil USTs. Separate phase product was noted in soil excavations conducted in Investigation Area SH-15, but measurable product thickness has not been observed in the four monitoring wells installed within the area. Measurable petroleum product was detected in one well in Investigation Area SH-16 (SH16-MW02 with an average thickness of 0.09 feet). These two areas are located approximately 200 to 300 feet from the river and given the monitoring completed to date at the facility, the product in this area appears to be heavily weathered, localized within these two areas, and not migrating away from this vicinity.

The other area is located west of Building 1. One of the areas is Investigation Area SH-19, where a petroleum product recovery ICM is located. Approximately 700 gallons of petroleum product (weathered diesel) has been recovered from the subsurface in this area. Three monitoring wells are located downgradient of the product area and adjacent to the river (SH19-MW08, SH19-MW09, and SH19-MW04). No separate phase product has been detected in any of these wells and no concentrations of any constituents have been detected in groundwater from these wells in excess of the CTDEP RSR SWPC. The other area is located west of the northern portion of Building 1 (SH17-MW01, SH18-MW02, and SH18-MW06). Average product thicknesses in these wells were 0.23 feet, 0.24 feet, and 0.1 feet, respectively. However, recent measurements (1999 and 2000) show a decrease in product thicknesses in SH17-MW01 (average of 0.04 feet) and SH18-MW06 (average of 0.06 feet). In addition, no separate phase product was detected in SH18-MW08, which is located approximately 30 feet downgradient of SH18-MW02 and this area.

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.

During the investigation, numerous observations of the river and shoreline were conducted to check for any sheens or other evidence of groundwater discharge impacts to the river. No sheens or product were observed during any of these observations. Consistent with the findings of the investigation, separate phase product encountered in the subsurface beneath the facility appears to be related to historical releases and as such is weathered and appears to be localized.

As indicated previously, the primary sources for contaminants in groundwater were related to historic operations or sources (i.e., fill material placed along the waterfront, historic oiling of unpaved surfaces for dust control, or former USTs and abandoned fuel distribution lines). These conditions have resulted in numerous years for contaminant concentrations to equilibrate within the subsurface. A review of the groundwater data collected from 1994 through 2000 indicates that the contaminant concentrations have maintained relatively the same or decreased in most of the monitoring wells (refer to Tables 2 and 3). A further summary of contaminant concentrations detected in select wells distributed across the facility is presented as Table 4. As indicated on Tables 2, 3, and 4, contaminant concentrations in the majority of the wells have either remained relatively the same or decreased (i.e., stabilized in concentration).

Based on the identification of potential contaminant sources and the results of the investigation of these sources, the majority of the groundwater contamination across the facility is located within the lower operational areas of the facility (i.e., within 200 feet of the River). Given the groundwater flow regime, the river represents a natural barrier to further groundwater migration away from the facility. As indicated on Tables 2 and 3, the majority of contaminant concentrations detected in groundwater in excess of the SWPC were detected in shallow water table wells above the silt unit. As described in the following paragraphs, groundwater in this zone most likely discharges to the river at the boundary between the site and river.

A detailed discussion of groundwater flow patterns, estimated seepage velocities for each saturated unit (fill underlain by silt [near the river] or by till which overlies bedrock), and tidal influences on groundwater was presented in the Draft RFI report. In summary, the hydrogeological conditions at the site are typical of land along the shore of an estuary, with the direction of groundwater flow toward the river (east to west – see Drawing 7), tidal influence on groundwater levels, and discharge of groundwater to the river.

Given the hydraulic conductivity differences between the silt layer and the till or fill material (i.e., fill and till layers are more permeable than the silt), the depths of these units in relation to the depth of the river, and the hydraulic gradients, groundwater above the silt (either in fill or till and in some areas shallow bedrock) and any associated contaminants most likely discharge to the river (see hydrogeologic cross section presented as Drawing 8). The majority of flow beneath the silt layer (in the till and shallow bedrock) at the boundary between the site and the river most likely continues to flow beneath the silt (see Drawing 8). Bathymetric and soil boring data collected from the river indicates that the geologic materials on either side of the navigational channel slope downward towards the channel; therefore, groundwater flowing away from the site beneath the silt layer would not be expected to flow beyond the channel (see Drawing 1) and most likely would ultimately follow a path towards Long Island Sound (to the south).

In summary, the majority of the contaminants detected in groundwater beneath the facility were detected in the upper saturated fill and till units, which exhibit a flow path and discharge to the Thames River adjacent to the facility. The contaminant concentrations detected over time in this upper layer have been shown to be relatively stable or decreasing. Contaminants detected in the lower units (i.e., beneath the silt layer), which were also observed to be stable or decreasing, mostly likely discharge to the river at a location further off-shore from the facility. The historic nature of the releases support the contaminant concentrations detected and also suggest similar conditions in the future. Thus, given the historic nature of the releases and proximity to the Thames River, it is expected that the contaminated groundwater detected on the facility would remain within the existing area (horizontal and vertical dimensions) of contaminated groundwater.

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

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)

Given the proximity to the river of those monitoring wells which have detected contaminants in excess of the appropriate "levels", it is assumed that "contaminated" groundwater discharges to the tidally influenced Thames River.

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

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

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

If unknown - enter "IN" status code in #8.

Rationale and Reference(s)

As indicated in the response to Question 2, a total of 47 monitoring wells have been used to evaluate potential impacts from "contaminated" groundwater discharging to surface water (refer to Drawing 5). Groundwater samples from each of these wells were collected and analyzed by an off-site laboratory. The "appropriate groundwater level" used in this evaluation was the CTDEP's Surface Water Protection Criteria (SWPC).

The CTDEP RSR SWPC were developed as a general default standard to be protective of an average surface water body in the State of Connecticut. As described in detail in the Draft RFI report, the Thames River is a large, navigable, tidally-influenced surface water body. The depth of the river adjacent to the site varies between 7 feet (North and South Yards) and 40 feet (Main Yard and Dock Areas). The width of the river adjacent to the facility ranges from 2500 to 4000 feet. The average of the maximum tidal fluctuations in the river measured adjacent to the facility is approximately 2.5 feet.

With respect to SVOCs in groundwater and as summarized on Table 5, only 4 of the 45 wells detected concentrations of SVOCs in excess of the CTDEP RSR default SWPC. As presented in the discussion provided on Table 5, current concentrations in two of these four wells were non-detect (laboratory's minimum reporting limits were below the SWPC standard). In both of the other wells (SH18-MW02 and SH16-MW02, see Drawing 5 for locations), phenanthrene was the only SVOC detected in excess of the SWPC. In both wells, separate phase product was present prior to sampling (0.14 feet on SH16-MW02 and present in SH18-MW02, but non-measurable due to the weathered nature of the product). Given the limited thickness, the product was removed from the well/purge water prior to sample collection; however, the results may be influenced from the presence of the petroleum product (diesel).

With respect to SH18-MW02, phenanthrene was not detected above the laboratory's minimum reporting limit (which was below the SWPC standard) in SH18-MW08. Monitoring well SH18-MW08 is located immediately downgradient (approximately 30 feet) from SH18-MW02 and adjacent to the river; therefore, SH18-MW02 data is not considered to represent groundwater conditions which discharge to the river.

(non-detect)

? closer to river + downgradient

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

Monitoring well SH16-MW02 is located approximately 200 feet from the river and was only included in the evaluation because no wells are located between this location and the river (due to access and physical restraints for well installation). The concentration of phenanthrene was 9.6 ug/l, which is slightly higher than 10 times the SWPC (3.0 ug/l), but below 100 times the SWPC. Given the reduction in phenanthrene concentration between SH18-MW02 and SH18-MW08, the general findings of the RFI investigation which predominantly detected isolated, localized contaminant releases, and the high degree of mixing (tidal influences) that occurs between the well location and the river, it is not expected that the phenanthrene concentration detected in SH16-MW02 is representative of groundwater conditions which discharge to the river.

