



February 2, 2005

47540.9100.40.5

CB Consultants
868 Greystone Place
San Luis Obispo, California 93401

**HDPE Penetration Repair Documentation Report
Casmalia Hazardous Waste Management Facility
Casmalia, California**

Dear Mr. Bertelsen:

On behalf of the Casmalia Steering Committee (CSC), MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit this Certification Report documenting repair of final cover penetrations in accordance with the work described in the planning documents listed below hereafter referred to as "work plan":

- *Casmalia Site Remediation RI/FS Work Plan dated June 2004*

INTRODUCTION AND BACKGROUND

MACTEC performed final cover repairs where cone penetrometer testing and other drilling locations damaged the final cover during October 2004. Repairs were made where the final cover was punctured due to installation of piezometers, other borings, and hand auger damage. This report documents repairs to the final cover system associated with execution of the scope of work described in the above mentioned work plan. A total of seventeen repairs were completed. Four repairs were for piezometer installations, six were boring attempts to refusal, five were borings, one was hand-auger damage, and one was for an 8" boring.

EXCAVATION

Excavation to expose the HDPE geomembrane areas to be repaired were performed using a CAT 303.5 mini-excavator and laborers. A minimum of 12 inches of clearance was provided between the outer edge of the damage and the limit of the exposed geomembrane. Grout materials above the geomembrane associated with the recent CPT and observation well installations and grouting were carefully chipped away to prevent damage to the geomembrane.

HDPE GEOMEMBRANE REPAIRS

HDPE geomembrane and extrudate materials were provided by GSE Lining Technology, Inc. (GSE). GSE manufactured the original geomembrane materials. The pipe boots used around piezometer casings were also pre-manufactured by GSE. HDPE geomembrane patch repairs had a minimum of 8 inches of overlap beyond damaged geomembrane areas.

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c/o Mr. Corey Bertelsen
CBC Inc.
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Repair locations are illustrated on Plate 1. The table relates observation well, CPT, and piezometer numbers to the repair number:

Field seaming and repairs were generally performed in accordance with the procedures and protocols described in the work plan and Standard Operating Procedure 5-5 (Rev 1.0, June 3, 2004). Construction Quality Assurance (CQA) documentation is presented in the Attachments, including photographs of representative repairs included in Attachment E.

BIOTIC BARRIER REPAIR

All of the repairs were located in roadway areas and therefore did not include biotic barrier geonet. The “runout” edges of some geonet were removed during excavation activities since the material was encountered in some of the roadway excavations.

GEOCOMPOSITE DRAINAGE LAYER

The geocomposite drainage layer directly overlying the geomembrane was repaired by overlapping and lustering the existing material to new 12 oz/sq yd geotextile a minimum of 6 inches prior to backfilling.

BACKFILL

Backfill of the repair areas were generally performed in accordance with the work plans. The Vegetative Layer was compacted with a hand operated plate vibrator. Soil removed from the individual excavations was reused for backfill.

REVEGETATION

All areas disturbed by repair activities were on bench roads. Repair areas on bench roads were completed with the re-installation of aggregate base.

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ENGINEERING CERTIFICATION

This report prepared by MACTEC for CB Consultants has been prepared under my supervision and is accurate to the best of my knowledge.

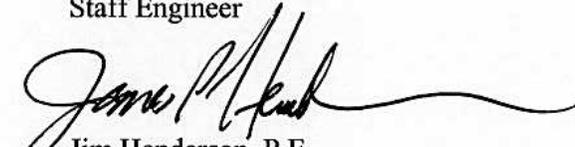
Based on MACTEC's observations and the results of testing as described in this report, it is MACTEC's opinion repair of the final cover at the Heavy Metals/Sludges Landfill, Pesticides/Solvents Landfill, Caustic/Cyanide, and Acids Landfill have been performed in accordance with the intent of the approved work plan.

If you have any questions, please contact the undersigned at (916) 332-5552.

Yours very truly,

MACTEC Engineering and Consulting, Inc.


Justin Thompson, EIT
Staff Engineer

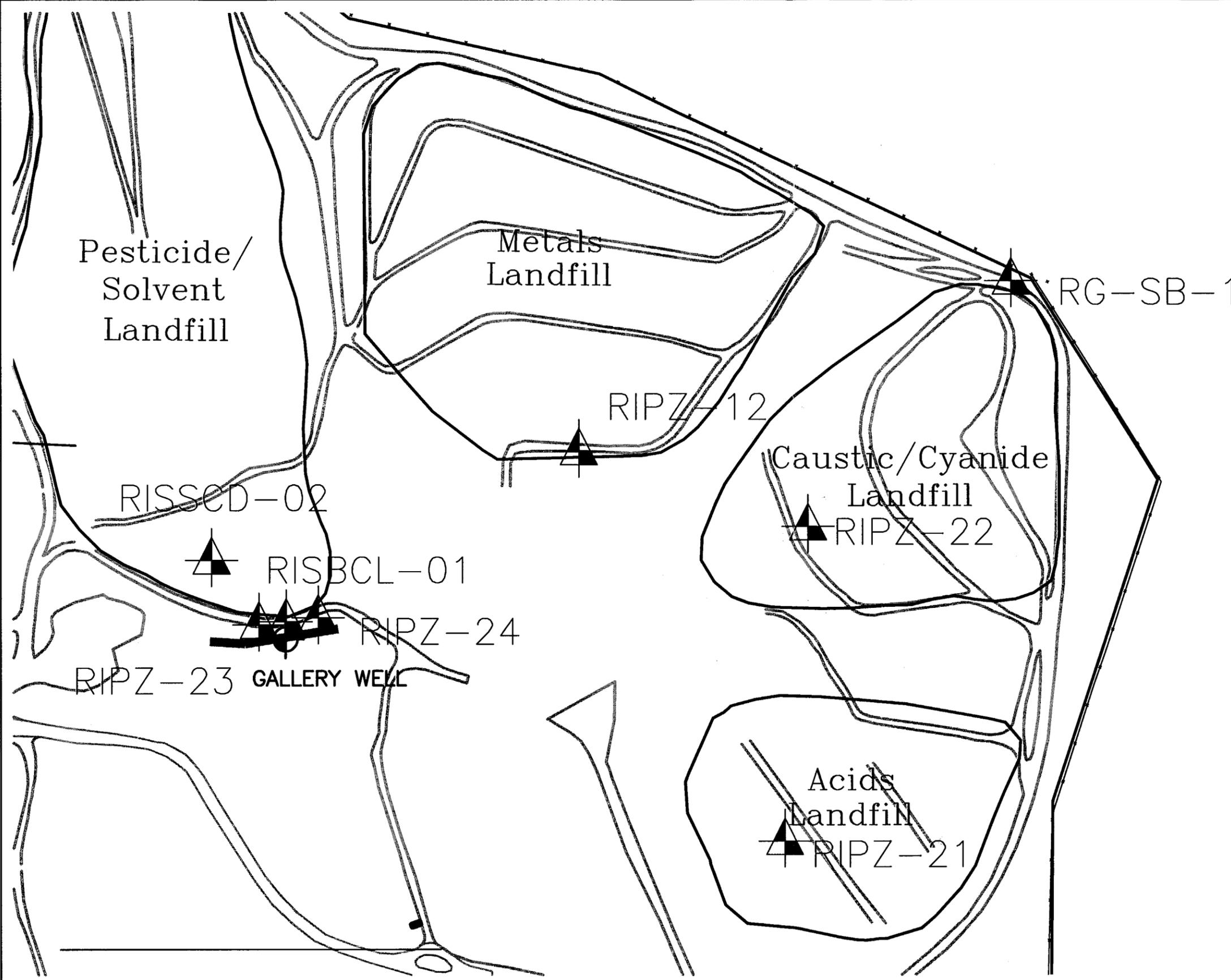

Jim Henderson, P.E.
Senior Engineer



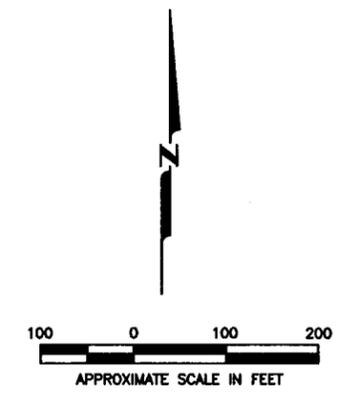
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Attachments: Plate 1 Final Cover Repair Locations
Attachment A CQA Monitor Narrative Daily Reports
Attachment B Geosynthetic Repair Reports
Attachment C Photographic Record

PLATES



GEOMEMBRANE REPAIR LOG	
REPAIR NUMBER	CORRESPONDING OBSERVATION WELL OR CPT LOCATION
R-1	RIPZ-12
R-2	RIPZ-12
R-3	RIPZ-22
R-4	RIPZ-22
R-5	RIPZ-22
R-6	RIPZ-21
R-7	RIPZ-21
R-8	RIPZ-21
R-9	RG-SB-1
R-10	RISSCD-02
R-11	RIPZ-23
R-12	RISBCL-01
R-13	RISBCL-01
R-14	RISBCL-01
R-15	RISBCL-01
R-16	RISBCL-01
R-17	RIPZ-24



 MACTEC ENGINEERING & CONSULTING 4704 Roseville Road, Suite 108 North Highlands, California 95660 (916) 332-5552	FINAL COVER REPAIR LOCATIONS RI/FS WORK PLAN CASMALIA SITE REMEDIATION		PLATE 1
	DRAWN JAT	FILE NAME REPAIRS 2004.DWG	PROJECT NUMBER 47540
		DATE 01/06/05	REVISED DATE

ATTACHMENT A

CQA MONITOR NARRATIVE DAILY REPORTS

Project Name: Casmalia Liner Repair Page: 1 of 2
 Owner's Representative: _____ Project No.: 47540
 Contractor: URS (Larry Bailey), Field Lining Systems Date: 10-07-09
 CQA Monitor: J. Thompson/J. Henderson

WEATHER:

Temp. (am): <u>~ 65°F</u>	Temp. (pm): <u>~ 86°F</u>	Wind (direction-speed): _____	Weather: <u>Clear, sunny, warm</u>
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RECORD OF ACTIVITIES

Time	Comment
0720	Checked in at Casmalia LF guard shack.
0730	Received safety/history briefing from Tony Colera (URS) he wanted us to use air monitoring while excavating and a H ₂ S meter would be very useful.
0830	Met with Anna Kente (MACTEC) for her to show us how she generally performed and delineated her borings or refusals.
0900	Met Larry Bailey (URS) at the location on the pesticides/solvents LF. Performed air monitoring.
1000	Excavated to the geocomposite, found what appeared to be a tear but there was no damage to the liner. Spoke with Mark Walnick (URS) to get more data on the boring location and depth. Location: CPT-LA-02, RISSCL-2.
1055	Mark returned and said that the puncture should be nearby.
1130	Excavated more into the north-side of the excavation and could not find a hole in the liner, we will come back to this excavation. Relocated to RIPZ-12.
1155	Brought mini-excavator over to the next spot.
1200	Took lunch, left LF.
1300	Returned to Casmalia LF
1330	Began excavation at RIPZ-12, had a piezometer and another puncture to refusal. As work progressed, material was cut or torn out of the way. 1' BGS hit 12oz geotextile, 3' BGS hit bitic layer, ~7.5' BGS found geocomposite with ^{1st} geomembrane just below it. This excavation is on the metals landfill.
1530	Found composite layer. Cleaned up around the 2 punctures.

WORK ITEMS TO ADDRESS/MISC. NOTES

Project Name: Casmalia Liner Repair Page: 1 of 2
 Owner's Representative: _____ Project No.: 47540
 Contractor: URS (Larry Bailey), Field Lining Systems Inc. - FLSI Date: 10-08-04
 CQA Monitor: J. Thompson/J. Henderson

WEATHER:

Temp. (am): <u>58°F</u>	Temp. (pm): <u>84°F</u>	Wind (direction-speed): _____	Weather: <u>Sunny, clear, warm</u>
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RECORD OF ACTIVITIES

Time	Comment
0730	Arrived at Casmalia Landfill. Field Lining Systems welder tech on-site. Tech has brought his 17 yr old son to the jobsite which wasn't alright, he took him to a hotel. This extrusion welder produces a temp. of ~405°F which may present a problem if any explosive vapors are present around the liner punctures. It was used for the last liner repair overseen by MACTEC in (2)2001. Tony Colera (URS) will find out how to deal with this issue. The technician cannot speak English ^{which may} also present a safety problem.
0800	Went to RIPZ-22 on the Acids/Caustics LF. There are 3 punctures localized in one area here, 1-PZ and 2-attempts. One excavation is necessary.
0850 0920	Liner tech and Jim Henderson went with over to the metals LF (RIPZ-12) with the air monitoring equipment, I remained with Larry Bailey (URS) to continue the excavation.
0940	Larry and I took a break.
1020	Returned to the excavation.
1030	Jim and the FLSI tech completed the patch. (See Jim's ^{daily} report.) Jim brought the air monitoring equipment back.
1130	URS sent people to Quinns Rentals to get a bucket with the teeth. The bucket on the mini-excavator right now has a plate welded on the teeth. Because we were already close to the liner the bucket wasn't switched. Exposed all the 3 punctures.
1200	Took lunch break. During lunch, excavator was walked over to next spot.
1230	Lunch break over. Larry began excavating the area. Jim and I met him and decided we really weren't needed right there and will come back at another time to complete the repairs.

WORK ITEMS TO ADDRESS/MISC. NOTES

	Vacuum test the patches already performed.

Project Name: Casmalia Liner Repair Page: 1 of 2

Owner's Representative: _____ Project No.: 47540

Contractor: Field Lining Systems / URS Date: 10-14-04

CQA Monitor: J. Thompson/J. Henderson

WEATHER:

Temp. (am): <u>58°F</u>	Temp. (pm): <u>78°F</u>	Wind (direction-speed): _____	Weather: <u>Foggy → warm, sunny</u>
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RECORD OF ACTIVITIES

Time	Comment
0740	Arrived at Casmalia LF Spoke with Anna Henke (MACTEC) she said there is another liner puncture to be repaired. Talked w/ Larry Bailey (URS) about this - he will begin excavating that location.
0800	FLSI tech arrived. Drove to RIPZ-22. Waited for air monitoring devices before entering the excavation. ^{H₂S} PID & OUM didn't show any readings. ^{H₂S} PID battery alarm sounded, turned off. Kept OUM on. Installed patches, lystered all patches.
0915	H ₂ S meter died, will recharge later on. Also have dumped bentonite pellets down the borings were there ^{was not} were not any.
0930	Dimensions of excav. @ RIPZ-22 8'-across, 4'3" bottom of AB / 5'3" top of AB, 23' foot long.
0950	Attached an additional length of sleeve to the boot.
1010	Ground patch edges then extrusion weld it, then move on to next patch on R-4 now, extrusion weld. Vac tests passed.
1030	Completed liner repairs. Began putting 12 oz geotextile over geocomposite and lyster the edges.
1050	Completed repairs went over to metals LF RIPZ-12 to vac test. Passed. URS crew began backfill, will leave spot open around PZ for clamps.
1120	Left RIPZ-12, put geotextile over geocomposite with a little layer of soil . Next, over to Acids LF. 3 repairs to make.
1255	Completed repairs. Had to put bentonite in 2 of the borings. No readings from the OUM. Putting geotextile patches over the geocomposite.
1320	Found boring on N.-side of Caustics LF. Chipped bentonite away and put a patch on it.
1345	Completed patch (R-9).

WORK ITEMS TO ADDRESS/MISC. NOTES

Temp ran between (on extrusion welder) between <u>430°F</u> and <u>445°F</u> on repairs at metals landfill.
Temp running <u>500°F</u> to <u>440°F</u> today

Project Name: Casualty Liner Repair Page: 2 of 2
 Owner's Representative: _____ Project No.: 47540
 Contractor: Field Lining System Inc/URS Date: 10-14-04
 CQA Monitor: J. Thompson/J. Henderson

WEATHER:

Temp. (am):	Temp. (pm):	Wind (direction-speed):	Weather:
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RECORD OF ACTIVITIES

Time	Comment
1420	Looked at repairs near gallery well. Went up and over to excavation on Pesticides/Solvents LF, on the bench above the gallery well.
1445	Completed repair to the liner, passed vac-test. Put geotextile over composite and lystered it to the geocomposite. Only minor damage to liner in one location.
1500	Took a break
1520	Returned to the excavations near the gallery well. Proceeded to repair the borings (5) in the large excavation.
1700	Vac-tested all 5 spots in large excavation (closest to the gallery well), all passed. RIPZ OVM showed no readings (0.0). Lystered geotextile to existing, no geocomposite in base above liner - same case in all 3 excavations in this area.
1710	Began the boot repair on R-11 (RIPZ-23).
1730	Vac tested R-11, passed. Then lystered geotextile to existing and around boot.
1745	Began the boot repair on R-17 (RIPZ-24).
1800	Vac tested R-17, passed. Then lystered geotextile to existing and around boot.
1815	Helped liner tech load his equipment up. and
1830	Departed jobsite. Left small roll of geomembrane at URS office.

WORK ITEMS TO ADDRESS/MISC. NOTES

>	Jim-CH ₂ M-Hill said biotic barrier repair only has to be replaced at the spot on N-side of Caustics LF.
>	Need to water test finished grade of soil backfill after compaction.
X	Larry Darty Bill Feller
>	Repair separation geotextile under gravel road base.

ATTACHMENT B

GEOSYNTHETIC REPAIR REPORTS

PANEL REPAIR LOG

PROJECT: 47540 Casmahs Liner Repair		Monitor: <u>JAT</u>		MATERIAL: <u>60 mil HDPE</u>		
MACTEC #		Tester: <u>RG</u>		smooth to textured		
Date of Repair	Repair No.	Repair Crew	Location of Repair	Description of Repair	Vacuum Test	
					Date	Pass/Fail
10-08-04	R-1	RG	RIPZ-12 Excav <u>RIPZ-12</u> 11.5' Edge of Conc. Ditch <u>LS4F</u>	20" Boot w/sleeve	10-14-04	P
10-08-04	R-2	RG	RIPZ-12 Excav 1.5' W of 11.5' Edge of Conc. Ditch <u>RIPZ-12</u>	12" Patch	10-14-04	P
10-14-04	R-3	R-6 LF RG	RIPZ-22 Excav <u>RIPZ-22</u> 7' Edge of Conc. Ditch	Boot w/sleeve 10"	10-14-04	P
10-14-04	R-4	RG	RIPZ-22 Excav N 3'6" from 9' Edge of Conc. Ditch <u>RIPZ-22</u>	Patch over refusal 22"	10-14-04	P
10-14-04	R-5	RG	RIPZ-22 Excav N 5' from 7' Edge of Conc. Ditch <u>RIPZ-22</u>	Patch over refusal 20"	10-14-04	P
10-14-04	R-6	RG	Excav <u>ACIDS LF</u> 5' Edge of Conc. Ditch	Patch 20"	10-14-04	P
10-14-04	R-7	RG	NW 4.5' of R-6 5.5' Edge of Conc. Ditch <u>ACIDS LF</u>	Patch 20"	10-14-04	P
10-14-04	R-8	RG	NW 1.5' of R-7 9.5' Edge of Conc. Ditch <u>ACIDS LF</u>	Patch 18"	10-14-04	P
10-14-04	R-9	RG	North-side of caustics LF 8" Boring	Patch 24"	10-14-04	P

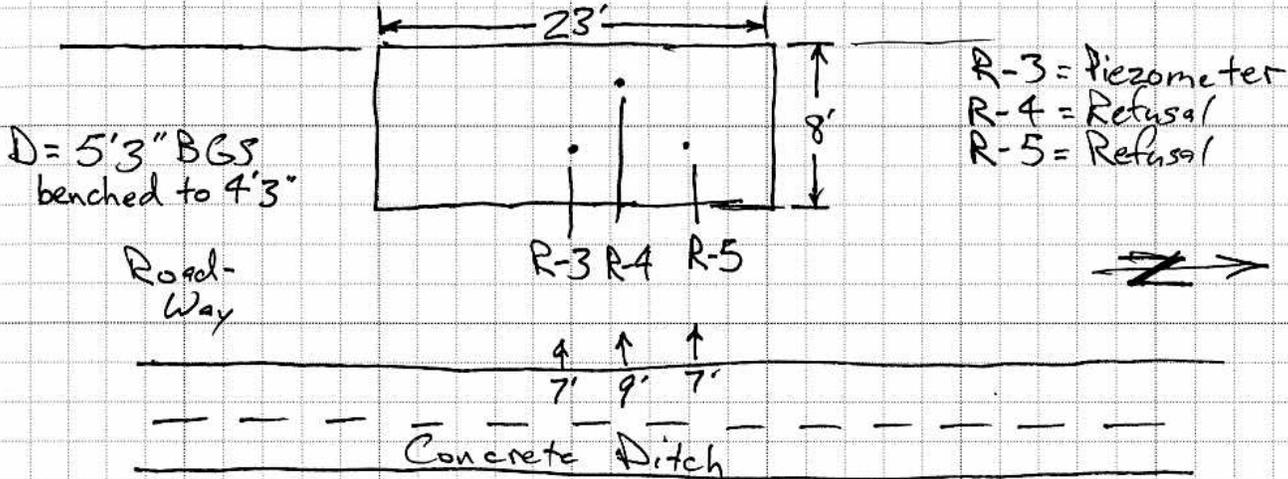
PANEL REPAIR LOG

PROJECT: Casmalia Liner Repair
 MACTEC # 47540
 Monitor: JAT
 Tester: RG - (FLSI)
 MATERIAL: 60 mil HDPE
smooth

Date of Repair	Repair No.	Repair Crew	Location of Repair	Description of Repair	Vacuum Test	
					Date	Pass/Fail
10-14-04	R-10	RG	RIP2-22 SCRIPT LA-02A , P/S LF 0.5' from edge of concrete ditch	Patch 18"	10-14-04	✓
10-14-04	R-11	RG	RIP2-23 - South of P/S LF, near Gallery Well, 24' West of Gallery Well	boot	10-14-04	✓
10-14-04	R-12	RG	South of P/S LF, near Gallery Well 8' from edge of concrete ditch	Patch 20"	10-14-04	✓
10-14-04	R-13	RG	South of P/S LF, near Gallery Well 9'3" from edge of concrete ditch	Patch 24" x 18"	10-14-04	✓
10-14-04	R-14	RG	South of P/S LF, near Gallery Well 7' from edge of concrete ditch	patch 16"	10-14-04	✓
10-14-04	R-15	RG	South of P/S LF, near Gallery Well 7' from edge of concrete ditch	patch 18"	10-14-04	✓
10-14-04	R-16	RG	South of P/S LF, near Gallery Well. 7'2" from edge of concrete ditch	patch 18"	10-14-04	✓
10-14-04	R-17	RG	RIP2-23 RIP2-24, South of P/S LF, near Gallery Well, 25' E of Gallery Well,	boot	10-14-04	✓

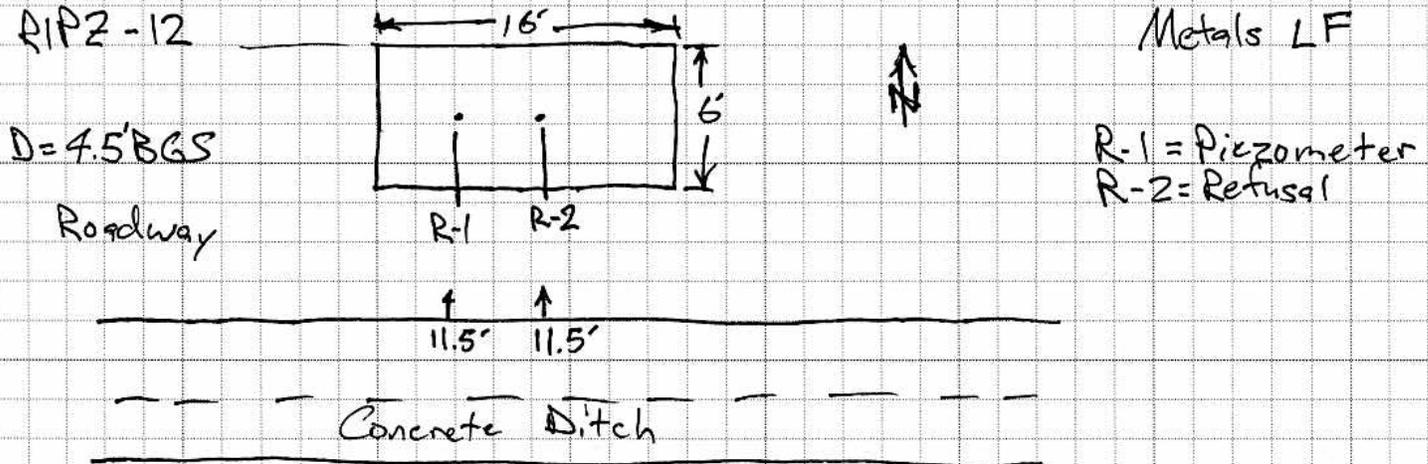
RIPZ-22

Caustics/Cyanide LF



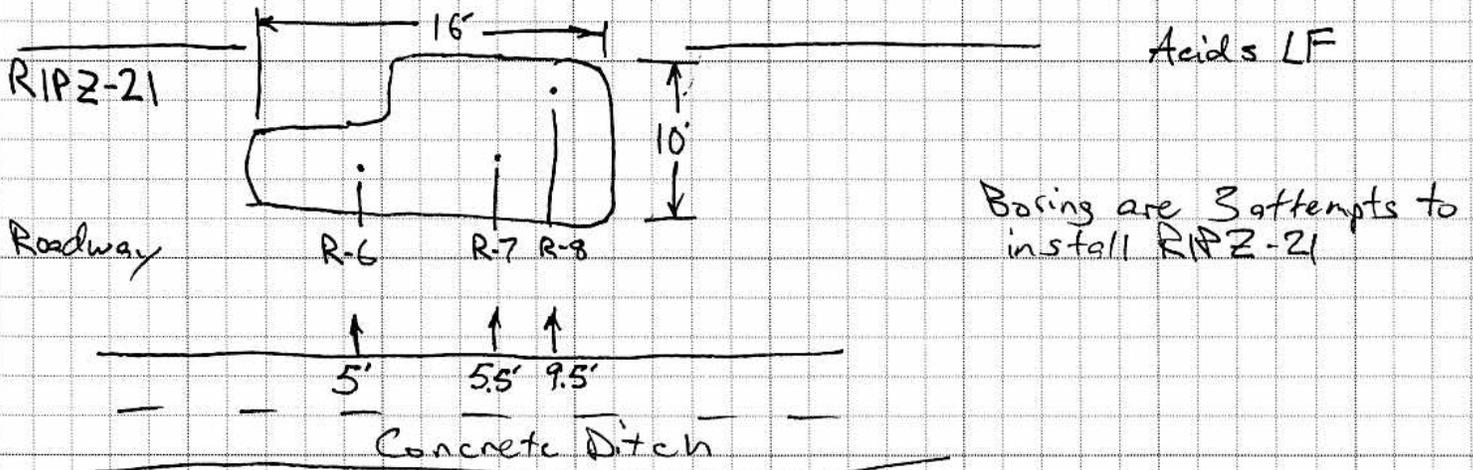
RIPZ-12

Metals LF



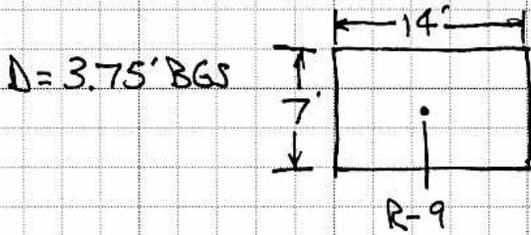
RIPZ-21

Acids LF

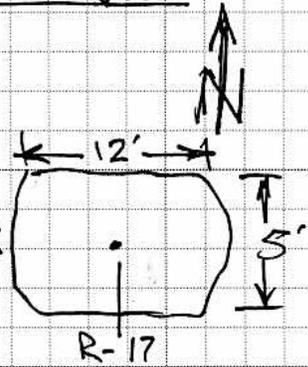
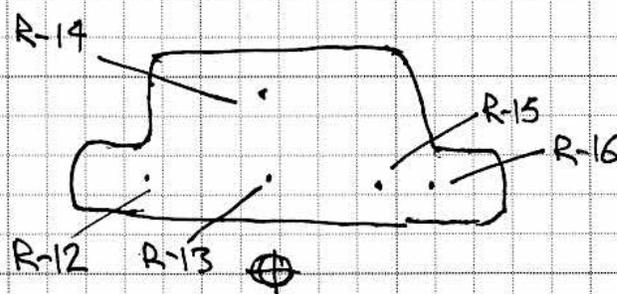
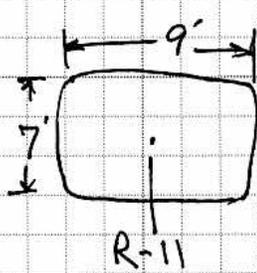
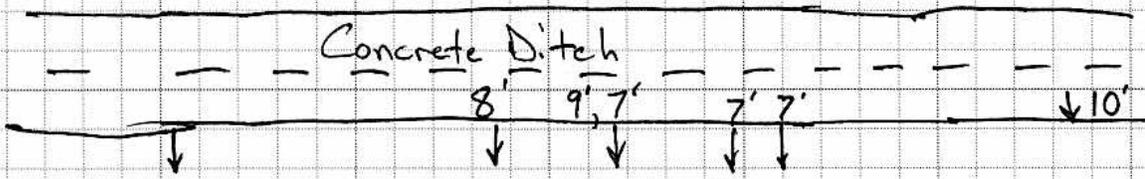
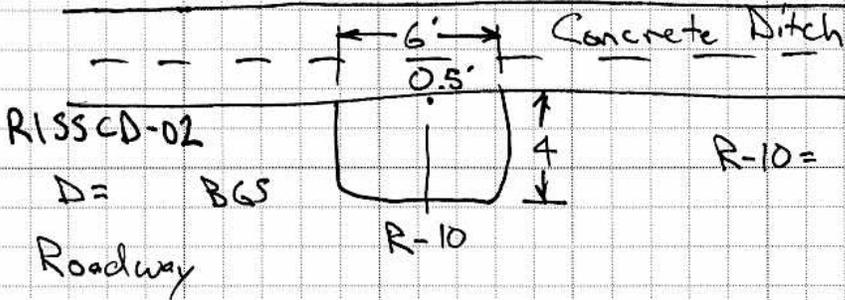


RG-SP-1

Northside of Caustics LF



R-9 = 8" Boring



D = 5' (for all spots)
 4' (benched depth)

GALLERY WELL

R-12 to R-16 = RISBCL-01

R-11 = RIPZ-23
 R-17 = RIPZ-24

ATTACHMENT C

PHOTOGRAPHIC RECORD



Photograph of Repair No. R-1 and R-2
Excavation at RIPZ-12, using CAT 303.5 mini-excavator



Photograph of Repair No. R-1 and R-2
Preparatory grinding the edges of the patch (R-2) and boot (R-1) at RIPZ-12.



Photograph of Repair No. R-10
Extrusion welding the patch over RISSCD-02.



Photograph of Repair Nos. R-3, R-4, and R-5
Vacuum testing repair R-3 at RIPZ-22



Photograph of Excavation at Repair R-3, R-4, and No. R-5
Backfilling and compacting excavation at RIPZ-22



Photograph of Repair No. R-17
Typical boot collar completion with geotextile cushion over geomembrane