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:	**Olin Microelectronics Materials**
Facility Address:	**731 Enger Road, Nazareth, PA 18064**
Facility EPA ID #:	**PAD002389104**

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 #6 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).

Facility History

The site is located at 731 Enger Rd. in Nazareth within Plainfield Township in Northampton County, Pennsylvania. The facility was established in 1972 as Hi-Pure Chemicals, Inc. The site facility consists of parcel #1 and parcel # 2. The parcels are non-contiguous properties, and industrial activity was limited to parcel # 1. The site is approximately 360 feet by 650 feet and consists of a large manufacturing building/warehouse and an office building. Industrial activities conducted by the Olin Corporation began in 1984. The facility repackaged and purified industrial, electronic, and food grade acids. Materials handled at the site included: ammonium hydroxide, hydrochloric acid, hydrofluoric acid, acetic acid, nitric acid, ammonia, hydrogen fluoride, phosphoric acid, sulfuric acid, and ammonium biflouride.

The site is currently inactive and zoned for use as Industrial/Business Park. During operations, the facility obtained several permits, including a water management permit, an air permit, and a RCRA (Resource Conservation Recovery Act) permit for the treatment and storage of hazardous waste. Permitted units, including the RCRA Elementary Neutralization Unit and storage pad are currently closed and dismantled. The groundwater and surface water monitoring program originally associated with the permitted units is still conducted at the site.

Storage tanks, both aboveground and underground, and sumps have been removed during the site demolition activities, which were completed in 1998. A permitted spray irrigation system, for non-contact cooling water, was operated on the northwest side of the property. The use of the spray irrigation system ended in 1987. Two surface water impounds were formerly in use at the site. The firewater pond located west of the property has been drained, but may be re-commissioned for use by a new owner. The retention pond has been drained, cleaned, and filled with crushed decontaminated concrete and stone fill. In addition, during demolition activities that occurred in 1998, process equipment, process lines , HVAC units and duct work were removed, and minor building repairs completed. One production well, PW-1, remains at the site, but is inactive.

The site soil is glacial drift overlying shale/slate bedrock. The upper layer of the bedrock is characterized by fractures. Site monitor wells were completed in overburden, fractured bedrock, and bedrock to monitor groundwater quality in multiple zones. Groundwater flow in the upper aquifer is towards the Little Bushkill Creek.

Nine groundwater monitor wells and one production well are currently located within and on the perimeter of the facility. Quarterly groundwater monitoring was initiated in the 1980's for seven of the monitoring wells. Beginning in 1999 groundwater sampling has been conducted on an annual basis, and surface water has been collected bi-annually from two locations in Little Bushkill Creek.

The groundwater and surface water samples have been analyzed for inorganic compounds (chloride, sulfate, nitrate, nitrite, fluoride, and ammonia as nitrogen), ph, and total dissolved solids. The majority of the site monitor wells are in compliance with Statewide Health Standards. However, three constituents, fluoride, nitrate, and sulfate, are not in compliance with Statewide Health Standards in select on-site wells and are addressed under Site Specific Standards, which were developed in the risk assessment. Nitrate could be attributed to agricultural run-off because this facility was originally a farm, and properties in the immediate area are currently used for farming. Fluoride and sulfate are covered by Secondary Drinking Water Regulations which cover the aesthetic affects these chemicals might have on drinking water, and are not based on health risks.

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):

Contaminants detected in groundwater under the facility in the latest round of sampling on June 4, 2004, include nitrate, fluoride, and sulfate. Nitrate exceeded the Maximum Contaminant Level (MCL) in 1 of the 9 wells tested. The highest nitrate concentration was 10.7 mg/l in monitoring well H-1. The MCL for nitrate is 10 mg/l. Fluoride and sulfate each exceed the secondary MCLs (SMCLs) in 2 of the 8 wells tested. The highest fluoride concentration was 16.7 mg/l in monitoring well H-7. The SMCL for fluoride is 2 mg/l. The highest sulfate concentration was 421 mg/l in monitoring well MW-1. The SMCL for sulfate is 250 mg/l. Fluoride and sulfate results exceed Secondary Drinking Water Regulations, which are not based on health risks, and cover the aesthetic affects (taste and smell) that these chemicals might have on drinking water.

Reference Olin's Final Report for investigation of contaminants and associated levels in groundwater, and supporting documentation and studies.

References:

Remedial Investigation Report Olin Nazareth Facility, MACTEC Engineering and Consulting, Inc., November 2004 prepared for Olin Corporation, Charleston, Tennessee

Risk Assessment Report Olin Nazareth Facility, MACTEC Engineering and Consulting, Inc., November 2004 prepared for Olin Corporation, Charleston, Tennessee

Final Report Olin Nazareth Facility, MACTEC Engineering and Consulting, Inc., August 2005 prepared for Olin Corporation, Charleston, Tennessee

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[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).

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):

Nitrate, fluoride, and sulfate concentrations at the site appear to be stable. Surface water sampling of the nearby Little Bushkill Creek at both upgradient and downgradient locations has shown no impact by groundwater from the Olin site. Concentrations of nitrate, fluoride, and sulfate were nearly identical in the upgradient and downgradient samples.

Reference Olin's Final Report for investigation of contaminants and associated levels in groundwater, and supporting documentation and studies.

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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.

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):

The groundwater at the Olin site discharges to the Little Bushkill Creek. Surface water sampling from 1998 through the present has shown no impact on the creek from the Olin Facility.

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)?

_____ 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):

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

[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] 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):

The facility has eight monitoring wells that are sampled annually for ph, specifric conductance, chloride, fluoride, nitrate, nitrite, sulfate, and total dissolved solids (TDS). An upgradient and downgradient sample is collected from the Little Bushkill Creek twice per year. The creek samples are analyzed for chloride, fluoride, nitrate, nitrite, nitrogen as ammonia, sulfate, and TDS.

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 **Olin Microelectronics Materials** facility, EPA ID # **PAD002389104,** located at **731 Enger Road, Nazareth, PA 18064** 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 _____ Date 1/4/06
Grant Dufficy
RCRA Project Manager

Supervisor _____ Date ~~1-6-06~~ 1-4-06
Paul Gotthold
Chief, PA Operations Branch
EPA, Region III

Locations where References may be found:

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