Although the concentrations of phenanthrene detected in SH18-MW02 and SH16-MW02 are greater than 10 times the SWPC, based on the discussion presented in the preceding paragraphs and the hydrologic properties of the Thames River, the discharge of "SVOC contaminated" groundwater to the Thames River is likely to be insignificant.

With respect to metals in groundwater and as summarized on Table 6, 17 of the 44 monitoring well stations detected metals concentrations in excess of the CTDEP RSR default SWPC; however, only one monitoring well (SH28-MW02) detected concentrations of metals in excess of 10 times the CTDEP RSR SWPC. Monitoring well SH28-MW02 is located approximately 70 feet from the River. Zinc (1300 ug/l) was detected in the well at a concentration slightly in excess of 10 times the SWPC of 1230 ug/l. This well is currently covered by a storage container and inaccessible for resampling. However, given that the concentration is only slightly in excess of 10 times the standard, it is considered insignificant with respect to the response to this question.

Other site-specific conditions relating to the "contaminated" groundwater discharge to surface water that demonstrate that no other conditions exist which would significantly increase the potential for unacceptable impacts to surface water systems include:

- There are no beaches in the areas of the groundwater discharge; therefore, recreational swimming is not likely in these areas.
- The Thames River is not used for drinking water purposes.
- The river adjacent to the facility (area of primary groundwater plume discharge) is closed to shellfishing; however, further offshore locations are open to shellfishing (lobstering).
- No SVOCs were detected in surface water samples and concentrations of metals detected in surface water samples were below the Connecticut Water Quality Standards and Ambient Water Quality Guidelines (with the exception of mercury, which was detected above these standards in both nearshore and farfield samples [refer to the Draft RFI report]).
- Concentrations of SVOCs were detected in 12 of the 15 nearshore sediment sampling stations ranging in total SVOC concentration from 2.5 to 239 mg/kg. The highest concentrations were detected in the North Yard (Investigation Area SH-06, former Marine Railway – SD04) and in the Main Yard adjacent to Storm Drain Outfall No. 10 (Investigation Area SH-17, SD07). In general, higher concentrations of SVOCs were detected in nearshore sediment samples than the farfield samples. Similar to the SVOC sediment results, the two locations with the highest SVOC results also detected the highest metal concentrations. Concentrations of copper, lead, and zinc were slightly higher in the nearshore samples than the farfield samples. The SVOC and metal concentrations at the two locations mentioned above (SD04 and SD07) exceed ecological screening criteria. However, the upgradient monitoring wells at these two locations did not detect SVOC or metal concentrations in groundwater in excess of the SWPC. The likely predominant contributors to these concentrations in sediment relate to historic operations (i.e., Marine Railway operations, historic waterfront filling, historic discharges from the stormwater drainage system, etc.). Additional evaluation of the sediment conditions will be performed as part of the RFI response-comment process. Given this information and the properties of the Thames River (volume of water, flow system, tidal fluctuation, etc.), it is unlikely that the discharge of "contaminated" groundwater would significantly increase the potential for unacceptable impacts to sediments.

Based on this information and in response to this question, the discharge of contaminated groundwater into surface water is likely to be insignificant and there are no apparent conditions, which would significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations.

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

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR

2) providing or referencing an interim-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.

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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?"

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 and Reference(s):

To verify that contaminated groundwater remains within the horizontal or vertical dimensions of the "existing area of contaminated groundwater", groundwater samples are proposed to be collected from 23 monitoring wells located throughout the Site on an annual basis (April). The locations of the specific wells to be sampled are shown on Drawing 9. All groundwater samples will be collected following EPA low flow (low stress) sampling guidelines for the requested analytical parameters provided on Table 7.

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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).

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 Electric Boat Corporation's Shipyard facility, EPA ID # CTD001147842, located at 75 Eastern Point Road Groton, 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 Jeffrey A. Hamel
Woodard & Curran Inc. for Electric Boat Corporation
Senior Project Manager

Date January 19, 2001

Robert O'Meara, RCRIS

Date 6/8/01

Supervisor

Robert O'Meara
Office of Site Remediation and Restoration
US EPA New England

Locations where References may be found:

US EPA New England, Office of Site Remediation and Restoration, Boston, MA
Draft RCRA Facility Investigation Report, October 1998 with revisions and responses
to comments

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Matthew R. Hoagland 8/13/01
Matthew R. Hoagland
Chief, RCRA Corrective Action Section
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TABLES

Table 1

**Summary of Compounds which Exceed CTDEP RSR Volatilization Criteria - Industrial/Commercial Settings
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Monitoring Well	Compound	Concentration		CTDEP RSR Vol-I/C Standard (ug/l)	Discussion/Comment
		(ug/l)	Date		
SH01-MW03R	1,1-Dichloroethene	78	10/16/95	6	The last sampling round detected concentrations below the applicable standard. In 1998, the well was decommissioned and all soils and initial few feet of bedrock was removed in the area of the monitoring well during the construction of a new building. As part of the construction, the new building was completed with a vapor barrier.
		7.6	9/26/97		
		3.8 J	12/4/97		
SH06-MW03R	1,1-Dichloroethene	14	11/1/95	6	This well is screened approximately 30 feet below the water table surface. The well was included in the evaluation because there is not a water table well at this location. The closest water table well (SH06-MW04) is located approx. 85 feet from SH06-MW03R. 1,1-Dichloroethene was not detected in SH06-MW04 (<1.0 ug/l two sampling events).
		9.3	7/28/97		
SH18-MW06	Vinyl Chloride	<10	10/1/95	2	
		27	12/20/95		
		57	8/1/97		
		<2.0	12/11/00		
SH18-MW08	1,1-Dichloroethene	<5.0	11/3/95	6	
		21	12/13/95		
		<1.0	7/28/97		
		<2.0	12/8/00		
SH19-MW01	1,1-Dichloroethene	71	7/31/97	6	Separate phase product is present in the well ranging in thickness between approximately 0.1 and 0.5 feet. Samples were collected from beneath the product layer in the well.
SH28-MW02	1,1-Dichloroethene	<50	2/23/94	6	
		21	10/26/95		
		12	7/28/97		

NOTES:

ug/l = micrograms per liter

< = Less than the laboratory's minimum reporting limit, as indicated

J = Estimated concentration reported below the laboratory's minimum reporting limit

