Documentation of Environmental Indicator Determination
in accordance with EPA Interim Final Guidance 2/5/99

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

Migration of Contaminated Groundwater Under Control

Facility Name: **Philip Services Corp. (former Solvent Recovery Corp.)**
Facility Address: **700 Mulberry Street, Kansas City, Missouri**
Facility EPA ID #: **MOD 000 610 766**

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

The Philip Services Corporation (PSC) former Solvent Recovery Corp facility began operations in approximately 1926 manufacturing paint and varnish (PSC 2003). Solvent recycling and blending of alternative fuels for cement kilns began at the facility in 1980 with the start of Douglas Solvent Recovery Corp. The facility has had various owners until purchased by PSC in 1993. The facility continues to operate as a permitted RCRA facility for the storage of hazardous waste to be bulked and shipped to other RCRA TSD facilities for ultimate disposal. There are three Solid Waste Management Units (SWMUs) that are suspected source areas for Volatile Organic Compound (VOC) contamination: the Stationary Rail Tank Car (SRTC); Tank Truck Parking Lot (TTPL); and Courtyard Area. Significant releases of VOCs are known to have occurred historically from these SWMUs. Also, on February 1, 2001, a fuel blending tank exploded at the facility. Contaminated soil, debris, and water used to fight the fire were remediated following this incident. Verification sampling of surface soils confirmed that the contamination resulting from the tank explosion was removed to less than MDNR levels of concern. Contaminants of concern at the facility include VOCs and Semi-volatile Organic Compounds (SVOCs). Metals have been detected at the facility but these detections have been at concentrations believed to be consistent with area background.

Definition of Environmental Indicators (for 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 EIs 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 EIs 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 groundwater 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 Determination 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): Contaminant concentrations in groundwater may be found in the following documents: "RCRA Corrective Action Program Data Gap Report, Solvent Recovery Corporation, Kansas City, Missouri," PSC Environmental Services Group, January 31, 2003; "Final Human Health Risk Assessment, Solvent Recovery Corporation, Kansas City, Missouri," PSC Corporation, Revised February 13, 2004; and "Recent Groundwater Data, Solvent Recovery Corporation, 716 Mulberry Street, Kansas City, Missouri," PSC Corporation, September 16, 2004. For the purpose of demonstrating that the groundwater contaminant plume is stable, this evaluation focuses on the detection and monitoring of VOCs. VOCs are the most ubiquitous contaminants and present the greatest risk at the facility. SVOCs have been detected sporadically in groundwater at the facility, however, at much lower concentrations. For more information regarding the levels of SVOCs detected in monitoring wells at the PSC facility, refer to the "EI Evaluation for CA 725, Current Human Exposures Under Control," EPA, September 2003. The following table summarizes the groundwater VOC concentrations which exceed the EPA's Maximum Contaminant Levels (MCLs) and Cleanup Levels for Missouri (CALM), Groundwater Target Concentrations, in the most recent groundwater sampling event.

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).

VOCs in Groundwater – August 2004 Sampling Event

Contaminant	Location	Concentration (ug/L)	EPA MCL[1]	CALM GTARC[2]
1,1-DCE	MW-7	8.85	7	7
cis-1,2-DCE	MW-7	1590	70	70
Tetrachloroethene	MW-7	36.6	5	5
Trichloroethene	MW-7	12.8	5	5
Vinyl chloride	MW-7	223	2	2
Benzene	MW-5	2419	5	5
Ethylbenzene	MW-7	1645	700	700
Toluene	MW-5	56,822	1000	150

Table Footnotes:
[1] U. S. EPA Maximum Contaminant Levels (MCLs), July 2002.
[2] Cleanup Levels for Missouri (CALM), September 2001.

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): A complete historic presentation of the nature and extent of contamination is contained in the RFI Data Gaps Report (PSC, 2003). However, EPA and MDNR requested some additional site characterization to verify some of the conclusions of the RFI Data Gaps Report; specifically, the groundwater flow direction and relationship with the Missouri River, and to confirm the extent of

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.

groundwater contamination to the east and west boundaries of the facility. This additional work was conducted in May through August 2004. Appendix E contains groundwater elevation maps for May, June and August 2004. The June 2004 map indicates a groundwater flow direction to the southwest, while the data collected in August shows a flow direction to the northeast. The May 2004 map indicates a flat gradient across the site. Historically, quarterly and semi-annual water level measurements have shown the same degree of variability as the most recent measurements. To be certain of the groundwater flow direction(s), EPA and MDNR requested that PSC conduct a data logger study, collecting continuous groundwater elevations data. From May 1 through August 18, 2004, PSC collected water level data using downhole pressure transducer/data loggers. Hydrographs from the data logger study are presented in Appendix F. The hydrographs indicated that MW-9D, MW-10S, and MW-10D appear to correlate most closely with fluctuations in elevation of the Missouri River. Hydrographs showing the relationship between these wells and the Missouri River have been presented in Appendix F.

