APPENDIX Q – RI CHANGE FORMS & REQUEST FOR INFORMATION FORMS

FINAL REMEDIAL INVESTIGATION REPORT
CASMALIA RESOURCES SUPERFUND SITE
CASMALIA, CALIFORNIA

Prepared By: URS Corporation

RI Change Forms & Request for Information Forms

Description

Table Q-1 – List of RICH and RFI Form Subjects and Status

RI Change Forms
RICH-001.2
RICH-002
RICH-003
RICH-004.2
RICH-005.2
RICH-006
RICH-007.2
RICH-008.2
RICH-009.3
RICH-011
RICH-012.2
RICH-013
RICH-014
RICH-015
RICH-16
RICH-017

Request for Information Forms
RFI-001
RFI-002
RFI-003
RFI-2006-001
RFI-2009-01

Table Q-1
List of RICH and RFI Form Subjects and Status

RI CHANGE FORMS

RICH FORMS	SUBJECT	SUBMITTED	APPROVED
RICHform 001.2	Change in QAPP methodology, alternative extraction method for EPA 8270, 8081, 8082	07/15/2004	08/10/2004
RICHform 002	Soil gas SOP 1.9 Soil Vapor Sampling text changes	07/28/2004	08/06/2004
RICHform 003	Removal of RISSCL-05 and RISSCL-06 from sampling program	07/27/2004	08/10/2004
RICHform 004.2	Modify analytical procedures and reduce the number of soil samples being analyzed for Ethylene Glycol	01/06/2005	
RICHform 005.2	Collect trip blanks, equipment blanks and/or field blanks for soil sampling program	08/18/2004	09/08/2004
RICHform 006	Using the peristaltic pump to collect surface water samples	08/24/2004	09/07/2004
RICHform 007.2	Modify NAPL investigation procedures, MIP instead of UVIF	09/17/2004	09/23/2004
RICHform 008.2	Piezometer installation and video logging	08/31/2004	11/19/2004
RICHform 009.3	Modifying sampling procedure for 8015 direct inject for soils	09/14/2004	12/28/2004
RICHform 010	Cancelled		
RICHform 011	Additional CPT locations for low area confirmation	09/30/2004	12/28/2004
RICHform 012.2	Proposed methodology to determine clay barrier limits	10/19/2004	11/10/2004
RICHform 013	Sample collection of soil vapor sampling leak detection compound	11/18/2004	12/28/2004
RICHform 014	Delete monitoring well RIMW-4 from the well installation program	12/10/2004	01/18/2005
RICHform 015	Change from EPA Method 680 to EPA Method 1668 Modified for analysis of PCB Congeners	08/04/2005	
RICHform 016	Change location of clay barrier sampling location RISSCL-08 to location 70 feet east	07/25/2006	07/26/2006
RICHform 017	Resample three soil vapor locations to determine if elevated concentrations of 1,3-Butadiene are lab artifacts	08/22/2007	

REQUEST FOR INFORMATION FORMS

RFI FORMS	SUBJECT	SUBMITTED
RFI 001	Addition of TO-15 Laboratory QA/QC Requirements for QAPP (Table B-18)	08/13/2004
RFI 002	Modify the EPA 8141 analysis for soil samples to include two additional organophosphorus pesticides	09/15/2004
RFI 003.2	Clarify the sample depths that will be collected for Type 6 samples of the approved RI/FS Work Plan	09/13/2004
RFI-2006-001	Three borings were drilled around Phase I boring location RISBON-59	08/01/2006
RFI-2009-01	Modification of Plant Tissue Selection Hierarchy	05/04/2009

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-001.2** **Date**: July 15, 2004

Subject: Change in QAPP methodology.

Description: Alternative sample extraction method for EPA 8270, EPA 8081, and EPA 8082.

Prepared By: David Myers, Lily Bayati

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☐ SOP Number _____
- ☒ Other Quality Assurance Project Plan (QAPP)

Description: _____

☒ See Attached Field Change Request

Reason for Change: To facilitate completion of the soil and sediment sampling in a timely manner while maintaining the quality objectives as detailed in the QAPP.

Supporting Justification for Change: See attached change request

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 8/03/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 7/15/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 7/15/2004
Lily Bayati / URS Corporation

CHANGE REQUEST REVIEW:

- ☐ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ Date: 8/10/2004
Tom Henderson / CH2MHill

EPA Project Manager: Lynda Deschambault Date: 8/10/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-001.2** **Date**: July 15, 2004

The Quality Assurance Project Plan (QAPP) for Casmalia Remedial Investigation lists two extraction procedures for soil and sediment samples (EPA 3540C, and EPA 3550B). Sequoia Analytical is proposing a third option, EPA 3545 -Pressurized Fluid Extraction (PFE) for the extraction of soil and sediment samples for EPA 8270, EPA 8081, and EPA 8082 analyses. This extraction procedure offers the advantage of using less solvent and performing the extraction in significantly less time.

EPA 3545 method performance is on par with EPA 3550B. The laboratory has completed MDL studies for the indicated analyses using EPA 3545 for all chemical compounds that are required by the Casmalia RI. To address EPA concerns about the 3545 extraction at high concentrations, the laboratory will perform side-by-side extractions of soil samples from the Burial trench area by both EPA 3550B, and EPA 3545 to confirm that the alternate extraction method is appropriate. The CSC will provide all data information to EPA when completed.

The sample size using the 3545 extraction procedure is 15g.
The MDL's in the RIFS workplan are not compromised by this extraction volume.

RI Task Manager: Lily Bayati

Date: July 15, 2004

Lily Bayati/ URS Corporation

Please sign, and have your technical expert (lily) sign off. Return for approval.

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-002 **Date**: July 28, 2004

Subject: Proposed text changes to SOP 1.9 Soil Vapor Sampling

Description: _____

Prepared By: David Myers/ Robert Ettinger

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☒ SOP Number SOP 1.9 Revision 1.2
- ☐ Other _____

Description: Text edits that indicate that leak tests of the sampling train will be conducted at each sampling location. Text edits that include the option to use nylon or polyethylene tubing in addition to the Teflon or tygon tubing in the sampling train.

☐ See Attached Field Change Request

Reason for Change: _____

Supporting Justification for Change: Please see attached proposed SOP 1.9 revision 1.2

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 8/03/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 7/28/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 7/30/2004
Robert Ettinger / GeoSyntec

CHANGE REQUEST REVIEW:

- ☐ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☑ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ Date: 8/16/2004
Tom Henderson / CH2MHill

EPA Project Manager: _____ Date: 8/16/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

STANDARD OPERATING PROCEDURE 1-9
SOIL VAPOR SAMPLING
CASMALIA SITE REMEDIAL INVESTIGATION

Prepared by: Ruth Custance, GeoSyntec	July 12, 2004
Approved by: Corey Bertelsen, CSC	Revision 1.2

1.0 PURPOSE AND SCOPE

Soil vapor data will be collected at various locations throughout the site to evaluate the potential for migration of volatile organic compounds (VOCs) from potential source areas such as the landfills and burial trenches. Details regarding specific sampling locations and rationales are provided in the Work Plan and Sampling and Analysis Plan (SAP). Soil gas samples will be collected in SUMMA canisters and analyzed at an off-site laboratory for VOCs according to USEPA Method TO-15.

This SOP is to be used in conjunction with the Sampling and Analysis Plan/Field Sampling Plan (SAP/FSP) (Appendix A of the RI/FS). In addition to the SAP/FSP, the following SOPs should be consulted:

- SOP 1-8 – Sample Handling/Preservation
- SOP 5-1 – Photo-documentation
- SOP 5-2– Field Location / Surveying
- SOP 5-4 – Equipment Decontamination

Also refer to the Site Health and Safety Plan (HSP – Mactec, 2003) and the Job Hazard Analyses (Appendix C of the RI/FS).

2.0 RESPONSIBILITIES AND QUALIFICATIONS

The project manager (PM) is responsible for assigning project staff to complete these activities, and assuring that this and any other appropriate procedures are followed by all project personnel at the site.

The project staff assigned to soil vapor sampling are responsible for completing their tasks according to this and other appropriate procedures. All personnel are responsible for reporting deviations from the procedure or nonconformance with the procedure to the PM or project quality assurance/quality control (QA/QC) officer.

Only qualified project staff shall be allowed to perform this procedure. At a minimum, staff qualified to perform these activities will be required to have:

- Read this SOP and companion SOPs
- Indicated to the PM that all procedures contained in this SOP are understood

- Completed the Occupational Safety and Health Administration (OSHA) 40-hour training course and/or 8-hour refresher course, as appropriate
- Read the Health and Safety Plan
- Previously performed soil vapor sampling in a manner generally consistent with the procedures described in this SOP
- A minimum of one year experience performing similar activities

Project staff who do not have previous experience with soil vapor sampling will be trained on site by qualified personnel, and will be supervised directly until they have demonstrated an ability to perform the procedures. An experienced subcontractor may be used for soil vapor sampling. The subcontractor should have at least one year of experience performing similar activities. In this case, the staff fulfilling the first three prerequisites for qualification listed above will oversee the subcontractor's activities during soil vapor sampling. The PM shall document personnel qualifications related to this procedure in the project QA files.

It is the responsibility of the field personnel to ensure that he/she has the forms needed for sample custody, that materials needed for handling, preservation, and packaging are brought to the site, and that the necessary arrangements are made for shipment prior to initiating an investigation.

3.0 PROCEDURES FOR SOIL VAPOR SAMPLING

Soil vapor samples will be collected from temporary vapor probes. The temporary vapor probes will be installed using a direct push drill rig. The following sections provide details on required sampling equipment and procedures. The appropriate level of PPE will be determined based upon field monitoring results, and in accordance with the procedures specified in the Health and Safety Plan.

3.1 EQUIPMENT LIST

- Direct push drill rig
- Temporary vapor probe rods
- Sample points with threaded tubing connectors and o-rings
- Bentonite (powdered, granular, and/or pellet)
- Decontamination equipment
- De-ionized water
- Vacuum pump (capable of 50 to 500 milliliters per minute extraction rate)
- Flow meter (separate in-line, if not included with pump)
- Vacuum gauge (for SUMMA canisters)
- Leak check compound and rags (butane, isobutane, or pentane)
- SUMMA canisters (laboratory pre-cleaned and evacuated)
- Flow controllers for SUMMA canisters (laboratory calibrated)

- 1/8 or1/4 inch diameter (ID) polyethylene, Nylon, Tygon or Teflon tubing (disposable)
- In line "T-valves" and hose barbs or clamps, as needed
- Appropriate PPE

3.2 PROCEDURES FOR SOIL VAPOR SAMPLING

The following provides details on the field procedures to be used at each soil vapor sampling location.

Temporary Probe Installation

1. At each proposed sampling location a temporary soil vapor probe will be installed using a direct push drill rig.
2. Prior to use at each sampling location, drive rods and any other non-dedicated, non-disposable equipment that may come into contact with the soil vapor sample will be decontaminated in accordance with the procedures contained in SOP 5-4, Equipment Decontamination.
3. Each soil vapor probe will be driven to a depth of approximately 7 1/2 feet bgs and then retracted by 4 to 6 inches to expose the screened sampling tip.
4. An approximate twelve to fifteen-foot length of disposable 1/4 to 1/8 inch diameter polyethylene, Nylon, Tygon or Teflon sampling line will then be inserted into the vapor probe (drive rod) and connected to the screened sampling tip with a threaded connection containing a rubber gasket (post run tubing set-up).
5. Following installation of the sampling line, the annulus surrounding the probe rod at ground surface will be sealed with hydrated bentonite. Avoid over-hydrating the bentonite seal to minimize the possibility of liquid leakage down the borehole.
6. To allow subsurface conditions to equilibrate, no further procedures shall be conducted for a minimum of 20 minutes following placement of the bentonite.

Pre-Sample Purge

1. While the subsurface is equilibrating, determine the "dead space volume" by calculating the volume occupied by the sample tubing and sampling tip. This value will equal one purge volume. The low flow pump, flow meter, and "T- valve" are then attached to the end of the sampling line. The "T-valve" is positioned before the pump and flow meter.
2. After 20 minutes and before starting the pre-sample purge, a rag moistened with the selected leak check compound (butane or isobutane) will be placed on the ground surface around the annulus of the soil vapor probe. At least once a day, a second moistened rag will also be placed near the sampling train to check for possible leaks in the tubing connections.

3. Rotate the "T-valve" so that the sampling line is open to the pump. A total of three purge volumes of vapor will then be pumped from the sampling line at a flow rate of approximately 100 to 200 milliliters per minute. Record the purge rate, total purge volume, and measured vacuum in the field logbook.
4. If a vapor flow of 100 ml/min cannot be achieved with a maximum vacuum of 10 inches of mercury or 136 inches of water, work should cease until the cause of the problem is identified and corrected. If the cause of the flow condition cannot be addressed, the vapor probe is to be abandoned and reinstalled at a location within 5 feet. No more than 1 alternate location will be attempted at each proposed sampling location. Procedures for probe abandonment are contained later in this SOP.
5. After the desired volume of vapor is purged from the system, but before the pump is turned off, the valve on the "T" is then closed to isolate the pump from the sampling line and prevent ambient air from reentering the sampling line. Once the valve has closed, the pump can be turned off.