CTDEP RSR = Connecticut Department of Environmental Protection Remediation Standard Regulations Volatilization Criteria

under industrial/commercial settings

Table 2

**Concentrations of Semi-Volatile Organic Compounds Detected in Groundwater Samples from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval (ft)	Acenaphthene (ug/L)	Anthracene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Bis(2-ethyl hexyl)phthalate (ug/L)	Dibenzofuran (ug/L)	Fluoranthene (ug/L)	Fluorene (ug/L)	2-Methyl naphthalene (ug/L)	Phenanthrene (ug/L)	Pyrene (ug/L)
CTDEP RSR SWPC			NE	1,100,000	0.3	0.3	59	NE	3700	140,000	NE	0.3	110,000
SH02-MW02	11/02/95	5-15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH03-MW01	01/27/94	3-13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH03-MW01R	01/27/94	66-71	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/17/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH03-MW03	02/22/94	4-14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH03-MW03M	02/01/94	15-20	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH03-MW03D	02/03/94	39-41	<10	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J
SH04-MW01/X	02/24/94	3.5-11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	11/01/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH04-MW02/X	02/23/94	3 - 13	<50J	<50J	<50J	<5.8J	<50J	<50J	6.3J	<50J	<50J	<5.9J	5.7J
	10/17/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	08/20/97		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	12/08/00		<1.0	<1.0	<0.15	<0.15	-	-	<1.0	<1.0	<1.0	<0.20	<1.0
SH06-MW01	01/26/94	3-13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/17/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH06-MW01R	10/17/95	26-31	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	12/20/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH06-MW02	01/26/94	3-13	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/17/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH06-MW02R	01/26/94	38.5-43.5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/17/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH13-MW02	02/03/94	4.5-14.5	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J
	10/12/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	12/13/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH16-MW01	02/03/94	2.5-12.5	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J	<10J
	10/11/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	12/13/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH16-MW02	08/20/97	8 - 18	13J	<20	<20	<20	-	-	<20	22	-	<22	<20
	12/11/00		1.7	<1.0	<0.15	<0.15	-	-	5.3	3.1	3.3	<9.6	9.8
SH16-MW04	02/02/94	4-14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/11/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH17-MW01	02/17/94	5.5-15.5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH17-MW01R	02/17/94		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/18/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW01	02/28/94	5-15	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	10/27/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW02	2/18/94	8 - 18	<50	<50	<50	<50	(16)J	(7.7)J	<50	(7.7)J	(6.4)J	(8.9)J	<50
	10/30/95		(26)J	<100	<100	<100	(40)J	(67)J	<100	130	530	90	(15)J
	12/13/95		11	<10	<10	<10	16	<10	<10	16	19	23	<10
	7/28/97		<10	<10	<10	<10	-	-	<10	<10	-	<10	<10
	12/11/00		5.3	<1.0	0.28	<0.15	-	-	54.9	6.7	8.9	75.6	<1.0
SH18-MW03	10/18/95	7-17	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/31/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Table 2

**Concentrations of Semi-Volatile Organic Compounds Detected in Groundwater Samples from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval (ft)	Acenaphthene (ug/L)	Anthracene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Bis(2-ethyl hexyl)phthalate (ug/L)	Dibenzofuran (ug/L)	Fluoranthene (ug/L)	Fluorene (ug/L)	2-Methyl naphthalene (ug/L)	Phenanthrene (ug/L)	Pyrene (ug/L)
CTDEP RSR SWPC			NE	1,100,000	0.3	0.3	59	NE	3700	140,000	NE	0.3	110,000
SH18-MW06	10/30/95	7-17	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW06M	10/30/95	21-26	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW06R	10/30/95	47-52	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW07R	11/2/95	48-53	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH18-MW08	11/3/95	5-15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	7/28/97		<10	<10	<10	<10	-	-	-	<10	-	<10	<10
	12/8/00		<1.0	<1.0	<0.15	<0.15	-	-	<1.0	<1.0	<1.0	<0.20	<1.0
SH18-MW08R	11/3/95	58-63	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH18-MW09	11/6/95	4-14	12	12	11	<10	<10	<10	<10	12	<10	42	27
	8/1/97		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	12/8/00		<1.0	<1.0	<0.15	<0.15	-	-	<1.0	<1.0	<1.0	<0.21	<1.0
SH19-MW04	11/6/95	12-22	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH19-MW04R	2/25/94	27-32	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH19-MW08	10/31/95	6-16	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH19-MW09	8/20/97	6.5-16.5	<10	<10	<10	<10	-	-	-	<10	-	<10	<10
	12/07/00		<1.0	<1.0	<0.16	<0.16	-	-	<1.0	<1.0	<1.0	<0.21	<1.0
SH20-MW02	2/24/94	7-17	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	12/20/95		<10J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10J
SH21-MW02	2/22/94	5-15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/19/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH21-MW02M	10/31/95	18-23	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH21-MW04	2/24/94	4-9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/19/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH24-MW01	10/19/95	7.5 - 17.5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH24-MW03	2/18/94	4-14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/26/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH26-MW01R	10/25/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH26-MW02R	2/23/94	24.5-29.5	<10	<10	<10	<10	15	<10	<10	<10	<10	<10	<10
	10/19/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH28-MW01	10/18/95	12-22	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH28-MW02	2/23/94	11-21	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/26/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SH28-MW02R	2/23/94	37.5-42.5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH29-MW01	10/19/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
SH29-MW01R	2/24/94	35-40	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	10/19/95		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

NOTES:

Only those SVOCs detected in at least one monitoring well are indicated on the table. All monitoring wells installed along the facility's perimeter are included on the table

ft = feet below ground surface.

ug/l = micrograms per liter

< = Less than minimum reporting limit as indicated by the laboratory

Parentheses around a concentration indicates the concentration was detected below the laboratory's minimum reporting limit. Such concentrations are always qualified as estimated

J = Estimated concentration

CTDEP RSR SWPC = Connecticut Department of Environmental Protection Remediation Standard Regulations Surface Water Protection Criteria

NE = No criteria established

A dash indicates the sample was not analyzed for this constituent

Shading indicates compound detected in excess of the CTDEP RSR SWPC

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
			Total (mg/l)	Dissolved (mg/l)												
CTDEP RSR SWPC			86		0.004		NE		0.004		0.006		NE		NE	
SH02-MW02	11/02/95	5 - 15	DNR	<0.050	DNR	<0.005	DNR	0.038	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.010
SH02-MW02	07/23/97	5 - 15	<0.050	<0.050	<0.005	NA	0.3	0.32	<0.002	<0.002	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010
SH03-MW01	01/27/94	3 - 13	DNR	<0.050	DNR	<0.005	DNR	0.073	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW01	10/17/95	3 - 13	DNR	<0.050	DNR	<0.005	DNR	0.21	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW01	07/23/97	3 - 13	<0.050	<0.050	<0.005	0.0052	0.19	0.19	<0.002	<0.002	<0.005	<0.005	<0.010	<0.010	<0.01	<0.01
SH03-MW01	12/08/00	3 - 13	<0.006	NA	<0.004	NA	DNR	NA	<0.004	NA	<0.004	NA	<0.010	NA	DNR	NA
SH03-MW01M	07/28/97	19 - 24	<0.050	NA	<0.005	NA	<0.3	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH03-MW01R	01/27/94	66 - 71	DNR	<0.050	DNR	<0.005	DNR	0.036	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	0.032
SH03-MW01R	07/28/97	66 - 71	<0.050	NA	<0.005	NA	0.049	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.010	NA
SH03-MW03	02/22/94	4 - 14	DNR	<0.050	DNR	<0.005	DNR	0.6	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW03	10/17/95	4 - 14	DNR	<0.050	DNR	0.0057	DNR	0.65	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW03	07/30/97	4 - 14	<0.050	NA	<0.005	NA	1.3	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH03-MW03D	02/03/94	39 - 41	DNR	<0.050	DNR	<0.005	DNR	0.03	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW03D	07/29/97	39 - 41	<0.050	NA	<0.005	NA	0.04	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH03-MW03M	02/01/94	15 - 20	DNR	<0.050	DNR	<0.005	DNR	0.84	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH03-MW03M	10/17/95	15 - 20	DNR	<0.050	DNR	<0.005	DNR	0.7	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH04-MW01/X	02/24/94	3.5 - 11	DNR	<0.25	DNR	<0.005	DNR	0.041J	DNR	<0.01	DNR	<0.025	DNR	<0.05	DNR	<0.05
SH04-MW01/X	07/29/97	3.5 - 11	<0.050	NA	<0.005	NA	0.027	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.010	NA
SH06-MW01	01/26/94	3 - 13	DNR	<0.050	DNR	<0.005	DNR	0.11	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH06-MW01	07/30/97	3 - 13	<0.050	NA	<0.005	NA	0.039	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH06-MW01R	10/17/95	26 - 31	DNR	<0.050	DNR	<0.005	DNR	0.18	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	0.021
SH06-MW01R	07/29/97	23 - 31	<0.050	NA	<0.005	NA	0.091	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH06-MW02	01/26/94	3 - 13	DNR	<0.10	DNR	<0.005	DNR	0.059	DNR	<0.004	DNR	<0.01	DNR	<0.020	DNR	<0.02
SH06-MW02	10/17/95	3 - 13	DNR	<0.050	DNR	0.0058	DNR	0.09	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH06-MW02	07/23/97	3 - 13	<0.050	<0.050	<0.005	<0.005	0.13	0.13	<0.002	<0.002	<0.005	<0.005	<0.010	<0.010	<0.01	<0.01
SH06-MW02R	01/26/94	38.5 - 43.5	DNR	<0.050	DNR	<0.005	DNR	0.013	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	<0.01
SH06-MW02R	07/29/97	38.5 - 43.5	<0.050	NA	<0.005	NA	0.021	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH13-MW02	03/17/98	4.5 - 14.5	<0.050	NA	<0.005	NA	0.64	NA	<0.002	NA	<0.005	NA	<0.010	NA	<0.01	NA
SH16-MW01	02/03/94	2.5 - 12.5	DNR	<0.050	DNR	<0.005	DNR	1.1	DNR	<0.002	DNR	<0.005	DNR	<0.010	DNR	0.011
SH16-MW01	10/11/95	2.5 - 12.5	DNR	<0.050	DNR	<0.005	DNR	1.5	DNR	<0.002	DNR	0.0058	DNR	<0.010	DNR	0.025
SH16-MW01	07/29/97	2.5 - 12.5	<0.050	<0.050	<0.005	<0.005	0.58	0.61	<0.002	<0.002	<0.005	<0.005	<0.010	<0.010	0.016	0.017
SH16-MW02	08/20/97	8 - 18	<0.050	<0.050	<0.005	<0.005	0.52	0.52	<0.002	<0.002	<0.005	<0.005	<0.010	<0.010	<0.01	<0.01

