

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: Giant Refining Company  
Facility Address: Route 3, Box 7 Gallup NM 87301  
Facility EPA ID #: NMD000333211

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"<sup>1</sup> 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?

X 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 contamination is present beneath the refinery facility; however, based on information provided in the RCRA Post-closure Care Permit Application, Part B Volumes I - III (Giant Refining Company, 2000), and Giant's "Comprehensive Groundwater Sampling Report" (Giant Refining Company, 2001) groundwater contamination is limited in extent, has not migrated off site, and the affected aquifer is limited in capacity and not currently used by the refinery or any surrounding properties; therefore, migration of groundwater contamination is not considered to be occurring for the purposes of this survey.

Petroleum-related surface soil contamination is known to be present at the following SWMUs: Aeration Basin, Evaporation Ponds, Evaporation Ponds Ditch, Fire Training Area, Railroad Rack Lagoon and the API Separator. Petroleum-related subsurface soil contamination is known to be present at the following SWMUs: Aeration Basin, Evaporation Ponds, Tank Farm, Railroad Rack Lagoon, API Separator and Sludge Pits. The soils underlying the refinery consist of reworked Triassic Chinle Formation mudstones, siltstones and other fluvial sediments that dip north toward the Rio Puerco. In general, soils underlying the refinery are comprised of stiff to hard clays with varying amounts of silt and sand, containing occasional sand stringers that generally parallel strike, to depths up to 80 feet below the ground surface. The unconsolidated fine-grained sediments contain occasional sand stringers that are generally oriented parallel to the local drainage (east-west). The reworked sediments overly Chinle Formation mudstones. There is a thin coarse-grained lag at the contact between the unconsolidated sediments and the Chinle Formation. The uppermost aquifer is considered to be the Sonsela Sandstone which is a relatively thin sandstone unit located close to the top of the Chinle Formation. The depth to the Sonsela Sandstone beneath the refinery ranges from approximately 30 feet below ground surface on the south side of the facility to greater than 80 feet below the ground surface at the north end of the facility property. Sand stringers and lenses located within the unconsolidated sediments contain varying amounts of groundwater. The sand stringers and lenses are not considered to be hydraulically connected to the Sonsela Sandstone. The saturated zones located in the unconsolidated sediments beneath the refinery process and storage units may contain water supplied from sources directly related to refinery operations.

The results of groundwater monitoring and sampling conducted prior to 2001 indicate that groundwater contamination is not present beneath the refinery with the exception of the vicinity, and northeast, of the main aboveground storage tank (AST) farm (SWMU #6). [RCRA Post-closure Care Permit Application, Part B Volumes I - III (Giant Refining Company, 2000), and Giant Refining Company Comprehensive Groundwater Sampling Report (Giant Refining Company, 2001)]

REGULATED UNIT SUMMARY

The Land Treatment Unit (LTU) is the only regulated unit at the Ciniza Refinery. The LTU is undergoing post-closure care under a Post-closure Care Permit issued in September 2000. Post-closure soil sampling and groundwater monitoring will be conducted periodically for 30 years. [RCRA Post-closure Care Permit Application, Part B Volumes I - III (Giant Refining Company, 2000)]. Chromium was detected in monitoring well SMW-5 at concentrations less than the EPA MCL of 0.1 mg/L (milligrams per liter) in 1997 and 1998 and at a concentration greater than the EPA MCL in 1999. Chromium was not detected in groundwater samples obtained from any of the other monitoring wells located adjacent to, and in the

vicinity of the LTU between 1997 and 1999. Monitoring well SMW-5 was constructed using a stainless steel, wire-wrapped screen. Based on the data obtained from monitoring wells located in the vicinity of well SMW-5 and the materials used to construct the monitoring well, Giant concluded that the presence of chromium was caused by degradation of the well screen materials. Giant anticipates abandoning well SMW-5 in conjunction with monitoring well installation activities scheduled to be conducted in 2003.

#### SOLID WASTE MANAGEMENT UNIT SUMMARY

A SWMU Assessment Report is currently being revised by Giant Refining Company in compliance with the Post-closure Care Permit, Module IV (NMED, 2000) and as required by NMED. The following summary provides a description of the status of the SWMUs at the Ciniza Refinery [RCRA Post-closure Care Permit Application, Part B Volumes I – III (Giant Refining Company, 2000), and No Further Action Report SWMUs 1, 2, 3, 4, 5, 7, 9, 10, 11, 12, and 13 (August 2001 and Supplement, November 2002) ]:

SWMU #1 - Aeration Basins - the Aeration Basins are operating wastewater treatment aeration ponds. The ponds are being evaluated for status as aggressive biological treatment units as defined in 40 CFR 261.31(b)(2). Further investigation will likely be required to evaluate petroleum-related subsurface soil and the potential for groundwater contamination. Based on the soil types underlying the Aeration Basins, it is not considered likely that petroleum-related contamination has infiltrated to the uppermost aquifer. Giant will confirm and monitor infiltration of waste water to the subsurface by installing one well to a depth of approximately 20 to 25 feet below the ground surface at the downgradient (north) end of the Aeration Basins. The well is anticipated to be installed after NMED has approved the final SWMU Assessment Report.

SWMU #2 – Evaporation Ponds – the Evaporation Ponds are part of the operating wastewater treatment system. The units are used for evaporation of treated waste water. The ponds will not be considered as RCRA-regulated units providing that the treatment methods used in the aeration ponds located upstream of the evaporation ponds meet the requirements for aggressive biologic treatment units as defined in 40 CFR 261.31(b)(2). Further investigation is being required to evaluate petroleum-related subsurface soil and groundwater contamination. Two monitoring wells are scheduled to be installed along the north and west property boundaries, respectively, in June 2003 to supplement the current groundwater monitoring network. Based on the results of previous groundwater monitoring, groundwater contamination is not present beneath the Evaporation Ponds.

SWMU #3 – Empty Container Storage Area – this unit was investigated in 1993 and recommended for No Further Action (NFA) by the Ciniza Refinery. EPA approved the NFA determination in a letter dated January 7, 1994. NMED will review the investigation and NFA determination as part of the SWMU assessment required by the Post-closure Care Permit. This unit is not considered to be a potential source of groundwater contamination.

SWMU #4 – Old Burn Pit – the Old Burn Pit assessment report is in preparation as part of the SWMU assessment required in the Post-closure Care Permit. An engineered cover has been placed on the unit therefore it is unlikely that infiltration of meteoric water will occur at a rate sufficient to cause either leaching of residual contaminants or infiltration of surface water to the uppermost aquifer.

SWMU #5 – Landfill Areas – the Landfill areas have not been recommended for NFA by Ciniza to date. The landfills were capped with an engineered cover in 1993 upon approval by EPA of a voluntary corrective action plan for the landfills. NMED will evaluate the need for further corrective action at the units upon receipt of the SWMU Assessment Report required by the Post-closure Care Permit. Evidence of a release to native soils beneath the landfills has not been reported and it is unlikely that a potential for significant infiltration of surface water exists at this location. Based on presence of the engineered cover and the properties of the underlying soils, NMED does not consider this unit to be a potential source of groundwater contamination.

SWMU #6 – Tank Farm-Leaded Gasoline Tanks – the tank farm assessment is in preparation as part of the SWMU assessment required in the Post-closure Care Permit. Interim measures consisting of recovery of phase-separated hydrocarbons have been conducted for the previous seven years and are ongoing on an intermittent basis. Separate-phase hydrocarbon thickness generally has been reduced to a sheen. Petroleum-related contamination is present in subsurface soils and groundwater. Based on the available data, petroleum-related contamination has migrated toward the northeast in relatively coarser-grained sand stringers within the unconsolidated clays and silty clays underlying the refinery. There is no evidence of

off-site migration of petroleum-related contamination and dissolved-phase contaminants have decreased over previous sampling events. An additional monitoring well is scheduled to be installed northeast of the Tank Farm in June 2003 to supplement the current monitoring well network. Petroleum-related contamination has not been detected in the uppermost aquifer (Sonsela Sandstone). NMED considers migration of groundwater contamination to be controlled at this unit.

SWMU #7 – Fire Training Area – the Fire Training area remains in use. Previous investigations have detected diesel-range hydrocarbon contamination in soils at depths less than 5 feet below the ground surface. Petroleum-related surface soil contamination is present at the Fire Training Area; however, a concrete cap has been emplaced beneath the training structures and equipment in order to contain any releases of diesel fuel that may occur during training exercises. Based on the results of previous investigations, and the containment system that has been constructed to prevent future releases, NMED does not consider the Fire Training Area to be a source of groundwater contamination at the refinery. The Fire Training Area will be re-evaluated in the final SWMU assessment required in the Post-closure Care Permit.

SWMU #8 – Railroad Rack Lagoon – the Railroad Rack Lagoon is currently undergoing corrective action. Corrective action at the unit consists of excavation and removal of contaminated soils. The objectives of the remedial actions are to remove the source of petroleum-related contamination at the unit. Groundwater contamination has not been detected in the vicinity of the Railroad Rack Lagoon to date, therefore this unit is not considered a source of groundwater contamination. An additional monitoring well is scheduled to be installed northwest of the Tank Farm in June 2003 to supplement the current monitoring well network. The location of this well will be downgradient of the Railroad Rack Lagoon and will provide additional data regarding groundwater quality in the vicinity of this SWMU.

SWMU #9 – Inactive Landfarm and Drainage Ditch – land treatment of oily waste was discontinued in the early 1980s at this unit. A site investigation was conducted in the early 1990s that included soil sampling and analyses. Relatively low concentrations of organic compounds and metals were detected during the investigation. The results of the investigation and the need for further site assessment will be discussed in the SWMU assessment required in the Post-closure Care Permit. The site has naturally revegetated since land farming activities were discontinued. This site is not considered to be a potential source of groundwater contamination.

SWMU #10 – Sludge Pits – the sludge contained in the Sludge Pits was partially removed in 1980 and the excavation was backfilled with clean soil. The pits were then capped with a layer of clean soil and revegetated. The evaluation of residual hydrocarbons in subsurface soils has been completed and was submitted as part of the SWMU assessment required by the Post-closure Care Permit. Based on the information submitted to date, the extent of contamination has not been fully defined; however, based on the types of waste placed in the sludge pits (oil-range and heavier hydrocarbons) and soil types observed beneath the Sludge Pits location (very stiff to hard, moist to dry clay and silty clay), NMED considers it unlikely that petroleum-related contamination migrated to depths sufficient to reach the uppermost aquifer. NMED does not consider the Sludge Pits to be a source of groundwater contamination.

SWMU #11 – Secondary Oil Skimmer – the Secondary Oil Skimmer has been removed. Residual petroleum-related contamination is present in surface and subsurface soils in the vicinity of the location of the former Secondary Oil Skimmer. Giant Refining Company has recommended excavation and removal of the contaminated soils. Removal of the residual contamination will eliminate any remaining potential source of contamination of groundwater. This unit is not considered to present a potential threat to groundwater beneath the facility.

SWMU #12 – Contact Wastewater Collection System – Giant Refining Company is in the process of upgrading the wastewater collection system that includes replacement of piping and the separation of the storm water and wastewater collection systems. This unit is considered a source of shallow subsurface saturation and potential groundwater contamination. A groundwater recovery system will be installed and subsurface soils will be characterized during upgrading activities. Based on previous groundwater sampling, the uppermost aquifer has not been impacted and migration of contamination within the unconsolidated sediments underlying the refinery is limited in extent and not expanding. The system upgrade is anticipated to eliminate releases of wastewater from this unit. NMED considers migration of groundwater contamination from this unit to be controlled.







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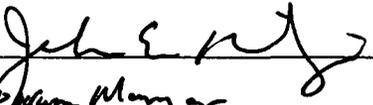
8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

**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 Giant Refining Company Ciniza Refinery facility, EPA ID # NMD 000333211, located at Interstate 40, Exit 17, McKinley County, New Mexico. 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)  Date 5/21/03  
(print)  
(title)

Supervisor (signature)  Date 5/21/2003  
(print) Program Manager  
(title) New Mexico Environment Department  
(EPA Region or State)

Locations where References may be found:

Giant Refining Company, Ciniza Refinery, McKinley County, New Mexico  
U.S. Interstate 40, Exit 17  
New Mexico Environment Department Hazardous Waste Bureau  
2905 Rodeo Park Drive East Building 1, Santa Fe New Mexico 87505

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