Final Work Plan RIPZ-13 DNAPL Test program
February 27, 2009

CASMALIA SITE REMEDIATION PROJECT

Corey Bertelsen
Project Manager

February 27, 2009

To: Russell Mechem – EPA
Mark Samolis – EPA

Subject: **Final Work Plan**
RIPZ-13 DNAPL Test Program

The Casmalia Steering Committee (CSC) has prepared and is submitting this Final RIPZ-13 Test Program Work Plan (Work Plan) to further evaluate the dense non-aqueous phase liquid (DNAPL) that has been measured in piezometer RIPZ-13. This Work Plan was revised to address EPA's February 18, 2009 comments on the CSC's draft Work Plan, dated January 26, 2009.

As you know, RIPZ-13 was installed on Bench 1 of the Pesticide/Solvent Landfill (P/S Landfill) in August 2007 as part of the ongoing Remedial Investigation at the site. The CSC has been monitoring the liquid levels in the piezometer and reporting that data to EPA since that time. EPA requested that the CSC prepare a Work Plan for additional evaluations of RIPZ-13 in Comment G41-E (2) of their October 15, 2008 comments on the Draft RI Report.

This Work Plan describes the methods we propose to evaluate whether a pool of DNAPL exists in the subsurface area surrounding RIPZ-13. The general plans of the test program were initially discussed with EPA on February 7, 2008, and were included in the April 8, 2008 Draft RI Report. The specific objective of the program we are proposing is to develop more detailed information with which to assess whether the DNAPL currently present in RIPZ-13 originated from either: (1) a discreet release of a relatively small volume of DNAPL from piercing of buried drums during CPT and/or or piezometer installation activities; or (2) is part of a larger *in-situ* pool of DNAPL that may be present at the base of the P/S Landfill.

The test program proposes to recover and record DNAPL from RIPZ-13, and to gauge water and DNAPL levels/thicknesses present within RIPZ-13 before, during, and after the proposed DNAPL recovery effort. Data developed from this investigation will be used to assess the potential origin of DNAPL that has accumulated in this piezometer since its installation. The measurements of liquid volumes recovered during the test program (water, DNAPL and LNAPL) should provide an indication of the origin of non-aqueous phase liquids present in proximity to RIPZ-13, and we hope will also provide direct information relevant to the mass and mobility of these materials in the

subsurface. The volumes of multi-phase liquids removed are indicators that we expect to be able to use to evaluate the source of DNAPL in RIPZ-13. If pierced waste drums are the source of the measured DNAPL, we expect that during the test period the thickness of DNAPL measured in the piezometer will decline while liquids are carefully extracted at rates that should not create a differential flow condition within materials surrounding the piezometer. We would also expect that DNAPL thickness would remain low and not rebound to currently measured levels as the well equilibrates. Conversely, if a significant volume of DNAPL is recovered, and the thickness of DNAPL measured in the piezometer remains consistent through the test program, and/or post-testing liquid level monitoring indicates DNAPL to have recovered to the pre-testing level, this may possibly indicate that the DNAPL is part of a larger pool present at the base of the P/S Landfill.

As noted in the Draft RI Report, depending on whether the results we get from this first phase of additional investigations are sufficient to define the source and extent of the apparent DNAPL in the piezometer, the CSC has agreed to install at least two additional CPT pushed piezometers adjacent to RIPZ-13 if additional information is required. The CSC understands that while the findings of the test program will impact whether the two piezometers are needed, this decision is at EPA's discretion. In the event the piezometers are required, the CSC will install additional piezometers using the same SOPs previously employed for RIPZ-13. We will discuss the number, location, and design of any such additional piezometers in collaboration with EPA, and document any plans for additional piezometers in a supplemental Work Plan that we will submit to EPA before beginning that work.

This memorandum is formatted to include the same information that we had provided EPA in several prior RI sampling memorandums which were in turn intended to be consistent with the June 3, 2004 Final RI/FS Work Plan that was approved by EPA.