Sample Collection

1. A completed sample label will first be attached to the SUMMA canister. The SUMMA canister ID and flow controller ID (lab serial number) are recorded on the field data sheets.
2. Prior to collection of the sample, a pre-sampling vacuum gauge reading will be collected on the SUMMA canister by attaching the vacuum gauge directly to the canister and fully opening the valve. The pre-sampling vacuum reading is recorded and the valve is closed prior to removing the gauge. Ambient air pressure and temperature will also be collected.
3. The SUMMA canister will then be fitted with the flow controller using a ¼-inch inert tubing equipped with a barbed, quick-disconnect male or female fitting and a ferrule nut as appropriate. A separate, pre-cleaned, and calibrated stainless steel flow controller from the laboratory will be used for each SUMMA canister.
4. The inlet end of the flow controller and SUMMA canister assembly will then be attached to the third end of the "T-valve" on the sample line using inert tubing, hose clamps or barbed, quick-disconnect fittings as appropriate.
5. A rag moistened with the selected leak check compound (butane or isobutane) will be placed on the ground surface around the annulus of the soil vapor probe. A second moistened rag will also be placed near the sampling train to check for possible leaks in the tubing connections.
6. The valve of the SUMMA canister will then be fully opened, beginning sample collection at the targeted rate of approximately 150 - 200 milliliters per minute. The flow controllers will be pre-calibrated by the laboratory for a total sample time of approximately 40 minutes (6 liters of total sample at a rate of 150 milliliters per minute).
7. After sample collection is complete, the valve on the SUMMA canister will be closed and the canister will be disconnected from the sampling line and the flow controller.

8. A post-sampling vacuum gauge reading will be collected on the SUMMA canister by attaching the vacuum gauge directly to the canister and fully opening the valve. The post-sampling vacuum reading is recorded and the valve is closed prior to removing the gauge.
9. The SUMMA canister sample will then be stored away from excessive heat or cold pending shipment to the fixed laboratory under chain of custody protocol in accordance with the Sample Handling, Preservation, and Shipping SOP (SOP 1-8).

Temporary Probe Abandonment

1. Following sample collection the temporary soil vapor probe will be removed using the direct push drill rig.
2. The remaining borehole will be backfilled with hydrated bentonite. Surface restoration will consist of manually patching the probe hole with soil, asphalt, or concrete to match existing conditions.
3. A stake will be driven and labeled with the sample ID at each abandoned soil vapor probe location in accordance with the procedures in the Field Location and Surveying SOP (SOP 5-2).
4. The probe rods and screened sampling tip will be decontaminated prior to use at another sampling location. Decontamination procedures are detailed in SOP 5-4, Equipment Decontamination.

4.0 DOCUMENTATION

Daily logbooks will be used to document overall field activities. Photographs will be taken of completed vapor probes and the sample collection apparatus in accordance with the Photo-documentation SOP (SOP 5-1). Field data for each sample will be recorded on field data sheets, which are included in Attachment 2 to Appendix A. Field data to be recorded for each soil vapor sample include:

- Name of author, date, and time of entry
- Location of activity
- Names and affiliation of personnel onsite
- Sample collection or measurement methods
- Sample ID
- Sample date and time
- SUMMA canister serial number
- Flow controller serial number
- Field observations and comments, especially noting wet conditions from rainfall or irrigation
- Purge rates, start and stop times, purge vacuum, and total volume purged
- Sample collection start and stop times
- Pre-sample collection SUMMA canister vacuum

- Post-sample collection SUMMA canister vacuum

5.0 REFERENCES

California Regional Water Quality Control Board, Los Angeles Region, "Interim Guidance for Active Soil Gas Investigation", February 25, 1997.

Department of Toxic Substances Control/California Regional Water Quality Control Board, Los Angeles Region, "Advisory – Active Soil Gas Investigations", January 28, 2003.

RI CHANGE FORM REVIEW

Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-002, dated July 28, 2004

Subject: Proposed text changes to SOP 1.9 Soil Vapor Sampling

EPA Review: As indicated in RICH-002, the revisions made to SOP 1.9 (Revision 1.2) include text edits that provide for the following:

- Leak tests of the sampling train will be conducted at each sampling location
- Option to include use of using nylon or polyethylene tubing in addition to Teflon or Tygon tubing in the sampling train

These items and other minor wording changes improve the SOP. However, one change that was not highlighted in RICH-002, that is not acceptable, is the wording change that "No more than 1 alternate location will be attempted at each proposed sampling location" (see item #4 of Pre-Sample Purge). Two attempts at each location may not be enough given the limited depth/number of soil vapor samples for the site. Pre-specifying the maximum number of additional alternative locations at this time, before the soil gas pilot study is completed, is premature because the feasibility of the sampling methodology will be assessed during this time.

EPA Conditional Approval: The proposed revisions to SOP 1.9 (Revision 1.2) are approved, with the exception of the maximum number of alternative locations that will be attempted at each soil vapor sample location. The maximum number of alternative locations at each sample location will be mutually determined by the CSC and EPA following the soil gas pilot study.

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-003 **Date**: July 27, 2004

Subject: Removal of Type 2 sampling locations RISSCL-05 and RISSCL-06 from the sampling program.

Description: RISSCL-05 and RISSCL-06 were originally scoped as grout settlement locations associated with the borings SB-CB-01 and SB-CB-02. The locations of these soil borings are uncertain due to lack of original survey control. We propose that the location be removed from the sampling program to avoid the potential for unrepresentative samples.

Prepared By: David Myers

SUMMARY INFORMATION:

- ☒ Remedial Investigation Work Plan Section 4.7
- ☐ SOP Number
- ☐ Other

Description:

- ☐ See Attached Field Change Request

Reason for Change: The sample locations were never surveyed during the drilling operations performed by Harding ESE back in 2001. On site personnel have been unable to precisely locate the former boreholes, so any samples collected would not necessarily represent the conditions directly above the former sites. Four other grout settlement sample locations have been sampled and it is felt that these data would be representative of similar conditions at all six of the originally scoped locations.

Supporting Justification for Change: See Report of Findings, Pesticide/Solvent Landfill Low Area and Gallery Well/Clay Barrier Investigations, prepared by Harding ESE and dated July 31, 2001

Schedule Impacts:

- ☐ No Change
- ☒ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: Corey Bertelsen / CBCI Date: 8/03/2004

RI Field Manager: David Myers / URS Corporation Date: 7/27/2004

CHANGE REQUEST REVIEW:

- ☐ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: Tom Henderson / CH2MHill Date: 8/10/2004

EPA Project Manager: Lynda Deschambault / US EPA Date: 8/10/2004

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-004.2 **Date**: January 6, 2005

Subject: Modify analytical procedure, and reduce the number of soil samples being analyzed for Ethylene Glycol in RI/FS Work Plan

Description: Modify the RI/FS Work Plan to allow analyzing the soil samples for ethylene glycol by EPA method 8015 modified using a solvent extraction procedure, and reducing the number of soil samples being analyzed for ethylene glycol to 90 samples.

Prepared By: David Myers, Lily Bayati

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☐ SOP Number _____
- ☒ Other RI/FS Work Plan

Description: _____

- ☒ See Attached Field Change Request

Reason for Change: Sequoia Analytical Laboratories is not able to analyze Ethylene Glycol by EPA 8015 Modified utilizing an aqueous extraction procedure. The laboratory is only able to analyze Ethylene Glycol utilizing a solvent extraction procedure by EPA 8015 Modified.

Supporting Justification for Change: See attached change request

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 1/6/2005
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 1/6/2005
David Myers / URS Corporation

RI Task Manager: _____ Date: 1/6/2005
Lily Bayati / URS Corporation

CHANGE REQUEST REVIEW:

- ☐ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ Date: _____
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: _____
Lynda Deschambault / US EPA

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-004.2** **Date**: January 6, 2005

The RI/FS Work Plan calls for ethylene glycol analysis in 63 surface soil samples, 40 Five-foot deep soil samples, 40 ten-foot deep soil samples, and 39 deep boring soil samples. Many of these are multiple depths from the same location (i.e.. type 4, 5, and 6 sample types). The CSC proposes to modify the RI/FS Work Plan to allow analyzing the soil samples for ethylene glycol by EPA method 8015 modified utilizing a solvent extraction procedure and to reduce the number of samples being analyzed by this method to 90 samples. All other compounds scheduled to be analyzed by method 8015 will still be analyzed by the standard water extraction method on all of the previously agreed to locations. The 90 samples will include half of each of the depths noted above and will include at least one soil sample from each sample location that the current Work Plan calls for 8015 analysis. As an example, for a Type 4 location we will analyze ethylene glycol for at least one depth of the multiple depths this sample location requires. The proposed list of 90 samples is included in the attached table.

RI Task Manager: Lily Bayati Date: January 6, 2005

Lily Bayati/ URS Corporation

Table B3-C
Poor Purging Organic Compounds in Water
EPA Test Method 8015B by Direct Injection

	Compound	CAS RN	Analytical Method	Practical Quantitation Limit (ug/L)	MDL (ug/L)	Lowest Human Health Risk Screening Level[1] (ug/L)	Lowest Ecological Screening Level[2,3] (ug/L)
Poor Purging Organic Compounds							
	Acetone	67-64-1	EPA 8015B, Direct Inject	500.		610	1500
	Acetonitrile	75-05-8	EPA 8015B, Direct Inject	500.	110	100	--
	Acrolein	107-02-8	EPA 8015B, Direct Inject	500.	442	0.042	--
	Acrylonitrile	107-13-1	EPA 8015B, Direct Inject	500.	173	0.039	--
	Allyl alcohol	107-18-6	EPA 8015B, Direct Inject	500.	175	180	--
	1-Butanol	71-36-3	EPA 8015B, Direct Inject	500.		3600	--
	t-Butanol	75-65-0	EPA 8015B, Direct Inject	500.		--	--
	Crotonaldehyde	123-73-9	EPA 8015B, Direct Inject	500.		--	--
	Diethyl ether	60-29-7	EPA 8015B, Direct Inject	500.		1200	--
	1,4-Dioxane	123-91-1	EPA 8015B, Direct Inject	500.	337	6.1	340000
	Ethanol	64-17-5	EPA 8015B, Direct Inject	500.		--	--
	Ethyl acetate	141-78-6	EPA 8015B, Direct Inject	500.		--	--
	Ethylene glycol	107-21-1	EPA 8015B, Direct Inject	5000		--	--
	Ethylene oxide	75-21-8	EPA 8015B, Direct Inject	500.		--	--
	Isobutyl alcohol	78-83-1	EPA 8015B, Direct Inject	500.		1800	--
	2-Propanol (Isopropyl)	67-63-0	EPA 8015B, Direct Inject	500.	200	--	7.5
	Methanol	67-56-1	EPA 8015B, Direct Inject	500.		--	--
	Methyl ethyl ketone	78-93-3	EPA 8015B, Direct Inject	500.		1900	14000
	4-Methyl-2-pentanone	108-10-1	EPA 8015B, Direct Inject	500.	72	160	170
	N-Nitrosodi-n-butylamine	924-16-3	EPA 8015B, Direct Inject	500.	345	0.002	--
	Paraldehyde	123-63-7	EPA 8015B, Direct Inject	500.		--	--
	2-Pentanone	107-87-9	EPA 8015B, Direct Inject	500.		--	--
	2-Picoline	109-06-8	EPA 8015B, Direct Inject	500.		--	--
	1-Propanol	71-23-8	EPA 8015B, Direct Inject	500.		--	--
	Propionitrile	107-12-0	EPA 8015B, Direct Inject	500.		--	--
	Pyridine	110-86-1	EPA 8015B, Direct Inject	500.	141	36	950
	o-Toludine	95-53-4	EPA 8015B, Direct Inject	500.	323	0.28	--

PQL = Practical Quantitation Limit supplied by BC Analytical Laboratory.
--- = Not Available.
[1] Source of Lowest Human Health Screening Level provided on Table 3-9 of the Work Plan.
[2] Source of Lowest Ecological Screening Level provided on Table 3-11 of the Work Plan.
[3] Ecological Screening Levels provided for surface water samples only.

Table B3-D
Poor Purging Organic Compounds in Soil
EPA Test Methods 8260B, 8270C and 8015B by Direct Injection

	Compound	CAS RN	Analytical Method	Practical Quantitation Limit (mg/kg)	MDL (mg/kg)	Lowest Human Health Risk Screening Level[1] (mg/kg)	Lowest Ecological Screening Level[2] (mg/kg)
Poor Purging Organic Compounds							
	Acetone	67-64-1	EPA 8260B	0.05		1,600	--
	Acetonitrile	75-05-8	EPA 8260B	0.1		420	--
	Acrolein	107-02-8	EPA 8260B	0.02		0.1	--
	Acrylonitrile	107-13-1	EPA 8260B	0.02		0.21	--
	Allyl alcohol	107-18-6	EPA 8015B, Headspace [3]	1.0		310	--
	1-Butanol	71-36-3	EPA 8260B	0.2		6100	--
	t-Butanol	75-65-0	EPA 8260B	0.1		--	--
	Crotonaldehyde	123-73-9	EPA 8015B, Headspace [3]	1.0		--	--
	Diethyl ether	60-29-7	EPA 8260B	0.01		1800	--
	1,4-Dioxane	123-91-1	EPA 8270C	0.66		44	--
	Ethanol	64-17-5	EPA 8260B	0.1		--	--
	Ethyl acetate	141-78-6	EPA 8015B, Headspace [3]	1.0		--	--
	Ethylene glycol	107-21-1	EPA 8015B, Direct Inject [4]	20	0.72	--	--
	Ethylene oxide	75-21-8	EPA 8015B, Headspace [3]	1.0		--	
	Isobutyl alcohol	78-83-1	EPA 8260B	0.1		13,000	--
	2-Propanol (Isopropyl)	67-63-0	EPA 8260B	0.1		--	--
	Methanol	67-56-1	EPA 8015B, Headspace [3]	1.0		--	--
	Methyl ethyl ketone	78-93-3	EPA 8260B	0.01		7,300	--
	4-Methyl-2-pentanone	108-10-1	EPA 8260B	0.01		790	--
	N-Nitrosodi-n-butylamine	924-16-3	EPA 8270C - SIM	0.067	0.043	0.024	--
	Paraldehyde	123-63-7	EPA 8260B	0.01		--	--
	2-Pentanone	107-87-9	EPA 8260B	0.01		--	--
	2-Picoline	109-06-8	EPA 8270C	0.33		--	--
	1-Propanol	71-23-8	EPA 8260B	0.1		--	--
	Propionitrile	107-12-0	EPA 8260B	0.1		--	--
	Pyridine	110-86-1	EPA 8270C	0.66		61	--
	o-Toludine	95-53-4	EPA 8270C	0.33		2.0	--

PQL = Practical Quantitation Limit supplied by Sequoia Analytical Laboratory.
--- = Not Available.
[1] Source of Lowest Human Health Screening Level provided on Table 3-10 of the Work Plan.
[2] Source of Lowest Ecological Screening Level provided on Table 3-10 of the Work Plan.
[3] This compound will be analyzed by modified EPA 8015B, using headspace analysis
[4] This compound will be analyzed by 8015B, direct inject with methanol extraction

VOLATILE GC ANALYSIS DEPARTMENT

SEQUOIA ANALYTICAL - MORGAN HILL LABORATORY

STANDARD OPERATING PROCEDURE (SV027)
EPA METHOD 8015B MODIFIED
ETHYLENE GLYCOL BY GAS CHROMATOGRAPHY

Applicable matrix or matrices: Solid
Standard Compound List and Reporting Limits: See Table 1

Control # _____

Approvals and Signatures

QA Manager:_____Date: _____

Laboratory Director:_____Date: _____

Department Manager:_____Date: _____

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the concentration of Ethylene Glycol in soil in compliance with the Resource Conservation and Recovery Act. Direct injection is used in conjunction with a modified EPA 8015B Gas Chromatographic Flame Ionization Detector method.

