RDMS DocID 107826

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

WATER PROTECTION AND LAND REUSE

MAY 05 2009

REMEDIATION DIVISION

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

Facility Name: Former Tri-Star Sports
Facility Address: 475 Smith Street, Middletown, CT 06457
Facility EPA ID #: CTD052544376

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

   __X__ If yes - check here and continue with #2 below.
   _____ If no - re-evaluate existing data, or
   _____ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Migration of Contaminated Groundwater Under Control" EI

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

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993. 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).

RCRA RECORDS CENTER
FACILITY Olin Corp
I.D. NO. CTD052544376
FILE LOC. R-13
OTHER # 107826

Migration of Contaminated Groundwater Under Control
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2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   __X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

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

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

Rationale and Reference(s):

Areas of Concern (AOCs) 1, 6, and 12 have concentrations of contaminants of concern (COCs) in groundwater above applicable Connecticut's Remediation Standard Regulations (CT RSR) criteria and/or Media Closure Criteria (MCC). AOC 1, Former Hazardous Waste Storage Area, and AOC 6, Former Raw Chemical Storage Area, have had detections of chlorinated volatile organic compounds (CVOCs) in groundwater during recent groundwater sampling events (Figure 2). Extractable total petroleum hydrocarbons (ETPH) have infrequently been detected in groundwater adjacent to AOC 12, Discharge Point for the Roof Drain Leaders, only twice in seven sampling events but at concentrations only slightly above CT RSR criteria. Remedial measures are complete for AOCs 6 and 12, and monitored natural attenuation per an agreed approach with the Connecticut Department of Environmental Protection is being implemented for AOC 1. A summary of the maximum detections for each area from sampling events conducted since April 2008 is depicted in the tables below:

COCs Detected Above Applicable Criteria in Past Year

AOC 1 - Former Hazardous Waste Storage Area

Compound (µg/l)	GWPC	SWPC	I/C VC	MCC	Maximum Concentration (Apr 2008 to Oct 2008)
1,1-dichloroethane	70	--	41,000	812	**1,300**
1,1-dichloroethene	7	96	920	7	**120**
1,1,1-trichloroethane	200	62,000	16,000	200	**230**
methylene chloride	5	48,000	2,200	5	**7.8**
tetrachloroethene	5	88	810	5	**9.9**

AOC 6 - Former Raw Chemical Storage Area

Compound (µg/l)	GWPC	SWPC	I/C VC	Maximum Concentration (May 2008 to Feb 2009)
1,1-dichloroethane	70	--	41,000	**96**
1,1-dichloroethene	7	96	920	**21**

AOC 12 - Discharge Point for the Roof Drain Leaders

[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).

Compound (µg/l)	GWPC	SWPC	I/C VC	Maximum Concentration (May 2008 to Feb 2009)
Extractable Total Petroleum Hydrocarbons	100	--	--	**120**

Notes:

µg/l = micrograms per liter
GWPC = RSR Groundwater Protection Criteria
SWPC = RSR Surface Water Protection Criteria
I/C VC = 2003 Proposed RSR Industrial/Commercial Volatilization Criteria
MCC = media closure criteria
COCs not compared to residential criteria since site is used for industrial purposes. An Environmental Land Use Restriction (ELUR) will be recorded to officially restrict residential use.
-- = no criteria established
Bold = exceeds one or more criteria

References:

MACTEC Engineering and Consulting, Inc. (MACTEC), June 27, 2008, *Quarterly Groundwater Monitoring Report, August 2007 - May 2008.*

MACTEC, February 24, 2009, *2008 Annual RCRA Post-Closure Groundwater Monitoring Report.*

MACTEC, May 2008 through February 2009, Groundwater data.

Olin Corporation, 1994, *Identification of Media Closure Criteria.*

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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)?

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

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

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

Rationale and Reference(s):

For AOC 1, the Former Hazardous Waste Storage Area, shallow and deep monitoring well pairs MW-4S/D and MW-5S/D are located at downgradient and cross-gradient locations, respectively, from the release area. CVOCs are detected in MW-4S at trace concentrations only and below applicable CT RSR criteria and MCC. No CVOCs were detected above CT RSR criteria in the MW-4 or MW-5 well pairs, with each pair consisting of a shallow and deep monitoring well. Further, no CVOCs were detected in well MW-9, which is located downgradient of AOC 12 and the MW-4 well nest. These results confirm that CVOCs in groundwater are limited to shallow groundwater, extend only a short distance downgradient from AOC 1, and that concentrations have exhibited no significant increases for more than 10 years. The rate of groundwater flow in this area is extremely low (less than one foot per year) because of the low hydraulic conductivity of the clay soils in which the water table resides, indicating that migration of CVOCs in groundwater will remain negligible. Overall CVOC concentrations in this area have exhibited a decreasing trend.