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Copper		Lead		Mercury		Nickel		Silver		Thallium		Vanadium		Zinc	
			Total (mg/l)	Dissolved (mg/l)														
CTDEP RSR SWPC			0.048		0.013		0.0004		0.88		0.012		0.063		NE		0.123	
SH02-MW02	11/02/95	5 - 15	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.0071U	DNR	<0.010	DNR	0.024
SH02-MW02	07/23/97	5 - 15	0.13	0.12	<0.005	<0.005	DNR	<0.0002	0.11	0.11	<0.010	<0.010	<0.005	<0.005	<0.010	<0.010	0.81	0.85
SH03-MW01	01/27/94	3 - 13	DNR	0.016	DNR	<0.005	DNR	<0.0002	DNR	0.26	DNR	<0.010	DNR	<0.05J	DNR	<0.01	DNR	0.65
SH03-MW01	10/17/95	3 - 13	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	0.18	DNR	<0.010	DNR	0.0058U	DNR	<0.01	DNR	0.5
SH03-MW01	07/23/97	3 - 13	0.34	0.32	<0.005	<0.005	<0.0002	<0.0002	0.42	0.42	<0.010	<0.010	<0.005	<0.005	<0.01	<0.01	1.6	1.6
SH03-MW01	12/08/00	3 - 13	0.405	NA	<0.01	NA	<0.0002	NA	0.229	NA	<0.005	NA	<0.05	NA	DNR	NA	0.687	NA
SH03-MW01M	07/28/97	19 - 24	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.010	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH03-MW01R	01/27/94	66 - 71	DNR	0.011	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.05J	DNR	<0.01	DNR	0.021
SH03-MW01R	07/28/97	66 - 71	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.010	NA	0.0085	NA	<0.01	NA	<0.02	NA
SH03-MW03	02/22/94	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.01J	DNR	<0.01	DNR	0.043
SH03-MW03	10/17/95	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH03-MW03	07/30/97	4 - 14	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.010	NA	<0.005	NA	<0.01	NA	0.021	NA
SH03-MW03D	02/03/94	39 - 41	DNR	0.011	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.05J	DNR	0.023	DNR	0.045
SH03-MW03D	07/29/97	39 - 41	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.010	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH03-MW03M	02/01/94	15 - 20	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.010	DNR	<0.05J	DNR	<0.01	DNR	<0.02
SH03-MW03M	10/17/95	15 - 20	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	0.049	DNR	<0.010	DNR	0.0063U	DNR	<0.01	DNR	<0.02
SH04-MW01/X	02/24/94	3.5 - 11	DNR	<0.05	DNR	<0.005J	DNR	<0.0002	DNR	<0.20	DNR	<0.05	DNR	<0.025	DNR	<0.05	DNR	0.015J
SH04-MW01/X	07/29/97	3.5 - 11	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	DNR	0.02
SH06-MW01	01/26/94	3 - 13	DNR	<0.01	DNR	0.01	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.05J	DNR	<0.01	DNR	0.041
SH06-MW01	07/30/97	3 - 13	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.022	NA
SH06-MW01R	10/17/95	26 - 31	DNR	0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.011U	DNR	<0.01	DNR	0.024
SH06-MW01R	07/29/97	23 - 31	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH06-MW02	01/26/94	3 - 13	DNR	0.017J	DNR	<0.01	DNR	<0.0002	DNR	<0.08	DNR	<0.02	DNR	<0.1J	DNR	<0.02	DNR	0.18
SH06-MW02	10/17/95	3 - 13	DNR	<0.01	DNR	0.067	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0082U	DNR	<0.01	DNR	0.15
SH06-MW02	07/23/97	3 - 13	0.018J	0.02	<0.005	<0.005	<0.0002	<0.0002	<0.04	<0.04	<0.01	<0.01	0.0052	<0.005	<0.01	<0.01	0.057	0.062
SH06-MW02R	01/26/94	38.5 - 43.5	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005J	DNR	<0.01	DNR	<0.02
SH06-MW02R	07/29/97	38.5 - 43.5	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH13-MW02	03/17/98	4.5 - 14.5	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH16-MW01	02/03/94	2.5 - 12.5	DNR	0.017	DNR	<0.005	DNR	<0.0002	DNR	1.1	DNR	<0.01	DNR	<0.05	DNR	<0.01	DNR	0.73
SH16-MW01	10/11/95	2.5 - 12.5	DNR	0.14	DNR	<0.005	DNR	<0.0002	DNR	0.46	DNR	<0.01	DNR	<0.0055U	DNR	<0.01	DNR	1.5
SH16-MW01	07/29/97	2.5 - 12.5	0.23	0.18	<0.005	<0.005	<0.0002	<0.0002	0.22	0.23	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.43	0.45
SH16-MW02	08/20/97	8 - 18	<0.01	<0.01	0.009	<0.005	<0.0002	<0.0002	<0.04	<0.04	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.036	0.052

