

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: Bethlehem Apparatus Company, Inc.

Facility Address: 935 Bethlehem Drive, Bethlehem, PA 18017

Facility EPA ID #: PA0000453084

- I. 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 #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 nonhuman (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):

Bethlehem Apparatus Company, Inc (Bethlehem Apparatus, BAB or facility) operates two facilities in Eastern Pennsylvania which use various methods for the recovery and resale of mercury. The original Bethlehem Apparatus Company, Hellertown (BAH) facility is located at 890 Front Street, Hellertown, Pennsylvania (PAD002390961) and commenced operations in 1948. The newer sister facility is the Bethlehem Apparatus Company, Bethlehem (BAB) facility located at 935 Bethlehem Drive, Bethlehem, Northampton County, Pennsylvania (PA0000453084 – Bethlehem Lamp Recycling) which opened in 1994 and is the subject of this report. The BAB facility recycles/reclaims mercury from mercury bearing hazardous waste and sends it to BAH for further refining by distillation for sale to commercial and industrial users.

The facility is an approximately 38,400-square foot facility on a 2.88 acre parcel, which includes an office area, a paved receiving lot, a material sorting and preparation area with various safety and handling equipment, an enclosed and covered container storage area, six high vacuum mercury retorts and associated equipment, a high vacuum auto-feed retort system, a calomel (mercurous chloride) process area and a research and development laboratory. All hazardous and non-hazardous waste, raw material, and product handling and storage activities are conducted within the enclosed building. The facility does not make use of hazardous waste disposal, waste piles, land treatment or application, or surface impoundments. A mercury amalgamation area (for mercury retirement) was under development as noted in the Hazardous Waste Recycling Permit Application (August 2007).

Site activities at the facility are conducted in a large, well-lit, warehouse-like structure constructed of cement block, a steel roof frame, and concrete floors that are bisected by a wall and swinging doors. The floor has been coated with epoxy and the floor is contoured to provide over 59,000 gallons of secondary containment capacity in the event of a release. No releases have been recorded. Concrete is impermeable to mercury and provides a safe containment surface for mercury recovery and recycling operations. There are isolated and covered sump pits in the floor that serve as release collection points that may be pumped out as necessary. There is a ceiling-mounted sprinkler system. The facility has fire extinguishers and fire alarms, no smoking signs, restricted entry signs and spill cleanup kits throughout the building. The receiving and storage activities occur primarily in the western side of the building. The processing activities occur primarily in the eastern side of the building. The offices are located in the front eastern corner of the building. There is a laboratory attached to the rear of the office area where computers monitor the auto feed system on a real-time basis. Other activities conducted in the laboratory include the single batch retort preparation of most compounds and solutions and appropriate waste analysis.

The facility has twenty four hour electronic surveillance maintained by using entry sensors, motion detectors, and heat rise and smoke detectors. All equipment is designed to automatically shutdown if any operational parameter is exceeded.

Adjacent sites are commercial/light industrial properties. Beyond the adjacent commercial/light industrial properties are

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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some scattered enclaves of residential houses.

The facility operated under permit-by-rule (PBR) until permitted. A Hazardous Waste Recycling Permit Application for hazardous waste treatment and storage was prepared and submitted on behalf of the facility by RT Environmental Services, Inc. (RT) on September 23, 2007 to the Pennsylvania Department of Environmental Protection (PADEP). On June 16, 2011, PADEP issued the facility Permit No. PA0000453084 for hazardous waste storage and treatment.

The facility is a mercury recycling facility, which accepts waste for retort and chemical processing for the purpose of recovery and resale of mercury. This facility receives hazardous waste material in steel 55 gallon drums or box quantities from waste generators representing a wide range of industries and agencies. Materials are delivered to the facility in company vehicles or by outside contractors and stored in containers until they are processed. The wastes managed are composed primarily of characteristic D009 (mercury) or U151 (mercury) waste. Some wastes also have secondary characteristic waste codes other than D009 and U151 because of the chemical composition of the material, typically D001 (ignitable), D002 (corrosive), D003 (reactive), D004 (arsenic), D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D010 (selenium) and D011 (silver). Additional mercury bearing wastes include waste codes K071 (brine purification muds from mercury cells) and K106 (wastewater treatment sludge from mercury cells). Typical secondary characteristic codes are for other metals contained in the waste such as selenium, lead or cadmium. A D002 waste code is also accepted and found on many solutions and batteries because of their corrosivity. Typical materials accepted for processing include, but are not limited to: thermometers, switches (glass and steel), controls, relays, ignitron tubes, high pressure quartz lamps, mercury vapor lamps, mercury dental amalgams, mercury oil sludges, mercury spill kits, mercury compounds, mercury batteries, fluorescent lamps, mercury on carbon, cinnabar (mercuric sulfide) and mercury in soil (Hazardous Waste Permit Application, 2007).

