SWR# 30043

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: Borger Rubber Chemicals Complex
Facility Address: FM 1551 & SH 136, Borger, Texas
Facility EPA ID #: TXD 091263558

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?

   X 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 Naples). 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?

__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): ConocoPhillips (formerly Phillips Petroleum Company) previously operated the Borger Rubber Chemicals Complex (BRCC) until the mid 1980's when the facility was closed and the majority of the facility demolished. A number of waste units were utilized during the operation of the BRCC and some of these were identified as Solid Waste Management Units (SWMUs). One waste unit, the Waste Chemical Pond (WCP) was permitted to handle hazardous waste. The WCP was closed and is currently in Detection Monitoring in accordance with a Post Closure Care Permit. The Post Closure Care Permit incorporates a Compliance Plan that requires an RCRA Facility Investigation (RFI) to be completed at the BRCC for the identified SWMUs. Two phases of the RFI have been completed at the BRCC and the investigations have defined the extent of APs in each of the different media. The first phase of the RFI was conducted in the mid 1990s and provided an initial assessment of the extent of impacts resulting from the different SWMUs. The second phase of the RFI was completed in accordance with the Texas Risk Reduction Program (TRRP) in the form of an Affected Property Assessment Report (APAR). The APAR requires that each of the media of concern be addressed by defining the extent of the affected media based on Protective Concentration Limits (PCLs). The APAR was completed in May 2001 with Addenda submitted in May 2002, August 2003, and July 2004.

The site information and the investigation results presented in the APAR documents provide the basis for the conclusions presented herein. As noted, the BRCC is a closed and demolished facility that is fenced and has security during daylight hours.

During the second phase of the RFI, the SWMUs present at the site were divided into two Affected Properties (APs) based on the types of waste managed in the SWMUs. The two APs are as follows:

- Furfural Area – located on the west side of the BRCC north of the old Butadiene Plant;
- Rubber Burial Site/Consolidated Ponds Area – located on the east side of the BRCC north of the old Copolymer Plant.

The two APs were defined based on the close proximity of many of the SWMUs and the similar wastes that were managed in the SWMUs. The locations and the similar wastes make the grouping of the SWMUs the most practical approach to conducting an investigation into the nature and extent of the impacts at the BRCC. The data collected during the investigations indicate that the identified media have been impacted. The results of the APAR are summarized below and provide the basis for the responses presented herein.

Groundwater: As discussed in Section 6 of the APAR, the concentrations of contaminants in the groundwater in each of the APs at the BRCC exceed the residential PCLs (Tables 2-1 and 2-2). The TRRP requires that the extent of affected groundwater be defined to residential PCLs. This was done at the BRCC and it was determined that even though some contaminants of concern do exceed PCLs, the extent of the impacted groundwater that exceeds residential PCLs does not extend past the property boundary of the BRCC.

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)?

__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"[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): As documented in the APAR, the extent of impacts to the groundwater has been defined in both of the Affected Properties (APs). The investigations that have been completed to date demonstrate the affected groundwater is restricted to the onsite property based on hydrogeological conditions. As noted above, the source of the contamination at the two APs are the waste units that have been closed for almost 20 years. There is no evidence that there are new releases or new sources that would contribute to additional plumes. In addition, the groundwater conditions at the BRCC are relatively complex with two shallow hydrostratigraphic units that have been impacted. It can be concluded that affected groundwater within these units does not extend beyond the property boundaries. The contaminated plumes are expected to remain within the original footprint because the waste units that are the source of the contamination originally contained water and fluids that carried contaminants to the hydrostratigraphic units beneath the facility. Each of these waste units was drained at the time of the BRCC closure and now has, at a minimum, a soil covering over the remaining waste. By eliminating the water that existed in the waste units in the past, the primary transport mechanism for delivering the contaminants to the groundwater has been removed. Although precipitation continues to percolate through the waste units that do not have an engineered cap, the volume of water moving through the systems are greatly reduced. The limited volume of water that can transmit contaminants limits the migration of the plume. In addition, there are physical barriers to groundwater flow in each of the APs. As noted, there are two groundwater regimes that have been impacted at the BRCC. Both of the groundwater regimes are relatively close to the surface and both of the groundwater regimes crop out at the surface to form surface seeps. (The seeps are addressed in Question 4). The surface seeps result in termination of the groundwater regimes and thus do not allow for further migration of the contaminated groundwater.

A series of existing perimeter monitoring wells have been sampled and the groundwater analyzed for contaminants of concern for the past 3 years. The results of the groundwater sampling indicate that there are no new detections of contaminants of concern in downgradient wells indicating that the plumes that were identified during the APAR investigation are stable and not expanding. If the plumes were not stable and were migrating, contaminants of concern would be expected to have been detected in downgradient wells that defined the extent of impacts at the time of the APAR in 2001.

In the Furfural Area, groundwater collected from the perimeter wells during the groundwater sampling in 2002 and 2003 have not detected contaminants of concern. See the 2002 and 2003 Groundwater Annual Report.

In the CPA/RBS area, groundwater collected from the perimeter wells during the groundwater sampling conducted in 2002 and 2003 did not detect contaminants of concern. See the 2002 and the 2003 Annual Groundwater Report.

[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?

__X__ 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 BRCC is located in the semi-arid Texas panhandle where there is only a limited amount of precipitation that infiltrates to recharge the local groundwater regimes. The local groundwater regimes are complex due to a heterogeneous depositional history of the soils and rocks. As discussed above, only two limited, hydrostratigraphic units have been affected. The APAR provides a detailed discussion of these hydrogeological conditions. Due to these conditions, groundwater does seep to the surface in small drainages adjacent to each of the APs. The volume of water that seeps to the surface is relatively small and both of the drainages are dry much of the year. Each of the drainages has a small retaining dam downstream of the seepage area. These retaining dams rarely contain water. In this section a brief summary of the groundwater-surface water interaction is presented.

