

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)**

Interim Final 2/5/99

Migration of Contaminated Groundwater Under Control

Facility Name: Arch Chemicals
Facility Address: 350 Knotter Drive; Cheshire, CT
Facility EPA ID #: CTD980916779

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).

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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?

_____ If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

 x 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):

The following documents have been previously submitted to Connecticut Department of Environmental Protection (CTDEP) and have been used to support the verification of site compliance with prevailing guidelines and CT Remediation Standard Regulations (RSRs).

- GZA, Phase I and Phase II Environmental Site Assessment, November 1999.
- ENSR, Phase III Transfer Act Site Assessment, July 2001.
- ENSR, Quarterly Groundwater Monitoring Reports, July 2001, November 2001, and February 2002.
- ENSR, Additional Subsurface Investigation of the Former Interim Waste Storage Unit, February 2002.
- HRP Associates, Inc., RCRA Closure of Former <90 Day Hazardous Waste Container Storage Area, May 15, 2002.
- ENSR, Limited Dieldrin Investigation Near the Former Interim Waste Storage Unit, December 2003
- ENSR, Verification Report, March 2004.

A site wide evaluation the facility was required under the Connecticut Transfer Act when the facility was divested from Olin Chemical to Arch Chemical in February of 1999 and a second Transfer Act requirement was triggered when the facility was sold to Winstanley Enterprises (Winstanley) on July 21, 2000. The Transfer Act assessment involved the collection of soil and groundwater samples from areas of concern (AOCs) located throughout the site to evaluate whether the site was in compliance with the Connecticut Remediation Standard Regulation (RSR) or if remediation to achieve RSR compliance would be required. The investigations completed indicated that the site met all applicable RSR soil and groundwater criteria and no remediation was necessary.

On March 30, 2004, ENSR submitted a Verification Report to the CTDEP to bring the investigation and demonstration of compliance with the Connecticut RSR of the facility to regulatory closure. The Verification Report was audited by CTDEP and on August 16, 2004 CTDEP issued a letter indicating that the Verification was acceptable.

The facility formerly contained an Interim Waste Storage (IWS) Unit. Arch operated this regulated unit under “interim status” as provided by 22a-449(c)-105 of the Regulations of Connecticut State Agencies and Section 3005 of RCRA. The IWS Unit was housed in a 575-square foot concrete and metal building with an eight-foot wide double door. The IWS Unit is on the eastern portion of the property. Wastes stored in

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).

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the IWS Unit consisted of flammable liquids, acids, alkalis, mercury, and hazardous and non-hazardous solid wastes and liquids. The building is still present; however, it was decontaminated and was documented as a clean closure with no release to the environment identified. Public notice for the clean closure was published on August 3, 2005. In addition, as detailed by CTDEP in August 2006, a (1) drinking water well survey, (2) filing of the Quality Assurance Project Plan (QAPP), and (3) an ecological risk assessment were needed to meet RCRA Corrective Action requirements. The ecological risk assessment is the remaining task and is currently underway.

The site is set in a valley area at an elevation of approximately 150 feet above mean sea level). Subsurface investigations have demonstrated that the site is underlain by interbedded fine sand, silt, and clay which in turn is underlain by silt and clay at a depth of approximately 10 to 14 feet. These observations are consistent with the regional Surficial Geologic Materials Map of Connecticut that describes the surface deposits beneath the site as composed of well sorted thin layers of alternating silt and clay or thicker layers of very fine sand and silt. Very fine sand commonly occurs at the surface and grades downward into rhythmically bedded silt and clay varves (lake-bottom deposits). The bedrock beneath the site is mapped as the New Haven Arkose. Bedrock refusal was not encountered on site, nor have any bedrock outcrops been identified on the site.

The site is located in an area where groundwater is classified by CTDEP as "GB", indicating that it is considered degraded and is not suitable for human consumption without treatment. The surficial geology on-site is consistent with this designation as the water yielding properties of the deposits observed and mapped are poor.

Although site contaminants were present in groundwater at low levels in a few monitoring wells, there is no evidence of any identifiable groundwater gradient or "plume" at the site that is migrating off-site. In addition, as described below, compliance with RSR criteria for on-site groundwater has been demonstrated. The Site soil and groundwater exceedances are highly localized and limited in spatial area and vertical extent. Potential fate and transport mechanisms at site do not result in identifiable "areas of site discharge."

As described in the Verification Report (ENSR, 2004), groundwater and soil data collected between 1999 and 2003 show compliance with all applicable RSR criteria for the site. In groundwater, 1,1-dichloroethene and chloroform are the only volatile organic compounds (VOCs) that have ever shown an exceedance of an RSR criteria at the site. Both of these compounds exceeded the residential volatilization criteria (RVC) in the October 1999 sampling round in only one AOC but were below the industrial/commercial volatilization criteria (I/C VC). In all subsequent sampling rounds neither of these compounds exceeded the RVC. Lead and cadmium exceeded the Surface Water Protection Criteria (SWPC) in the GZA sampling rounds. These samples were collected using bailers, which produce a silty sample. Four subsequent rounds collected by low flow techniques did not detect either metal. Cadmium exceeded the SWPC in February 2002 in a monitoring well located downgradient from the former swimming pool chemical test pools (GZ-7). This metal had not been detected previously in this well in five prior rounds. Since there is a well downgradient of GZ-7 in which cadmium has not been detected in four sampling rounds, the SWPC does not apply to the GZ-7 cadmium data from February 2002. The Verification Report (ENSR, 2004) concluded that compliance with RSR criteria for groundwater at the site had been demonstrated and that remediation was not necessary.

Based on the investigations performed, the distribution of contaminants found in groundwater at the site indicate that the closed in place 1,500-gallon underground storage tank (UST) and/or leaching pit used by Siemens are likely the source of contamination observed in the monitoring well located downgradient from interim waste storage (IWS) unit, abandoned 1,500-gallon UST and former leaching pit (GZ-3) and landscaping activities and/or historic agricultural use are the likely source of the pesticides (i.e., dieldrin)

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observed in the soil near the IWS. However, the investigations completed by both GZA and ENSR indicate that no remediation is required relative to these historic features since the investigation of this area has been thorough and RSR criteria are met in soil and groundwater.

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):

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):

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.

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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 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 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):

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

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

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

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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):

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):

causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

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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 Arch Chemicals facility, EPA ID # CTD98016799, located at 350 Knotter Drive in 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.

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Locations where References may be found:
All references have been submitted to CT DEP located at 79 Elm Street in Hartford, CT.

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