

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99  
Revised 11/8/00

RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: National Cooperative Refinery Association  
Facility Address: 1391 Iron Horse Rd., McPherson, KS, 67460  
Facility EPA ID #: KSD007145956

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).



R00412483

RCRA RECORDS CENTER

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2. Is groundwater known or reasonably suspected to be "contaminated"<sup>1</sup> 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): LNAPL is present on the water table beneath the Facility. An LNAPL recovery system has been operating since 1987 and has resulted in the recovery of approximately 200,000 barrels of product to the present time. LNAPL recovery efforts are documented in annual reports, with the latest dated January 30, 2002, and titled "2001 Annual Ground Water Monitoring Report - NCRA". Key contaminants which are prone to dissolving in ground water from LNAPL are the petroleum hydrocarbons, including benzene, toluene, ethylbenzene, and xylenes (BTEX). Six "zero-line" monitoring wells strategically placed around the perimeter of the site, four monitoring wells around the Lime Ponds SWMU, and approximately ten monitoring wells around the hazardous waste landfarm SWMU have been sampled for VOCs, including BTEX compounds. The other site monitoring wells in the interior part of the property are not sampled due to the presence of LNAPL in or nearby those wells. VOCs have generally not been detected in samples from these wells above MCLs, except for two wells in the south/southeast part of the site. The detections of benzene in these two wells, ZL-3 and LF-3, are attributed to offsite sources whose contaminant plumes are migrating toward the site. This information is from the "Demonstration Report, Offsite Source of Ground Water Contamination, NCRA, Closed Hazardous Waste Landfarm" dated May 15, 1998. Elevated chlorides have been detected in the Lime Pond wells, apparently from leakage of process water through the unlined ponds when they were in operation, and in some wells on the east side of the site from an offsite oil field source. This information is from "Analysis of Chloride Plume Migration Based on Aquifer Characteristics, Water Well Pumping Rate, Soil, and Stratigraphic Properties" dated November 2000.

Footnotes:

<sup>1</sup>"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"<sup>2</sup> 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 "existing area of groundwater contamination"<sup>2</sup>.

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) - 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): A network of 70+ ground water monitoring wells is in place at the site, and measurements of fluid levels (LNAPL and/or water) demonstrate hydraulic control of the remaining LNAPL pool is being maintained by the recovery system. Perimeter wells are sampled semi-annually for VOC analysis to ensure that dissolved LNAPL constituents are not migrating. The Facility has always required large volumes of water for its refining processes, and the water-supply wells have created a large cone-of-depression in the water table that extends beyond the Facility property boundaries. This cone-of-depression will be maintained as long as the recovery system is operating.

Primary references include the annual reports, including "2001 Annual Ground Water Monitoring Report - NCRA" dated January 30, 2002.

Secondary references used during this assessment include the following:

Final Report - RCRA Facility Assessment, PRC Environmental Management, Inc., Nov. 7, 1988

Pleistocene Geology of Kansas, State Geological Survey of Kansas, Bulletin 99, 1952

Progress Report on the Ground Water Hydrology of the Equus Beds Area, Kansas, State Geological Survey of Kansas, Bulletin 119, Part 1, 1956

A Model Study of the McPherson Moratorium Area in Ground Water Management District #2, KGS, Open-File Report 79-7, April, 1979

Hydrogeologic Investigation Report, Engineering Enterprises, Inc., August, 1988

Comprehensive Ground Water Monitoring Evaluation, KDHE, March, 1989

Demonstration Report - Offsite Source of Ground Water Contamination, Roberts/Schornick & Associates, Inc., May 15, 1998

Three-dimensional analysis of soil, vadose zone, and aquifer stratigraphy affecting contaminant transport at the NCRA refinery in McPherson County, Kansas, Emporia State University, 2000

Analysis of Chloride Plume Migration Based on Aquifer Characteristics, Water Well Pumping Rate, Soil, and Stratigraphic Properties, Emporia State University, November, 2000

Telephone conversation with Mr. Rick Anderson, Director of City of McPherson Board of Public Utilities, May 24, 2002 (see attached e-mail documenting the call)

<sup>2</sup> “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.

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):** The water table is 70 to 100 feet below the surface in the area of the site, with only small streams in the immediate vicinity whose channels are far above the water table.

**References include annual monitoring reports, including "2001 Annual Ground Water Monitoring Report - NCRA" dated January 30, 2002, and the USGS 7.5' McPherson South topographic quadrangle, 1985 (photorevised).**

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5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration<sup>3</sup> 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<sup>3</sup> 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 concentration<sup>3</sup> 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<sup>3</sup> 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): \_\_\_\_\_  
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<sup>3</sup> 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<sup>4</sup>)?

\_\_\_\_\_ 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,<sup>5</sup> 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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<sup>4</sup> 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.

<sup>5</sup> 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?"

**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 six "zero-line" monitoring wells have been, and will continue to be, sampled periodically to ensure that Facility contaminants are not migrating out of the zone of influence of site water-supply/recovery wells. These wells were strategically placed to enable detection of VOCs migrating away from the site in any direction. In addition, the Facility is beginning a Comprehensive Investigation/Corrective Action Study to identify and remediate source areas.

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**References** include annual reports and "Comprehensive Investigation/Corrective Action Study (CI/CAS) Work Plan for the National Cooperative Refinery Association (NCRA) Site, dated April 13, 2001.

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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 **National Cooperative Refinery Association** facility, EPA ID # **KSD007145956**, located at **McPherson, Kansas**. 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 (signature) *Gayle Hubert* Date: 7-15-02  
(print) Gayle Hubert  
(title) Project Manager

Supervisor (signature) *John J. Smith* Date: 7/17/02  
(print) John Smith  
(title) RCAP Branch Manager  
(EPA Region or State) EPA R7

Locations where References may be found:

Primary references and telecon summary attached to this document; secondary references in R7 Records Center

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