1.2 The Practical Quantitation Limit (PQL) of this method is highly matrix dependent. Dilutions should not be performed for this method. If the material has a high level of Ethylene Glycol, use a smaller sample size rather than dilution, if possible.

1.3 This method is based on a direct injection gas chromatography (GC) procedure. This method should be used by, or under the supervision of, analysts experienced in the use of gas chromatographs. The analysts should be skilled in the interpretation of chromatograms and their use as a quantitative tool.

Note: The quality control limits specified in this Standard Operating Procedure are applicable to all analyses which specify this method and are not governed by a project or program specific QAPP. In cases where a separate QAPP is provided, the QAPP will supersede the limits specified herein.

Table 1 – Compound List and Detection Limits		
Compound	**Detection Limits (mg/Kg)**	
Ethylene Glycol	20	

2.0 SUMMARY OF METHOD

2.1 This method provides gas chromatographic conditions for the detection of Ethylene Glycol. Detection is by flame ionization detector (FID).

2.2 This method is only suitable for the analysis of soils. Soil samples can be analyzed directly after dispersion in methanol to dissolve the organic constituents (Method 5030B).

2.3 This method is based on USEPA SW-846 Methods 5030B for extraction and 8000 and 8015B for analysis. Refer to the SOP for EPA Method 5030B for applicable procedure.

3.0 DEFINITIONS

3.1 Secondary Source Standard: A commercial standard used by the laboratory as a quality control check, prepared from a different source than the primary standards to serve as a quality control check. If a secondary source from a manufacturer different from the calibration standard manufacturer is not available, a different lot number standard will be sufficient, or alternatively, a standard may be prepared from neat solutions.

3.2 Laboratory Control Sample: A method blank sample spiked with the representative secondary source standards. The spike recovery is used to evaluate method control.

3.3 Method Blank: A blank matrix that is treated exactly as a sample, including exposure to all glassware, equipment and solvents that are used with other samples. The method blank is used to determine if interferences are present in the laboratory environment.

4.0 INTERFERENCES

4.1 High levels of heavier petroleum products such as gasoline or diesel fuel may contain some volatile components producing a response within the retention time of the compound measured by this method

5.0 SAFETY

5.1 During the execution of the procedures outlined in this SOP, potentially hazardous compounds may be encountered. Preparation personnel should observe all appropriate safety rules as outlined in the Chemical Hygiene Plan.

5.2 Samples handled under this SOP may originate from unknown sites, which could contain a variety of hazardous materials. Appropriate safety rules as outlined in the Chemical Hygiene Plan should be observed while handling samples of unknown content and/or origin.

6.0 EQUIPMENT AND SUPPLIES

6.1 Gas Chromatograph: HP 5890 equipped with FID and HP 7673 series autosampler. Analytical system complete with gas chromatograph and all required accessories, including a detector, column supplies, gases, syringes, and data system to determine peak areas.

6.2 Columns:

6.2.1 Column A: MXT-WAX, 60m x 0.53mm ID capillary column

6.2.2 Column B: MXT-200, 60m x 0.53 ID capillary column

6.2.3 If coelution is a problem use the alternate column as the primary

6.3 Detectors: Flame ionization detector (FID). The FID should be cleaned frequently if the chromatography on the instrument indicates a problem. Document all such procedures in the Instrument Maintenance Log.

6.4 Microsyringes: 5, 10, 25, 50, 100, 250, 500, and 1000 µL.

6.5 Balances: Analytical, capable of weighing 0.0001g; and top-loading balance capable of weighing to the nearest 0.1g.

7.0 REAGENTS AND STANDARDS

7.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

Note – Each new lot of solvent must be checked for contamination by using a method blank. These blanks must pass below the reporting limit for each new lot. If a new lot is found to be contaminated, it shall not be used. It is recommended that the vendor set aside a number of bottles of the same lot to minimize the number of blanks analyzed.

8.0 SAMPLE COLLECTION, PRESERVATION, SHIPMENT AND STORAGE

8.1 According to SW-846, soil samples for volatile organic analysis must be held at 4°C and analyzed as soon as possible. The maximum holding time is 14 days.

9.0 QUALITY CONTROL REQUIREMENTS

9.1 **Method Blank -** For each analytical batch of no more than 20 samples processed, a Prep blank (method blank) must be carried throughout the entire sample-preparation and analytical process. This blank will be useful in determining if samples are being contaminated during extraction and analysis.

9.2 A **Laboratory Control Sample** (LCS) (blank spike) must be processed with each analytical batch of no more than 20 samples. An LCS is a blank spiked at approximately

ten times the Method Detection Limit and brought through the whole preparation and analytical process.

9.3 **Matrix spike (MS) and matrix spike duplicate (MSD)** samples should be prepared with each analytical batch of no more than 20 samples. Spiked samples should be included whenever a new sample matrix is being analyzed. If there is insufficient sample for a matrix spike duplicate, a Laboratory Control Sample duplicate may be substituted.

9.4 **Continuing Calibration Standard -** Analyze a continuing calibration standard every ten samples.

9.5 **Initial Calibration Verification** – A second source standard should be analyzed after each calibration curve to verify the analytical validity of the curve obtained.

10.0 CALIBRATION AND STANDARDIZATION

10.1 **Five-Point Calibration**: Prepare at least a five-level calibration curve using the following standards.

Table 2 – o2si Part # 020307-01	
Ethylene Glycol Calibration Level	**Nominal Concentration (mg/kg)**
Level 1	10
Level 2	50
Level 3	100
Level 4	250
Level 5	500

10.2 Summed areas of standards are used to develop an external quantitation curve using linear regression to obtain a calibration curve. A minimum value of 0.990 must be obtained for the correlation coefficient (r) or order to establish the linearity of an external calibration curve. The calibration curve may also be evaluated using %RSD. The calibration curve should have a percent relative standard deviation (%RSD) < 20% for quantitation to be performed.

10.3 Ongoing Calibration: At the beginning of each analytical run and after the analysis of every ten samples (excluding quality control samples), the initial calibration is verified by running a mid-level standard (alternating concentrations) as an unknown. If the measured concentration is within 20% of the 5 point calibration, the initial calibration is considered valid. If the measured deviation is greater than 20%, a new initial calibration must be performed if reanalysis of the ongoing solution does not indicate an isolated solution problem.

10.4 Retention Time Windows and Pattern Recognition

10.4.1 Before establishing windows, be certain that the GC system is within optimum operating conditions. Make three injections of the standard throughout the course of a 72 hour period. Serial injections over less than a 72 hour period result in retention time windows that are too tight.

10.4.2 Calculate the standard deviation of the three absolute retention times for each method standard component. In those cases where the standard deviation for a

particular analyte is zero, the laboratory should use plus or minus 0.50 min as a retention time window.

10.4.3 The laboratory should calculate retention time windows for each standard on each GC column and whenever a new GC column is installed.

11.0 PROCEDURE

11.2.2 **GC Operating Conditions**

Table 4 - GC Operating Conditions		
Initial operating temperature:	120 °C	
Initial hold time:	0.25 min	
Temperature rate:	20.0 °C/min	
Final Target Temperature	210 °C	
Final Hold Time:	2.00 min	
Injection port temperature:	250 °C	
Detector temperature:	300 °C	
Sample Volume:	1 ul	
Detector:	FID	

Note: Instrument operating conditions are for guideline purposes only, and may vary from instrument to instrument. The operational conditions should be optimized for maximum operating performance according to the instrument utilized.

11.1 Solid Samples – Put 5.0 g of solid sample into a 40 mL VOA vial and add 5.0 ml of reagent grade Methanol. Vortex or shake for at least five minutes, and pipette extract from the top of the extract into an autosampler vial.

11.2 If the initial analysis of a sample or dilution of the sample has a concentration of analyte(s) that exceeds the initial calibration range, the sample must be reanalyzed using less sample. When a sample is analyzed that has a saturated response from a compound, this analysis may be followed by methanol blank analysis. The next run should be reviewed to confirm the absence of carryover. If the blank analysis is not free of interferences, the system must be decontaminated. Sample analysis may not resume until a blank can be analyzed that is free of interference.

11.3 Method Blank: Analyze a method blank at least once per day or every 20 samples, whichever is more frequent, and whenever system contamination is suspected following a high level sample. If the concentration of any component in a method blank is above the reporting limit for that compound, the system must be decontaminated and the method blank reanalyzed.

11.4 Second Column Confirmation - Concentration values must be within 40% agreement between the two columns. If the columns do not agree within 40%, evaluate the

chromatograms for interferences, report the lower of the two values and narrate in the QA/QC Summary. Samples matching historical data need not be confirmed. GC/MS may also be used for confirmation when required reporting limits can be met.

11.5 Samples are analyzed in a set referred to as an analytical sequence. The sequence begins with instrument calibration or calibration verification followed by ten samples (excluding quality control samples) and completed with a continuing calibration standard.

12.0 CALCULATIONS

12.1 **Use Turbochrom to calculate sample concentrations in soils in mg/Kg (ppm). Turbochrom calculates using the following formula:**

12.2 External standard calibration - The concentration of each analyte in the sample may be determined by calculating the amount of standard, from the peak response, using the calibration curve or the calibration factor. The concentration of a specific analyte is calculated as follows:

Non-aqueous Sample Conc. (mg/Kg) = $[(A(x))(A)(D)]/[(A(s)(X_{cf)(W)]}$

where:

A(x)	=	Response for the analyte in the sample, units are in area counts.
A	=	Amount of standard on column, ng.
A(s)	=	Response for the external standard, units same as for A(x).
D	=	Dilution factor, if dilution was made on the sample prior to analysis. If no dilution was made, D = 1, dimensionless.
W	=	Weight (W)] x of sample, g.
X_{cf}	=	Average Calibration Factor

13.0 METHOD PERFORMANCE

13.1 Method Detection Limit Studies are performed for this method on each instrument per matrix on an annual basis.

14.0 POLLUTION PREVENTION

14.1 All wastes from this procedure shall be disposed following the recommendations of the chemical hygiene plan.

15.0 DATA ASSESSMENT AND ACCEPTANCE CRITERIA FOR QUALITY CONTROL MEASURES

15.1 See Table 5, Section 16.

16.0 CORRECTIVE ACTIONS FOR OUT-OF-CONTROL DATA

16.1 Follow the corrective actions outlined in the following table.

Table 5 - Quality Control and Corrective Action

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Method Detection Limit (MDL) Study	Annually	Minimum of 7 replicates. Spike level must be at a concentration between the calculated MDL and 10 x MDL.	Reprepare study at adjusted spiking levels for MDLs falling outside of acceptable range.
Initial Demonstration of Proficiency	Prior to use of method for client samples.	Method-specific. Precision and accuracy goals established for many parameters in published methods.	Investigate failure. Verify solution integrity and instrument performance. Reprepare and reanalyze.
Initial Calibration	As necessary.	Minimum of five points. Low standard must not exceed method reporting limit. Average %RSD for all analytes may not exceed 20% or 0.990 for the calibration curve.	Verify solution integrity and check instrument performance. Perform necessary maintenance and recalibrate instrument. Reanalyze all affected samples.
Secondary Source Calibration Verification	Following every initial calibration.	Secondary source check – average of all target compounds +/- 20% of expected value.	Verify solution integrity and instrument performance. Reanalyze, if still out, then recalibrate.
Retention Time (RT) Window Study	Every new column installation	Target compounds and surrogates in all standards must fall within calculated window.	Perform system maintenance. Reanalyze affected samples.
Continuing Calibration Verification	Every 10 samples and following sample analysis to close out bracket.	Average Percent difference not to exceed 20%.	Verify solution integrity and instrument performance. Reanalyze standard once, if still out recalibrate and reanalyze affected samples.
Method Blank	One per batch of 20 samples.	Target compounds < reporting limit.	Investigate source of contamination. Reprepare and reanalyze all associated samples.

Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action
	.		.
Laboratory Control Sample	One per analytical batch of 20 samples.	80-120% for soils or project-specific control limits.	Reanalyze once, if still out verify solution integrity and instrument performance. Reprepare and reanalyze all associated samples.
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	One set per 20 samples of a similar matrix.	70-130% recovery or project-specific limits. 0-20 RPD limit between MS/MSD.	Reanalyze once (unless high background levels present), if still out, verify solution integrity and instrument performance. If LCS acceptable, narrate as possible matrix effect.
Second Column Confirmation	All hits above the reporting limit.	60-140% of original analysis. (GC/MS may be used if the sensitivity of the method satisfies the reporting requirements)	Evaluate the chromatograms for interferences, report the lower of the two values.
Instrument Blanks	Following high level samples and standards.	Target compounds < reporting limits.	Continue to analyze instrument blanks or perform decontamination procedures.

17.0 CONTINGENCIES FOR HANDLING OUT-OF-CONTROL OR UNACCEPTABLE DATA

17.1 Data that fails quality control requirements but cannot be repeated (i.e., insufficient sample volume, or severe matrix effects) should be brought to the immediate attention of the Department Manager or Client Services Representative so that the results may be discussed with the client. A narrative should accompany the analytical results explaining the analytical difficulties the laboratory encountered.

18.0 WASTE MANAGEMENT

18.1 All wastes produced by this procedure must be disposed following the procedures outlined in the Chemical Hygiene Plan.

19.0 REFERENCES

19.1 USEPA "SW-846 Test Methods for Evaluating Solid Waste", 3rd Edition; Methods 5030, 8000, 8015, and 8021, 1994.

VOLATILE GC ANALYSIS DEPARTMENT

SEQUOIA ANALYTICAL - MORGAN HILL LABORATORY

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-005.2** **Date**: August 18, 2004

Subject: To implement collection and analyses of trip blanks, equipment blanks *and/or field blanks* for the soil samples program

Description: Modify the SAP to clarify and add collection of trip, equipment, and/or field blanks for soil sampling in a manner that is consistent with the QAPP.

Prepared By: David Myers, Lily Bayati

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☒ SOP Number **SOP's for soil sampling and handling: 1-1, 1-3, 1-4, 1-8, equip decon 5-4**
- ☒ Other *SAP*

Description:

- ☒ See Attached Field Change Request

Reason for Change: to detect possible sources of contamination that could potentially influence contaminant values reported in field samples, both quantitatively and qualitatively.

Supporting Justification for Change: See attached change request

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 8/16/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 8/16/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 8/16/2004
Lily Bayati / URS Corporation

CHANGE REQUEST REVIEW:

- ☒ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ Date: 9/8/2004
Tom Henderson / CH2MHill

EPA Project Manager: _____ Date: 9/8/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-005.2** **Date**: August 18, 2004

The QAPP *and SAP* for the approved RI/FS Work Plan for the Casmalia Site Remediation *are unclear and inconsistent as to when blanks from the field will be collected and submitted* as part of field quality control samples for the soil-sampling program. Per EPA's request, starting August 13, URS will be collecting equipment blanks *and/or field blanks* and sending trip blanks with daily soil sample shipments.

One equipment blank will be collected at the end of each sampling day. This blank will be collected and analyzed for all analytical parameters collected for analysis during that day from that piece of equipment. To ensure we get appropriate coverage of all equipment, at least one equipment blank will be collected each week from each of the various mechanical sampling devices used during the sampling week (i.e., continuous core samplers, direct push samplers, split spoon, sample sleeves, and etc.). The equipment blanks will be varied each day so that the equipment blanks are representative of the equipment used for that week. For example, the following schedule could be followed for a typical week:

DAY 1 - EQUIPMENT BLANK FOR SURFACE DRIVE SAMPLER
DAY 2 - EQUIPMENT BLANK FOR SUBSURFACE SPLIT SPOON SAMPLER
DAY 3 - STAINLESS STEEL SLEEVES
DAY 4 - SAME AS DAY 1
DAY 5 - SAME AS DAY 2

Any time that only disposable or dedicated equipment is used (for some or all parameters sampled during a day) field blanks can be submitted in place of equipment blanks. Field blanks may also be submitted in place of equipment blanks on rare occasions when it is not practical or possible to collect an equipment blank, this will only be done with concurrence from EPA's onsite representative.

Trip blanks for VOCs will be submitted with ***each*** *cooler containing VOC samples. Trip blanks are not required for VOC methods other than EPA SW846 8260 if an equipment blank is included in the cooler in question. (For example a cooler that includes samples for analyses for both methods 8015 – gasoline and 8260, at a minimum would contain equipment blanks for both methods and a trip blank for method 8260.)*

RI Task Manager: Lily Bayati Date: August 16, 2004
Lily Bayati/ URS Corporation

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-006 **Date**: August 24, 2004

Subject: Implementing the use of a peristaltic pump to collect surface water samples for the creek sampling (Type 9) program

Description: Modify the RI/FS Workplan and applicable SOP to include an alternate method of collecting surface water samples by using a peristaltic pump equipped with disposable tubing.

Prepared By: Mark Wanek

SUMMARY INFORMATION:

- ☒ Remedial Investigation Work Plan Section 5.1.3
- ☒ SOP Number 3-4
- ☐ Other

Description:

- ☒ See Attached Field Change Request

Reason for Change: In surface water sampling locations where water is shallow, a peristaltic pump would facilitate the collection of surface water.

Supporting Justification for Change: See attached field change request form

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: Date: 8/24/2004
Corey Bertelsen / CBCI

RI Assistant Field Manager: Date: 8/24/2004
Mark Wanek / URS Corporation

RI Task Manager: Date: 8/24/2004
Mark Wanek / URS Corporation

CHANGE REQUEST REVIEW:

- ☒ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: Date: 9/7/2004
Tom Henderson / CH2MHill

EPA Project Manager: Date: 9/7/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-006** **Date**: August 24, 2004

Section 5.1.3 of the approved RI/FS Work Plan for the Casmalia Site Remediation for collecting surface water samples requires samples to be collected by "submerging laboratory provided containers just under the surface of the water until the container is full." The CSC proposes an alternate surface water collection technique to facilitate surface water collection in shallow waters. All surface water samples with the exception of volatiles would be collected using a peristaltic pump equipped with disposable polyethylene and silicone tubing. Tubing from the negative pressure side of the peristaltic pump would be inserted just beneath the surface of the surface water source, and the water would be pumped through the peristaltic pump into appropriate clean, laboratory-provided containers. In addition, the pump would be used to pressure filter through a 0.45 micron filter for dissolved metals analysis. The peristaltic pump would not be used to collect water samples for volatile analysis. Because of the small size of the sample containers for volatiles (40 mL VOA vials), and to minimize volatilization, these samples would be collected by carefully placing clean VOA vials beneath the surface of the water source.

RI Task Manager: _____ Date: August 24, 2004
Mark Wanek/ URS Corporation

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-007.2** **Date**: September 17, 2004

Subject: Modify NAPL investigation field procedures.

Description: Modify the RI/FS Work Plan to eliminate the use of the Ultraviolet Induced Fluorescence (UVIF) probe and replace it with the use of a Membrane Interface Probe (MIP) for all Type 7 sampling locations.

Prepared By: Brian Bjorklund, RG, CHG

SUMMARY INFORMATION:

☒ Remedial Investigation Work Plan Sections: 4.7, 4.7.2, 4.7.4, 4.7.6, 4.7.7, 4.7.8, 4.7.9, 4.7.10, 4.7.10, 4.7.12, 5.3, and 5.3.1.

☒ SOP Number 4-1

☐ Other

Description:

☒ See Attached Field Change Request

Reason for Change: In accordance with the RI/FS Workplan, co-located UVIF/MIP borings were completed at 8 locations at the site (including 1 off-site background location that was not anticipated in the RI/FS Workplan). Based on conversations with the CSC on August 20 and 25, 2004, EPA is concerned that the UVIF instrument is not detecting chlorinated DNAPLs, and believes that the MIP provides more useful information for the NAPL investigation. The CSC proposes to continue the NAPL investigation program using the MIP at all remaining Type 7 sample locations.

Supporting Justification for Change: See attached change request

Schedule Impacts:

☐ No Change
☐ Schedule Compression
☒ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 9/1/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 9/1/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 9/1/2004
Brian Bjorklund, R.G. / ERM

CHANGE REQUEST REVIEW:

☒ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ /for Date: 9/23/2004
Tom Henderson / CH2MHill

EPA Project Manager: _____ Date: 9/23/2004
Lynda Deschambault / US EPA

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-007.2** **Date**: September 17, 2004

The RI/FS Work Plan calls for the use of a UVIF probe at 50 Type 7 sampling locations. Because to the EPA's uncertainty regarding the UVIF data, the CSC proposes to modify the RI/FS Work Plan to reflect a change from the use of the UVIF tool to the exclusive use of a MIP tool at all remaining Type 7 sample locations, plus five sample locations where either UVIF/MIP or UVIF (only) data have already been collected. A summary of the Type 7 samples to be completed using the MIP is attached as Table 1. Field procedures for the MIP are already described in SOP 4-1 of the RI/FS Workplan, however, the following changes will be made:

- The MIP will include the use of three detectors: a flame ionization detector (FID), a photoionization detector (PID), and an electron capture detector (ECD) (SOP 4-1 previously required the use of only a PID and an ECD);
- The MIP will be mounted to the back of the CPT cone tip, therefore the electrical conductivity tool that is typically used on the tip of the MIP will not be utilized. Lithologic data will be collected using the standard CPT cone tip.

RI Task Manager: _____ Date: September 17, 2004

Brian Bjorklund, R.G./ ERM

Table 1
RI Change Form 007
MIP Sampling Locations

Priority Grouping	Sample Area	Type 7 Sample Location/Tag	Comment	Completed UVIF	Completed MIP (PID+ECD)	Planned (RICH-007) MIP (FID+PID+ECD)
1	Burial Trench Area	RISBBC-1	Located in Burial trench area.	X	-	-
1	Burial Trench Area	RISBBC-2	Located in Burial trench area.	X	-	-
1	Burial Trench Area	RISBBC-3	Located in Burial trench area.	X	X	X
1	Burial Trench Area	RISBBC-4	Located in Burial trench area.	X	X	-
1	Burial Trench Area	RISBBC-5	Located in Burial trench area.	X	X	X
1	Capped Landfill Area	RISBCL-1	Located adjacent to Gallery Well	X, X (a)	X	
1	Central Drainage Area	RISBCD-9	Located near Sump 9B	X	X	X
1	Central Drainage Area	RISBCD-11	Located between Gallery Well and Sump 9B	X	X	X
2	Former Ponds and Pad Subare	RISBON-67 (Pond M)	Pond M received PS Landfill leachate	X	-	-
2	Central Drainage Area	RISBCD-8	Proximal to toe of PS Landfill	X	-	X
2	Central Drainage Area	RISBCD-13	Proximal to toe of PS Landfill	-	-	-
3	Former Ponds and Pad Subare	RISBON-58	Former drainages, no prescribed soil sampling	-	-	X
3	Former Ponds and Pad Subare	RISBON-59	Former drainages, no prescribed soil sampling	-	-	X
3	Former Ponds and Pad Subare	RISBON-60	Former drainages, no prescribed soil sampling	-	-	X
3	Former Ponds and Pad Subare	RISBON-61	Former drainages, no prescribed soil sampling	-	-	X
3	Former Ponds and Pad Subare	RISBON-62	Former drainages, no prescribed soil sampling	-	-	X
4	Central Drainage Area	RISBCD-7	Former drainage from PS Landfill	-	-	X
4	Central Drainage Area	RISBCD-6	Former drainage from PS Landfill	X	X	-
4	Central Drainage Area	RISBCD-10	Former drainage from PS Landfill	-	-	X
5	Central Drainage Area	RISBCD-4	Former drainage north of PSCT	-	-	X
5	Central Drainage Area	RISBCD-5	Former drainage north of PSCT	-	-	X
5	Central Drainage Area	RISBCD-12	Former drainage north of PSCT	-	-	X
6	Former Ponds and Pad Subare	RISBON-63 (Pond A)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-64 (Pond S)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-65 (Pond S)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-66 (Pond C)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-68 (Pond D)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-69 (Pond D)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-70 (Pond C)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-71 (Pond M)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-72 (Pond V)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-73 (Pond 16)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-74 (Pond B)	Former Pond, shallow prescribed soil sampling	-	-	X
6	Former Ponds and Pad Subare	RISBON-75 (S. of Ponds P/14)	Ponds P and 14 contained only acids and caustics	-	-	X
7	Liquids Treatment Area	RISBLT-5		-	-	X
7	Liquids Treatment Area	RISBLT-7		-	-	X
7	Liquids Treatment Area	RISBLT-8		-	-	X
7	Liquids Treatment Area	RISBLT-9		-	-	X
8	Maintenance Shed Area	RISBMS-2		-	-	X
8	Maintenance Shed Area	RISBMS-3		-	-	X
8	Maintenance Shed Area	RISBMS-8		-	-	X
8	Maintenance Shed Area	RISBMS-9		-	-	X
9	RCRA Canyon	RISBRC-1		-	-	X
9	RCRA Canyon	RISBRC-2		-	-	X
9	RCRA Canyon	RISBRC-3		-	-	X
9	RCRA Canyon	RISBRC-4		-	-	X
9	RCRA Canyon	RISBRC-6		-	-	X
10	Admin Building Area	RISBAB-1		-	-	X
10	Admin Building Area	RISBAB-4		-	-	X
11	Offsite Area	RISBOF-1	Offsite	X	X	-

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-008.2** **Date**: August 31, 2004
Subject: Piezometer Installation and Video Logging
Description: 1 - Delete piezometer RIPZ-1; 2 - Do not perform downhole video logging of Upper HSU CPT/Direct Push piezometers.
Prepared By: Daniel J. Craig

SUMMARY INFORMATION:

☒ Remedial Investigation Work Plan Section 5.1.5
☒ SOP Number SOP 3-1

Other References: Table 4-8, Proposed Additional Well and Piezometer Installations
Figures 4-7/A-7, Proposed Groundwater Investigation Program
Section A.6.3.2, Borehole Geophysical Logging
Tables A-7/A1-2, Well and Piezometer Drilling and Logging Program

Description:

☒ See Attached Field Change Request

Reason for Change: 1 - Piezometer RIPZ-01 not needed for water level monitoring
2 – Downhole video logging of shallow Upper HSU piezometers installed using CPT/Direct Push not useful.

Supporting Justification for Change: 1 – existing Upper HSU well B6B, along with new piezometer RIPZ-02 are adequate for RAP B-Trench water level monitoring; 2 – downhole video logging is not practical since the narrow diameter steel casing will act as an optical barrier to any video logging.

Schedule Impacts:

☒ No Change
☐ Schedule Compression
☐ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 8/31/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 8/31/2004
David Myers / URS Corporation

RI Task Manager: Daniel Craig (el) Date: 8/31/2004
Daniel Craig / Mactec

CHANGE REQUEST REVIEW:

☒ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ for Date: 11/19/2004
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 11/19/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: 008.2 **Date**: August 31, 2004

Delete piezometer RIPZ-1, and do not perform downhole videologging of Upper HSU CPT/Direct Push piezometers. Piezometer RIPZ-01 is not required to fulfill the needs for water level monitoring as described in Table 4-8. Existing Upper HSU well B6B, along with new piezometer RIPZ-02 are adequate for RAP B-Trench water level monitoring. Please see Figures 4-7 for reference locations and proximity to adjacent wells and piezometers.

Downhole video logging of shallow Upper HSU piezometers installed using CPT/Direct Push is not useful. Additionally the small diameter, direct push casing, being used with the CPT rig would make video logging impractical since the casing would be an optical barrier to the borehole wall.

RI Task Manager: Daniel J. Craig (el) Date: August 31, 2004

Dan Craig / Mactec

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-009.3** **Date**: September 14, 2004

Subject: Modify sampling procedure for the 8015 direct inject for soils.

Description: Modify the RI/FS Work Plan to account for the sampling of the 8015 direct inject by using the Encore sampling method rather than collecting the sample from a ring as had been previously done.

Prepared By: David Myers, Lily Bayati

SUMMARY INFORMATION:

☐ Remedial Investigation Work Plan Section _____
☐ SOP Number _____
☒ Other RI/FS Work Plan

Description: _____
☒ See Attached Field Change Request

Reason for Change: Sequoia Analytical Laboratories will extrude the required sample volume from the Encore sampling devise in preparing the sample for analysis.
Supporting Justification for Change: See attached change request

Schedule Impacts:

☒ No Change
☐ Schedule Compression
☐ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 8/6/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 8/6/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 8/6/2004
Lily Bayati / URS Corporation

CHANGE REQUEST REVIEW:

☒ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ for Date: 12/28/2004
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 12/28/2004
Lynda Deschambault / US EPA

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-009.3** **Date**: September 14, 2004

The RI/FS Work Plan Table A-2 calls for a 2-oz jar to be used for the 8015 direct inject methodology. The CSC laboratory expressed the desire to pull the required sample from one of the bulk rings instead of a separate sample container. After the start of the sampling program it was noted by the EPA that there was a discrepancy between the methods being used by their contractors labs and the labs being used by the CSC contractors. During a conference call EPA noted that the CSC, was not using the 2-oz jars as specified in the work plan. Therefore it was decided that for consistence and in order to limit any loses of the volatile component; the CSC would use the Encores samplers as were currently being used by the EPA contractors to analyze for the 8015 direct inject method. They asked the CSC to switch over to the Encore samplers for all future 8015 direct inject samples collected. The CSC began using the Encore samplers starting on September 3, 2004 for the remainder of the sampling program.

RI Task Manager: Lily Bayati Date: September 14, 2004

Lily Bayati/ URS Corporation

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: 011 **Date**: September 30, 2004

Subject: Additional CPTs for low area confirmation

Description: The CSC is proposing to add two to four additional CPTs located in an area of the Site immediately north of PSCT-1 as summarized on the figure attached to this form. The additional CPTs will be used to help analyze the Seismic Refraction data that was collected as part of the RI (please see Section 5.3.2 of the approved RI/FS Work Plan). In addition to using the information from these additional CPTs to analyze the geophysical survey data, the CSC will include this information as part of or all of the "confirmation" work detailed in the Work Plan (the Work Plan notes that ..."Following the geophysical efforts, if a low area or depression is indicated, the CSC will complete CPTs to confirm the depression").

Prepared By: C.Bertelsen

SUMMARY INFORMATION:

☒ Remedial Investigation Work Plan Section 5.3.2
☐ SOP Number _____
☐ Other _____

Description: See above

☐ See Attached Field Change Request

Reason for Change: The CPTs will provide data to correlate the Seismic Refraction survey and analysis

Supporting Justification for Change: _____

Schedule Impacts:

☐ No Change
☐ Schedule Compression
☐ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 9/30/04
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 9/30/04
David Myers / URS Corporation

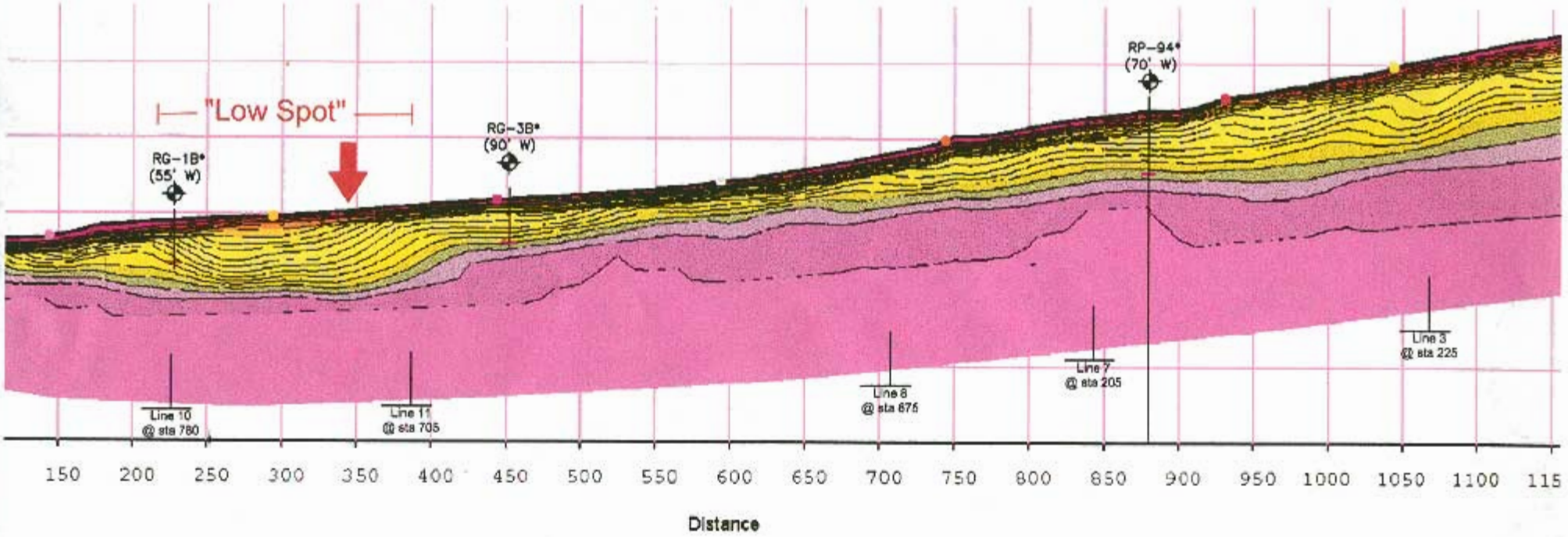
CHANGE REQUEST REVIEW:

☒ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

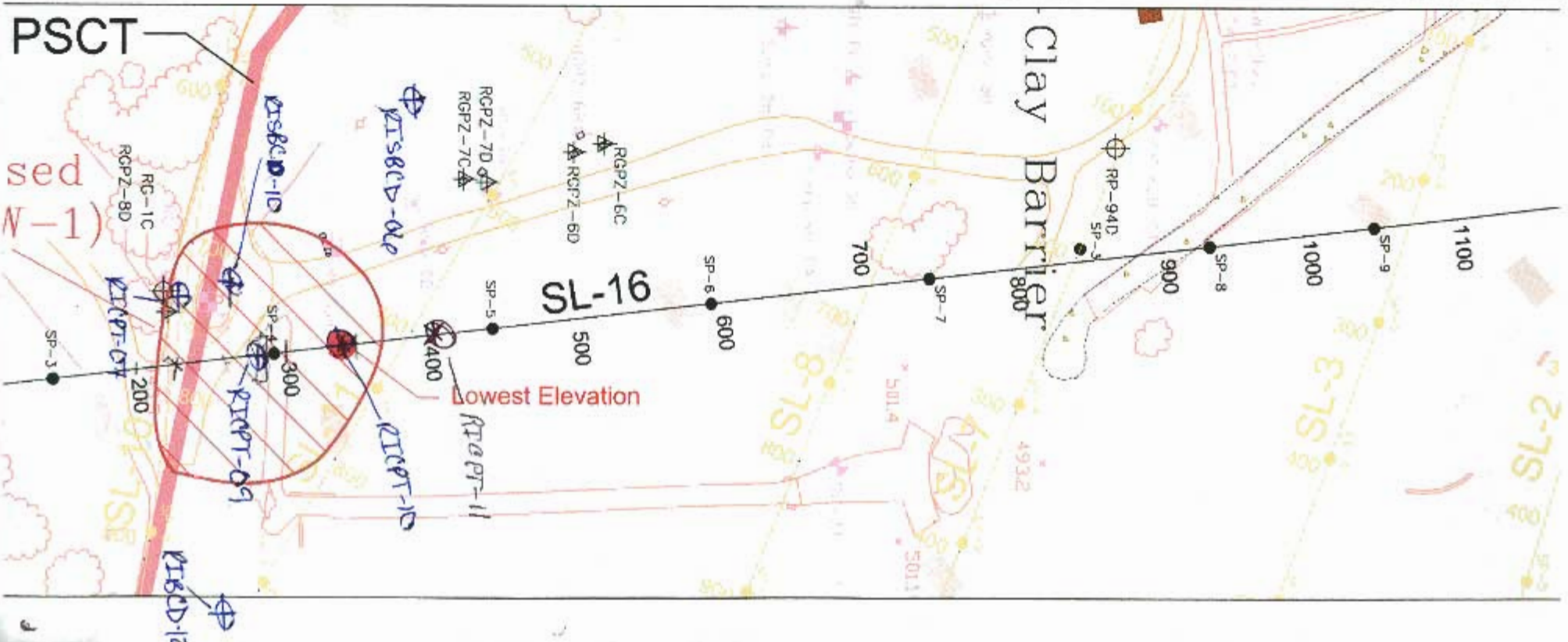
EPA Onsite Representative: _____ for Date: 12/28/2004
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 12/28/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill


"Low Spot"
RG-1B*
(55' W)
RG-3B*
(90' W)
RP-94*
(70' W)
Line 10
@ sta 780
Line 11
@ sta 705
Line 8
@ sta 675
Line 7
@ sta 205
Line 3
@ sta 225
150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100 115
Distance

odel_v1.vs


PSCT
sed
N-1)
RG-1C
RGPZ-8D
RGPZ-7D
RGPZ-7C
RGPZ-6D
RGPZ-6C
RP-94D
SP-3
SP-4
SP-5
SP-6
SP-7
SP-8
SP-9
SL-16
Clay Barrier
Lowest Elevation
SL-8
SL-3
SL-2
200
300
400
500
600
700
800
900
1000
1100

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **012.2** **Date**: October 19, 2004

Subject: Proposed Methodology for Determining the Elevation of the Top and Lateral Limits of the Clay Barrier

Description: The approved RI/FS Work Plan discusses the methodology the CSC proposed to determine the lateral extent and top of the clay barrier (see Sections 4.7.1 and 5.2). The Work Plan noted that the CSC would first complete directional horizontal borings to locate the lateral limits or alignment of the clay barrier, then would drill vertical borings and coring at three locations along the alignment to verify the elevation of the top of the clay barrier at those locations.

The CSC proposes to eliminate the first step (or directional horizontal boring) and to move directly to the vertical boring and coring. Since the submittal of the RI/FS Work Plan, the CSC was able to complete additional review of the available aerial photographs and to compare those with the information previously generated (see Section 5.2 and the discussion of the 2001 investigations). The results of that work has further convinced the CSC that the alignment or lateral location of the clay barrier is the "orange" line shown on Figure 5.2 and shown as the 1981 aerial location (also depicted in orange) on Figure 5.3 and 5.4. The CSC acquired further high-resolution photographs and used these to determine the outline of the exposed portion of the clay barrier. This information was transferred to the coordinate system for the site and the surveyors prior to the start of drilling activities staked the outline in the field.

The CSC will complete four (rather than three) vertical borings and collect core from the target zones immediately preceding the top of the clay barrier and at least 4 to 5 feet into the clay barrier as part of this work. The vertical borings will be done in accordance with the existing Work Plan procedures for hollow stem auger drilling (Vol 3, SOP 1-1). A sample of the offsite borrow area source material will be collected prior to the start of the drilling so that field comparison can be performed during coring operations.

Prepared By: C. Bertelsen

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section 4.7.1, 5.2, Figure 5.2, 5.3, 5.4
- ☐ SOP Number 1-1
- ☐ Other

Description: Please see the discussion above

- ☐ See Attached Field Change Request

Reason for Change: The CSC has collected additional information that eliminates the need for the first step of the work (i.e. directional horizontal boring to determine alignment).

Supporting Justification for Change: Please see above. Note that the CSC completed this work and has confirmed the alignment without the need of the horizontal borings.