For AOC 6, the Former Raw Chemical Storage Area, several wells are located downgradient from the release area, with other wells located within the plume and at cross-gradient locations (Figure 2). CVOCs have not been detected in downgradient wells during sampling events completed over the last year at concentrations above applicable CT RSR criteria, including the Surface Water Protection Criteria (SWPC). Overall, CVOC concentrations in this area have exhibited a well defined decreasing trend. The extent of the groundwater plume with concentrations exceeding risk-based criteria has been defined and groundwater monitoring data indicate the plume is stable. Also, with only trace CVOC detections in the deeper downgradient well (MW-10D) and non-detect at the source area well (MW-17D), the groundwater plume has been delineated vertically. The rate of groundwater flow in this area is extremely low (less than one foot per year) because of the low hydraulic conductivity of the clay soils in which the water table resides, indicating that migration of CVOCs in groundwater will remain negligible.

Monitoring well MW-9 is located downgradient of AOC 12, Discharge Point for the Roof Drain Leaders. Extractable Total Petroleum Hydrocarbons (ETPH) are sporadically detected in this well. Because ETPH

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[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.

concentrations have been non-detect in groundwater collected during five of the last seven quarters of sampling, and detected concentrations have only slightly exceeded the GWPC, there does not appear to be a COC plume originating from this AOC.

In summary, remedial measures have been completed at AOCs 6 and 12 to remove contaminant source material, and ongoing groundwater monitoring indicates that contaminant concentrations in groundwater are relatively low and exhibiting decreasing trends. Although shallow groundwater beneath the site likely eventually discharges to Sawmill Brook or its adjacent wetlands, groundwater concentrations at the most downgradient monitoring wells are all below applicable risk based criteria, and the very low hydraulic conductivity of the soils makes it extremely unlikely that significant migration of remaining COCs will occur. Additionally, the only risk-based criteria exceeded by COC concentrations in source area groundwater are the GWPC and MCC, which are both based on risk scenarios involving long-term consumption of groundwater. There is no current use of site groundwater, and the extremely low permeability of the soils ($\sim 1 \times 10^{-6}$ cm/sec) makes future use unlikely. In addition, public water is available and in use in the area of the site.

References:

MACTEC, June 27, 2008, *Quarterly Groundwater Monitoring Report, August 2007 - May 2008.*

MACTEC, February 24, 2009, *2008 Annual RCRA Post-Closure Groundwater Monitoring Report.*

MACTEC, May 2008 through February 2009, Groundwater data.

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

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

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

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

Rationale and Reference(s):

For AOC 1, the Former Hazardous Waste Storage Area, no CVOCs were detected above CT RSR criteria at the most downgradient monitoring wells (MW-4S and MW-4D, which are 184 feet from Sawmill Brook). For AOC 6, the Former Raw Chemical Storage Area, no CVOCs have been detected in any of the downgradient monitoring wells (including MW-15 and MW-16, which is nearest the Sawmill Brook and associated wetlands) above applicable SWPC. For AOC 12, Discharge Point for the Roof Drain Leaders, no ETPH has been detected in five of the seven quarterly samples collected from MW-9 (located within the Sawmill Brook wetlands area). Based on the absence of significant COC concentrations in downgradient wells at each of these AOCs and the extremely low rate of groundwater flow (less than one foot per year), it is highly unlikely that COCs from any of these release areas are discharging into the surface water body.

References:

MACTEC, June 27, 2008, *Quarterly Groundwater Monitoring Report, August 2007 - May 2008.*

MACTEC, February 24, 2009, *2008 Annual RCRA Post-Closure Groundwater Monitoring Report.*

MACTEC, May 2008 through February 2009, Groundwater data.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentrations 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 concentrations 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 concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations 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):

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

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) Providing or referencing an interim-assessment[5]s 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):

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

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

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

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

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

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

Rationale and Reference(s):

Groundwater sampling at AOCs 1, 6, and 12 is currently conducted per a schedule that varies from quarterly for some wells to annually for others. The sampling schedule is presented in the annual groundwater monitoring reports (listed below). The monitoring programs are evaluated at least on an annual basis to determine effectiveness of the well network, including verifying that contamination is not migrating beyond the known limits. Groundwater monitoring is proposed to be conducted until applicable regulatory requirements and criteria are met.

References:

MACTEC, June 27, 2008, *Quarterly Groundwater Monitoring Report, August 2007 - May 2008.*

MACTEC, February 24, 2009, *2008 Annual RCRA Post-Closure Groundwater Monitoring Report.*

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

   __X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **Former Tri-Star Sports** facility, EPA ID # **CTD052544376**, located at **475 Smith Street, Middletown, CT 06457**. 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.