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
			Total (mg/l)	Dissolved (mg/l)												
CTDEP RSR SWPC			86		0.004		NE		0.004		0.006		NE		NE	
SH16-MW04	02/02/94	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.36	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH16-MW04	10/11/95	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.51	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH16-MW04	07/29/97	4 - 14	<0.05	<0.05	<0.005	<0.005	0.51	0.55	<0.002	<0.002	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01
SH16-MW04	12/07/00	4 - 14	<0.006	NA	<0.004	NA	DNR	NA	<0.004	NA	<0.004	NA	<0.01	NA	DNR	NA
SH17-MW01	02/17/94	5.5 - 13.5	DNR	(0.057)	DNR	<0.025	DNR	0.22	DNR	<0.004	DNR	<0.01	DNR	<0.02	DNR	<0.02
SH17-MW01	07/29/97	5.5 - 13.5	<0.05	NA	<0.005	NA	0.13	NA	<0.002	NA	<0.005	NA	<0.01	NA	0.031	NA
SH17-MW01R	02/17/94	29.5 - 34.5	DNR	<0.25	DNR	<0.025	DNR	0.27	DNR	<0.01	DNR	<0.025	DNR	<0.05	DNR	<0.05
SH17-MW01R	07/29/97	29.5 - 34.5	<0.05	NA	0.017	NA	0.61	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW01	02/28/94	5 - 15	DNR	<0.05	DNR	<0.005	DNR	0.028	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW01	07/28/97	5 - 15	<0.05	NA	<0.005	NA	0.14	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW02	02/18/94	8 - 18	DNR	<0.05	DNR	<0.025	DNR	0.58	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW02	10/30/95	8 - 18	DNR	<0.05	DNR	0.0061	DNR	0.06	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW02	07/28/97	8 - 18	<0.05	NA	<0.005	NA	0.17	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW06	10/30/95	7 - 17	DNR	<0.05	DNR	<0.005	DNR	0.13	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW06	08/01/97	7 - 17	<0.05	NA	<0.005	NA	0.48	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW06M	10/30/95	21 - 26	DNR	<0.05	DNR	0.0083	DNR	0.13	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW06M	07/28/97	21 - 26	<0.05	NA	0.011	NA	0.1	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW06R	10/30/95	47 - 52	DNR	<0.05	DNR	<0.005	DNR	0.21	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	0.054
SH18-MW06R	03/16/98	47 - 52	<0.05	NA	<0.005	NA	0.21	NA	<0.002	NA	<0.005	NA	<0.01	NA	0.016	NA
SH18-MW07R	11/02/95	48 - 53	DNR	<0.05	DNR	<0.005	DNR	0.14	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW07R	03/16/98	48 - 53	<0.05	NA	<0.005	NA	0.59	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH18-MW08	11/03/95	5 - 15	DNR	<0.05	DNR	<0.005	DNR	0.026	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW08	07/28/97	5 - 15	<0.05	NA	<0.005	NA	0.13	NA	<0.002	NA	<0.005	NA	<0.01	NA	0.012	NA
SH18-MW08R	11/03/95	58 - 63	DNR	<0.05	DNR	<0.005	DNR	0.17	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	0.054
SH18-MW08R	07/29/97	58 - 63	<0.05	NA	<0.005	NA	0.28	NA	<0.002	NA	<0.005	NA	<0.01	NA	0.033	NA
SH18-MW09	11/06/95	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.14	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH18-MW09	08/01/97	4 - 14	<0.05	<0.05	<0.005	<0.005	0.87	0.14	<0.002	<0.002	<0.005	<0.005	<0.01	<0.01	<0.01	0.029
SH19-MW04	11/06/95	12 - 22	DNR	<0.05	DNR	<0.005	DNR	0.21	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH19-MW04	07/29/97	12 - 22	<0.05	NA	0.0066	NA	0.35	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH19-MW04R	02/25/94	27 - 32		<0.05	DNR	<0.005	DNR	0.19	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	0.039
SH19-MW04R	07/29/97	27 - 32	<0.05	NA	<0.005	NA	0.49	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Copper		Lead		Mercury		Nickel		Silver		Thallium		Vanadium		Zinc	
			Total (mg/l)	Dissolved (mg/l)														
CTDEF RSR SWPC			0.048		0.013		0.0004		0.88		0.012		0.063		NE		0.123	
SH16-MW04	02/02/94	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	0.086	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	0.1
SH16-MW04	10/11/95	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	0.17	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	0.36
SH16-MW04	07/29/97	4 - 14	0.18	0.11	0.0076	<0.005	<0.0002	<0.0002	0.29	0.28	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.17	1.7
SH16-MW04	12/07/00	4 - 14	0.386	NA	0.0143	NA	<0.0002	NA	0.186	NA	<0.0050	NA	<0.01	NA	DNR	NA	0.687	NA
SH17-MW01	02/17/94	5.5 - 13.5	DNR	<0.02	DNR	<0.005J	DNR	<0.0002	DNR	<0.08	DNR	<0.02	DNR	<0.05	DNR	<0.02	DNR	<0.04
SH17-MW01	07/29/97	5.5 - 13.5	0.25J	NA	0.041	NA	<0.0002	NA	0.11	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.53	NA
SH17-MW01R	02/17/94	29.5 - 34.5	DNR	<0.05	DNR	<0.005J	DNR	<0.0002	DNR	<0.2	DNR	<0.05	DNR	<0.05J	DNR	<0.05	DNR	<0.1
SH17-MW01R	07/29/97	29.5 - 34.5	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH18-MW01	02/28/94	5 - 15	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH18-MW01	07/28/97	5 - 15	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.024	NA
SH18-MW02	02/18/94	8 - 18	DNR	<0.01	DNR	<0.005J	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.05J	DNR	<0.01	DNR	<0.02
SH18-MW02	10/30/95	8 - 18	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH18-MW02	07/28/97	8 - 18	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH18-MW06	10/30/95	7 - 17	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0061U	DNR	<0.01	DNR	0.022
SH18-MW06	08/01/97	7 - 17	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH18-MW06M	10/30/95	21 - 26	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0052U	DNR	<0.01	DNR	<0.02
SH18-MW06M	07/28/97	21 - 26	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	0.0064	NA	<0.01	NA	<0.02	NA
SH18-MW06R	10/30/95	47 - 52	DNR	0.039	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0051U	DNR	<0.01	DNR	0.04
SH18-MW06R	03/16/98	47 - 52	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	0.0063	NA	<0.01	NA	<0.02	NA
SH18-MW07R	11/02/95	48 - 53	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH18-MW07R	03/16/98	48 - 53	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH18-MW08	11/03/95	5 - 15	DNR	0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	0.03
SH18-MW08	07/28/97	5 - 15	0.078	NA	0.016	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.34	NA
SH18-MW08R	11/03/95	58 - 63	DNR	0.022	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0067U	DNR	<0.01	DNR	0.02
SH18-MW08R	07/29/97	58 - 63	0.022	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH18-MW09	11/06/95	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	0.25	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	0.065
SH18-MW09	08/01/97	4 - 14	<0.01	0.021	<0.005	<0.005	<0.0002	<0.0002	<0.04	0.81	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	<0.02	0.48
SH19-MW04	11/06/95	12 - 22	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0058U	DNR	<0.01	DNR	<0.02
SH19-MW04	07/29/97	12 - 22	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH19-MW04R	02/25/94	27 - 32	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH19-MW04R	07/29/97	27 - 32	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
			Total (mg/l)	Dissolved (mg/l)												
CTDEP RSR SWPC			86		0.004		NE		0.004		0.006		NE		NE	
SH19-MW08	10/31/95	6 - 16	DNR	<0.05	DNR	<0.005	DNR	0.057	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH19-MW08	07/31/97	6 - 16	<0.05	NA	<0.005	NA	0.056	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH19-MW09	08/20/97	6.5 - 16.5	<0.05	<0.05	<0.005	<0.005	0.092	0.089	<0.002	<0.002	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01
SH19-MW09	12/07/00	6.5 - 16.5	<0.006	NA	<0.004	NA	DNR	NA	<0.004	NA	<0.004	NA	<0.01	NA	DNR	NA
SH20-MW02	02/24/94	7 - 17	DNR	<0.01	DNR	<0.005	DNR	0.14	DNR	<0.004		<0.01		<0.02		<0.02
SH20-MW02	12/20/95	7 - 17	DNR	<0.05	DNR	<0.005	DNR	0.11	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH20-MW02	07/31/97	7 - 17	<0.05	NA	<0.005	NA	0.13	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH21-MW02	02/22/94	5 - 15	DNR	0.12J	DNR	<0.005	DNR	0.05	DNR	<0.01	DNR	<0.025	DNR	<0.05	DNR	0.0081J
SH21-MW02	10/19/95	5 - 15	DNR	<0.05	DNR	<0.005	DNR	0.97	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH21-MW02	07/21/97	5 - 15	<0.05	<0.05	<0.005	<0.005	0.089	0.090	<0.002	<0.002	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01
SH21-MW02M	10/31/95	18 - 23	DNR	<0.05	DNR	<0.005	DNR	0.12	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH21-MW02M	07/28/97	18 - 23	<0.05	NA	<0.005	NA	0.099	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH21-MW04	02/24/94	4 - 9	DNR	<0.025	DNR	<0.005	DNR	0.18	DNR	<0.01	DNR	<0.025	DNR	<0.05	DNR	<0.05
SH21-MW04	10/19/95	4 - 9	DNR	<0.05	DNR	<0.0069	DNR	0.057	DNR	<0.002	DNR	<0.005	DNR	0.015	DNR	<0.01
SH21-MW04	07/29/97	4 - 9	<0.05	<0.05	<0.005	<0.005	0.068	0.067	<0.002	<0.002	<0.005	<0.005	0.014	0.014	<0.01	<0.01
SH24-MW01	10/19/95	7.5 - 17.5	DNR	<0.05	DNR	<0.005	DNR	0.12	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH24-MW01	07/28/97	7.5 - 17.5	<0.05	NA	<0.005	NA	0.12	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH24-MW03	02/18/94	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.099	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH24-MW03	07/28/97	4 - 14	<0.05	NA	<0.005	NA	0.04	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH26-MW01R	10/25/95	22 - 32	DNR	<0.05	DNR	<0.005	DNR	0.1	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH26-MW01R	03/16/98	22 - 32	<0.05	NA	<0.005	NA	0.15	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH26-MW02R	02/23/94	24.5 - 29.5	DNR	<0.05	DNR	<0.005	DNR	0.14	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	0.016
SH26-MW02R	03/16/98	24.5 - 29.5	<0.05	NA	<0.005	NA	0.3	NA	<0.002	NA	<0.005	NA	0.056	NA	<0.01	NA
SH28-MW01	10/18/95	12 - 22	DNR	<0.05	DNR	<0.005	DNR	0.013	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH28-MW01	03/17/98	12 - 22	<0.05	NA	<0.005	NA	0.024	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH28-MW02	02/23/94	11 - 21	DNR	<0.05	DNR	<0.005	DNR	0.5	DNR	0.0028	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH28-MW02	10/27/95	11 - 21	DNR	<0.05	DNR	<0.005	DNR	0.15	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH28-MW02	07/28/97	11 - 21	<0.05	<0.05	<0.005	<0.005	3.3	3.4	<0.002	<0.002	0.011	0.011	<0.01	<0.01	0.014	0.014
SH28-MW02R	02/23/94	37.5 - 42.5	DNR	<0.05	DNR	<0.005	DNR	0.024	DNR	<0.002	DNR	<0.005	DNR	0.018	DNR	<0.01
SH28-MW02R	06/16/98	37.5 - 42.5	<0.05	NA	<0.005	NA	0.12	NA	<0.002	NA	<0.005	NA	<0.01	NA	0.012	NA