SWMUs identified in the June 2011 permit, and confirmed during the 2011 site visit are as follows:

Facility Operation Area – Physical Treatment	Hazardous Waste Code
Retorts 1 through 6	Primary codes: D009, K071, K106 Secondary codes: U151, D001, D002, D003, D004, D005, D006, D007, D008, D010, D011
Lamp Recycling Area	
Battery Crushers	
Drum Crushers	
Centrifugal Separation System	
Amalgamation Process	
Facility Operation Area – Chemical Treatment	
Calomel Process	
Reaction Vessel for Reduction or Precipitation	

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The aboveground storage tank (AST) information associated with the calomel process is summarized the following table.

ASTs				
Tank No.	Installed	Size (gallons)	Contents	Status/Owner
001A	7/22/1997	1,500	sodium hydroxide	Basic Chemical
002A	removed	100	hydrochloric acid	removed
003A				replaced in 2010 with tank 004A
004A		540	hydrochloric acid	Basic Chemical
4A		2,550	hazardous wastewater from the calomel process (D009 mercury/D010 selenium)	emptied in 90 days (disposed by DuPont)/BAH
4B		2,550	hazardous wastewater from the calomel process (D009 mercury/D010 selenium)	emptied in 90 days (disposed by DuPont)/BAH
4C		2,550	hazardous wastewater from the calomel process (D009 mercury/D010 selenium)	emptied in 90 days (disposed by DuPont)/BAH
4D		2,550	hazardous wastewater from the calomel process (D009 mercury/D010 selenium)	removed – sent for disposal in February 2011

On February 3, 1999, the facility was notified that the permit expired on November 6, 1997. On March 17, 1999, the facility submitted the stormwater permit renewal by completing a Notice of Intent (NOI) Under the Under the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Industrial Activities form. Two outfalls were identified that discharge ultimately to the Lehigh River (Outfalls 01 and 02).

Outfall 01 drains the paved parking area and roof drains; Outfall 02 drains an unimproved area. An outfall is located west of the building in the tree line. PADEP reissued NPDES Permit No. PAR232228 on April 15, 1999.

On March 29, 2004 and February 25, 2009 (renewal), PADEP issued a letter stating they had received the facility's No Exposure Certification for Discharges of Stormwater Associated with Industrial Activities form (NNOEX013-02) for the facility. The form certifies that a condition of no exposure exists at the facility, and that the facility must maintain a condition of no exposure to remain eligible for permit exemption. This exemption will expire on March 28, 2014.

The facility receives its water supply from the City of Bethlehem. The City of Bethlehem's water comes entirely from surface water sources, namely the Wild Creek Reservoir, Towamensing Township, Carbon County, in a watershed that covers 22 square miles and the Penn Forest Reservoir, Penn Forest Township, Carbon County and Polk Township, Monroe County, in a watershed that covers 17 square miles. This primary water supply is located 22 miles north of the City. The Tunkhannock Creek, Tunkhannock Township, Monroe County provides a supplemental supply to the Penn Forest Reservoir. Dual transmission mains can carry up to 47 million gallons of water per day to the city's water filtration plant in Lehigh Township and from there to the distribution system (2009 Bethlehem Consumer Confidence Report).

Information obtained from the Pennsylvania Department of Conservation and Natural Resources (DCNR) Groundwater Information System (PaGWIS) accessed on March 31, 2011 provided information regarding six groundwater wells located within a 0.5 mile radius of the facility. The open holed wells were installed between 1936 and 1967 and ranged in depth of 335 to 433 feet below ground surface (bgs) based on available data. Five of the six wells were listed as withdraw wells for industrial use, located southwest of the facility, and one well was used for air conditioning, located to the north of the facility.

There have been no known or reported releases that occurred on the interior portion of the property that would indicate groundwater had been impacted; therefore, there have been no groundwater investigations conducted at the facility. The neighboring properties are connected to the public water supply.

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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”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):

³ 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 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 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.

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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 **Bethlehem Apparatus Company, Inc.** facility,

EPA ID # PA0000453084, located at 935 Bethlehem Drive, Bethlehem, PA 18017.

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)	<u>KHA M. Dato</u>	Date	<u>10/25/12</u>
	(print)	<u>KHA. M. Dato</u>		
	(title)	<u>EPA PROJECT MANAGER</u>		
Supervisor	(signature)	<u>Paul Gottbold</u>	Date	<u>10-26-12</u>
	(print)	<u>Paul Gottbold</u>		
	(title)	<u>ASSOCIATE DIRECTOR, LCD</u>		
	(EPA Region or State)	<u>EPA R3</u>		

Locations where References may be found:

USEPA Region III
Waste and Chemical Mgmt. Division
1650 Arch Street
Philadelphia, PA 19103

PADEP
North East Regional Office
2 Public Square
Wilkes-Barre, PA 18701

Contact telephone and e-mail numbers

(name) _____
(phone#) _____
(e-mail) _____

Facility Name:

Bethlehem Apparatus Company, Inc.

EPA ID#

PA000453084

City/State

Bethlehem, PA 18017

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