November 7, 2013
December 2, 2013 Updated with SP-NCTL results
February 21, 2014 Updated with assessment clarification

Mail To:

Naomi Azulai
Maralex Resources, Inc.
775 Goddard Ave.
P.O. Box 338
Ignacio, CO 81137

email: naomi@maralexinc.com
cc email: esi.craig@sopris.net

Bill To:

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Dear Ms. Azulai:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Roan Creek Evaporation Pond**
TRI Job Reference Number:	E2386-15-03
Material(s) Tested:	Two 40 mil. Ten year old Liner Smooth HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5199) Density (ASTM D 1505) Carbon Content (ASTM D 1603, mod.) Carbon Dispersion (ASTM D 5596) Tensile (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004) Oxidative Induction Time (ASTM D 3895) SP-NCTL Stress Crack Resistance (ASTM D 5397, App)

Geomembrane Assessment

Both the exposed and trench geomembrane material appear to be in relatively good condition. Minimal OIT remains suggesting that, while the material is in good condition and does not need to be replaced currently, continued monitoring should be practiced as the onset of degradation is likely in the next few months and years as the antioxdant package is completely consumed. However, the existing material demonstrates good mechanical strength and ductility. Stress crack resistance testing was terminated shortly after 300 hour test duration and we note that this measurement demonstrates compliance with GRI GM 13 requirements for resistance to stress cracking.

TRI recommends that this geomembrane material be monitored again in 5 years for continued performance.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Sam R. Allen

Sam Allen
Vice President
Geosynthetic Services Division
www.GeosyntheticTesting.com

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GEOMEMBRANE TEST RESULTS

TRI Client: Maralex Resources, Inc.
Project: Roan Creek Evaporation Pond

Material: 40 mil. Smooth HDPE Geomembrane (Ten year old material)
Sample Identification: Exposed
TRI Log #: E2386-15-03

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	GM 13 SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	42	41	41	40	42	41	40	42	42	41	41	1	40
											40	<< min	36
Density (ASTM D 1505)													
Density (g/cm3)	0.951	0.951	0.951								0.951	0.000	> 0.94
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.60	2.63									2.62	0.02	2-3
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								1
Rating - 2nd field view	1	1	1	1	1								1
Tensile Properties (ASTM D 6693, 2 lpm strain rate)													
MD Yield Strength (ppi)	107	120	114	117	116						115	5	84
TD Yield Strength (ppi)	128	132	127	125	121						127	4	84
MD Break Strength (ppi)	184	198	198	193	169						188	12	152
TD Break Strength (ppi)	197	200	179	139	171						177	25	152
MD Yield Elongation (%)	21	21	21	21	21						21	0	12
TD Yield Elongation (%)	18	18	18	18	18						18	0	12
MD Break Elongation (%)	739	731	799	771	648						738	57	700
TD Break Elongation (%)	844	835	771	616	764						766	91	700
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	110	109	109	108	108						109	1	72
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	36	33	31	35	34	35	33	33	35	34	34	1	28
TD Tear Strength (lbs)	34	34	32	34	30	33	33	28	32	33	32	2	28

MD Machine Direction TD Transverse Direction

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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GEOMEMBRANE TEST RESULTS

TRI Client: Maralex Resources, Inc.
Project: Roan Creek Evaporation Pond

Material: 40 mil. Smooth HDPE Geomembrane (Ten year old material)
Sample Identification: Exposed
TRI Log #: E2386-15-03

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	GM 13 SPEC.
Oxidative Induction Time (ASTM D 3895)													
OIT (minutes)	20.8	21.4									21.1	0.4	> 100

SP-NCTL Stress Crack Resistance (ASTM D 5397, App)

SURFACTANT:	CO-630
EXPOSURE PERIOD:	300 hrs
DATE TEST STARTED:	4-Nov-13
TEST TEMPERATURE:	50C

Transverse direction yield stress:	3030	(psi)
x 30%	909	(x 0.30)
x hinge thickness (in)	0.032	(80% of thickness)
x specimen width	0.124	(0.125")
Load	3.61	(lbs)

