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: **Betz Laboratories, Inc.**
Facility Address: **985 Wheeler Way Langhorne, PA 19047**
Facility EPA ID #: **PAD000824805**

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).

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):

The former Betz Laboratories, Inc. (Betz) facility occupies an 8-acre property comprised of a production/warehouse building and parking lots in Middletown, Langhorne Borough, located 10 miles northeast of Philadelphia within Bucks County, Pennsylvania. The majority of the property consists of the production building and paved surrounding lots. The property is surrounded by light industrial and commercial establishments in a business park. To the east, is a railroad spur owned by Conrail Corporation and a shallow stream (Mill Creek) both of which traverse the eastern boundary of the property. Properties in the general vicinity surrounding the commercial entities are predominantly residential towards the north and across US Route 95 towards the east.

Beginning in 1979, Betz produced specialty chemicals at this location. The facility went through a variety of name changes, as the entity was bought by Betz Dearborn by 1996, which designed and developed water purification systems. The facility was then purchased by Hercules, Inc. in 1998, and was later purchased by General Electric effective May 15, 2002, and subsequently known as GE Betz, Inc. On May 11, 2004, Betz notified the Pennsylvania Department of Environmental Protection (PADEP) that operations ceased, the facility was closed, and property was turned over to Hercules Hydrocarbon Holdings, Inc. (Hercules) on April 30, 2004. Hercules entered into a lease agreement with GE Betz Inc., which was to remain the operator of the facility for operations other than chemical processing.

Waste types handled at the facility included ignitable (D001), corrosive (D002), and chromium (D007). The bulk of the hazardous waste generated was wastewater which was removed twice weekly by a licensed hauler. No discharges to surface water were reported. Other hazardous wastes were stored in containers. This container storage area operated under a Part B permit. This storage area was closed in 2002.

Former solid waste management units (SWMUs) and tanks associated with the processes employed by Betz were no longer present during a site visit conducted on April 29, 2009. Former aboveground storage tanks (AST) pads associated with the Betz operations continued to be present in the truck parking area and loading dock area adjacent to the warehouse building currently operated by United Refrigeration Inc. (UR) and National Refrigeration Products (NRP).

In 2003, baseline environmental sampling was conducted under the ownership of Hercules, Inc. In 2005, Phase II Activities were conducted for UR after the facility was vacated. The report concluded that no apparent adverse environmental impacts were present.

No land-use controls were required under the transfer of ownership, according to the representative of UR.

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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).

UR and NRP have been operating a warehouse and machine repair shop at the facilitysince March of 2007. The majority (80 percent) of the facility is dedicated to warehouse space. The remaining 20 percent is office space and a repair shop where refrigerant recycling units are maintained. UR and NRP do not generate hazardous waste. The property is zoned non-residential and potable groundwater use is not permitted by municipal ordinance.

1990 and 1993 Groundwater Investigations
2003 and 2005 Soil and Groundwater Investigations

Groundwater:
Three 20,000-gallon heating oil underground storage tanks were removed in September 1990along with associated contaminated soil Follow-up recovery of light non-aqueous phase liquid was completed leaving total petroleum hydrocarbons (TPH); and benzene, ethylbenze, toluene and xylene (BTEX) as the primary constitutents of concern to analyze and monitorin groundwater and soil (BCM 1990)

A hydrogeologic study was conducted to determine theextent and impact of contamination, and to develop a monitoring program. The1993 Hydrogeologic InvestigationReport concluded thatBTEX concentrations were below detection limits for soil, and that there was evidence that soil TPH concentrations were decreasing compared to post-excavation analytical data. Groundwater concentrations of BTEX were below their detection limits. Based on a recommendation of the1993 Hydrogeologic Investigation Report, quarterly groundwater monitoring of the four monitoring wells and two standpipes in the vicinity of the former USTs was conducted for one year (1993 to 1994). On August 27, 1993, PADEP determined that because BTEX was not detected, analyzing for those compounds could be discontinued.In December 1994, PADEP reviewed quarterly sampling results for onsite monitoring wells and standpipes and noted TPH concentrations fluctuated, indicating petroleum contaminated soils and groundwater still existed,but at low and declining concentrations and limited size. PADEP concurred with the facility to discontinue monitoring in 1994. Betz discontinued groundwater sampling and properly abandon the wells.

Groundwater and soils were investigatedat other locations of the facility as part of a2003 Baseline Sampling Program and a2005 Phase II investigation.

In 2003, the facility (under the ownership of Hercules, Inc), conducted an investigation with the purpose of obtaining baseline environmental data about the property Four groundwater samples were collected from the Hazardous Materials and Petroleum Products area four groundwater samples were collected from the Drain, Sumps and Clarifiers area; and one groundwater sample was collected from theAST area. All of the samples were analyzed for metals andvolatile organic compounds (VOCs), nitrates, and nitrites. One groundwater sample from the Drain Sump and Clarifier area andthe groundwater sample from the AST area was also analyzed for semi-volatile organic compounds (SVOCs). Concentrations of detected constituents in groundwater were compared toPennsylvania Act 2 Non-Residential Non-Use Aquifer standards, and the more stringent Non-Residential Used Aquifer standards. No exceedances of either standards was found to be present

As part of a Phase II investigation in 2005, four groundwater samples were collected from temporary wells installed at boring locations B-1, B-6, B-8, and B-10. B-1 is located within the building near the former truck loading/unloading area and boring locations B-6, B-8 and B-10 were located on the southern, eastern, and northern sides of the former AST farm. All groundwater samples were analyzed for metals and VOCs. No VOCs were detected in the groundwater samples at concentrations exceeding their Non-Residential Used Aquifer standards. Among metals, only manganese slightly exceeded its Non-Residential Used Aquifer standard in all of the samples; however, it is most likely naturally-occurring, according to aregional geology analysis presented in the report.

