RCRA RECORDS CENTER
FACILITY Virginia Industri
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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: Former Holgrath Medical Technologies Facility
Facility Address: 30 Knotter Drive, Cheshire CT 06410
Facility EPA ID #: CTD 001164334

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

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

____ If no - re-evaluate existing data, or

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

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Migration of Contaminated Groundwater Under Control" EI

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

Relationship of EI to Final Remedies

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

Duration / Applicability of EI Determinations

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

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):

See Item 2 Addendum

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).

Migration of Contaminated Groundwater Under Control -
Item 2 Addendum:

The only groundwater known or reasonably suspected to be contaminated above appropriately protective risk-based levels relates to the chlorinated VOC plume from the former underground storage tank and container storage area (discussed earlier). The only contaminants present above risk-based levels are vinyl chloride (on occasion) and PCE. PCE is the primary contaminant in the plume with concentrations on the order of 50 to 60 mg/l at the most impacted well OW-5 located at the release area, and on the order of 1 to 2 mg/l within the downgradient portion of the deep overburden plume. In shallow overburden groundwater downgradient of the release area where less impacts are noted, PCE concentrations are typically on the order of 0.1 mg/l.

For a summary of other contaminants present in the plume, and contaminant concentrations measured over time in on-site monitoring wells, see the aforementioned Tables I and XI (attached). A detailed description of the nature, degree and extent of groundwater contamination is included in Reference 1 identified under "Current Human Exposures Under Control" Item 2 Addendum.

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): See Item 3 Addendum

[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.

Migration of Contaminated Groundwater Under Control -
Item 3 Addendum:

The migration of chlorinated VOC-contaminated groundwater has stabilized such that it is expected to remain within the "existing area of contaminated groundwater", based on the following rationale:

The chlorinated VOC release occurred sometime between 1972 (when site operation began) and 1986 (when the release was discovered by the underground storage tank). The groundwater plume is preferentially migrating within a high permeability sand/weathered bedrock zone where groundwater flow velocity is on the order of 0.2 ft./day or 73 ft./yr. The source of the release was removed in 1986, and the shallow chlorinated VOC soil contamination caused by this release was remediated by 1993. A multi-phase extraction system has been operational since 1995 to remediate the deeper soil/groundwater contamination caused by this release and intercept the highly-contaminated groundwater stemming from the release area. As a result, groundwater quality data generated through periodic monitoring of up to 22 on-site wells shows that the shallow overburden plume is undergoing natural attenuation and nearly attains compliance with the DEP groundwater remediation standards in the RSRs, and that groundwater contaminant concentrations are decreasing in wells along the downgradient property boundary (including those screened within the deeper, most impacted overburden intervals).

Therefore, the plume not only appears to be stabilized, but shrinking due to operation of the multi-phase extraction system. We expect that this system will be operated for an additional 3 to 4 years before the specified remedial goals are achieved. Reference 3 identified above (see "Current Human Exposures Under Control" Item 2 Addendum) details the goals of the remedial system, and its performance since start-up.

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

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

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

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

Rationale and Reference(s):

See Item 4 Addendum
Item 4 (a) Addendum
Item 4 (b) Addendum

Migration of Contaminated Groundwater Under Control -
Item 4 Addendum:

The dilute shallow portion of the overburden plume is inferred to discharge to Judd Brook and its associated wetlands. As mentioned earlier, however, testing of surface water and sediment samples from Judd Brook (the nearest surface water body) and its associated wetlands revealed non-detectable concentrations of VOCs (see Reference 1 for these data).

Judd Brook flows into Tenmile River, and ALTA inferred that deep overburden groundwater contamination could potentially discharge to Tenmile River (the nearest significant surface water drainage feature in the downgradient direction). Hence, ALTA recently collected a sample of surface water from Tenmile River at a location immediately downgradient of the on-site groundwater plume. This sample SW-1 was tested for VOCs, and VOCs were not detected above the laboratory reported detection limit (see attached analytical results - Reference 5).

