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: **Stackpole Corporation**
Facility Address: **201 Stackpole Street, ST Marys PA 15857**
Facility EPA ID #: **PAD063652820**

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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1. 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.

☐ 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):

Groundwater

The site is underlain by three different types of unconsolidated deposits including, fill material, natural unconsolidated deposits and weathered bedrock. The combined thickness of the unconsolidated deposits generally ranges between 10 and 18 feet, although a thickness of only 4 to 6 feet exists in the vicinity of monitoring well MW-13D in the southern portion of the Northeast Area. The uppermost bedrock units beneath the site are the shales and siltstones of the Pennsylvanian-age Pottsville Group.

The uppermost groundwater flow zone occurs in the natural silt and clay deposits and the underlying weathered bedrock. Depth to groundwater in the uppermost aquifer ranges from 1 to 10 feet. In the Northeast Area, groundwater flow in the unconfined aquifer is to the west-southwest toward Elk Creek and North Elk Creek. The direction of groundwater flow in the unconfined aquifer in the Southwest Area is also toward Elk Creek, predominantly in a westerly direction.

Northeast Area

Nineteen monitoring wells have been installed in the Northeast Area, including 15 that monitor the shallow groundwater zone and four that monitor groundwater in the upper bedrock. The wells were sampled in 1994/1995 and 2001.

Several VOCs, primarily chlorinated hydrocarbons, were detected in samples collected from monitoring wells tapping the shallow groundwater zone. Ten different VOCs were detected at concentrations exceeding PADEP=s Non-Residential Used Aquifer Medium Specific Concentrations (MSCs) in at least one sample location. The most prevalent contaminants include TCE (max. conc.- 11.44 mg/l at MW-5, vinyl chloride (max. conc. - 0.42 mg/l at MW-8), cis-1,2-DCE (max. conc. - 2.8 mg/l at MW-8), 1,2-DCA (max. conc. - 19 mg/l at MW-8) and 1,1-DCE (max. conc. - 0.064mg/l at MW-14). Monitoring well MW-2 was the only location containing semivolatile organic compounds at concentrations greater than the corresponding Act II Non-Residential Used Aquifer MSCs. A sample collected from MW-2 in November 1994 was found to contain pyrene (57 ug/l), benzo(a)anthracene (39 ug/l), chrysene (44 ug/l), benzo(b)fluoranthene (30 ug/l), benzo(k)fluoranthene (26 ug/l) and benzo(a)pyrene (23 ug/l). Lead in a sample collected from MW-15S in May 2001 (12 ug/l) was the only metal detected above the PADEP non-residential used aquifer MSC of 5 ug/l in any of the shallow groundwater samples. Lead was not detected in MW-15S when it was resampled one month later in June 2001. Although a few groundwater hotspots occur in the Northeast Area, there is no well-defined plume of contaminants in the shallow aquifer.

The only VOC detected at a concentration above the non-residential MSC in the bedrock aquifer in the Northeast Area was 1,2-dichlorethane (1,2-DCA) in a sample collected from MW-13D. Lead in one bedrock well (MW-17D (7 ug/l in May 2001)) was the only metal detected above the MSC; however, lead was not detected in a sample collected from that location in June 2001.

Southwest Area

Groundwater sampling has been conducted in the Southwest Area since 1991. There are 31 monitoring well locations within the Southwest Area boundaries, including shallow wells and deeper wells that monitor the upper bedrock aquifer. Eleven well clusters containing a total of 32 wells are also located offsite and downgradient of Stackpole Center.

The historical sampling results indicate that the shallow groundwater in the vicinity of the Southwest Area's Main Plant Area contains concentrations of the following contaminants in excess of the non-residential MSCs for groundwater in a used aquifer: 1,1-dichloroethene (1,1-DCE), 1,2-DCA, 1,2-dichloroethene (1,2-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), methylene chloride, PCE, TCE, vinyl chloride, naphthalene, cadmium and nickel. The shallow groundwater in the vicinity of the Special Purpose Resistors Area has been found to contain 1,1-DCE, 1,2-DCE, PCE, TCE and vinyl chloride at concentrations greater than the non-residential MSCs for groundwater in a used aquifer. The shallow groundwater in the vicinity of the Coal Tar Area contains 1,2-DCE, cis-1,2-DCE, TCE and vinyl chloride at concentrations greater than the non-residential MSCs for groundwater in a used aquifer.

TCE and 1,2-DCE have been detected in shallow groundwater samples collected from Offsite Areas at concentrations greater than the residential MSCs for groundwater in a used aquifer. The source of this contamination is likely the former SPR Building Area and a chlorinated organic contaminant plume has been delineated flowing northwesterly from the SPR Building Area towards Elk Creek. Portions of the plume are believed to flow beneath the commercial buildings located on the south side of Stackpole Street across from the Main Plant Area. The shallow aquifer plume is not believed to flow beneath any residential areas prior to discharging into Elk Creek.

Several volatile organic compounds including 1,2-DCA, 1,2-DCE, PCE, TCE and vinyl chloride have been detected at concentrations greater than the non-residential direct contact MSCs for groundwater in a used aquifer in samples collected from the intermediate and bedrock aquifers in onsite areas. The same contaminants with the exception of vinyl chloride were detected in intermediate and bedrock groundwater samples collected from off-site locations at concentrations exceeding the residential direct contact MSCs for groundwater in a used aquifer. Chlorinated organic plumes have been delineated flowing westerly from the SPR Building Area off-site to beneath commercial and residential areas between Brussels and Depot Streets on both sides of Elk Creek.

Footnotes:

[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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2. 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):

Stackpole submitted Act 2 final reports for the Northeast Area and the Southwest Area. In December 2008 PADEP approved the Northeast Area Act 2 Final Report and in March 2010 PADEP approved the Southwest Area Act 2 Final Report.

[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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3. 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):

Surface water sample results demonstrated compliance with PADEP Chapter 16 aquatic life criteria for Elk Creek.

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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 judgment/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):

Post remedial Care measures include:
-administrative monitoring (verifying IC and having property owners who do not have an EC to get an EC)
-Suspended pump and treat system
-Verify continued compliance with Elk creek
-implement a monitoring well abandonment program
-Maintain a financial assurance

Indoor air was looked at in the Risk Assessment for both areas. Both Risk Assessments concluded that potential risks associated with predicated concentrations of VOCs in indoor air related to vapor intrusion are within acceptable limits established under Act 2.

[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 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):

Pump and Treat has been halted to determine the rebound in the relevant aquifers.

[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):

Elk Creek will be sampled twice a year to verify that contaminated groundwater does not discharge at amounts that are higher than PADEP Chapter 16 aquatic life criteria.

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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 (insert facility and EPA ID #, located at (insert address). 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 9 July 19

Catheryn Blankenbiller
RPM

Supervisor _____ Date 9 July 2019

Paul Gotthold
RCRA Corrective Action Branch # 2
EPA Region 3

Locations where References may be found:

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