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Copper		Lead		Mercury		Nickel		Silver		Thallium		Vanadium		Zinc	
			Total (mg/l)	Dissolved (mg/l)														
CTDEP RSR SWPC			0.048		0.013		0.0004		0.88		0.012		0.063		NE		0.123	
SH19-MW08	10/31/95	6 - 16	DNR	0.013	DNR	<0.005	DNR	<0.0002	DNR	0.04	DNR	<0.01	DNR	<0.0068U	DNR	<0.01	DNR	0.037
SH19-MW08	07/31/97	6 - 16	0.044J	NA	<0.005	NA	<0.0002	NA	<0.04	NA	0.04	NA	<0.005	NA	<0.01	NA	0.088	NA
SH19-MW09	08/20/97	6.5 - 16.5	<0.01	<0.01	<0.005	<0.005	<0.0002	<0.0002	<0.04	<0.04	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.055	0.045
SH19-MW09	12/07/00	6.5 - 16.5	<0.025	NA	<0.010	NA	<0.0002	NA	<0.04	NA	<0.005	NA	<0.05	NA	DNR	NA	<0.040	NA
SH20-MW02	02/24/94	7 - 17		<0.02	DNR	<0.005	DNR	<0.0002	DNR	<0.08	DNR	<0.02	DNR	<0.025	DNR	<0.02	DNR	<0.04
SH20-MW02	12/20/95	7 - 17	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0060U	DNR	<0.01	DNR	<0.02
SH20-MW02	07/31/97	7 - 17	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH21-MW02	02/22/94	5 - 15	DNR	0.052	DNR	<0.05	DNR	<0.0002	DNR	0.058J	DNR	0.022J	DNR	<0.05J	DNR	0.0056J	DNR	0.072J
SH21-MW02	10/19/95	5 - 15	DNR	0.016	DNR	<0.005	DNR	<0.0002	DNR	0.042	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	0.15
SH21-MW02	07/21/97	5 - 15	0.059	0.057	0.0089	0.0078	<0.0002	<0.0002	<0.04	<0.01	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.21	0.2
SH21-MW02M	10/31/95	18 - 23	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0056U	DNR	<0.01	DNR	<0.02
SH21-MW02M	07/28/97	18 - 23	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH21-MW04	02/24/94	4 - 9	DNR	0.18	DNR	0.28	DNR	<0.0002	DNR	0.23	DNR	<0.05	DNR	<0.005	DNR	<0.05	DNR	0.88
SH21-MW04	10/19/95	4 - 9	DNR	0.081	DNR	<0.005	DNR	0.00029	DNR	0.058	DNR	<0.01	DNR	<0.0063U	DNR	<0.01	DNR	0.24
SH21-MW04	07/29/97	4 - 9	0.13	0.13	0.015	0.016	0.00055	0.00055	0.059	0.06	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.44	0.45
SH24-MW01	10/19/95	7.5 - 17.5	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH24-MW01	07/28/97	7.5 - 17.5	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.027	NA
SH24-MW03	02/18/94	4 - 14	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005J	DNR	<0.01	DNR	<0.02
SH24-MW03	07/28/97	4 - 14	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH26-MW01R	10/25/95	22 - 32	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH26-MW01R	03/16/98	22 - 32	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	<0.02	NA
SH26-MW02R	02/23/94	24.5 - 29.5	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005J	DNR	<0.01	DNR	<0.02
SH26-MW02R	03/16/98	24.5 - 29.5	<0.01	NA	<0.005	NA	<0.0002	NA	0.061	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.047	NA
SH28-MW01	10/18/95	12 - 22	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH28-MW01	03/17/98	12 - 22	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	0.007	NA	<0.01	NA	<0.02	NA
SH28-MW02	02/23/94	11 - 21	DNR	0.034	DNR	0.15	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	0.044	DNR	0.23
SH28-MW02	10/27/95	11 - 21	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.0062U	DNR	<0.01	DNR	<0.02
SH28-MW02	07/28/97	11 - 21	0.37	0.4	0.0088	<0.005	<0.0002	<0.0002	0.04	0.042	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01	0.3	1.4
SH28-MW02R	02/23/94	37.5 - 42.5	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005J	DNR	<0.01	DNR	<0.02
SH28-MW02R	06/16/98	37.5 - 42.5	0.014	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	<0.005	NA	<0.01	NA	0.17	NA