Former Holgrath Medical Technologies Facility Prepared by ALTA Environmental Corporation
CTD 001164334 Contact: Kelly Meloy, Vice President

Item 4(a)

EPA has asked for additional information supporting ALTA's conclusion that if deep overburden groundwater contamination from the former Holgrath facility migrated as far to the south as Tenmile River, it would be expected to discharge to Tenmile River (the nearest significant surface water drainage feature in the downgradient direction) and not go beneath it and farther to the south. ALTA bases its conclusion on the very steep rise in the bedrock (and ground) surface on the opposite side of the Tenmile River (i.e., to the south). The significant hydraulic head caused by that southerly hillside would be expected to cause groundwater to flow down the Tenmile River Valley (northeasterly) towards its discharge point (the Quinnipiac River).

Attached are relevant excerpts of the U.S.G.S. Topographic Map for the Southington Quadrangle and U.S.G.S. Contour Map of the Bedrock Surface, Southington Quadrangle (Map MF-660 A) which demonstrate that the bedrock and ground surfaces in the Tenmile River Valley nearby this facility are significantly lower in elevation than the steep bedrock-cored hillside to the south. For instance, bedrock surface elevations beneath the adjacent Tenmile River Valley are about El. 50 ft. whereas to the south the bedrock surface rises steeply to El. 250 ft. Similarly, ground surface elevations of approximately El. 130 ft. in the Valley rise steeply to about El. 240 ft. just to the south of the Tenmile River.