Schedule Impacts:

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2MHill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

☐ No Change
☐ Schedule Compression
☐ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 10/19/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 10/19/2004
David Myers / URS Corporation

RI Task Manager: _____ Date: 10/19/2004
Mark Wanek / URS Corporation

CHANGE REQUEST REVIEW:

☒ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ for/ Date: 11/10/2004
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 11/10/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2MHill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility
Field Change Request Form

RICH Form No: 012.2 **Date**: October 19, 2004

The approved RI/FS Work Plan discusses the methodology the CSC proposed to determine the lateral extent and top of the clay barrier (see Sections 4.7.1 and 5.2). The Work Plan noted that the CSC would first complete directional horizontal borings to locate the lateral limits or alignment of the clay barrier, then would drill vertical borings and coring at three locations along the alignment to verify the elevation of the top of the clay barrier at those locations.

The CSC proposes to eliminate the first step (or directional horizontal boring) and to move directly to the vertical boring and coring. Since the submittal of the RI/FS Work Plan, the CSC was able to complete additional review of the available aerial photographs and to compare those with the information previously generated (see Section 5.2 and the discussion of the 2001 investigations). The results of that work has further convinced the CSC that the alignment or lateral location of the clay barrier is the "orange" line shown on Figure 5.2 and shown as the 1981 aerial location (also depicted in orange) on Figure 5.3 and 5.4.

The CSC will complete four (rather than three) vertical borings and collect core from the target zones immediately preceding the top of the clay barrier and at least 4 to 5 feet into the clay barrier as part of this work. The vertical borings will be done in accordance with the existing Work Plan procedures.

RI Task Manager: Mark Wanek / URS Corporation Date: 10/19/2004

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2MHill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-013** **Date**: November 18, 2004

Subject: Sample Collection of Soil Vapor Sampling Leak Detection Compound

Description: _____

Prepared By: David Myers/ Robert Ettinger

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☒ SOP Number _____
- ☐ Other _____

Description: A sample will be collected to analyze the compound used to test the soil vapor sampling system for leaks. To collect the sample, the leak detection material (shaving cream) will be placed in a large plastic bag (as is done for the leak test for the sampling train fittings. A vapor sample will be collected from this bag using a 1-L Tedlar bag and a lung box. The sample will be analyzed for VOCs by TO-15 and isobutane by ASTM D1946.

☐ See Attached Field Change Request

Reason for Change: Verification of the presence and our ability to detect the leak detection compounds in shaving cream.

Supporting Justification for Change: _____

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ _____ Date: 11/18/04
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 11/18/04
David Myers / URS Corporation

RI Task Manager: _____ Date: 11/18/04
Robert Ettinger / GeoSyntec

CHANGE REQUEST REVIEW:

- ☒ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ for Date: 12/28/2004
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 12/28/2004
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: 014 **Date**: December 10, 2004

Subject: Monitoring Well Installation
Description: Delete monitoring well RIMW-4.
Prepared By: Daniel J. Craig

SUMMARY INFORMATION:

X Remedial Investigation Work Plan Section 5.1.5
X SOP Number SOP 3-1

Description: Delete Monitoring Well RIMW-4.
X See Attached Field Change Request

Reason for Change: Monitoring Well RIMW-4 is not needed for water level or chemical quality monitoring as these data quality objectives will be achieved by new piezometer RIPZ-8.

Supporting Justification for Change: RIPZ-8 and RIMW-4 were originally planned to be installed near the southwest end of the Clay Barrier (Figure 4-7, Proposed Groundwater Investigation Program). During the EPA/CSC location approval walkthrough RIPZ-8 was re-located to allow ARCH drill rig access . RIPZ-8 was field-located to be on the buttress slope south of Gallery Well road and north of the small buttress road immediately to the south. RIMW-4 was slightly relocated in the field (<10') to allow ARCH drill rig access to avoid a ditch. However, during the recent drilling/installation of RIPZ-8, the field team realized that RIPZ-8 and RIMW-4 are within ~100' of one another. Installing both would now be redundant. Both are targeted to be screened in the Upper HSU and are nearly collocated. Sampling of the 2" PVC piezo (RIPZ-8) is logistically feasible . Installation of the 4" well (RIMW-4) is not necessary. RIPZ-8 would be sampled for the same parameters as originally planned for RIMW-4.

Schedule Impacts:

- ☐ No Change
- ☒ Schedule Compression (minor)
- ☐ See Attached technical expert justification w/signature

RI Project Manager: _____ Date: 12/10/2004
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: 12/10/2004
David Myers / URS Corporation

RI Task Manager: Daniel Craig el Date: 12/10/2004
Daniel Craig / Mactec

CHANGE REQUEST REVIEW:

- ☒ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ for Date: 01/18/2005
Elizabeth Bryant / CH2MHill

EPA Project Manager: _____ Date: 01/18/2005
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Mark Wuttig / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: 014 **Date**: December 10, 2004

Delete Monitoring Well RIMW-4. Monitoring Well RIMW-4 is not needed for water level or chemical quality monitoring as these data quality objectives will be achieved by new piezometer RIPZ-8. RIPZ-8 and RIMW-4 were originally planned to be installed near the southwest end of the Clay Barrier (Figure 4-7, Proposed Groundwater Investigation Program). During the EPA/CSC location approval walkthrough RIPZ-8 was re-located to allow ARCH drill rig access . RIPZ-8 was field-located to be on the buttress slope south of Gallery Well road and north of the small buttress road immediately to the south. RIMW-4 was slightly relocated in the field (<10') to allow ARCH drill rig access to avoid a ditch. However, during the recent drilling/installation of RIPZ-8, the field team realized that RIPZ-8 and RIMW-4 are within ~100' of one another. Installing both would now be redundant. Both are targeted to be screened in the Upper HSU and are nearly collocated. Sampling of the 2" PVC piezo (RIPZ-8) is logistically feasible . Installation of the 4" well (RIMW-4) is not necessary. RIPZ-8 would be sampled for the same parameters as originally planned for RIMW-4.

RI Task Manager: Daniel J. Craig el December 10, 2004

Date: _____

Daniel J. Craig / Mactec

CC: Lynda Deschambault / EPA Project Manager
Mark Wuttig / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH-015** **Date**: August 4, 2005

Subject: EPA 1668 Modified

Description: The RI/FS Work Plan required that approximately 60 soil samples be analyzed for PCB Congeners using EPA Method 680. The RI/FS Work Plan also required that 30 of those 60 samples be analyzed for PCB Congeners using EPA Method 1668. The intent of the Work Plan was to use Method 680 (which was recognized as having higher detection limits than Method 1668) as a screening analysis which could be compared to the better resolution Method 1668. The CSC's soil contractor chose instead to analyze 30 of the soil samples which would otherwise have been analyzed by EPA Method 680 by EPA Method 1668 Modified. EPA Method 1668 Modified allowed for the detection of specific PCB congeners (which EPA Method 680 was not capable of detecting).

Prepared By: Lily Bayati

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☐ SOP Number _____
- ☒ Other RI/FS Work Plan

Description:

- ☒ See Attached Field Change Request

Reason for Change: The CSC has made the change from EPA Method 680 to EPA Method 1668 Modified to allow for the detection of fourteen specific PCB congeners that were requested by EPA in the RI/FS Work Plan and are listed on the Casmalia RI/FS QAPP table B-7C as part of the World Health Organization (WHO) list which the RI/FS Work Plan had identified as required analysis.

Supporting Justification for Change: See attached change request

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

CHANGE REQUEST REVIEW:

☐ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

RI Project Manager:  Date: 8/5/05
Corey Bertelsen / CBCI

RI Field Manager: _____ Date: _____
David Myers / URS Corporation

RI Task Manager:  Date: 8/4/2005
Lily Bayati / URS Corporation

EPA Project Manager: _____ Date: _____
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-015** **Date**: August 2, 2005

The Casmalia RI/FS QAPP Table B-7C requires the analysis of fourteen specific PCB congeners and identified EPA method 680 (low resolution GCMS) as the analytical test that would be used. Under EPA Method 680 PCBs are identified and measured only as isomer groups (i.e., by level of chlorination) and consequently, the individual PCB congeners listed on Table B-7C (WHO List) could not be analyzed. In order to satisfy the QAPP requirements, soil samples that were originally requested to be analyzed by EPA 680 were analyzed instead by EPA 1668 modified, and soil samples that were originally requested to be analyzed by both EPA 680, and EPA 1668 were analyzed instead only by EPA 1668 (The list of which samples were analyzed by which method is included as Table 1 to this RICH). EPA 1668 (high resolution GC/MS) is an excellent method for the analysis of specific PCB congeners, and it produces more accurate and defensible data. It has more stringent control criteria and has better resolution than EPA 680 thus providing lower reporting limits. EPA 1668 modified uses the same criteria as EPA 1668, however in order to be more inline with EPA 680 the reporting limits are higher (the initial weight was decreased from 10 grams to 5 grams and the final extract volume was increased from 50ul to 200ul, See table 2 for method comparisons). The change from EPA Method 680 to EPA Method 1668 Modified was made at the suggestion of Frontier Analytical Lab (a pioneer, and preferred laboratory in the analysis of PCB congeners) and was done so that the laboratory could produce a more accurate and defensible data by using EPA 1668 modified rather than EPA 680.

The original sampling requirements of the RI/FS Work Plan specified that a total of 60 soil samples would be analyzed for PCB congeners. The change the CSC has proposed also analyzes a total of 60 soil samples for PCB congeners, and by using Method 1668 Modified rather than Method 680 we are able to meet the analytical requirements specified by the Work Plan that we would otherwise not have been able to satisfy. The proposed change both accomplishes the objectives of the original sampling plan and improves the quality of data gathered.

The following two tables are included with this RICH form.
Table 1: EPA Revised (1-21-05) including Frontier Analysis
Table 2: PQL Comparison, Method Comparison

RI Task Manager: Lily Bayati Date: revised August 24, 2005
Lily Bayati/ URS Corporation

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

TABLE 1
EPA Revised
Proposed Samples for PCB Congener Analysis
Casmalia Site Remedial Investigation

Study Area	Location	Sample Depth	Analyte	Concentration	Method 680	Method 1668	Analyzed By Frontier
Administration Building	**RISBAB-01**	0		ND	X	X	1668
Administration Building	**RISBAB-04**	0		ND	X		1668 Modified
Burial Trench Area	**RISBBC-03**	0		ND	X	X	1668
Burial Trench Area	**RISSBC-01**	0		ND	X		1668 Modified
Central Drainage	**RISBCD-01**	0		ND	X		1668 Modified
Central Drainage	RISBCD-02	0	PCB- Arochlor 1260	0.019	X		1668 Modified
Central Drainage	**RISBCD-03**	0		ND	X		1668 Modified
Central Drainage	RISBCD-08	5	PCB- Arochlor 1260	0.091	X	X	1668
Central Drainage	RISBCD-10	0	PCB- Arochlor 1260	3.2	X	X	1668
Central Drainage	RISBCD-10	5	PCB- Arochlor 1260	0.073	X		1668 Modified
Central Drainage	**RISSCD-01**	0		ND	X	X	1668
Existing Ponds	RISESP-03	0		0.056	X	X	1668
Existing Ponds	RISESP-04	0		0.098	X	X	1668
~~Existing Ponds~~	~~RISESP-08~~	~~0~~		~~pending~~	~~X~~	~~X~~	
Existing Ponds	**RISESP-09**	0		ND	X	X	1668
Existing Ponds	**RISESP-10**	0		ND	X	X	1668
~~Existing Ponds~~	~~RISESP-11~~	~~0~~		~~pending~~	~~X~~	~~X~~	
~~Existing Ponds~~	~~RISETL-02~~	~~0~~		~~pending~~	~~X~~	~~X~~	
Existing Ponds	**RISETL-03**	0		ND	X	X	1668
Existing Ponds	**RISETL-05**	0		ND	X	X	1668
~~Liquid Treatment Area~~	~~RISBLT-04~~	~~0~~		~~ND~~	~~X~~		
Liquid Treatment Area	**RISBLT-12**	0		ND	X		1668 Modified
Liquid Treatment Area	**RISSLT-04**	0		ND	X	X	1668
Maintenance Shed	RISSMS-03	0	PCB- Arochlor 1260	0.55	X	X	1668
RCRA Canyon	**RISBRC-01**	0		ND	X	X	1668
RCRA Canyon	**RISBRC-04**	0		ND	X		1668 Modified
RCRA Canyon	RISBRC-08	0	PCB- Arochlor 1260	0.096	X	X	1668
RCRA Canyon	RISBRC-20	0	PCB- Arochlor 1260	0.034	X		1668 Modified
RCRA Canyon	RISSRC-06	0	PCB- Arochlor 1254	0.06	X	X	1668
RCRA Canyon	RISSRC-13	0	PCB- Arochlor 1254	0.089	X		1668 Modified
Remaining Onsite	RISBON-06	0	PCB- Arochlor 1260	0.13	X		1668 Modified
Remaining Onsite	**RISBON-08**	0		ND	X	X	1668
Remaining Onsite	RISBON-09	0	PCB- Arochlor 1260	0.025	X		1668 Modified
Remaining Onsite	RISBON-15	0	PCB- Arochlor 1260	0.064	X		1668 Modified
Remaining Onsite	RISBON-30	0	PCB- Arochlor 1260	0.4	X		1668 Modified
Remaining Onsite	RISBON-34	0	PCB- Arochlor 1260	0.15	X	X	1668
Remaining Onsite	RISBON-38	0	PCB- Arochlor 1260	0.1	X		1668 Modified
Remaining Onsite	**RISBON-40**	0		ND	X	X	1668
Remaining Onsite	RISBON-41	0	PCB- Arochlor 1260	0.076	X		1668 Modified
Remaining Onsite	RISBON-44	0	PCB- Arochlor 1260	0.02	X		1668 Modified
Remaining Onsite	RISBON-55	5	PCB- Arochlor 1260	0.062	X	X	1668
Remaining Onsite	RISBON-57	5	PCB- Arochlor 1260	0.15	X		1668 Modified
Remaining Onsite	RISBON-64	5	PCB- Arochlor 1260	0.4	X	X	1668
Remaining Onsite	RISBON-64	0	PCB- Arochlor 1260	0.069	X		1668 Modified
Remaining Onsite	RISBON-65	0	PCB- Arochlor 1260	0.087	X		1668 Modified
Remaining Onsite	RISBON-66	0	PCB- Arochlor 1260	0.65	X		1668 Modified
Remaining Onsite	RISSON-04	0	PCB- Arochlor 1254	0.43	X	X	1668
Remaining Onsite	RISSON-17	0	PCB- Arochlor 1260	0.55	X		1668 Modified
Remaining Onsite	RISSON-18	0	PCB- Arochlor 1260	0.31	X		1668 Modified
~~Remaining Onsite~~	~~RISSON-20~~	~~0~~	~~PCB- Arochlor 1260~~	~~1.1~~	~~X~~	~~X~~	
Remaining Onsite	**RISSON-22**	0		ND	X	X	1668
Remaining Onsite	RISSON-27	0	PCB- Arochlor 1260	1.4	X	X	1668
Remaining Onsite	RISSON-29	0	PCB- Arochlor 1260	0.13	X		1668 Modified
Remaining Onsite	RISSON-31	0	PCB- Arochlor 1260	1.7	X	X	1668
Roadway Sample	**RISSRS-07**	0		ND	X	X	1668
Roadway Sample	**RISSRS-09**	0		ND	X		1668 Modified
Roadway Sample	RISSRS-11	0	PCB- Arochlor 1260	0.04	X		1668 Modified
Roadway Sample	RISSRS-13	0	PCB- Arochlor 1260	1.5	X	X	1668
Roadway Sample	RISSRS-14	0	PCB- Arochlor 1260	0.19	X		1668 Modified
Roadway Sample	RISSRS-19	0.25	PCB- Arochlor 1254	0.53	X		1668 Modified
Roadway Sample	RISSRS-21	0.25	PCB- Arochlor 1260	0.73	X	X	1668
Roadway Sample	**RISSRS-26**	0		ND	X	X	1668
West Canyon Spray Area	RISBSA-03	0	PCB- Arochlor 1260	0.026	X		1668 Modified
West Canyon Spray Area	**RISSSA-05**	0		ND	X	X	1668
West Canyon Spray Area	**RISSSA-06**	0		ND	X		1668 Modified

