

John Smith

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

Revised 11/8/00

RCRA File Copy

Document # _____

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA750)
Migration of Contaminated Groundwater Under Control

OCT 03 2001
FIELD

Facility Name: Kerr-McGee Chemical Limited Liability Corporation (KMCLLC)
Facility Address: Springfield, MO
Facility EPA ID #: MOD007129406

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 RCRA Info national database ONLY as long as they remain true (i.e., RCRA Info status codes must be changed when the regulatory authorities become aware of contrary information).



R00184141

RCRA RECORDS CENTER

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)
Page 2**

VSD-0107/03

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 [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act]) 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):

The KMCLLC Springfield wood treatment facility is located in an industrial/residential section of northwestern Springfield in Greene County, Missouri (see Figure 1). The facility, which has been in operation since the early 1900s, uses creosote to pressure-treat railroad cross-ties. Pressure-treated railroad products have been produced at this facility since 1907. In 1965, KMCLLC purchased the facility from American Creosote Corporation. Historically, sawed lumber from a 300-mile radius was utilized at the facility. Creosote and creosote-coal tar solutions have been the only preservatives used at the facility. Presently, KMCLLC manufactures products at the facility for the Burlington Northern Santa Fe Railroad and several regional railroad contractors. The facility has the capacity to treat up to 900,000 railroad ties per year.

Land use immediately south, east, and west of the facility is industrial. This includes the Burlington Northern Santa Fe Railroad and Master Builder facilities which are located to the south and the Greene County maintenance yard which is located to the east. The majority of the area to the north is developed as residential lots. Larger rural residential lots, farm land, and undeveloped acreage are located to the west.

A contaminated groundwater plume exists in the uppermost flow zone. This plume originates on-site, and is divided into two lobes by the groundwater flow divide in the uppermost flow zone. The lobes extend both northeastward and southward from the source areas. The northeast lobe originates from the former wastewater impoundments and production process area and trends to the northeast. Groundwater contamination in this northeast lobe of the uppermost flow zone extends off-site, about 2,000 feet northeast of the facility. The southern lobe originates from the former production process area and trends approximately 800 feet to the south.

A contaminated groundwater plume also exists in a lower, secondary flow zone. This plume is small, and is completely contained within KMCLLC property. The plume extends a short distance northwestward from the area where the wastewater impoundments were formerly located.

Groundwater underlying the Kerr-McGee Chemical facility has been monitored extensively for many years. The underlying geology is Karstic, complicating the characterization effort. Creosote is present in the form of a dense non-aqueous phase liquid (DNAPL), with the major plume consisting of dissolved creosote constituents, primarily polynuclear aromatic hydrocarbons (PAHs). See attached Table from Draft Permit which lists constituents of concern and associated regulatory criteria. See facility annual groundwater monitoring reports for information regarding current contaminant levels in the groundwater.

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).

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)

Page 3

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): Although the contaminated groundwater plume "footprint" exhibits negligible change over time (see the 1998, 1999, and 2000 Annual Groundwater Reports), contaminant concentrations within the plume vary somewhat due to the presence of entrenched free-phase creosote (DNAPL) within dissolution features in the limestone bedrock. KMCLLC's ongoing groundwater and DNAPL extraction and treatment system serves to capture much of the contaminated groundwater and limit its spread. However, contaminants exist outside the area of influence of these extraction systems. These contaminants migrated beyond the facility boundaries prior to the systems' installation, and, because of the persistent nature of the wood-preserving agents, are slow to dissipate. KMCLLC's groundwater monitoring program has and will continue to monitor trends/changes in the nature of the off-site contamination. Due to the fact that the vast majority of contaminant source materials which could impact groundwater were removed many years ago and the relatively insoluble nature of the chemicals in residually contaminated subsurface soils, further significant contaminant migration in the groundwater is unlikely.

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.

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 only evidence found during the RCRA Facility Investigation of possible migration to a surface water body were low levels of PAH contaminants found in sparse sediments located within the Clifton Drainage, an intermittent creek which contains water only following significant precipitation events. The contaminants which were found were never conclusively demonstrated to be related to releases at the KMCLLC facility and were, in fact, speculated to have potentially come from another facility located in the same drainage and/or be the result of ubiquitous anthropogenic activities.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)
Page 4

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.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)**

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.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)**

Page 6

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 groundwater extraction and monitoring activities for this facility are currently conducted under an EPA 3008(h) Administrative Order on Consent. The requirements for Corrective Action contained in this Order will be transitioned to a State-issued Hazardous Waste Management Facility Part I Permit in the very near future. A primary component of the State-issued Part I Permit will be the continuation of groundwater extraction and monitoring requirements required under the current EPA Order. It is expected that these groundwater extraction and monitoring requirements will continue for many years.