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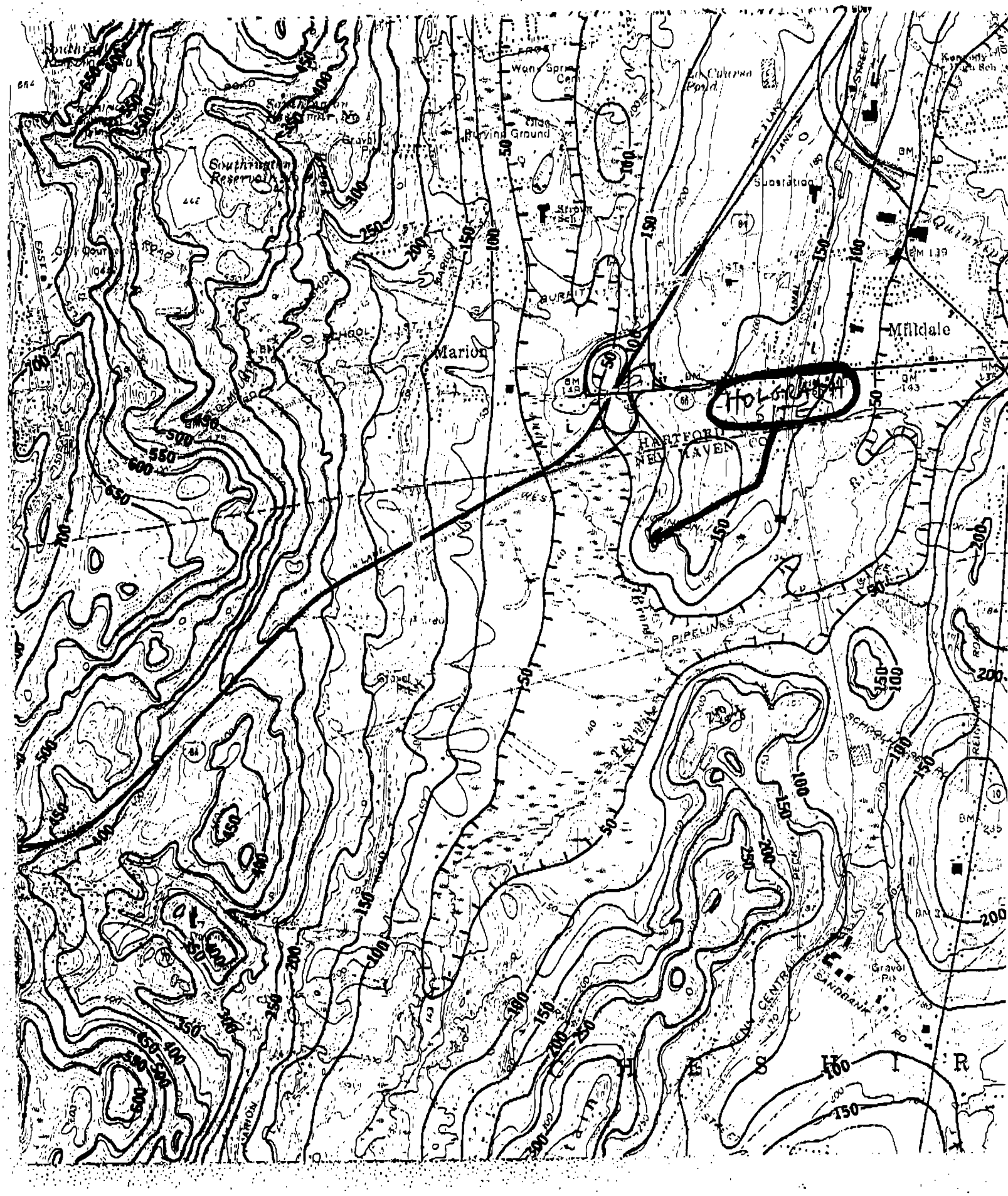
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Mildale
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HARTFORD
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Substation
Burying Ground
Gravel Pit
PIPELINES
SANDBANK RD
NEW CENTRAL
PECK
MARION
BARNES
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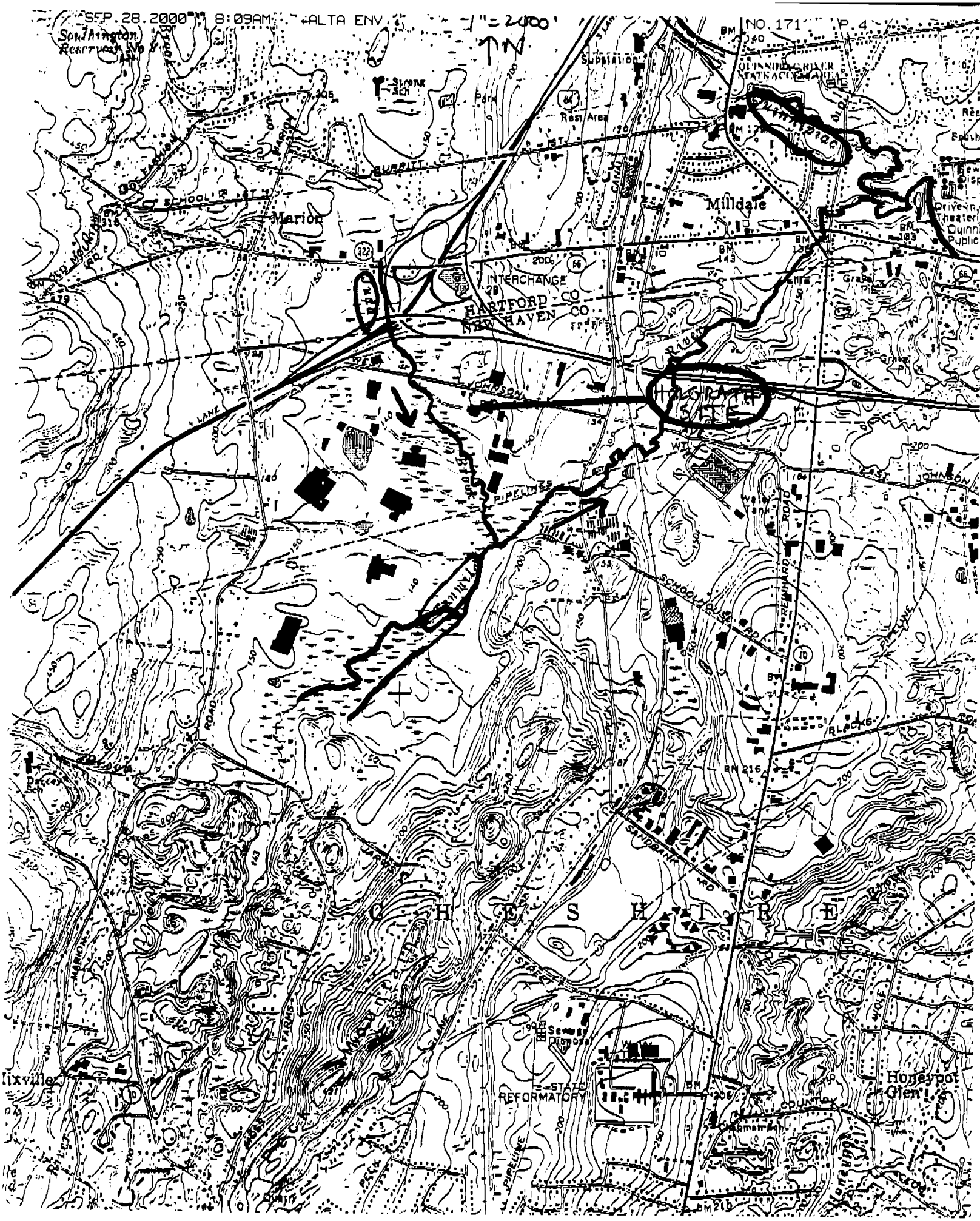
H E S I R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Substation
Rest Area
Milldale
Marion
INTERCHANGE 28
HARTFORD CO
NEW HAVEN CO
HAGRAM SITE
PIPELINES
JOHNSON
LANE
SCHOOL HOUSE ROAD
REINHARD ROAD
BLACKS
SANDBANK ROAD
CHESHIRE
STATE REFORMATORY
Honeypot Glen
Dixville

