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: **Former Royster Facility**
Facility Address: **Money Point, Pratt Street**
Facility EPA ID #: **VAD 003 178 126**

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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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.

☒ 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):

This plant (also referred to as the Royster Company Money Point Plant) manufactured commercial fertilizer from approximately the mid-1930s until 1973. From 1978 through 1986, waste piles and mixing operations took place with metal constituents such as zinc, chromium, lead, and cadmium. According to the 1986 Facility Management Plan, the only regulated hazardous waste managed by the Royster facility was emission control dust/sludge from the primary production of steel in electric furnaces (K061). The waste was mixed with non-hazardous zinc rich filter cake sludge. The emission control dust/sludge and the zinc rich filter cake sludge were both generated from off-site operations and brought to the Royster site. According to a letter from Royster to USEPA Region III dated March 18, 1986, the mixture was then transferred to Royster's South Norfolk facility and used as feed stock for the production of commercial fertilizer.

Two SWMUs of concern were identified at this facility.

SWMU #1 - Former Mixing Tank

This open top plate steel tank was used to receive and mix two waste streams; one hazardous and one non-hazardous. The dimensions of this unit were 36 feet, 6 inches by 38 feet, 8 inches; the tank was 46 inches high. The carbon steel plate tank covered the entire front room of the process building. Kinder Morgan indicated that this structure was actually a small processing building, that was lined with metal plates (the floor and all four walls). The 1986 Facility Management Plan also refers to this SWMU as a storage tank.

Operation of this unit reportedly began in December 1985. A letter from Royster to the Virginia Department of Health dated May 1986 indicated that the facility no longer handled hazardous waste. Therefore, it is assumed that the mixing tank was no longer in use by 1986. Wastes managed included granulated emission control dust from the electric furnaces of a nearby steel production process and a zinc-rich, non–hazardous filter cake sludge from a nearby zinc sulfate production process. The dust had a high zinc content with low concentrations of hexavalent chromium, lead, and cadmium. The waste was mixed with non-hazardous zinc-rich filter cake sludge. Each batch mixing operation could process approximately 100 tons of material per year. This process was conduced three to six times per year. According to a letter from Royster to USEPA Region III dated March 18, 1986, the mixture was then transferred to Royster's South Norfolk facility and used as feedstock for the production of commercial fertilizers.

The tank mixing unit (SWMU No. 1) has been closed in general accordance with the approved Closure Plan for this SWMU. Closure activities included four rounds of sampling and analyses, and three rounds of soil excavation and removal. In addition to the excavation of contaminated soil, the building housing the tank mixing facility and the foundation were also demolished and removed. These actions have mitigated any environmental impacts from historic operations and have resulted in the Facility posing no unacceptable risk to human health and the environment.

SWMU #2 - Former Waste Piles A and B

According to a July 1986 Facility Management Plan, two indoor storage waste piles (A and B) were in use at the site. Waste Pile A operated from 1978 to September 1984. It was located inside a warehouse building, which was destroyed during a windstorm in September 1984. The warehouse structure was 150 feet by 250 feet in size. Approximately 5,000 tons of material were mixed here during this unit's operational period according to a March 18, 1986 letter from Royster to USEPA Region III. Waste Pile B replaced Waste Pile A and was operated in a warehouse structure adjacent to Waste Pile A. Dimensions of this building were 100 feet by 50 feet. It operated from September 1984 and was used until SWMU #1 was constructed in this building in December 1985. It appears that SWMU #1 replaced SWMU #2. Wastes managed included granulated emission control dust from the electric furnaces of a nearby steel production process and a zinc-rich, non–hazardous filter cake sludge from a nearby zinc sulfate production process.

In this case, the waste pile unit (SWMU No. 2) at the Royster property underwent closure activities that included five rounds of sampling and analyses, and three rounds of soil excavation and removal. The foundation of the building that formerly housed the waste pile facility was demolished and also removed prior to closure.

The distribution of residual contaminants in soils (post remedial action) at the SWMUs is such that there is insufficient mass of contamination in any one area to remain a concern for potential leaching to groundwater. In December 1988, the facility was inspected by a representative from the Virginia Department of Waste Management. Based on the December 1988 site visit, the Virginia Department of Waste Management determined that the company had completed a clean closure at the Facility. EPA Region III agrees with this determination.

References:

Final RCRA Site Visit Report for the Former Royster Company Facility.
Prepared by Tetra Tech EC, Inc., March 2007.

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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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):

[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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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[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):

[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):

[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 Former Royster facility, EPA ID # VAD 003 178 126, located at Money Point, Pratt Street in Chesapeake, Virginia. This determination will be re-evaluated if 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 Bill Wentworth Date 12/17/08
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Locations where References may be found:

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