8. Check the appropriate RCRA Info 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 Kerr McGee Chemical Limited Liability Corporation facility, EPA ID # MOD007129406, located at Springfield, Missouri. 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.

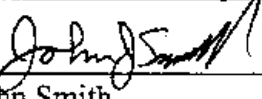
NO - Unacceptable migration of contaminated groundwater is observed or expected.

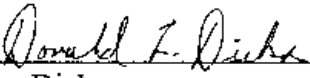
IN - More information is needed to make a determination.

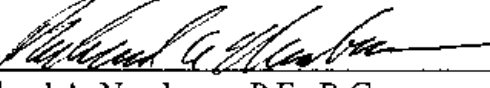
Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)

Page 7

Completed by (signature)  Date 9/27/01
(print) John A. DeLashmit, P.E.
(title) Environmental Engineer

Supervisor: (signature)  Date 9/27/01
(print) John Smith
(title) Chief, RCAP Branch, USEPA Region 7

State contact: (signature)  Date 9/28/01
(print) Don Dicks
(title) Environmental Engineer

Supervisor: (signature)  Date 9/28/01
(print) Richard A. Nussbaum, P.E., R.G.
(title) Chief, Corrective Action Unit, MDNR-Hazardous Waste Program

Locations where References may be found:

USEPA Region 7 Regional Records Center
901 North 5th Street
Kansas City, Kansas

Missouri Department of Natural Resources
Hazardous Waste Program
1738 East Elm St. (Lower level)
Jefferson City, Missouri 65101

Contact telephone numbers and e-mail addresses:

(name) John DeLashmit, P.E. (name) Don Dicks
(phone #) (913)551-7821 (phone #) (573) 751-3553
(e-mail) delashmit.john@epa.gov (e-mail) nr dickd@mail.dnr.state.mo.us

TABLE I - GROUNDWATER PROTECTION STANDARDS

Groundwater Monitoring Constituent	Maximum Concentration Limit (µg/l)	Maximum Detection Limit (µg/l)•
Acenaphthene	1200 (b)	10
Acenaphthylene	10 (d,e)	10
Benzene	5 (a)	5
Benzo(a)anthracene	10 (d)	10
Benzo(b)fluoranthene	10 (d)	10
Benzo(a)pyrene	10 (d)	10
2-Chlorophenol	10 (d)	10
Chrysene	10 (d)	10
Dibenz(a,h)anthracene	10 (d)	10
2,4-Dimethylphenol	540 (b)	10
2,4-Dinitrophenol	70 (b)	25
Ethyl Benzene	700 (b)	5
Fluoranthene	300 (b)	10
Indeno(1,2,3-cd)pyrene	10 (d)	10
Naphthalene	10 (d)	10
Phenol	300 (b)	10
Toluene	1,000 (a)	5
Xylene	10,000 (a,b)	5

•The lower of Practical Quantitation Limits (PQLs) contained in the latest version of the EPA publication entitled: Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (SW-846) or method specific detection limits routinely achieved by the Permittee's laboratory.

- (a) Denotes limits derived from state (10 CSR 60 Chapter 4, dated July 31, 2000) and federal public drinking water regulations.
- (b) Denotes limits derived from Missouri Water Quality Standards (10 CSR20-7.031) for protection of groundwater, dated August 31, 2000.
- (c) Denotes limits derived from risk-based concentration values for tap water as contained in the EPA Region III Risk-Based Concentration Table dated October 5, 2000.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRA Info code (CA750)
Page 9

- (d) Health- and/or environmental-based levels are lower than the ability of current analytical technology to routinely attain detection limits at or below such levels. These constituents and their health- and/or environmental-based criteria are listed below.

<u>Groundwater Monitoring</u> <u>Hazardous Constituent</u>	<u>Maximum Concentration</u> <u>Limit (µg/l)</u>	<u>Source</u>
Acenaphthylene	0.0044	(b)
Benzo(a)anthracene	0.0044	(b)
Benzo(b)fluoranthene	0.092	(c)
Benzo(a)pyrene	0.2	(a,b)
Chrysene	0.0044	(b)
Dibenzo(a,h)anthracene	0.0044	(b)
Indeno(1,2,3-cd)pyrene	0.0044	(b)
2-Chlorophenol	0.1	(b)
Naphthalene	6.5	(c)

- (e) Denotes a chemical which is not a hazardous constituent as defined in the Definitions section of this Permit, but is a groundwater monitoring constituent defined in 40 CFR Part 264 Appendix IX and a chemical compound which is a plume indicator. Maximum concentration limits are defined for these compounds where available.