Notes:
TBD - To be determined
ND - Non detect
All units in mg/kg

Deleted locations struck out in red
Additional sampling locations
changes to existing locations
Samples for which chromatograms from the Method 8082, Total PCB analysis, are to be provided to EPA

Table 2
RICH Form 010
WHO[(1)] List PCB Congeners

	Compound	Specific Isomer	Analytical Method	Practical Quantitation Limit (PQL) (pg/g)	Analytical Method	Practical Quantitation Limit (PQL) (pg/g)	Analytical Method	Practical Quantitation Limit (PQL) (pg/g)
WHO LIST PCB CONGENERS								
	Tetrachlorobiphenyl (PCB-77)	33'44'-TeCB	EPA 680	40	EPA 1668	0.35	EPA 1668 Modified	2.8
	Tetrachlorobiphenyl (PCB-81)	344'5-TCB	EPA 680	40	EPA 1668	0.37	EPA 1668 Modified	2.9
	Pentachlorobiphenyl (PCB-105)	233'44'-PeCB	EPA 680	40	EPA 1668	0.42	EPA 1668 Modified	3.3
	Pentachlorobiphenyl (PCB-114)	2344'5-PeCB	EPA 680	40	EPA 1668	0.23	EPA 1668 Modified	1.8
	Pentachlorobiphenyl (PCB-118)	23'44'5-PeCB	EPA 680	40	EPA 1668	0.34	EPA 1668 Modified	2.7
	Pentachlorobiphenyl (PCB-123)	2'344'5-PeCB	EPA 680	40	EPA 1668	0.42	EPA 1668 Modified	3.3
	Pentachlorobiphenyl (PCB-126)	33'44'5-PeCB	EPA 680	40	EPA 1668	0.48	EPA 1668 Modified	3.8
	Hexachlorobiphenyl (PCB-156)	233'44'5-HxCB	EPA 680	40	EPA 1668	0.27	EPA 1668 Modified	2.1
	Hexachlorobiphenyl (PCB-157)	233'44'5'-HxCB	EPA 680	40	EPA 1668	0.27	EPA 1668 Modified	2.1
	Hexachlorobiphenyl (PCB-167)	23'44'55'-HxCB	EPA 680	40	EPA 1668	0.25	EPA 1668 Modified	2.0
	Hexachlorobiphenyl (PCB-169)	33'44'55'-HxCB	EPA 680	40	EPA 1668	0.35	EPA 1668 Modified	2.8
	Heptachlorobiphenyl (PCB-170)	22'33'44'5-HpCB	EPA 680	40	EPA 1668	0.18	EPA 1668 Modified	1.4
	Heptachlorobiphenyl (PCB-180)	22'344'55'-HpCB	EPA 680	40	EPA 1668	0.17	EPA 1668 Modified	1.4
	Heptachlorobiphenyl (PCB-189)	233'44'55'-HpCB	EPA 680	40	EPA 1668	0.23	EPA 1668 Modified	1.8

[(1)] WHO = World Health Organization

Practical Quantitaion Limit (PQL) provided by Frontier Analytical Laboratories.

Note: PQLs cited assume no significant matrix interference.

	Analytical Method	Instrument	Initial Weight (g)	Final Extract Volume (uL)
	EPA 680	GC LRMS	20*	10000*
	EPA 1668	GC HRMS	10	50
	EPA 1668 Modified	GC HRMS	5	200

* EPA 8082 Criteria is used
LRMS - Low Resolution MS
HRMS - High Resolution MS

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: **RICH- 16** **Date**: July 25, 2006

Subject: Change the location of clay barrier sampling locations RISSCL-08 from the location currently shown on Figure 4.1-P2 to a location approximately 70 feet east.

Description: RISSCL-08 was one of three proposed sample locations that were designed to collect samples of the P/S Landfill clay barrier for permeability testing. The three sample locations were roughly spaced across the clay barrier (the location of which had been confirmed as part of the Phase I RI sampling program). The number of the clay barrier samples was chosen to provide enough data to increase confidence in the permeability results. The locations of the clay barrier samples were randomly selected to be equidistant across the clay barrier and there was no specific goal for the proposed placement. Since the origin of the clay in the barrier and the construction details are the same regardless of the barrier location, there is no reason to believe that the permeability of the clay barrier samples will vary significantly at different locations. The CSC and their contractor have recently become concerned about safe access to the middle clay barrier sample (RISSCL-08) which requires the contractors rig to move down a steep hill (i.e. the P/S Landfill buttress which is designed at a 2.5:1 slope) to set up and to subsequently come back up that hill when the sampling is complete. The safety concerns require us to change the location of the sample to a new location approximately 45 feet east to allow access. The CSC will walk that proposed location with EPA's on site representative and select a new location as close as safety allows to the previous location.

Prepared By: David Myers

SUMMARY INFORMATION:

☒ Spring 2006 Phase II RI Sampling Memo Figure 4.1-P2
☐ SOP Number
☐ Other

Description: Change clay barrier sample location RISSCL-08

☐ See Attached Field Change Request

Reason for Change: The current sample locations cannot be safely accessed by the sample rig.

Supporting Justification for Change:

Schedule Impacts:

X No Change
☐ Schedule Compression
☐ Schedule Delay
☐ Schedule Revision Attached
☐ See Attached technical expert justification w/signature

CC: Lynda Deschambault / EPA Project Manager

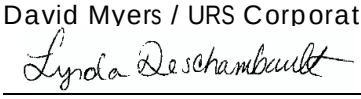
RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

CHANGE REQUEST REVIEW:

☐ Approved as Proposed ☐ PE or RG stamp/signature if required
☐ Approved with Modifications Indicated - See Attached Explanation
☐ Not Approved - See Attached Explanation

RI Project Manager:  Date: 7/25/06
Corey Bertelsen / CBCI

RI Field Manager:  Date: 7/25/06
David Myers / URS Corporation

EPA Project Manager:  Date: 7/26/06
Lynda Deschambault / US EPA

CC: Lynda Deschambault / EPA Project Manager

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Change Request No: RICH-017 **Date**: August 22, 2007

Subject: To resample three soil vapor locations (RISVCL-3D, RISVCL-5D, and RISVCL-8D) and analyze these at both Air Toxics Lab (using TO-15) and Alpha Woods Lab (using TO-15 SIM) to determine if the elevated concentrations of 1,3 Butadiene are lab artifacts

Description: Modify Table B-17 to add two constituents to the TO-15 SIM method. Air Toxics Lab will use TO-15 for their analysis with the previous list of constituents from Table B-17 from the approved RI/FS Work Plan and and Alpha Woods will use TO-15 SIM for their analysis with the modified Table B-17 list of constituents. The change order also allows for using Alpha Woods in the list of labs and the TO-15 SIM analytical techniques to analyze the soil vapor samples.
Prepared By: Corey Bertelsen, Robbie Ettinger

SUMMARY INFORMATION:

- ☐ Remedial Investigation Work Plan Section _____
- ☐ SOP Number _____
- ☒ Other See attached Soil Vapor Follow-up Sampling Memo

Description: _____

- ☒ See Attached Field Change Request

Reason for Change: To determine if previously reported concentrations of 1,3 Butadiene in soil vapor results are lab artifacts.

Supporting Justification for Change: See attached Soil Vapor Follow-up Sampling Memo

Schedule Impacts:

- ☒ No Change
- ☐ Schedule Compression
- ☐ Schedule Delay
- ☐ Schedule Revision Attached
- ☐ See Attached technical expert justification w/signature

RI Project Manager:  Date: 8/22/2007
Corey Bertelsen / CBCI

RI Task Manager: _____ Date: 8/22/2007
Robbie Ettinger / GeoSyntec

CHANGE REQUEST REVIEW:

- ☐ Approved as Proposed ☐ PE or RG stamp/signature if required
- ☐ Approved with Modifications Indicated - See Attached Explanation
- ☐ Not Approved - See Attached Explanation

EPA Onsite Representative: _____ Date: _____

EPA Project Manager: _____ Date: _____
Rich Hiett / US EPA

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

RI CHANGE FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Field Change Request Form

RICH Form No: **RICH-017** **Date**: August 22, 2007

The approved RI/FS Work Plan for the Casmalia Site Remediation indicated that the soil vapor samples would be analyzed at Air Toxics Lab using TO-15 methods. Since receiving those sample results, we have discovered that the GC spike for 1,3 Butadiene may be adversely impacted by other C3 and C4 compounds in the soil vapor and the reported concentrations of 1,3 Butadiene (which is a COPC and possible risk driver for the HHRA) might be a false high. Recent research referenced in the attached memorandum indicates that a modified method (TO-15 SIM) is better able to separate these C3 and C4 species and provide true sample results. Please see the attached Soil Vapor Follow Up Sampling Memo which discusses this issue in detail.

The CSC will resample three previous soil vapor locations (RISVCL-3D, RISVCL-5D, and RISVCL-8D) and split the sample to send one to Air Toxics Lab to analyze using TO-15 and the other to Alpha Woods Lab to analyze using TO-15 SIM. The list of constituents the two labs will analyze for is provided on the modified Table B-17. The samples will be collected using the same SOPs and other QA/QC requirements that applied to the earlier soil vapor sampling.

The CSC has included the following information for the Alpha Woods Lab attached to this RICH:

1. Lab QA manual
2. Standard operating procedures (SOP) for the method to be used
3. Method detection limit (MDL) study data, obtained within the last 12 months, for the method to be used
4. Copies of laboratory certifications
5. Copies of laboratory audits and corrective action responses for the past two years

*We have also attached a modified list of constituents (Table B-17) that will be analyzed for by Alpha Woods and a f*ull data packages, including raw data, for the data collected from the three previous step-out soil vapor sampling locations (RISVLC-3D, RISVCL-5D, and RISVCL-8D).

RI Task Manager:  for R. Ettinger: August 22, 2007

Robbie Ettinger / GeoSyntec

CC: Lynda Deschambault / EPA Project Manager
Thomas Henderson / CH2Mhill

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RFI No: RFI-001 **Date**: August 13, 2004

Subject: Addition of TO-15 Laboratory QA/QC Requirements for QAPP (Table B-18)

Description: The QAPP does not contain Laboratory QA/QC Requirements for Volatile Organic Compounds Analytical Method TO-15. These requirements are not the same as those for EPA 8260B. The attached table summaries the TO-15 Laboratory QA/QC Requirements.

Prepared By: Robert Ettinger

SUMMARY INFORMATION:

☐ Remedial Investigation Workplan Section QAPP table B-18

☐SOP Number

☒ Other See attached table

Information / Clarification Requested:

☒ See Attached RFI Detail Form

☐ See Attached technical expert justification w/signature if applicable

RI Task Manager: Robert Ettinger Date: August 13, 2004

Robert Ettinger / GeoSyntec

Clarification / Response: the attached table fulfills the needs of the TO-15 QA/QC requirements.