Prepared by (signature) [signature] Date 7/16/09
(print) Stephen R. Walbridge
(title) Principal Scientist – MACTEC Engineering & Consulting, Inc.

DEP reviewed by (signature) [signature] Date 7/20/09
(print) SANDY BRUNELLI
(title) EA-3
(EPA Region or State) CTDEP

DEP Supervisor (signature) [signature] Date 7-22-09
(print) DAVID RINGQUIST
(title) Supervising EA
(EPA Region or State) CTDEP

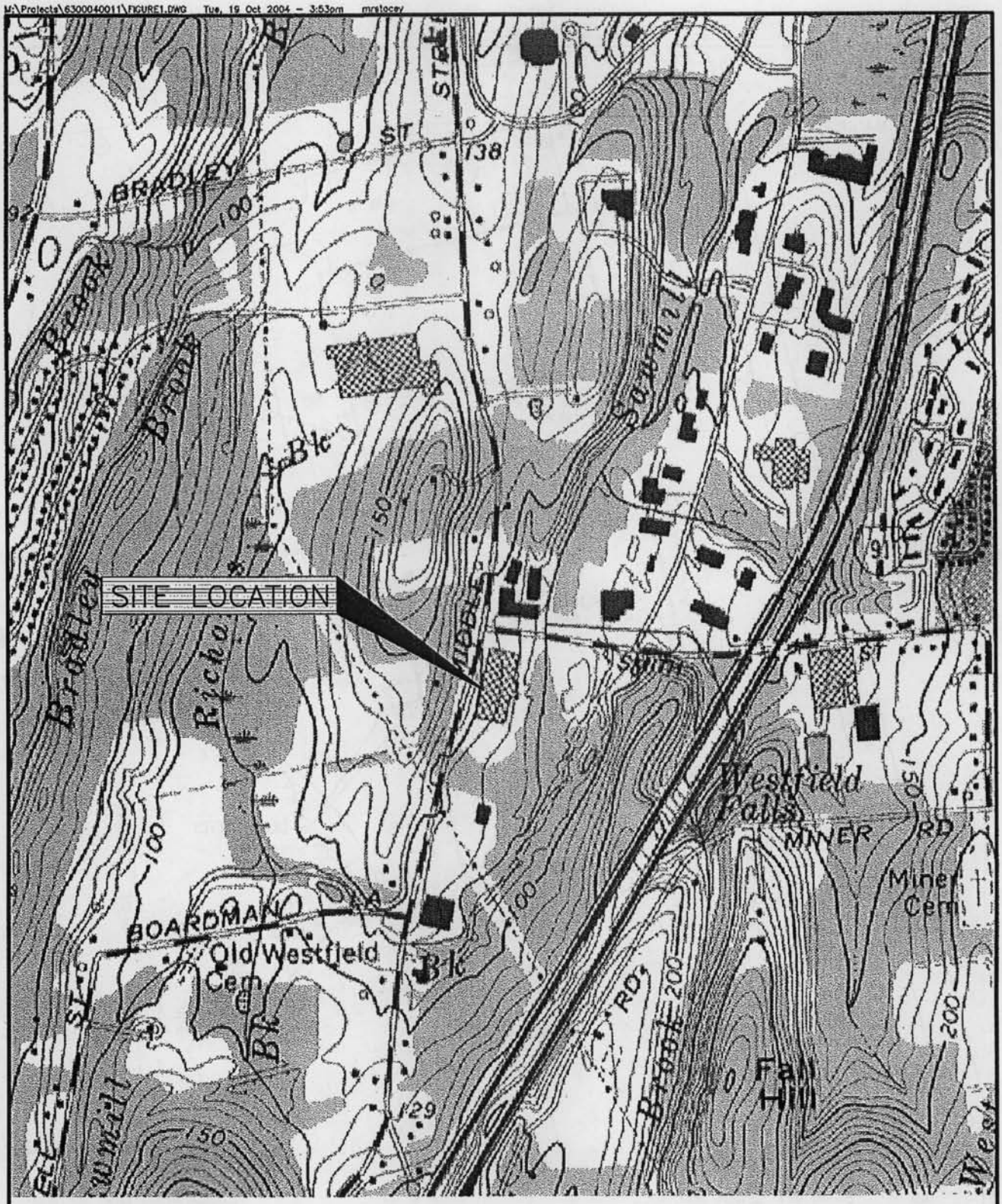
Locations where References may be found:

Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, CT 06106

Contact telephone and e-mail numbers:

(Name)
(Phone #)
(E-mail)

M:\Projects\6300040011\FIGURE1.DWG Tue, 19 Oct 2004 - 3:53pm mrslocey



Quadrangle Source: MAPTEC USGS
Topographic Series Connecticut, Edition 2.0

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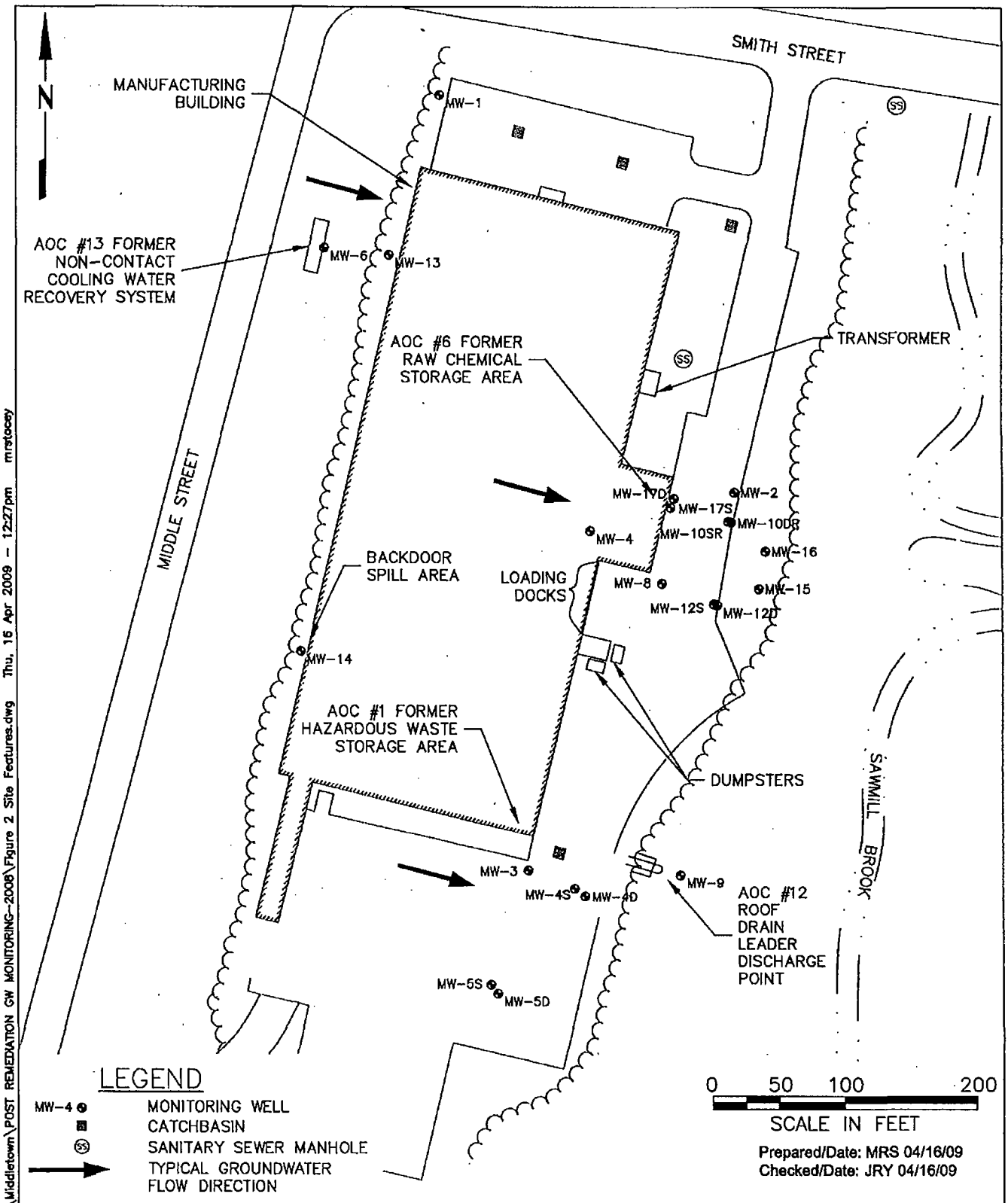
SCALE IN FEET

Prepared by: MRS | Checked by: JRY

FIGURE 1
SITE LOCATION MAP
FORMER TRI-STAR SPORTS FACILITY
475 SMITH STREET
MIDDLETOWN, CONNECTICUT

MACTEC Engineering and Consulting



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FORMER TRI-STAR SPORTS FACILITY MIDDLETOWN, CONNECTICUT	MACTEC	SITE FEATURES Project 6107-09-0006 Figure 2