This memorandum summarizes the field procedures to be used during this DNAPL recovery effort. The work described herein will take place over a two week period, and can commence immediately upon EPA's approval of this Work Plan.

PROPOSED RIPZ-13 PURGE METHODS AND PROCEDURES

The CSC is proposing to develop or purge RIPZ-13 as described below. The purge method proposed for RIPZ-13, a ¾-inch diameter piezometer, will use a Waterra® inertial pump. We are proposing an inertial pump based on our previous successful use of the same during previous RI tasks involving the development of other onsite small-diameter wells. Based on previous RIPZ-13 development efforts, the inertial pump is capable of removing up to approximately 10 to 20 gallons per hour from this piezometer.

A stainless steel foot-valve will be securely threaded onto 1/2-inch OD (3/8-inch ID) HDPE tubing. The tubing is then inserted into the well, valve first. The tubing is fed down to near the total depth of the piezometer, but no deeper than one foot from the bottom, and then cut approximately eight feet above the top of the well. The drive mechanism of the actuator will be stabilized adjacent to the well head and the exposed tubing from the well will be connected to the reciprocating arm of the actuator. The discharge end of the tubing will be affixed to the inlet of a 200-gallon portable poly tank. A vent hose attached to a secondary port on the tank will be affixed to a 200 lbs. granular activated carbon (GAC) vapor scrubbing canister.

The purge volumes from RIPZ-13 will be collected in a 200-gallon poly tank temporarily located adjacent to the piezometer. For low flow extraction rates, liquids will be initially collected into a smaller graduated tank and ultimately transferred into the 200-gallon poly tank. The poly tank will be securely fastened to a standard wood pallet and secured to the forks of the site forklift. The forklift will be positioned adjacent to the well head and on HDPE sheeting bermed with sand bags on all four sides to provide appropriate containment in the event of a spill. The containment will be at least 40 ft^3.

Pumping of RIPZ-13 is initiated by activating the portable generator-powered drive mechanism to achieve an appropriate flow rate. The inertial pump is operated by oscillating the tubing and foot-valve assembly up and down in the piezometer. The upward stroke imparts upward momentum to the liquid column trapped in the tubing by the foot valve. This liquid column continues to move upwards through the tubing because of its momentum during the pump's downward stroke, and in effect draws more liquid into the tubing.

Pumping Strategy

The speed and frequency cycles of the actuator will be increased in a step-wise manner during the course of the test program to minimize the potential for preferential flow of water in lieu of DNAPL, and thus the potential for false negative findings. The pumping schedule will be as follows:

Initial Day:

The CSC will pump the volume of total liquids present in RIPZ-13 (approximately 0.5 gallons) once each hour for eight hours. Pumping at this low initial rate will serve to maximize the DNAPL-to-water ratio, and help ensure that materials in proximity to the piezometer screen will not become excessively desaturated with respect to DNAPL. Prior to initiating pumping, and after each 0.5 gallons removed, water and DNAPL levels/thicknesses present within RIPZ-13 will be gauged and recorded. Episodic pumping will continue at this 0.5 gallon per hour (GPH) rate throughout the initial day of testing so long as the DNAPL level measured after each 0.5 gallon purge volume recovers to within

80% of the level recorded at the beginning of the day. If during any measurement on this initial day the DNAPL level is found to recover to less than 80% of its initial level, pumping will be discontinued, and plans forward will be discussed with EPA.

