

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: MELROSE AIR FORCE RANGE
Facility Address: CANNON AIR FORCE BASE, NEW MEXICO 88103-5214
Facility EPA ID #: NM 5572124456-1

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.

X 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)

SEE ATTACHMENT

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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 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.

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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 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.

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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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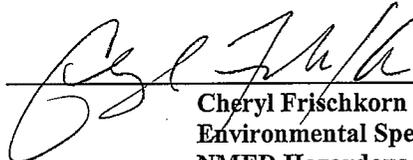
8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

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 MELROSE AIR FORCE RANGE facility, EPA ID # NM 5572124456-1, located at CANNON AIR FORCE BASE, NEW MEXICO 88103-5214. 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.

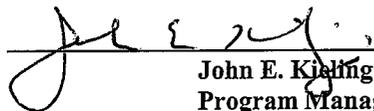
IN - More information is needed to make a determination.

Completed by


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Date 3.22.07

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Date 3/22/2007

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ATTACHMENT
To the
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
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For
Melrose Air Force Range, New Mexico

2.)

CONTAMINANT	MAXIMUM CURRENT CONCENTRATION ** (SCREENING LEVELS)***	AREA OR SWMU #
barium	31 mg/l and 2.5 mg/l (1.0 mg/l)	SWMU 115 and SWMU 133
chromium	0.42 mg/l, 0.114 mg/l, and 0.36 mg/l (0.05 mg/l)	SWMU 115, SWMU 130, and SWMU 133
nickel	0.45 mg/l (0.10 mg/l)	SWMU 115
selenium	0.088 mg/l (0.05 mg/l)	SWMU 130
cadmium	96.01 mg/l (0.01 mg/l)	SWMU 133
perchlorate	0.02 mg/l	Well MWQ15 (USGS)
selenium	0.160 mg/l (0.05 mg/l)	Well MWQ15 (USGS)
vanadium	78, 55, 60, 55, 49, and 65 mg/l (37 mg/l)	Wells MWQ 3, 4, 5, 6, 7, and 13 (USGS)

** Concentrations listed are taken from the most recent report available at time of CA750 evaluation.

*** Ground water screening levels are New Mexico Water Quality Control Commission Human Health Standards or EPA Region 6 Human Health Medium-SPECIFIC Screening Levels

RATIONALE:

Monitoring for potential hazardous constituents in the ground water across the Range at SWMU monitoring points and U.S. Geological Survey (USGS) monitoring points reveal concentrations of pesticides, explosives, volatile organic compounds, and semi-volatile organic compounds to be non-detect or below New Mexico Water Quality Control Commission (WQCC standards). A number of metals, as well as perchlorate, were detected above screening levels in the ground water at Melrose (SEE TABLE ABOVE). However, no contaminant release patterns from specific SWMUs were noted and these detections do not correlate with metals detected above background values in the overlying soils. The occurrences of metals in the ground water, more than likely, reflect natural background conditions. With the exception of the area beneath SWMU 115, ground water is greater than 150 feet below the ground surface. The

Soils and bedrock geology at Melrose are highly alkaline in nature, making the migration of metals from a SWMU to the depths at which groundwater is encountered at Melrose is highly unlikely. Groundwater flow rates determined from the aquifer testing conducted during the RCRA Facility Investigation are on the order of 0.01 to less than 5 feet per year.

There is no permanent surface water at the Range. Two wells at Range Headquarters supply water for fire suppression and non-potable domestic supply. The Melrose Bombing Range water system consists of one production well, a treatment unit, two storage tanks, and the distribution system. Water from the production well (Well 11), located approximately a mile north of the Ranges Office Complex, provides water that is disinfected using injected hyperchlorination. A second well was disconnected from use due to quality concerns regarding arsenic and perchlorate.

REFERENCES:

- 1.) Langman, J.B, Gebhardt, F.E., and Falk, S.E., United States Geological Survey Ground-Water Hydrology and Water Quality of the Southern High Plains Aquifer, Melrose Air Force Range, Cannon Air Force Base, Curry and Roosevelt Counties, New Mexico, 2002-03, Scientific Investigation Report 2004-5158, Prepared in cooperation with the U.S. Air Force, Cannon Air Force Base, 2004.
- 2.) Department of the Air Force, Cannon Air Force Base, Part A RCRA Permit Application Corrective Action for Melrose Air Force Range, Cover Letter December 2004.
- 3.) United States Geological Survey, United States Air Force Ground-Water Monitoring at Melrose Air Force Range, Analytical Results of Samples Collected December 13, 14, 15, and 16, 2004, Prepared for Cannon Air Force Base, April 2005.
- 4.) Foster Wheeler Environmental Corporation, RCRA Facility Investigation Report Addendum for Melrose Bombing Range Cannon Air Force Bas, New Mexico, Prepared for Cannon Air Force Base, February 2003.
- 5.) Ebasco (Foster Wheeler Environmental Corporation), Draft Phase I RCRA Facility Investigation for Melrose Air Force Range, Volumes I through V, October 1996.
- 6.) New Mexico Water Quality Control Commission, 20.6.2 NMAC New Mexico Water Quality Control Commission Regulations, Effective September 15, 2002.
- 7.) Environmental Protection Agency, Region 6 Human Health Medium-Specific Screening Levels, 2006.