

## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

#### Migration of Contaminated Groundwater Under Control

**Facility Name:** Ferroxcube (Philips Components)  
**Facility Address:** 1033 Kings Highway, Saugerties, NY 12477  
**Facility EPA ID #:** NYD000233510

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? (**Note: This determination addresses contaminated media regulated under New York State's Inactive Hazardous Waste Disposal Site Remedial Program.**)

- 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 check the "IN" 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**”<sup>1</sup> 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):

The Ferroxcube plant, currently owned by Philips Components (Philips), has been manufacturing electronic components since 1961. Halogenated solvents have been used in the production operations. In 1982, the Ulster County Department of Health (UCDH), as part of a regional groundwater quality assessment, identified the presence of halogenated hydrocarbons in four nearby residential wells (Cunningham, Cole, Andreassen, and Knicely) above drinking water standards. As a result, a site investigation was performed and on-site contamination of groundwater and surface soil was detected.

In the mid-1980s Ferroxcube purchased the Knicely well (K-well) and has abandoned its use. The Miles house, built in 1984, has exhibited contamination of its well water since 1985. Drinking water in the four impacted wells has been monitored monthly since 1982. The maximum concentration detected in the residential wells was 2,000 ppb total VOCs in 1988 in the Miles well. The Miles house, too, was purchased by Philips in 1999 and its well has been abandoned.

As reported in the 1992 RI/FS report (Groundwater Technology 1992), the principal contaminants detected in groundwater are: 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), 1,1-dichloroethane (DCE), tetrachloroethane (PCE), and Freon 113. The applicable groundwater standard or guidance value for each of these compounds is 5 ppb or 100 ppb total VOCs. Concentrations of total VOCs detected on-site have been as high as 134,000 ppb, detected in monitoring well OW-3 in 1986. By 1992, the concentration in OW-3 had fallen to around 45,000 ppb. The RI revealed that the heaviest contamination in groundwater is localized around OW-3 and at the bedrock-overburden interface.

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<sup>1</sup> “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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3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”<sup>2</sup> 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”).

  **X**   If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”) - 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):

Engineered systems are in place which prevent migration of overburden groundwater from occurring, however contamination in the bedrock regime is still present and may be migrating. Based on the 1992 RI/FS report for the site, a ROD was issued in 1993 which addressed sources of on-site groundwater contamination. The goal of the remediation was to clean up groundwater to meet, within five years, New York State drinking water standards. The remedial system designed for the site was developed to meet the following objectives:

- remove adsorbed and vapor-phase VOCs from the soils above and below the water table
- provide hydraulic control of overburden groundwater to prevent migration of VOCs from the target area
- create no adverse impacts
- protect human health during construction and operation
- reduce groundwater concentrations of VOCs as specified in the ROD

The remedy includes periodic sampling and analysis of groundwater and drinking water to monitor the effectiveness of the remedial action. The ROD included a table of theoretical concentrations or groundwater quality objectives to compare against annual data from the Miles well as a measure of the remedial action’s effectiveness. These annual targets for PCE and total VOCs at the Miles well are presented below in Table 1.

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<sup>2</sup> “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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**Table 1. Groundwater Quality Objectives for Miles Domestic Well**

Number of years of remedial operation	Theoretical concentration of PCE (ppb)	Theoretical concentration of Total VOCs (ppb)
1	200	875
2	80	510
3	30	295
4	15	170
5	5	100

Since 1994, an active soil and groundwater remediation system has been in place at the site consisting of three components: soil vapor extraction, air sparging, and groundwater collection and treatment. The groundwater pumping system originally consisted of seven recovery wells, however, due to unexpectedly low yields and low rates of contaminant mass removal, only two of the recovery wells (OW-3 and OW-10) continue to operate. The air sparge/SVE system was shut down in April 1998 after meeting performance objectives for soil specified in the ROD. In early 1999, Philips acquired the Miles property and abandoned use of its well. All four homeowner wells are monitored on a monthly basis by the UCDH and show a downward trend in VOC concentrations, however, the Miles well, which is affected by conditions at the overburden/bedrock interface, is not meeting the remedial objectives outlined in the ROD (see Figure 3). This indicates that, although the overburden groundwater and soil have been remediated and there are no continuing sources of contamination, the bedrock groundwater has been impacted and needs to be addressed. The NYSDEC is currently reviewing a proposal to treat the bedrock groundwater using chemical oxidation while hydraulically containing the plume.