RI Field Manager: Dave Myers Date: August 13, 2004

David Myers / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Table B-18 Laboratory QA/QC Requirements

Parameter	Analytical Method	QA/QC Parameter	Frequency	Acceptance Criteria	Corrective Action
Volatile Organic Compounds	Method TO-15	Check of Instrument Tuning	Every 24 Hours	Refer to TO-15 Table 3 (equivalent to CLP OLM04.2 Exhibit D Volatiles Section 17 Table 1)	1) Retune instrument 2) Reanalyze tuning check
		Initial Calibration	Initially and as required	% RSD ≤ 30% with two compounds allowed out to 40%	1) Evaluate system 2) Perform maintenance if necessary
		Initial Calibration Verification	Following Initial Calibration	Recoveries for 90% of "TO-14A list" compounds must be 70-130%; for 80% of "Non-TO-14A list" compounds, recoveries must be 60-140%. No recovery may be <50%.	1) Reanalyze standard 2) Remake standard 3) Recalibrate
		Instrument Blank	Following Initial Calibration if there is additional sample analysis within the daily analytical batch, and as needed	< Method Reporting Limit	1) Reanalyze blank 2) Clean system 3) Reanalyze affected samples
		Continuing Calibration Verification	Every 24 hours (per analytical batch of 20 samples)	% D ≤ 30% with two compounds allowed out to 40%	1) Reanalyze standard 2) Remake standard 3) Recalibrate
		Method Blank	Every 24 hours (per analytical batch of 20 samples)	< Method Reporting Limit	1) Reanalyze blank 2) Clean system
		Laboratory Control sample (LCS)	Every 24 hours (per analytical batch of 20 samples)	Recoveries for 90% of "TO-14A list" compounds must be 70-130%; for 80% of "Non-TO-14A list" compounds, recoveries must be 60-140%. No recovery may be <50%.	1) Reanalyze standard 2) Remake standard 3) Recalibrate
		Matrix Spike/Matrix Spike Duplicate	Not performed because it is not possible for samples collected in summa canisters		

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RFI No: **RFI-002** **Date**: September15, 2004

Subject: Modify the EPA 8141 analysis for soil samples to include two additional organophosphorus pesticides.

Description: Modify the RI/FS Work Plan to include two additional analytes (Chlorpyrifos, Diazinon) to the EPA 8141 analyte list for the soil samples.

Prepared By: Lily Bayati

SUMMARY INFORMATION:

- ☐ Remedial Investigation Workplan Section _____
- ☐ SOP Number _____
- ☐ Other _____

Information / Clarification Requested: See above.

- ☒ See Attached RFI Detail Form
- ☐ See Attached technical expert justification w/signature if applicable

RI Task Manager: Lily Bayati Date: September 15, 2004
Lily Bayati / URS Corporation

RI Field Manager: David Myers Date: September 15, 2004
David Myers / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

DETAIL FORM

RFI No: RFI-002 **Date**: September 15, 2004

Per EPA's request, starting from September 10, 2004, the analyses of soil samples by EPA 8141 include two additional analytes (Chlorpyrifos, Diazinon). The laboratory has current MDL studies, and calibrations for these analytes.

RI Task Manager: Lily Bayati Date: September 15, 2004

Lily Bayati / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RFI No: 003 **Date**: September13, 2004

Subject: **Type 6 Sample Depths**

Description: The purpose of this RFI is to clarify the sample depths that will be collected for Type 6 Samples of the approved RI/FS Work Plan. EPA and the CSC have had discussions about the potential confusion or differences between Table 4.2 of the RI/FS Work Plan (which provides a general description of the different soil sample types and sample depths associated with those sample types) and the detailed sampling tables (Tables A.2 etc) included in the Work Plan that list specific sample depths, analytical suites, etc for all samples. The attached summary table which lists all Type 6 samples provides a summary of sample depths that will be collected as part of the RI and which supercedes both Table 4.2 and Table A.2 and other tables in the Work Plan.

The Type 6 sampling should be completed consistent with the following:

1) RCRA Canyon Area: , for each of the five locations, the maximum boring depth will be the contact and the water table will be sampled if it is encountered above the contact.

2) Burial Trench Area, for four of the five locations, the EPA representative will assist the CSC sampling team to determine whether the 5' sample should be collected. Samples will be collected at 5' if the material is "soil-like" but will not be collected at 5' if the material is waste. EPA will help in making this field determination. In addition, the water table will be sampled in any of the five locations if it is encountered above the contact.

3) Maintenance Building Area, for each of the four locations, the maximum boring depth will be 20'. Deeper soils to the contact may be collected in Phase 2, if necessary, based on the results of the Phase 1 soil samples.

4) Liquids Treatment Area, surface and 5' samples will not be collected for RISBLT-06 because the objective is to sample deeper soils that may be associated with old well BLS-1.

5) Pond C&M Trenches, the maximum sample depth will be 10', the depth of the trenches. No surface samples will be collected because the purpose is to assess subsurface soils within the trenches.

Prepared By: C.Bertelsen

SUMMARY INFORMATION:

- ☐ Remedial Investigation Workplan Section Appendix A
- ☐ SOP Number _____
- ☐ Other _____

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

Information / Clarification Requested: See above. Final sample depths for Type 6 soil samples.

☐ See Attached RFI Detail Form
☐ See Attached technical expert justification w/signature if applicable

RI Task Manager: _____ Date: 9/30/04
Mark Wanek - URS

Clarification / Response: See the attached table providing a summary of the sample depths (by location) that the Type 6 soil samples will include.

RI Field Manager: _____ Date: 9/30/04
David Myers / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

Type 6 Sample Locations - Sampling Depths

RI/FS Work Plan, Table A.2

Location	Boring Location ID	Type	Surface	5 Feet	**	Water Table	Contact	CSC Comments	EPA Comments
Former RCRA LF	RISBRC-01	6/7	X	X	X	X	X		OK
Former RCRA LF	RISBRC-02	6/7	X	X	X	X	X		OK
RCRA Canyon Base	RISBRC-03	6/7	X	X	10 (a)		X (a)	Water table expected within 2 feet of surface	Sample water table if it is 15 feet or deeper and above contact
RCRA Canyon Base	RISBRC-04	6/7	X	X	10 (a)		X (a)	Contact expected within 10 feet	Sample water table if it is 15 feet or deeper and above contact
RCRA Canyon Sideslope	RISBRC-06	6/7	X	X	20 b)		X (b)	Maximum sampling depth not expected to reach water	Sample water table if it is 40 feet or deeper and above contact
DG of Trenches	RISBBC-01	6/7	X	X	10, 20	X	X		OK
Between Trenches	RISBBC-02	6/7	X		20		X	Maximum sampling depth not expected to reach water, 5' sample omitted to avoid waste	Sample 5' if no waste encountered at that depth, sample water table if it is above contact
Between Trenches	RISBBC-03	6/7	X		20		X	Maximum sampling depth not expected to reach water, 5' sample omitted to avoid waste	Sample 5' if no waste encountered at that depth, sample water table if it is above contact
Between Trenches	RISBBC-04	6/7	X		20		X	Maximum sampling depth not expected to reach water, 5' sample omitted to avoid waste	Sample 5' if no waste encountered at that depth, sample water table if it is above contact
Between Trenches	RISBBC-05	6/7	X		20		X	5' sample omitted to avoid waste	Sample 5' if no waste encountered at that depth, sample water table if it is above contact
Near 6 Pack Tanks	RISBLT-05	6/7	X	X	10, 20	X	X		OK
Within/Near BLS-1	RISBLT-06	6		~~X~~	15, 20	X	X	No surface sample is possible	OK
Near 6 Pack Tanks	RISBLT-07	6/7	X	X	10, 20	X	X		OK
Near 6 Pack Tanks	RISBLT-08	6/7	X	X	10, 20	X	X		OK
East of Maint Bldg at Decon Tank	RISBMS-02	6/7	X	X	10, 20			Sample location includes 0', 5', 10', and 20' to look for contamination associated with septic tank.	OK
East of Maint Bldg at Decon Tank	RISBMS-03	6/7	X	X	10, 20			Sample location includes 0', 5', 10', and 20' to look for contamination associated with septic tank.	OK
Near Septic Tank	RISBMS-08	6/7	X	X	10, 20			Sample location includes 0', 5', 10', and 20' to look for contamination associated with septic tank.	OK
Near UST	RISBMS-09	6/7	X	X	10, 20			Sample location includes 0', 5', 10', and 20' to look for contamination associated with septic tank.	OK
Ponds Along NTU Rd	RISBON-51	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-52	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-53	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-54	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-55	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-56	6	X	X	10, 20	X	X		OK
Ponds Along NTU Rd	RISBON-57	6	X	X	10, 20	X	X		OK
Pond C & M Trenches	RITRON-01	6		X	10			Sample locations specifically evaluating trench location	OK, purpose is to sample trenches
Pond C & M Trenches	RITRON-02	6		X	10			Sample locations specifically evaluating trench location	OK, purpose is to sample trenches

Notes from Table 4-2

** = Type 6 boring sampling interval vary depending on depth to groundwater and the contact and study area needs (see Table 4-4 for default sampling depths)

Notes from Table A-2

(a) Samples will be collected at 10 feet or the contact, whichever is shallower

(b) Samples will be collected at 20 feet or the contact, whichever is shallower

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RFI No: **RFI-2006-001** **Date**: August 1, 2006

Subject: Three Type 6 borings were drilled around the phase I boring location RISBON-59. The phase II plan called for the borings to be completed in a manner that would identify the worst-case contamination similar to the deep contamination found in RISBON-59.

Description: The purpose of this RFI is to document the sample depths collected and the rational for each sample.

Prepared By: David Myers

SUMMARY INFORMATION:

☒ Remedial Investigation Workplan Section

☐ SOP Number

☐ Other

Information / Clarification Requested: See above.

☒ See Attached RFI Detail Form

☐ See Attached technical expert justification w/signature if applicable

RI Field Manager:  Date: August 1, 2006

David Myers / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

DETAIL FORM

RFI No: **RFI-2006-001** **Date**: August 1, 2006

Location ID	Sample Interval (feet)	Rational
RISBON-83	10-12	Default Type 6 Interval (dark stained soils)
	20-22	EPA Requested Interval (dark stained soils) exchanged for shallow surface sample location at the request of Liz Bryant CH2MHill
	30-34	Default Type 6 (groundwater sample depth) with field duplicate (lightly stained with some mild odors)
	40-42	EPA Requested Interval exchanged for shallow surface sample location at the request of Liz Bryant CH2MHill. No staining or odors
	55-57	Default Type 6 Interval (contact) no staining or odors
RISBON-84	0-2	Default Type 6 Interval no staining or odors
	5-7	Default Type 6 Interval no staining or odors
	8-10	Scattered Dark Gray staining with slight chemical odor, Default 10 foot interval moved to 8 foot based on field observations
	18-20	Abundant Dark Gray staining with moderate chemical odor, Default Contact interval exchanged to 18 foot based on field observations and at the request of Liz Bryant of CH2MHill.
	30-32	Default Type 6 (groundwater sample depth)
RISBON-85	0-2	Default Type 6 Interval no staining or odors
	5-7	Default Type 6 Interval no staining or odors
	16-18	Default Type 6 Interval 10 foot sample moved based on field observations. Moderate staining and odors.
	20-23	Default Type 6 Interval (groundwater) moderate to strong odors and staining.
	51-51.5	Default Type 6 Interval (contact) no odors or staining.

RI Field Manager:  Date: August 1, 2006

David Myers / URS Corporation

CC: Thomas Henderson / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RFI No: **RFI-2009-01** **Date**: 4 May 2009

Subject: Modification of plant tissue selection hierarchy

Description: The plant selection hierarchy described in the Tissue Sampling and Analysis Plan called for preferentially selecting deep-rooted shrubs such as *Altriplex spp.* or *Baccharis pilularis* and collecting annual grasses (Family Poacea) where deep-rooted shrubs are not present. Three site sample locations and all five background locations are situated in areas where deep-rooted shrubs are not present in the immediate vicinity of the existing RI sample location. Therefore, the plant selection hierarchy will be modified to preferentially select annual grasses at all site and background locations to maintain consistent tissue types across all sample locations. Additionally, shrubs will be collected at all onsite locations. Discrete co-located soil samples will be collected with each shrub sample thus increasing the total number of soil samples collected by 12. Shrub and co-located soil samples collected from locations where shrubs were not located in the immediate vicinity of the existing RI sample locations will be held pending analysis of grass and shrub samples from the remaining locations.

Prepared By: Thomas Orr - Arcadis

SUMMARY INFORMATION:

- ☐ Remedial Investigation Workplan Section _____
- ☐ SOP Number _____
- ✓ Other Tissue Sampling and Analysis Plan, Section 2.2

Information / Clarification Requested: See above information and detail form.

- ☐ See Attached RFI Detail Form
- ☐ See Attached technical expert justification w/signature if applicable

RI Task Manager: _____ Date: 28 April 2009

Tony Colera / URS Corporation
David Myers / URS Corporation
Bridgette DeShields / Arcadis

Clarification / Response: _____

CC: Jim Soutee / CH2Mhill
Corey Bertelsen / CBCI

REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

RI Field Manager: _____ Date: _____

David Myers / URS Corporation
Corey Bertelsen / CBCI

CC: Jim Soutee / CH2Mhill
Corey Bertelsen / CBCI

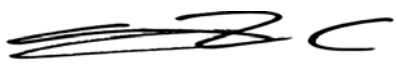
REQUEST FOR INFORMATION FORM
Casmalia Remedial Investigation
Casmalia Hazardous Waste Management Facility

DETAIL FORM

RFI No: **RFI-2009-01** **Date**: 28 April 2009

Locations where deep-rooted shrubs were not observed in the vicinity of the proposed sample location include:

RISBON-66
RISBON-41
RISSSA-04
BK-19
RISSBK-15
BK-11
RISSBK-19
BK-07

RI Task Manager:  Date: 28 April 2009

Tony Colera / URS Corporation
David Myers / URS Corporation
Bridgette DeShields / Arcadis

CC: Jim Soutee / CH2Mhill
Corey Bertelsen / CBCI