Because of the variation in groundwater flow direction and the very flat groundwater elevation contours depicted in previous submittals summarized in the RFI Data Gaps Report (PSC, 2003), MDNR requested that the facility install additional monitoring in wells that may be downgradient from the site, depending on groundwater flow direction. MW-12S (monitors the shallow aquifer), MW-12D (monitors the deep aquifer), MW-13S (shallow) and MW-13D (deep) were installed to verify that unacceptable levels of contamination were not migrating from the facility to the west and east of the facility, respectively. These wells did not contain any chlorinated or non-chlorinated VOCs in excess of MCLs. With the addition of these two recently installed monitoring well clusters, it may be concluded that the contaminant plume is defined at all boundaries of the site.

Contaminant levels measured in groundwater show stable or declining concentrations of chlorinated and non-chlorinated VOCs. Appendix G presents time versus concentration graphs for MW-4, MW-5, and MW-7, which historically have been the most impacted wells because they are the closest downgradient wells to known source areas. Further, the facility has conducted monitored natural attenuation sampling from November 2000 to the present which substantiates that the groundwater contaminant plume has stabilized (PSC, 2003). In the May and August 2004 sampling events, results for MW-10S/10D and MW-13S/D, believed to be installed beyond the leading edge of the contaminant plume at the Missouri Department of Corrections property directly to the east of the PSC facility and in the predominantly downgradient direction(s) of groundwater flow, depending on the Missouri River stage, contained no detectable contaminant levels and slight detections of tetrachloroethene and trichloroethene at concentrations less than MCLs, respectively. It should also be noted that in 2004, PSC installed a soil vapor extraction (SVE) system as an interim measure (full scale pilot) that is designed to reduce contaminant levels in the Courtyard and Stationary Rail Tank Car (SRTC) Solid Waste Management Units (SWMUs) to remediate soils containing high concentrations of volatile organic contaminants (VOCs) believed to be a continuing source of groundwater contamination. Based on the time versus concentration

graphs in Appendix G, it appears that the SVE system is effecting (i.e., lowering) chlorinated and non-chlorinated VOC concentrations in MW-4, MW-5 and MW-7.

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): Monitoring wells MW-10S (monitors the shallow aquifer), MW-10D (monitors the deep aquifer), MW13S (shallow) and MW-13 D (deep) are the downgradient wells closest to the Missouri River (see figure in Appendix D). While MW-13S and MW-13D are recently installed, MW-10S and MW-10D have been sampled for a number of rounds. These wells do not contain chlorinated or non-chlorinated VOCs in excess of MCLs. Therefore, it may be concluded that there is no discharge of contaminated groundwater to the Missouri River.

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 the appropriate groundwater "level," and there are no other conditions (e.g., the nature or 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;

3 As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times the 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):_____
_____
_____
_____
_____

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 specialist(s), 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-

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.

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 cannot 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):_____
_____
_____
_____

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): Semi-annual groundwater sampling and analysis, and data interpretation will continue to occur as agreed upon by EPA, PSC and MDNR. MDNR is in the process of reissuing the facility's operating permit. The renewed permit will require the semi-annual groundwater monitoring to continue throughout the Corrective Measures Study (CMS) process until a final remedy is selected which will specify future groundwater monitoring requirements during the Corrective Measures Implementation (CMI).

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 **Philip Services Corporation (former Solvent Recovery)** facility, EPA ID # **MOD 000 610 766** , located at **700 Mulberry Street, Kansas City, Missouri**. 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: _____ Date 10/5/04
Stephanie Doolan
Project Manager

Supervisor: _____ Date 10/5/04
Jody Hudson
Associate Director of RCRA
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Locations where References may be found:

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References:

1. “RCRA Corrective Action Program Data Gap Report, Solvent Recovery Corporation, Kansas City, Missouri,” PSC Environmental Services Group, January 31, 2003.

2. “Final Human Health Risk Assessment, Solvent Recovery Corporation, Kansas City, Missouri,” PSC Corporation, Revised February 13, 2004.

3. “Recent Groundwater Data, Solvent Recovery Corporation, 716 Mulberry Street, Kansas City, Missouri,” PSC Corporation, September 16, 2004.

4. “EI Evaluation for CA 725, Current Human Exposures Under Control,” Missouri Department of Natural Resources, September 2003.

Appendix A

Site Location Map

Appendix B

Summary of Detectable Volatile Organic Compounds in Groundwater
August 2004

Appendix C

Summary of Detectable Volatile Organic Compounds in Groundwater
Historic through August 2004

Appendix D

Volatile Organic Compound Concentrations in Groundwater
May and August 2004

Appendix E

Groundwater Elevation Maps
May, June and August 2004

Appendix F

Hydrographs from Data Logger Study
May through August 2004

Appendix G

Time versus Contaminant Concentrations Graphs
Historic through August 2004