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt	
			Total (mg/l)	Dissolved (mg/l)												
CTDEP RSR SWPC			86		0.004		NE		0.004		0.006		NE		NE	
SH29-MW01	10/19/95	12 - 22	DNR	<0.05	DNR	<0.005	DNR	0.029	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	<0.01
SH29-MW01	03/16/98	12 - 22	0.051	NA	0.0054	NA	0.025	NA	<0.002	NA	<0.005	NA	<0.01	NA	<0.01	NA
SH29-MW01R	02/24/94	35 - 40	DNR	<0.05	DNR	<0.005	DNR	0.23	DNR	<0.002	DNR	<0.005	DNR	<0.01	DNR	0.29
SH29-MW01R	03/16/98	35 - 40	<0.05	NA	0.0094	NA	0.46	NA	<0.002	NA	0.0051	NA	<0.01	NA	0.014	NA
NOTES: mg/l = milligrams per liter ft = feet below ground surface < = Less than minimum reporting limit as indicated by the laboratory J = Estimated concentration U = Laboratory result qualified as less than indicated limit based on method blank contamination DNR = Data deemed not representative of groundwater conditions due to potential turbidity interferences Shading indicates metal detected in excess of the CTDEP RSR SWPC CTDEP RSR SWPC = Connecticut Department of Environmental Protection Remediation Standard Regulations Surface Water Protection Criteria																

Table 3

**Concentrations of Metals Detected in Groundwater Samples
from Monitoring Wells Installed along the Facility's Perimeter
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Sample Location Identifier	Sample Date	Well Screen Interval	Copper		Lead		Mercury		Nickel		Silver		Thallium		Vanadium		Zinc	
			Total (mg/l)	Dissolved (mg/l)														
CTDEP RSR SWPC			0.048		0.013		0.0004		0.88		0.012		0.063		NE		0.123	
SH29-MW01	10/19/95	12 - 22	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005	DNR	<0.01	DNR	<0.02
SH29-MW01	03/16/98	12 - 22	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	0.0067	NA	<0.01	NA	<0.02	NA
SH29-MW01R	02/24/94	35 - 40	DNR	<0.01	DNR	<0.005	DNR	<0.0002	DNR	<0.04	DNR	<0.01	DNR	<0.005J	DNR	<0.01	DNR	0.031
SH29-MW01R	03/16/98	35 - 40	<0.01	NA	<0.005	NA	<0.0002	NA	<0.04	NA	<0.01	NA	0.0075	NA	<0.01	NA	0.029	NA

NOTE:
mg/l = milligrams per liter
R = feet below ground surface
< = Less than minimum reporting limit as indicated by the laboratory.
J = Estimated concentration.
U = Laboratory result qualified as less than indicated limit based on method blank contamination.
DNR = Data deemed not representative of groundwater conditions due to potential turbidity interferences
Shading indicates metal detected in excess of the CTDEP RSR SWPC
CTDEP RSR SWPC = Connecticut Department of Environmental Protection Remediation Standard Regulations Surface Water Protection Criteria

Table 4

**Concentrations of Constituents Detected in Groundwater Samples From Select Wells
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

VOCs

Sample Location Identifier	Sample Date	Well Screen Interval	Total VOCs (ug/l)
SH06-MW01	01/26/94	3 - 13	13.2
	10/17/95	3 - 13	8.4
	07/30/97	3 - 13	12.6
SH18-MW06	10/30/95	7 - 17	26
	12/20/95	7 - 17	128.9
	08/01/97	7 - 17	166.4
	12/07/00	7 - 17	19.8
SH28-MW02	02/23/94	11 - 21	915
	10/26/95	11 - 21	641
	07/20/97	11 - 21	115

SVOCs

Sample Location Identifier	Sample Date	Well Screen Interval	Total SVOCs (ug/l)
SH04-MW02	2/23/94	3 - 13	26.7
	10/17/95	3 - 13	ND (<10)
	8/20/97	3 - 13	ND (<10)
	12/8/00	3 - 13	ND (<1.0 or <0.15)
SH18-MW02	2/18/94	8 - 18	46.7
	10/30/95	8 - 18	998
	12/13/95	8 - 18	85
	7/28/97	8 - 18	ND (<10)
	12/11/00	8 - 18	151.7
SH16-MW02	8/20/97	8 - 18	57
	12/11/00	8 - 18	32.8

METALS

Sample Location Identifier	Sample Date	Well Screen Interval	Antimony		Arsenic		Barium		Cobalt		Copper		Lead		Nickel		Silver		Vanadium		Zinc	
			Total (mg/l)	Dissolved (mg/l)																		
SH03-MW01	01/27/94	3 - 13	DNR	<0.050	DNR	<0.005	DNR	0.073	DNR	<0.01	DNR	0.016	DNR	<0.005	DNR	0.26	DNR	<0.010	DNR	<0.01	DNR	0.65
SH03-MW01	10/17/95	3 - 13	DNR	<0.050	DNR	<0.005	DNR	0.21	DNR	<0.01	DNR	<0.01	DNR	<0.005	DNR	0.18	DNR	<0.010	DNR	<0.01	DNR	0.5
SH03-MW01	07/23/97	3 - 13	<0.050	<0.050	<0.005	0.0052	0.19	0.19	<0.01	<0.01	0.34	0.32	<0.005	<0.005	0.42	0.42	<0.010	<0.010	<0.01	<0.01	1.6	1.6
SH03-MW01	12/08/00	3 - 13	<0.006	NA	<0.004	NA	NA	NA	DNR	NA	0.405	NA	<0.01	NA	0.229	NA	<0.005	NA	DNR	NA	0.687	NA
SH16-MW04	02/02/94	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.36	DNR	<0.01	DNR	<0.01	DNR	<0.005	DNR	0.086	DNR	<0.01	DNR	<0.01	DNR	0.1
SH16-MW04	10/11/95	4 - 14	DNR	<0.05	DNR	<0.005	DNR	0.51	DNR	<0.01	DNR	<0.01	DNR	<0.005	DNR	0.17	DNR	<0.01	DNR	<0.01	DNR	0.36
SH16-MW04	07/29/97	4 - 14	<0.05	<0.05	<0.005	<0.005	0.51	0.55	<0.01	<0.01	0.18	0.11	0.0076	<0.005	0.29	0.28	<0.01	<0.01	<0.01	<0.01	1.7	1.7
SH16-MW04	12/07/00	4 - 14	<0.006	NA	<0.004	NA	NA	NA	DNR	NA	0.386	NA	0.0143	NA	0.186	NA	<0.0050	NA	NA	NA	0.687	NA
SH21-MW02	02/22/94	5 - 15	DNR	0.12J	DNR	<0.005	DNR	0.05	DNR	0.0081J	DNR	0.052	DNR	<0.05	DNR	0.058J	DNR	0.022J	DNR	0.0056J	DNR	0.072J
SH21-MW02	10/19/95	5 - 15	DNR	<0.05	DNR	<0.005	DNR	0.97	DNR	<0.01	DNR	0.016	DNR	<0.005	DNR	0.042	DNR	<0.01	DNR	<0.01	DNR	0.15
SH21-MW02	07/21/97	5 - 15	<0.05	<0.05	<0.005	<0.005	0.089	0.090	<0.01	<0.01	0.059	0.057	0.0089	0.0078	<0.04	<0.04	<0.01	<0.01	<0.01	<0.01	0.21	0.2