Item 4(b) Additional Information on the Deep Overburden Groundwater Contamination

The following information is from Loureiro Engineering Associates Inc,. the current consultant for Holgrath.

Alta Environmental Corporation previously presented information that indicated if the migration of impacted groundwater from the Site could travel as far south as the Tenmile River, it would be expected to discharge to the river and not bypass it to the south. Alta's conclusion was based on topographic mapping showing steep increases in elevation to the south of the Tenmile River and the expectation that the steep hill would cause groundwater flow to be northward towards Tenmile River.

Beyond the local data on the Site and Alta's conclusions, the United States Geological Survey (USGS) in cooperation with EPA prepared a report entitled "Geohydrology and Conceptual Model of a Groundwater Flow System Near a Superfund Site in Cheshire, Connecticut" Open-File Report 96-162. The purpose of the study was "to characterize the unconsolidated glacial deposits and sedimentary bedrock, integrate the local geohydrologic conditions with the regional geohydrologic system, and develop a conceptual understanding of groundwater flow in the study area."

Based on the numerical groundwater flow model of the regional study area developed for the UDGS study, the study indicated "that perennial streams within the region, including Judd Brook and the Tenmile River, form hydrologic divides that separate the larger regions into hydraulically independent flow systems - that is, groundwater flowpths do not extend across perennial streams (USGS, 1996)." This indicated that impacted groundwater from the Site would not bypass the watercourses and cause impacts to potential groundwater receptors across the watercourses.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_X_ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

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

Rationale and Reference(s):

See Item 5 Addendum

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

Migration of Contaminated Groundwater Under Control -
Item 5 Addendum:

Given the absence of detection of VOCs in surface water or sediment in the Judd Brook complex, the absence of VOCs in surface water in the portion of the Tenmile River immediately downgradient of the groundwater plume, and the natural attenuation/interception of various portions of the groundwater plume, ALTA concludes that any discharge of contaminated groundwater into surface water is insignificant.

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

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

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

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

Rationale and Reference(s):_____

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

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

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

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

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

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

Rationale and Reference(s):

See Item 7 Addendum

Former Holgrath Medical Technologies Facility Prepared by ALTA Environmental Corporation
CTD 001164334 Contact: Kelly Meloy, Vice President

Migration of Contaminated Groundwater Under Control –
Item 7 Addendum:

Virginia Industries (the site owner) intends to continue its routine groundwater/remedial system monitoring program in connection with the dissolved chlorinated VOC groundwater plume. Currently, the remedial system is monitored on a monthly basis, and groundwater monitoring is typically conducted on a semi-annual basis. The groundwater monitoring program involves monitoring of approximately 8 wells during the Spring, and 11 wells during the Fall, for chlorinated VOCs, which should continue to confirm the stabilization of the groundwater plume and ultimately demonstrate compliance with the DEP groundwater remediation standards.

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 Holgrath Medical Techologies facility, EPA ID # CTD001164334 located at Cheshire CT. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

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

____ IN - More information is needed to make a determination.

Completed by (signature) David Lim Date 9/22/03
(print) David Lim
(title) ENV. engineer

Supervisor (signature) [illegible] Date 10/23/03
(print) Matthew R. Hoagland
(title) Section Chief
(EPA Region or State) Reg. I

Locations where References may be found:

EPA Record Center

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