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 "existingarea 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):

The 1993 Hydrogeologic Investigation Report concluded that BTEX concentrations were below detection limits for soil, and that there was evidence that soil TPH concentrations were decreasing compared to post-excavation analytical data. Groundwater concentrations of BTEX were below their detection limits. Based on a recommendation of the 1993 Hydrogeologic Investigation Report, quarterly groundwater monitoring of the four monitoring wells and two standpipes in the vicinity of the former USTs was conducted for one year (1993 to 1994). On August 27, 1993, PADEP determined that because BTEX was not detected, analyzing for those compounds could be discontinued. In December 1994, PADEP reviewed quarterly sampling results for on-site monitoring wells and standpipes and noted TPH concentrations fluctuated, indicating petroleum contaminated soils and groundwater still existed, but at low and declining concentrations and limited size. PADEP concurred with the facility to discontinue monitoring in 1994.

In 2003, the facility (under the ownership of Hercules, Inc), conducted an investigation with the purpose of obtaining baseline environmental data about the property Four groundwater samples were collected from the Hazardous Materials and Petroleum Products area; four groundwater samples were collected from the Drain, Sumps and Clarifiers area; and one groundwater sample was collected from the AST area. All of the samples were analyzed for metals and volatile organic compounds (VOCs), nitrates, and nitrites. One groundwater sample from the Drain Sump and Clarifier area and the groundwater sample from the AST area was also analyzed for semi-volatile organic compounds (SVOCs). Concentrations of detected constituents in groundwater were compared to Pennsylvania Act 2 Non-Residential Non-Use Aquifer standards, and the more stringent Non-Residential Used Aquifer standards. No exceedances of either standards was found to be present

As part of a Phase II investigation in 2005, four groundwater samples were collected from temporary wells installed at boring locations B-1, B-6, B-8, and B-10. B-1 is located within the building near the former truck loading/unloading area and boring locations B-6, B-8 and B-10 were located on the southern, eastern, and northern sides of the former AST farm. All groundwater samples were analyzed for metals and VOCs. No VOCs were detected in the groundwater samples at concentrations exceeding their Non-Residential Used

[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.

Aquifer standards. Among metals, only manganese slightly exceeded its Non-Residential Used Aquifer standard in all of the samples; however, it is most likely naturally-occurring, according to a regional geology analysis presented in the report.

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):

Releases to surface water were not reported to have occurred. Regulated constituents were detected and found to not have exceeded non-residential used aquifer MSCs.

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 <u>key</u> 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 <u>each</u> 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., 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):

A hydrogeologic study was conducted to determine the impact of contamination, extent of groundwater pollution, and potential for migration, to evaluate alternatives to abate the groundwater pollution, and to develop a monitoring program. The 2003 Hydrogeologic Investigation Report concluded that benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations were below detection limits for soil, and that there was some evidence that soil TPH concentrations were decreasing compared to post-excavation analytical data. Groundwater concentrations of BTEX were below their detection limits. Based on a recommendation of the 2003 Hydrogeologic Investigation Report, quarterly groundwater monitoring of the four monitoring wells and two standpipes in the vicinity of the former USTs was conducted for one year (1993 to 1994). On August 27, 1993, PADEP determined that because BTEX was not detected, analyzing for those compounds could be discontinued. On December 29, 1994, PADEP reviewed quarterly sampling results for on-site monitoring wells and standpipes and noted TPH concentrations fluctuated, indicating petroleum contaminated soils and groundwater still existed. However, groundwater monitoring showed declining concentrations of TPH with non-detectable concentrations of BTEX, and PADEP concurred with the facility to discontinue monitoring in 1994. Betz discontinued groundwater sampling and requested to properly abandon the wells.

If any of these site conditions change, an appropriate monitoring program should be instituted at the facility.

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 **Betz Laboratories, Inc.** facility, EPA ID # **PAD000824805**, located at **985 Wheeler Way Langhorne, PA 19047**. 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 reevaluated 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) Linda A. Matyskiela Date 10/14/2014

(print) Linda A. Matyskiela

(title) Project Manager

Supervisor (signature) Paul Gotthold Date 12-15-14

(print) Paul Gotthold, Assoc. Director

(title) Office of PA Remediation

(EPA Region or State) EPA Region III

Locations where References may be found:

USEPA Region III
Land and Chemicals Division
1650 Arch Street
Philadelphia, PA 19103

PADEP
South East Regional Office
2 E. Main Street
Norristown, PA 19401

Contact telephone and e-mail numbers

(name) Linda Matyskiela
(phone#) 215-814-3420
(e-mail) MatyskielaLinda@epa.gov