NOTES:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
mg/l = milligrams per liter
ug/l = micrograms per liter

ft = feet below ground surface

DNR = data deemed not representative of groundwater conditions due to potential turbidity interferences

NA = Not Analyzed

< = Less than minimum reporting limit as indicated by the laboratory

J = Estimated concentration

U = Laboratory result qualified as less than indicated limit based on method blank contamination

Table 5

**Summary of Semi-Volatile Organic Compounds Detected in Monitoring Wells Installed Immediately Upgradient of the Thames River
in Excess of the CTDEP RSR Surface Water Protection Criteria**

**RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Monitoring Well	Compound	Concentration		CTDEP RSR			Discussion
		(ug/l)	Date	SWPC (ug/l)	10 X SWPC (ug/l)	100 X SWPC (ug/l)	
SH04-MW02	Benzo(b)fluoranthene	5.8 J	2/23/94	0.3	3	30	Current concentrations are below the standard for each compound. Soil excavation ICM performed in 1995.
		<10	10/17/95	0.3	3	30	
		<10	8/20/97	0.3	3	30	
		<0.15	12/8/00	0.3	3	30	
	Phenanthrene	8.9 J	2/23/94	0.3	3	30	
		<10	10/17/95	0.3	3	30	
		<10	8/20/97	0.3	3	30	
		<0.2	12/8/00	0.3	3	30	
SH16-MW02	Phenanthrene	22	8/20/97	0.3	3	30	Separate phase product is present in the well ranging in thickness between approximately 0.04 and 0.14 feet. Samples were collected after attempts to remove the product from the well; however, the results may be influenced by the presence of the product. This well is also located approximately 200 feet from the river and was included in this comparison because no wells are located between this location and the river (due to access and physical restraints for well installation).
		9.6	12/11/00	0.3	3	30	
SH18-MW02	Phenanthrene	8.9 J	02/18/94	0.3	3	30	Separate phase product is present in the well, although approximate thickness could not be determined due to the weathered, heavy nature of the product. Samples were collected after attempts to remove the product from the well; however, the results may be influenced by the presence of the product. Monitoring well SH18-MW08 is located immediately downgradient (approx. 30 feet) from this location and adjacent to the river. Phenanthrene has not been detected in this well above the laboratory's minimum reporting limit (which was below the SWPC standard).
		190	10/30/95	0.3	3	30	
		23	12/13/95	0.3	3	30	
		<10	7/28/97	0.3	3	30	
		75.6	12/11/00	0.3	3	30	
SH18-MW09	Benzo(a)anthracene	11	11/6/95	0.3	3	30	Current concentrations are below the standard for each compound.
		<10	8/1/97	0.3	3	30	
		<0.15	12/8/00	0.3	3	30	
	Phenanthrene	42	11/6/95	0.3	3	30	
		<10	8/1/97	0.3	3	30	
		<0.21	12/8/00	0.3	3	30	

NOTES:

ug/l = micrograms per liter

< = Less than the laboratory's minimum reporting limit, as indicated

SWPC = Connecticut Department of Environmental Protection Remediation Standard Regulations Surface Water Protection Criteria

J = Estimated concentration

Table 6

**Concentrations of Metals Detected in Monitoring Wells Installed Immediately Upgradient of the Thames River
in Excess of the Surface Water Protection Criteria
RCRA Facility Investigation
Electric Boat Corporation - Shipyard Facility**

Monitoring Well	No. of Sampling Events (unfiltered)	Constituent	Temporal Average Concentration (ug/l) ⁽¹⁾	SWPC (ug/l)	10 X SWPC (ug/l)	100 X SWPC (ug/l)	Was Const. Detected in excess of	
							10X the SWPC?	100X the SWPC?
SH02-MW02	1	copper	130	48	480	4800		
		zinc	810	123	1230	12300		
SH03-MW01	2	copper	373	48	480	4800		
		zinc	1144	123	1230	12300		
SH04-MW01/X	1	arsenic	5	4	40	400		
SH17-MW01	1	copper	250	48	480	4800		
		nickel	1100	880	8800	88000		
		zinc	530	123	1230	12300		
		lead	41	13	130	1300		
SH17-MW01R	1	arsenic	17	4	40	400		
SH18-MW08	1	copper	78	48	480	4800		
		zinc	540	123	1230	12300		
		lead	16	13	130	1300		
SH18-MW06M	1	arsenic	11	4	40	400		
SH19-MW08	1	silver	40	12	120	1200		
SH19-MW04	1	arsenic	6.6	4	40	400		
SH16-MW01	1	copper	230	48	480	4800		
		zinc	430	123	1230	12300		
SH16-MW04	2	copper	283	48	480	4800		
		lead	10.9	13	130	1300		
		zinc	1194	123	1230	12300		
SH21-MW02	1	copper	59	48	480	4800		
		zinc	210	123	1230	12300		
SH21-MW04	1	copper	130	48	480	4800		
		zinc	440	123	1230	12300		
		lead	15	13	130	1300		
		mercury	0.5	0.4	4	40		
SH28-MW02	1	copper	370	48	480	4800		
		zinc	1300	123	1230	12300	Yes	
		cadmium	11	6	60	600		
SH28-MW02R	1	zinc	170	123	1230	12300		
SH29-MW01	1	arsenic	5.4	4	40	400		
SH29-MW01R	1	arsenic	9.4	4	40	400		

NOTES:

Well sequence down the column represents well location progressing from north to south along the facility's perimeter

ug/l = micrograms per liter

(1) Average concentration of sampling events

SWPC = Connecticut Department of Environmental Protection Remediation Standard Regulations Surface Water Protection Criteria

Table 7

Proposed Groundwater Monitoring Program - Environmental Indicator CA750
RCRA Facility Investigation - Shipyard Facility

Sample Location Identifier ⁽¹⁾	Well Screen Interval (ft)	VOC	PAHs	Metals
SH02-MW02	5-15			X
SH03-MW01	3-13			X
SH04-MW02X	2-12		X	X
SH06-MW02	3-13		X	X
SH06-MW02R	38.5-43.5			X
SH16-MW01	2.5-12.5			X
SH16-MW02	8-18		X	X
SH16-MW03	5.5-15.5			X
SH16-MW04	4-14			X
SH17-MW01	5.5-15.5			X
SH17-MW01R	5.5-15.5			X
SH18-MW06	7-17	X		
SH18-MW06M	21-26	X		
SH18-MW06R	47-52	X		
SH18-MW08	5-15	X	X	X
SH18-MW09	4-14		X	
SH19-MW09	6.5-16.5		X	
SH20-MW02	7-17		X	X
SH21-MW02	5-15			X
SH21-MW04	4-9			X
SH28-MW01	12-22		X	
SH28-MW02	11-21	X		X
SH28-MW02R	37.5-42.5			X
Total Number of Samples		5	8	17
NOTES: ft = feet below ground surface X = The sample will be submitted for the analysis indicated VOCs = Volatile Organic Compounds (EPA Method 8260) PAHs = Polynuclear Aromatic hydrocarbons (EPA Method 8310) Metals = 13 Priority Pollutant (unfiltered) Metals (1) R = well screened within the bedrock				