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): \_\_\_\_\_  
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5. Is the discharge of “contaminated” groundwater into surface water likely to be “insignificant” (i.e., the maximum concentration<sup>3</sup> 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 concentration<sup>3</sup> 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<sup>3</sup> 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<sup>3</sup> 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): \_\_\_\_\_  
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<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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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 implemented<sup>4</sup>)?

\_\_\_\_\_ 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,<sup>5</sup> 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.

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<sup>4</sup> 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.

<sup>5</sup> 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): \_\_\_\_\_  
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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 Ferroxcube (Philips Components) Site, located at 1033 Kings Highway in Saugerties, NY 12477. 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 State 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 \_\_\_\_\_ Date \_\_\_\_\_  
Eric Hausamann  
Environmental Engineer 2

Supervisor \_\_\_\_\_ Date \_\_\_\_\_  
James Harrington  
Environmental Engineer 3  
New York State Department of  
Environmental Conservation

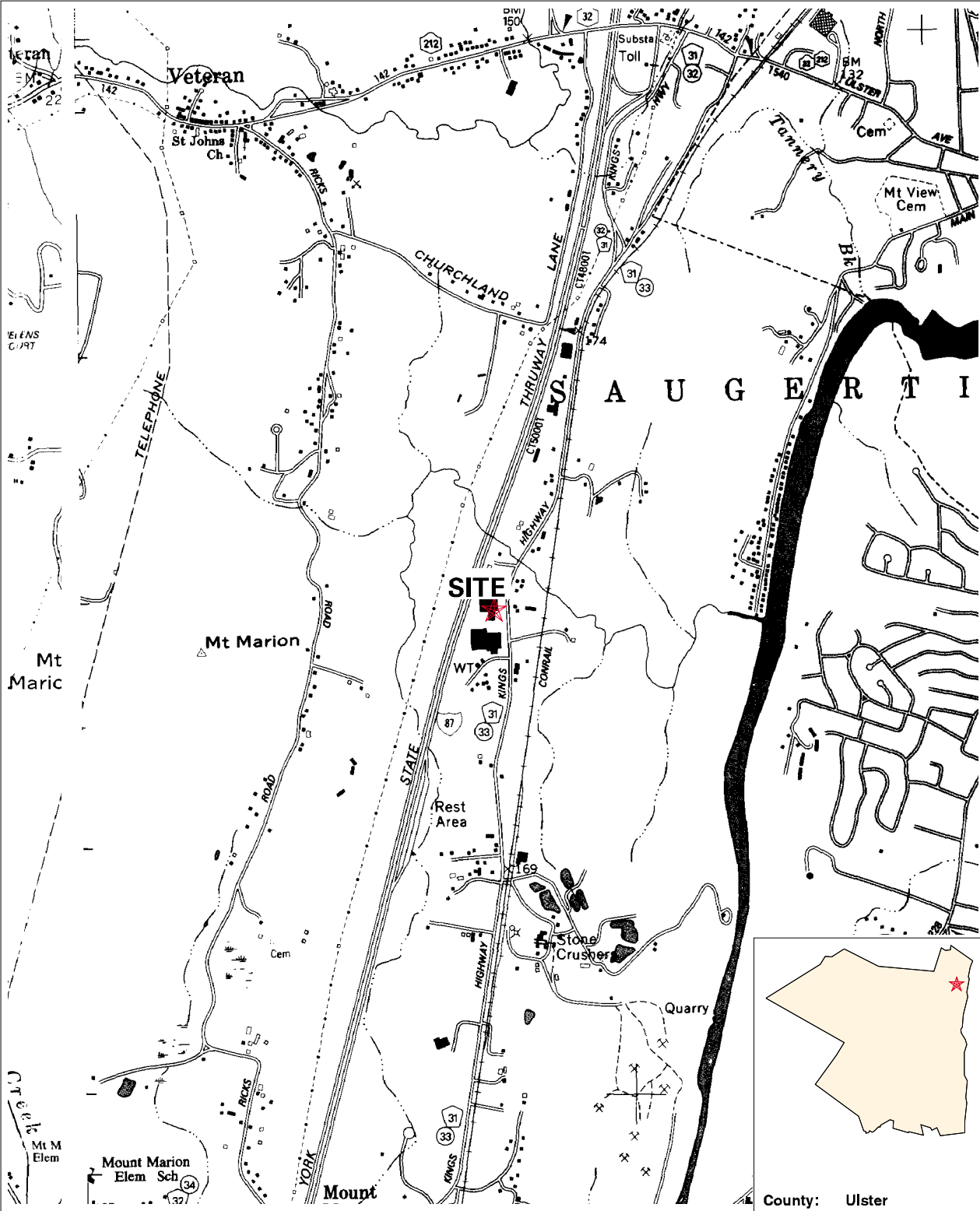
Locations where References may be found:

New York State Department of Environmental Conservation  
Region 3 Office  
21 South Putt Corners Rd.  
New Paltz, New York 12561

Contact telephone and e-mail numbers

Ram Pergadia  
(914) 256-3146  
rrpergad@gw.dec.state.ny.us





# Site Location Map

356011 Ferrocube

NYS DOT Planimetric Quadrangle(s):  
SAUGERTIES, WOODSTOCK



0 500 1000 1500 2000



FEET

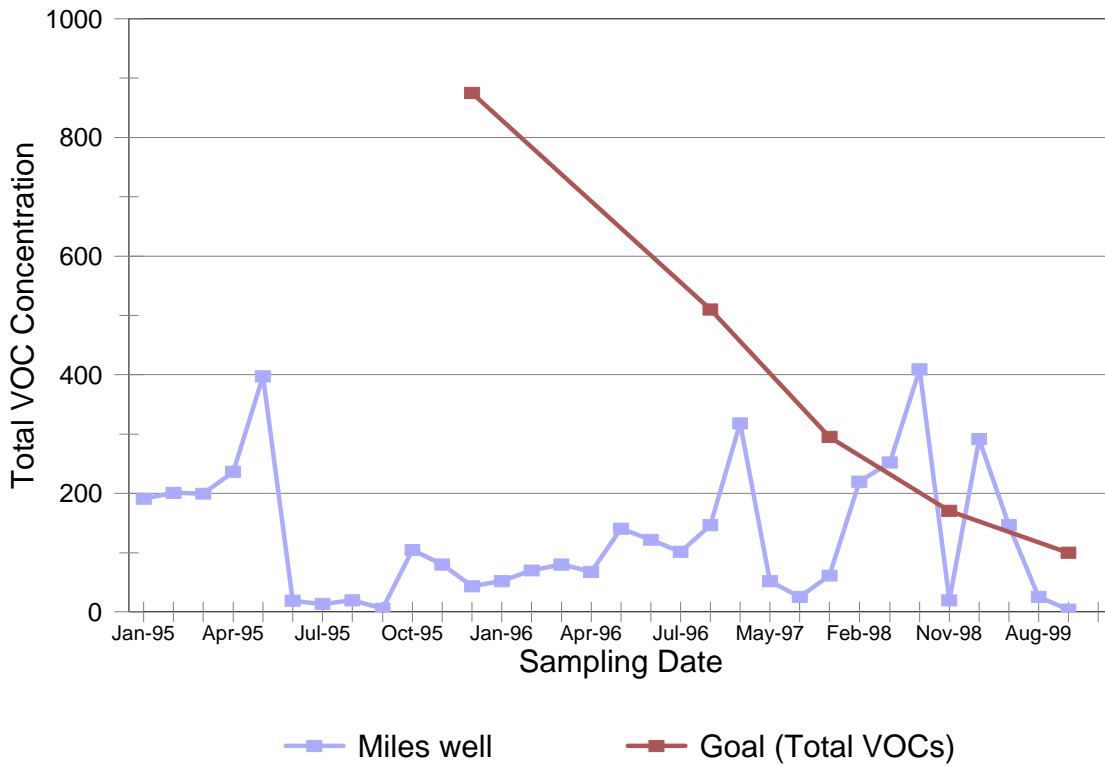
Scale 1:24,000

County: Ulster



# Ferroxcube (Philips Components) Miles Homeowner Well

## Figure 3 Total VOC Data vs. Remedial Goals



## Figure 4 PCE Data vs. Remedial Goals