Subsequent Days:

For subsequent days, the pumping frequency and rate will depend on the DNAPL level measured in RIPZ-13 at the end of the preceding day and the morning of the current day. The volume of liquids pumped *each hour* will be increased two-fold so long as the DNAPL liquid level measured after each hourly increment recovers to within 80% of the level recorded at the beginning of the preceding day. Thus, pumping on day two would be initiated at 0.5 GPH for the first hour, then increase to one GPH for the second hour, to two GPH for the third hour, to four GPH for the fourth hour, and so on. Similar to the initial day, liquid levels will be gauged and recorded prior to each day's pumping effort, and after each hour's incremental liquids volume has been removed. This step-increase in pumping rate will continue so long as the DNAPL level measured after each hour of pumping recovers to within 80% of the level recorded at the beginning of the preceding day. If during any hourly measurement on these subsequent days the DNAPL level is found to recover to less than 80% of the preceding day's initial level, pumping will be scaled-back to the prior day's final rate.

Purging will occur throughout each eight-hour work day as described above for a duration of up to two weeks. Liquid levels within RIPZ-13 and liquid volumes removed from RIPZ-13 (for DNAPL and water) will be recorded hourly through the work day using depth gauge readings within the piezometer and the graduations on the side of the poly tank. Liquid level and volume measurements will be documented on a field log (Attachment 1). Once the tank has reached 80% capacity the purging process will be temporarily paused to allow transfer of the recovered liquids into 55-gallon steel drums.

The CSC expects to be able to end the purging at the end of the planned two week recovery period. If at any point during the test program it appears that we are no longer recovering any DNAPL we will discuss whether to stop the effort at that time with EPA.

Following the completion of purging RIPZ-13, all liquids will ultimately be transferred into the onsite 16,000-gallon bulk liquid storage tank TS-7B. Gauging of liquid levels within RIPZ-13 (both water and DNAPL) will be conducted prior to and following purging each work day, as well as once each hourly incremental purge volume is attained. Liquid levels will not be monitored while purging is in process.

The CSC has summarized the proposed DNAPL recovery program in Tables 1 and 2, attached to this Work Plan**.**

Ongoing Liquid Level Monitoring

Following completion of the two week test program, the CSC will conduct ongoing liquid level monitoring activities at RIPZ-13 to assess long-term DNAPL recovery behavior. Ongoing liquid levels (water and DNAPL) within RIPZ-13 will be monitored according to the following schedule:

- Daily for one week
- Weekly for one month
- Monthly until equilibrium is achieved

DOCUMENTATION

The CSC will document the activities, methods, and findings of the RIPZ-13 DNAPL recovery program on a daily basis using standard field logs. At the conclusion of the recovery program, the CSC will prepare a brief memorandum summarizing the data obtained and providing an assessment of what these data may mean with respect to the origin of the DNAPL. Recommendations for additional work will be presented, as appropriate.

FIELD SUPERVISION AND COORDINATION WITH EPA

The CSC expects that the DNAPL recovery and gauging work will be performed by URS Casmalia site Operations & Maintenance staff. As required, the CSC's Project Coordinator will also provide supervision of URS while they are in the field.

The CSC will notify EPA's on site representative of our plans to initiate the DNAPL recovery program at least 48 hours in advance of beginning the work. The CSC will coordinate any field work with EPA using the same guidelines that are discussed in Section 11 of the June 2004 RI/FS Work Plan that we had established for the Phase I RI work. That coordination specifically includes the requirements to coordinate with EPA as discussed in Section 11.3 of the Work Plan (and in Section A6.1 of the Sampling Analysis Plan or Appendix A of the Work Plan) and to hold daily status meetings as discussed in Section 11.5 of the Work Plan. In addition, the CSC will continue to use the management of change procedures that we had agreed with EPA prior to beginning the Phase I RI work (please see Section 11.7 of the Work Plan).