Mechanical Advantage	5	
Lever Weight	0.33	(lbs)
Grip Weight	0.09	(lbs)

Applied load = (Load - Lever Weight + Grip Weight)/Mechanical Advantage = 0.67 lbs = 306 grams

Replicate No.:	1	2	3	4	5	MEAN	GM 13 SPEC.
No. Hours to Failure:	>300	>300	>300	>300	>300	>300	> 300

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GEOMEMBRANE TEST RESULTS

TRI Client: Maralex Resources, Inc.
Project: Roan Creek Evaporation Pond

Material: 40 mil. Smooth HDPE Geomembrane (Ten year old material)
Sample Identification: Anchor Trench
TRI Log #: E2386-15-03

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	GM 13 SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	40	41	41	42	42	42	40	41	40	42	41	1	40
											40	<< min	36
Density (ASTM D 1505)													
Density (g/cm3)	0.947	0.947	0.947								0.947	0.000	> 0.94
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.16	2.13									2.15	0.02	2-3
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								1
Rating - 2nd field view	1	1	1	1	1								1
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	109	109	122	122	110						114	7	84
TD Yield Strength (ppi)	136	118	114	122	109						120	10	84
MD Break Strength (ppi)	145	86	191	212	196						166	51	152
TD Break Strength (ppi)	218	175	169	230	175						193	28	152
MD Yield Elongation (%)	17	17	15	15	15						16	1	12
TD Yield Elongation (%)	15	20	20	15	18						18	3	12
MD Break Elongation (%)	501	89	804	878	869						628	338	700
TD Break Elongation (%)	906	614	636	975	655						757	170	700
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	115	114	109	110	110						112	3	72
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	35	33	34	36	31	31	34	27	31	33	33	3	28
TD Tear Strength (lbs)	34	32	31	35	32	34	34	29	35	29	33	2	28

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Maralex Resources, Inc.
Project: Roan Creek Evaporation Pond

Material: 40 mil. Smooth HDPE Geomembrane (Ten year old material)
Sample Identification: Anchor Trench
TRI Log #: E2386-15-03

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	GM 13 SPEC.
Oxidative Induction Time (ASTM D 3895)													
OIT (minutes)	29.5	29.8									29.6	0.2	> 100

SP-NCTL Stress Crack Resistance (ASTM D 5397, App)

SURFACTANT: CO-630
EXPOSURE PERIOD: 300 hrs
DATE TEST STARTED: 4-Nov-13
TEST TEMPERATURE: 50C

Transverse direction yield stress: 2880 (psi)
x 30% 864 (x 0.30)
x hinge thickness (in) 0.032 (80% of thickness)
x specimen width 0.124 (0.125")
Load 3.43 (lbs)

Mechanical Advantage 5
Lever Weight 0.33 (lbs)
Grip Weight 0.09 (lbs)

Applied load = (Load - Lever Weight + Grip Weight)/Mechanical Advantage = 0.64 lbs = 290 grams

Replicate No.:	1	2	3	4	5	MEAN	GM 13 SPEC.
No. Hours to Failure:	>300	>300	>300	>300	>300	>300	> 300

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TRI/Environmental, Inc.
A Texas Research International Company

Date: 2013-11-05

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Bill To:

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Dear Ms. Azulai,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Roan Creek Evaporation Pond**
TRI Job Reference Number:	**12240**
Material(s) Tested:	(1) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Maralex Resources, Inc.
Project: Roan Creek Evaporation Pond

Material: 40 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 12240

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DS-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	93	63	49	80	95	**76**
Peel Incursion (%)	<5	100	100	<5	<5	
Peel Locus Of Failure Code	SE	AD	AD	SE	SE	
Peel NSF Failure Code	FTB	NON-FTB	NON-FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	94	84	97	83	90	**90**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	123	124	122	122	123	**123**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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