Surface Water: In general, the BRCC drains to the north toward the Canadian River or to the east or west toward Rock Creek and Hill Creek, each of which tend to flow year-round during wet years and have intermittent flow during dry years. Surface water flow is directed to Rock and Hill Creeks by drainages that generally only contain surface flow during storm events. The surface water flow in the drainages increases quickly during storm events and then decreases rapidly shortly thereafter. In addition to the storm water flow, during wet periods, groundwater seeps into the upper reaches of these drainages. The seeps are intermittent in nature and the volume of water that seeps is not sufficient to sustain a constant surface flow for more than several hundred feet along the drainage. There are only two areas of seepage at the BRCC, one in the Furfural Area (Furfural Seep) and one in the CP Area (Johnson Seep).

The seeps at the BRCC have developed where the saturated hydrostratigraphic units have been intersected by the topography. The two hydrostratigraphic units that produce the seeps at the BRCC are saturated portions of the Ogallala Formation and the Alibates Dolomite. In general, the recharge from precipitation infiltrates through the permeable Ogallala and Alibates Dolomites to the water table where it then migrates laterally. The lateral migration of the groundwater continues to the seep points where the saturated zones of the Ogallala and the Alibates intersect the topography.

The Furfural Seep is north and downstream of the Furfural Area SWMUs. The saturated hydrostratigraphic unit that is intersected at this seep is the Ogallala. The saturated Ogallala is limited in extent in this area and can only discharge at the Furfural Seep. Impermeable subsurface conditions restrict the groundwater in the Ogallala from migrating further downgradient and downstream and direct the flow to the Furfural Seep. Although saturated Alibates Dolomite is present in the Furfural Area, there are no seeps associated with the Alibates in this area. Down the drainage from the Furfural Seep a small impoundment identified as SWMU 22 was installed when the BRCC was operational. The impoundment was designed to collect surface water seepage from the Furfural Seep. During the operation of the BRCC, the Furfural Seep was more active and sustained a surface flow that was captured by the small surface impoundment. As noted above, during operations of the BRCC, the waste units contained water and other fluids that acted to recharge the local hydrostratigraphic units. These waste units have all been removed

and no longer provide a source of water. Currently the only time that surface water is impounded behind SWMU 22 is following storm events and the majority of the impounded water is a result of surface runoff.

The drainage from the Furfural Area empties into the North Holding Pond. In 2004, this pond did not contain surface water. As with the other impoundments, the North Holding Pond only contains surface water when there is a significant storm event during wet periods.

The Johnson Seep is north and downstream of the CPA/RBS Area SWMUs. The saturated hydrostratigraphic unit that is intersected at this seep is the Alibates Dolomite. The groundwater flow in the Alibates in this area is directed to the Johnson Seep. Although saturated Ogallala is present in the CPA/RBS Area, there are no seeps associated with the Ogallala in this area.

In the CPA/RBS Area, downstream of the Johnson Seep is an additional surface impoundment that would collect any seepage from the CPA/RBS Area and the Johnson Seep. This impoundment has not been observed to contain surface water for several years.

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)?

__X__ 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 judgment/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):

Based on the concentrations of the contaminants and the limited extent of surface water in the Furfural and the RBS/CPA Areas, the discharge of groundwater contaminants into the surface water does not represent unacceptable impacts to the receiving surface water, sediments, or ecosystem. To further support this conclusion, ConocoPhillips conducted a Tier 2 Ecological Risk Assessment for the seepage areas in accordance with the TRRP. This assessment did not identify an unacceptable risk to the ecosystem in these areas.

The Tier 2 Ecological Risk Assessment has been revised (July 2004) and is currently under review by the TCEQ. In the risk assessment, each of the analytes at the BRCC during the RFI and subsequent APAR were evaluated through an approved screening process. Utilizing the screening process, chemicals of concern (COCs) were either eliminated or retained for further evaluation. Those COCs retained were evaluated based on the toxicity, local habitat, local fauna and the pathways for potential COCs to impact the ecosystem. Based on the assessment, the risk assessor found that none of the fauna would be subjected to concentrations of chemicals that would cause adverse impacts. The evaluation and the supporting documentation for this assessment is provided in detail in the Tier 2 Ecological Risk Assessment submitted in July 2004. The Tier 2 Ecological Risk Assessment has been prepared by a risk assessor experienced in evaluating the risk of contaminants to ecosystems in Texas. Based on the professional opinions of this risk assessor, the conclusion noted above is that the discharge is "insignificant".

[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,[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.

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): ConocoPhillips is currently implementing an ongoing monitoring program for selected wells at the BRCC. These wells have been strategically located in downgradient locations throughout the BRCC to monitor groundwater conditions (both flow direction and water quality). In this manner, ConocoPhillips can monitor whether or not the groundwater contamination is migrating beyond the "existing area of groundwater contamination". In addition, the two localized areas where seepage occurs periodically are also included in the groundwater monitoring system.

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).

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 facility Borger Rubber Chemical Complex, EPA ID # TXD091263558, located at FM 1551 and SH 136, Borger, Texas. 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: July 30, 2004
(print) Gilbert Manning
(title) Project Manager, TCEQ

Supervisor (signature) _____ Date: July 30, 2004
(print) Donald Boothby
(title) Supervisor, Team 1, TCEQ

Locations where References may be found:

TCEQ Central Records, Austin, Texas

Contact telephone and e-mail numbers

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Final Note: The purpose of the Migration of Contaminated Groundwater EI is to verify that the groundwater plume is stable. A "YE" determination does not constitute a screening tool to end the corrective action process. The "YE" determination may be changed at any time as new information becomes available.