The CSC recognizes that pumping protocols (timing and rates) may need to be adjusted based on field conditions encountered as the test proceeds. Changes to the proposed pumping protocols

will be made only after timely consultation and approval from EPA or EPA's oversight contractor. Any change in sampling procedures or analytical reporting that were documented in an approved RICH form for any RI sampling will also apply to the RIPZ-13 DNAPL Recovery Program,

Regards,

Corey Bertelsen
Casmalia Project Coordinator

Attachments:

Table 1
Table 2
Attachment 1

cc: Jim Dragna – BM
Glenn Anderson – Chevron
Dave Roberson - ExxonMobil
Paul Taylor - ConocoPhillips
Dan Niles – RWQCB
Caroline Rudolph – DTSC
Mark Wuttig – CH2MHill

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TABLE 1
RIPZ-13 DNAPL Test Program Summary

Area	Approximate # Samples: # Loc'ns	# per Loc'n	Total	Type	Approx. Boring Depth	VOC	Poor Purging Organics	Pest/ PCB	Herb	PCB Congeners	AVS/SEM	TOC/FOC	Mod Appx IX*	Dioxin/ Furans(2)	Hydraulic Conductivity	Comments
Capped Landfills Area																
DNAPL Recovery Program	0	0	0	N/A	N/A											
Location ID	*Northing*	*Easting*	*Type*													
RIPZ-13	*506070.0822*	*1237172.808*	*N/A*													No laboratory analyses will be conducted. Volume of recovered DNAPL and liquid levels in RIPZ-13 will be recorded

NOTES
N/A - Not applicable

Table 2
RIPZ-13 DNAPL Test Program

Study Area	Station Number	Matrix	Sample Number	Station Description	Sample Depth (ft)	Sample Type	VOC (TO-15)	Poor purging organic compounds (EPA 8015 Direct Inject)	Organochlorine Pesticides/PCBs (EPA 8081A/8082)	PCB Congeners (EPA Metod 1668)	Chlorinated Herbicides (EPA 8151a)	Modified Appendix IX* (Appendix IX with additional COPCs less dioxins and furans) (e)	Appendix IX (Mod Appendix IX plus additional COPCs and dioxins and furans) (e)	Dioxins and Furans (EPA 8290)	Acid Volatile Sulfides/SEM (EPA Method 821/R-91-100)	Hydraulic Conductivity (EPA 5084)	TOC/FOC (WalkleyBlack-ASTM D2974)	Comments
						Soil		2 oz jar	1-16oz.jar or ss-sleeve							Shelbt tube	NA	
						Sediment		NA	16 oz G	16 oz G	16 oz G	16 oz G	16 oz G	NA	16 oz G	NA	NA	
						Air		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
						Aqueous		3 x 40 mL VOA HCl	2 x 1L G	2 x 1L G	2 x 1L G	See bottle list in Appendix B, Table B-1	See bottle list in Appendix B, Table B-1	2 x 1L G	2 x 1L G	NA	2x1L G	
Capped Landfills Area	**DNAPL Recovery and Liquid Level Gauging**																	
	RIPZ-13	Aqueous	N/A	N/A	N/A	Aqueous												No laboratory analyses will be conducted. Volume of recovered DNAPL and liquid levels in RIPZ-13 will be recorded

N/A	Not Applicable
G	Glass.
oz	Ounce.
L	Liter.
Pl	Plastic.
mL	Milliliter.
HCL	Hydrochloric acid.
TOC	Total organic carbon
FOC	Free organic carbon
AVS	Acid volatile sulfides
SEM	Selective extraction method

ATTACHMENT 1

RIPZ-13 PURGE AND RECOVERY TEST LOG
CASMALIA LANDFILL

		PURGE VOLUMES				LIQUID LEVELS			AIR MONITORING		
Date	Time	LNAPL (gal)	Water (gal)	DNAPL (gal)	Tot. Liquids (gal)	LNAPL (ftbtoc)	Water (ftbtoc)	DNAPL (ftbtoc)	OBZ (ppm)	WF (ppm)	COMMENTS

Notes: DNAPL - Dense Non-Aqueous Phase Liquid; LNAPL - Light Non-Aqueous Phase Liquid; OBZ - Operator's Breathing Zone; WF - Work Face; gal - gallons; ftbtoc - feet below top of casing; ppm - parts per million

Additional Comments: