

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

Facility Name: Barksdale Air Force Base
Facility Address: Bossier Parish, Louisiana
Facility EPA ID #: LA9 571924050

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).

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):

Groundwater impact has been established through investigations beginning with an SI in 1988/89, an RI in 1992/93 and culminating with the RFI in 1998. LTM events conducted since the RFI have verified a number of CoCs present at concentrations higher than LDEQ RECAP screening guidelines. A table containing groundwater CoCs, concentrations detected, and sampling dates has been attached for all sites (Attachment #1).

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).

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):

Groundwater sampling and monitoring has been conducted at all sites with impacted groundwater since the RI in 1992/93. Two rounds of groundwater samples were collected for most of the sites during the RFI in 1998, and semiannual groundwater monitoring has continued at six sites since the RFI completion. The extended period of groundwater monitoring has shown the groundwater contaminant plumes to be contained within the sites' boundaries.

At two sites, the Flat River between Landfill #2 and Landfill #3, and Mack's Bayou at Landfill #1 there appears to be groundwater discharge to surface water. In both areas the impact is considered to be insignificant. To support this, sampling data including the maximum detected contaminant levels for all CoCs in groundwater and surface water have been compiled in Attachments 1 and 2. One area of possible surface water impact was on the Flat River. The only CoC detected in the surface waters of the Flat River has been lead at a concentration of 63.2 ppb. Although total lead was detected in groundwater samples from Landfill No. 2 at a level of 41.2 ppb and in Landfill No. 3 at a concentration of 72.9 ppb, these concentrations are not representative of groundwater quality because of matrix material in the sample. When the groundwater samples were filtered for dissolved analyte analysis, the concentrations detected were below LDEQ screening levels and substantially below levels found in the river. This indicates the lead contamination in Flat River is not associated with groundwater discharge from the landfills.

A similar explanation can be made for the potential impact of Mack's Bayou by discharge of contaminated groundwater from Landfill No. 1. Analysis of the surface water of Mack's Bayou detected three CoCs at concentrations above LDEQ screening levels in 1992. Of these three CoCs, one - antimony - has not been detected in groundwater monitoring for Landfill No. 1. Although total cadmium has been detected in landfill monitoring wells, dissolved cadmium has not been detected; thus the cadmium seen in Mack's Bayou surface waters is probably unrelated to the total cadmium in the landfill. Although dissolved lead is present at Landfill No. 1 (33.5 ppb) at higher concentrations than those found in Mack's Bayou (19.9 ppb), the bayou concentrations were detected in 1992. Subsequent sampling of groundwater monitoring wells for dissolved lead has shown concentration levels below LDEQ screening levels.

Therefore, the contamination indicated in the Flat River and Mack's Bayou is not associated with groundwater discharge from the landfills as levels in the rivers exceed those found in the site monitoring wells.

Hydrogeology information was collected from seven sites during the RI in 1993. Calculations performed for these seven sites indicated hydraulic conductivity in the shallow aquifer to be extremely low and made it unlikely the groundwater contaminants would have any off-site impact. The hydrogeology data from the RI has been included as Attachment 3.

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):

See Question #3 above.

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 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 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.

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, 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

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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.

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):

Barksdale AFB will be conducting semiannual groundwater sampling at the following sites to monitor contamination concentrations and migration: SWMU 1 – POL Pumphouses/Tank Sludge Disposal Areas, SWMU 5 – Fire Protection Training Area No. 2, SWMU 6 – Aqueous Film Forming Foam Retention Pond, SWMU 9 – Landfill No. 1/POL Bulk Fuel Storage Area, SWMU 12 - Landfill No. 2, SWMU 13 – Landfill No. 3, and the EOD OB/OD Unit. Groundwater monitoring will be conducted at these sites until contamination concentrations allow for a "closure with no further action required" determination.

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).

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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 US Air Force Barksdale Air Force Base facility, EPA ID # LA9 571924050, located at Bossier Parish, Louisiana. 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) David F. Beatty Date 7/20/00
(print) DAVID F. BEATTY
(title) GEOLOGIST

Supervisor (signature) Steve Chustz Date 7/20/00
(print) Steve Chustz
(title) Geologist Supervisor

(EPA Region or State) _____

Locations where References may be found:

- Administrative Record, Environmental Mgmt office, 2 CES/CEV
334 Davis Avenue W, Ste 208, Barksdale AFB, LA 71110-2078

- Information Repository, Bossier Parish Library
2206 Beckett Street, Bossier City, LA 71111

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