GW - 19

GENERAL CORRESPONDENCE

YEAR(S):

2006-2005

Page 2 of 2 of C-144 dated Nov 07/ 2006 by Wayne Price-Envr Bureau Chief.

Nov 09, 2006

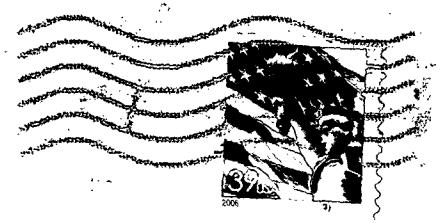
Loco Hills GSF C-144 approval conditions:

GSF shall submit the following information and receive OCD written approval before any water is discharged or placed in the new pond:

1. As built drawings showing any changes from the original submitted drawings.
2. All documented field test results including descriptive photos of installation.
3. A plan or a description on how the main concrete pipe stand will be protected from salt water.
4. The results of the pressure test for the main inlet/outlet pressure piping and a plan to verify the integrity of this pipe in the future.
5. A monitoring and response plan for the leak detection system.
6. A plan to demonstrate that an allowable Freeboard will not be exceeded.
7. A leak and spill plan including emergency response plan.
8. An operation, maintenance and inspection plan for the site.
9. Migratory bird protection plan.

LHGSF
1231 Old Annetta Rd
Aledo, TX 76008

FORT WORTH TX 761
03 NOV 2006 PM 6 T



State of NM
Energy Minerals & Natural Resources
O.C.D. - WAYNE PRICE
1220 South St. Francis Dr.
Santa Fe, NM 87505

87505+4000

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Friday, October 27, 2006 2:47 PM
To: 'Mitchel Johnson'
Cc: Bratcher, Mike, EMNRD
Subject: RE: Got your message
Attachments: rule 50 pits.doc; c144.doc

Dear Mitchel:

Please find enclosed a copy of our current pit rule 50 and a pit registration form C-144. Please fill out form and return for OCD approval.
Per our telephone conversation please notify the District and Santa Fe offices so we may witness the following events:

1. Subgrade before installation of primary liner.
2. Leak detection system.
3. Final liner installation.

OCD hereby approves of your preliminary preparation plans for liner and leak detection installation.

Please be advised that NMOCD approval does not relieve the owner/operator of responsibility should operations fail pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thanks for the call and good luck in your business.

From: Mitchel Johnson [mailto:mitchel.johnson@yahoo.com]
Sent: Friday, October 27, 2006 10:58 AM
To: Price, Wayne, EMNRD
Subject: Got your message

Wayne,

I hope all is going well for you. JB said you stopped by and I apologize for not calling you yesterday. I tried to call you this morning at (505) 476-3487, but I got the voice mail for "Brad". Please call me back or send me an email with your new number. Have a great day!

Thank you,

Mitchel Johnson
Loco Hills GSF
O: 817-441-6568
C: 817-371-7933

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-144
June 1, 2004

For drilling and production facilities, submit to appropriate NMOCD District Office.
For downstream facilities, submit to Santa Fe office

Pit or Below-Grade Tank Registration or Closure

Is pit or below-grade tank covered by a "general plan"? Yes x [X] No [ ]
Type of action: Registration of a pit or below-grade tank x [X] Closure of a pit or below-grade tank [ ]

Operator: Loco Hills GSF Telephone: 817-441-6568 e-mail address: mitchel.johnson@yahoo.com
Address: 1231 Old Annetta Rd, Aledo, TX 76008
Facility or well name: Loco Hills GSF API #: U/L or Qtr/Qtr NW1/4 SW 1/4 Sec 22 T 17 South R 29 East
County: Eddy Latitude Longitude NAD: 1927 [ ] 1983 [ ]
Surface Owner: Federal [ ] State x[X] Private [ ] Indian [ ]

Pit	**Below-grade tank**	
Type: Drilling [ ] Production x[X] Disposal [ ] Workover [ ] Emergency [ ] Lined x [X] Unlined [ ] Liner type: Synthetic x[X] Thickness 60&40 mil Clay [ ] Pit Volume 309,523 bbl	Volume: bbl Type of fluid: Construction material: Double-walled, with leak detection? Yes [ ] If not, explain why not.	
Depth to ground water (vertical distance from bottom of pit to seasonal high water elevation of ground water.) 120 ft	Less than 50 feet 50 feet or more, but less than 100 feet 100 feet or more	(20 points) (10 points) (0 points)
Wellhead protection area: (Less than 200 feet from a private domestic water source, or less than 1000 feet from all other water sources.) No	Yes No	(20 points) (0 points)
Distance to surface water: (horizontal distance to all wetlands, playas, irrigation canals, ditches, and perennial and ephemeral watercourses.) more than 1000 ft	Less than 200 feet 200 feet or more, but less than 1000 feet 1000 feet or more	(20 points) (10 points) (0 points)
	Ranking Score (Total Points)	

RECEIVED
NOV 03 2006
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505

If this is a pit closure: (1) Attach a diagram of the facility showing the pit's relationship to other equipment and tanks. (2) Indicate disposal location: (check the onsite box if your are burying in place) onsite [ ] offsite [ ] If offsite, name of facility. (3) Attach a general description of remedial action taken including remediation start date and end date. (4) Groundwater encountered: No [ ] Yes [ ] If yes, show depth below ground surface ft. and attach sample results.
(5) Attach soil sample results and a diagram of sample locations and excavations.

Additional Comments:

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that the above-described pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines x [X], a general permit [ ], or an (attached) alternative OCD-approved plan [ ].**

Date: 11/1/06
Printed Name/Title Mitchel Johnson / Operations Manager Signature

Your certification and NMOCD approval of this application/closure does not relieve the operator of liability should the contents of the pit or tank contaminate ground water or otherwise endanger public health or the environment. Nor does it relieve the operator of its responsibility for compliance with any other federal, state, or local laws and/or regulations.

Approval:
Printed Name/Title WAYNE PRICE - ENVR BUREAU CHIEF Signature Date: 11/7/06

SEE ATTACHED APPROVAL CONDITIONS:

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Thursday, November 09, 2006 2:03 PM
To: 'Mitchel Johnson'
Cc: Gum, Tim, EMNRD; Bratcher, Mike, EMNRD
Subject: C-144 approval with conditions
Attachments: C-144 approval Nov06.tif

P.01

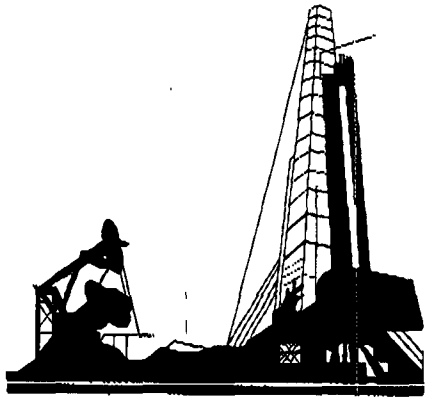
TRANSACTION REPORT

NOV-09-2006 THU 03:21 PM

FOR:

DATE	START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
NOV-09	03:20 PM	918174415880	52"	3	SEND	OK	481	

TOTAL : 52S PAGES: 3



TRANSMITTAL COVER SHEET

OIL CONSERVATION DIVISION
1220 S. ST. FRANCIS DRIVE
SANTA FE, NM 87505
(505) 476-3440
(505)476-3462 (Fax)

PLEASE DELIVER THIS FAX: ~~817~~ 817-441-5880

TO: MITCHELL JOHNSON - GSF

FROM: WAYNE PRICE - OCD

TRANSMITTAL COVER SHEET

OIL CONSERVATION DIVISION
1220 S. ST. FRANCIS DRIVE
SANTA FE, NM 87505
(505) 476-3440
(505)476-3462 (Fax)

PLEASE DELIVER THIS FAX:

TO: MITCHELL JOHNSON - GSF 817-441-5880

FROM: WAYNE PRICE - OCD

DATE: 11/09/06

PAGES: 3

SUBJECT: C-144 WITH CONDITIONS

IF YOU HAVE TROUBLE RECEIVING THIS FAX, PLEASE CALL THE OFFICE NUMBER ABOVE.

Loco Hills GSF
Brine Pond
Loco Hills, New Mexico

Installation By Falcon Environmental Lining Systems Inc.
P.O. Box 4306 Odessa, Tx 79760
432-366-2611

Enclosed
Liner material QC
Pre-Weld Test Data
Geomembrane Seaming Log
Geomembrane Repair Log
Non-Destructive Test Data
Panel-layout Drawing

GSE®

GSE Lining Technology, Inc.

LETTER OF TRANSMITTAL

Bryan Brooks
Falcon Environmental
P.O. Box 4306
Odessa, TX 79760

DATE: October 26, 2006
JOB NO: SO49158
JOB NAME: GSF Loco Hills
RE: QC/QA Certificate

COPIES	DESCRIPTION
1	QC/QA Documentation as per Bill of Lading #62920 & 62942

TRANSMIT VIA:

U.S. Mail

If enclosures are not as noted kindly notify us at once.

SIGNED: Patty Beaubien
DATE: October 26, 2006

Shipping Order - Packing List - Original - Not Negotiable

GSE Lining Technology, Inc. at HOUSTON, TEXAS

Shippers No. 62920

Ship To: Falcon Environmental
C/O GSF Loco Hills Brine Ponds
12705 Lovington Hwy
W of Loco Hills on US82@mile mark
127.5- Falcon@800-842-0945
Loco Hills NM 88255

Roll Certifications Included

Date: 10/25/06

Branch Plant: 1500 621811

Shipping Instructions:

call 24 hrs B4 delivery Falcon@800-842-0945

Sales Order
49158 SO

No. Line	Roll #	QTY Shipped	UM	Kind of Package, Description of Articles, Special Marks and Exceptions	Weight
1	107121031	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,450.00
2	107121206	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,500.00
3	107121210	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,442.00

Total Quantity 43,470 Total Weight: 13,392.00

Project# 513664

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer P.O. Number: 7303

If this shipment is to be delivered to consignor, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

Signature of Consignor

Local Verification Signed:

X

Pick Up # 14353RR

Seal #

Truckers P.O. #

Driver Requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier Name: _____

Carrier Signature: _____

Date: _____

GSE Lining Technology, Inc

Roll Test Data Report

Bill of Lading: 62920

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
49158	513664	Falcon Environmental	Loco Hills, NM	HDE060A001	10/25/2006 *Modified

GSE QC APPROVED

	ASTM D 5199		ASTM D6638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 1603*	ASTM D 5596
	Average Thickness (mils)	Minimum Thickness (mils)	TD Strength @ Yield (ppi)	MD Strength @ Yield (ppi)	TD Strength @ Break (ppi)	MD Strength @ Break (ppi)	TD Elongation @ Yield (%)	MD Elongation @ Yield (%)	TD Elongation @ Break (%)	MD Elongation @ Break (%)	TD Tear Resistance (lbs)	MD Tear Resistance (lbs)	Puncture Resistance (lbs)	Density (g/cc)	Carbon Black Content (%)	Carbon Black Dispersion Views in Cat1 - Cat2
Roll No.	every roll		every 3rd								every 3rd		every 3rd	every 3rd	every 3rd	every 3rd
107121031	62	58	157	157	333	282	17	18	848	743	49	51	149	0.945	2.28	,10
107121206	63	58	181	146	320	313	15	15	842	830	49	50	154	0.942	2.65	10
107121210	61	57	150	143	325	293	18	18	862	798	54	50	148	0.942	2.51	10

Approved By: Jane Allen

19103 Gundle Road - Houston, Texas 77073

Shipping Order - Packing List - Original - Not Negotiable

GSE Lining Technology, Inc. at HOUSTON, TEXAS

Shippers No. 62942

Ship To: Falcon Environmental
C/O GSF Loco Hills Brine Ponds
12705 Lovington Hwy
W of Loco Hills on US82@mile mark
127.5- Falcon@800-842-0945
Loco Hills NM 88255

Date: 10/25/06

Roll Certifications Included

Branch Plant: 1500 621811

Shipping Instructions:

call 24 hrs B4 delivery Falcon@800-842-0945

Sales Order
49158 SO

No. Line	Roll #	QTY Shipped	UM	Kind of Package, Description of Articles, Special Marks and Exceptions	Weight
1	107120172	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,660.00
2	107120177	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,614.00
3	107120179	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,592.00
4	107120182	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,610.00
5	107120185	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,552.00
6	107120191	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,586.00
7	107120192	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,602.00
8	107120195	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,616.00
9	107120196	22425	SF	HDE040A001 40 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,596.00
10	107121024	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,446.00

Deliver on 10/27/06

Total Quantity 216,315 Total Weight: 45,874.00

Project# 513664

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer P.O. Number: 7303

If this shipment is to be delivered to consignor, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

_____
Signature of Consignor

Local Verification Signed:

X _____

Pick Up # 14352RR

Seal #

Truckers P.O. # PO 134810

Driver Requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier Name: MEADOW LARK

Carrier Signature: _____

Date: _____

GSE Lining Technology, Inc

Roll Test Data Report

Bill of Lading: 62942

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
49158	513664	Falcon Environmental	Loco Hills, NM	HDE040A001	10/25/2006 *Modified

GSE QC APPROVED

	ASTM D 5199		ASTM D638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 1603*	ASTM D 5596
	Average Thickness (mils)	Minimum Thickness (mils)	TD Strength @ Yield (ppi)	MD Strength @ Yield (ppi)	TD Strength @ Break (ppi)	MD Strength @ Break (ppi)	TD Elongation @ Yield (%)	MD Elongation @ Yield (%)	TD Elongation @ Break (%)	MD Elongation @ Break (%)	TD Tear Resistance (lbs)	MD Tear Resistance (lbs)	Puncture Resistance (lbs)	Density (g/cc)	Carbon Black Content (%)	Carbon Black Dispersion Views in Cat1 - Cat2
Roll No.	every roll		every 2nd								every 2nd		every 2nd	every 2nd	every 2nd	every 2nd
107120172	43	39	110	109	237	233	17	18	877	874	34	35	114	0.946	2.36	10
107120177	41	38	109	114	244	221	21	19	920	902	32	34	109	0.946	2.45	10
107120179	41	37	111	103	230	213	16	19	863	858	32	34	110	0.945	2.37	10
107120182	42	38	113	102	233	232	15	18	869	890	34	34	113	0.946	2.53	10
107120185	42	37	112	107	208	181	18	18	796	706	33	34	112	0.945	2.41	10
107120191	42	37	108	106	235	215	16	18	904	851	35	36	111	0.946	2.49	10
107120192	42	37	108	106	235	215	16	18	904	851	35	36	111	0.946	2.49	10
107120195	41	39	106	105	233	204	18	19	907	819	32	34	111	0.946	2.50	10
107120196	41	37	106	105	233	204	18	19	907	819	32	34	111	0.946	2.50	10

Approved By: Jane Allen

19103 Gundle Road - Houston, Texas 77073

GSE Lining Technology, Inc

Roll Test Data Report

Bill of Lading: 62942

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
49158	513664	Falcon Environmental	Loco Hills, NM	HDE060A001	10/25/2006 *Modified

GSE QC APPROVED

	ASTM D 5199		ASTM D638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 1603*	ASTM D 5596
	Average Thickness (mils)	Minimum Thickness (mils)	TD Strength @ Yield (ppi)	MD Strength @ Yield (ppi)	TD Strength @ Break (ppi)	MD Strength @ Break (ppi)	TD Elongation @ Yield (%)	MD Elongation @ Yield (%)	TD Elongation @ Break (%)	MD Elongation @ Break (%)	TD Tear Resistance (lbs)	MD Tear Resistance (lbs)	Puncture Resistance (lbs)	Density (g/cc)	Carbon Black Content (%)	Carbon Black Dispersion Views in Cat - Cat2
Roll No.	every roll		every 3rd								every 3rd		every 3rd	every 3rd	every 3rd	every 3rd
107121024	60	56	149	151	323	312	18	19	832	836	51	51	150	0.945	2.31	10

Approved By: Jane Allen

19103 Gundle Road - Houston, Texas 77073

GSE®

GSE Lining Technology, Inc.

LETTER OF TRANSMITTAL

Bryan Brooks
Falcon Environmental
P.O. Box 4306
Odessa, TX 79760

DATE: October 25, 2006
JOB NO: SO49158
JOB NAME: GSF Loco Hills
RE: QC/QA Certificate

COPIES	DESCRIPTION
1	QC/QA Documentation as per Bill of Lading #62908

TRANSMIT VIA:

U.S. Mail

If enclosures are not as noted kindly notify us at once.

SIGNED: Patty Beaubien
DATE: October 25, 2006

Shipping Order - Packing List - Original - Not Negotiable

GSE Lining Technology, Inc. at HOUSTON, TEXAS

Shippers No. 62908

Ship To: Falcon Environmental
C/O GSF Loco Hills Brine Ponds
12705 Lovington Hwy
W of Loco Hills on US82@mile mark
127.5- Falcon@800-842-0945
Loco Hills NM 88255

Roll Certifications Included

Date: 10/25/06

Branch Plant: 1500 621811

Shipping Instructions:

call 24 hrs B4 delivery Falcon@800-842-0945

Sales Order
49158 SO

No. Line	Roll #	QTY Shipped	UM	Kind of Package, Description of Articles, Special Marks and Exceptions	Weight
1	107121018	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,480.00
2	107121021	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,442.00
3	107121026	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,502.00
4	107121030	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,450.00
5	107121204	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,484.00
6	107121208	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,468.00
7	107121209	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,448.00
8	107121211	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,440.00
9	107121212	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,410.00
10	107121213	14490	SF	HDE060A001 60 mil Avg GSE HD Blk, HD, Smooth, 34.5'	4,392.00

Total Quantity 144,900 Total Weight: 44,516.00

Project# 513664

Freight charges are prepaid unless marked collect.

Check box if collect ☐

Customer P.O. Number: 7303

If this shipment is to be delivered to consignor, consignor shall sign the following statement.

Carrier may decline to deliver this shipment without payment of freight and all other lawful charges.

Signature of Consignor

Local Verification Signed:

X

Pick Up # 14351RR

Seal #

Truckers P.O. #

Driver Requirements:

1) Driver must pre call 24 hrs prior to delivery and on Friday for Monday delivery.
2) Driver must call (281) 230-6781 when unloaded.
3) Driver must call and advise any delay in transit.
4) A copy of this bill of lading must accompany Freight Invoice.

Carrier Name: _____

Carrier Signature: _____

Date:

GSE Lining Technology, Inc

Roll Test Data Report

Bill of Lading: 62908

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
49158	513664	Falcon Environmental	Loco Hills, NM	HDE060A001	10/25/2006 *Modified

GSE QC APPROVED

	ASTM D 5199		ASTM D638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 1603*	ASTM D 5596
Roll No.	Average Thickness (mils) every roll	Minimum Thickness (mils)	TD Strength @ Yield (ppi) every 3rd	MD Strength @ Yield (ppi)	TD Strength @ Break (ppi)	MD Strength @ Break (ppi)	TD Elongation @ Yield (%)	MD Elongation @ Yield (%)	TD Elongation @ Break (%)	MD Elongation @ Break (%)	TD Tear Resistance (lbs) every 3rd	MD Tear Resistance (lbs)	Puncture Resistance (lbs) every 3rd	Density (g/cc) every 3rd	Carbon Black Content (%) every 3rd	Carbon Black Dispersion Views in Cat1 - Cat2 every 3rd
107121018	62	58	167	160	355	319	16	17	893	835	48	52	152	0.944	2.36	10
107121021	62	57	154	148	297	290	17	19	806	774	50	51	155	0.944	2.56	10
107121026	61	56	147	148	325	315	18	18	850	854	50	50	149	0.945	2.44	10
107121030	62	57	157	157	333	282	17	18	848	743	49	51	149	0.945	2.28	10
107121204	62	57	164	152	324	322	17	18	838	865	50	53	151	0.942	2.29	10
107121208	62	57	181	146	320	313	15	15	842	830	49	50	154	0.942	2.65	10
107121209	61	56	150	143	325	293	18	18	862	798	54	50	148	0.942	2.51	10
107121211	61	56	150	143	325	293	18	18	862	798	54	50	148	0.942	2.51	10
107121212	62	56	148	143	331	302	18	18	868	822	49	49	154	0.944	2.35	10
107121213	62	56	148	143	331	302	18	18	868	822	49	49	154	0.944	2.35	10

Approved By: Jane Allen

19103 Gundle Road - Houston, Texas 77073

SKAPS Industries (Nonwoven Division)
316 South Holland Drive
Pendergrass, GA 30567 (U.S.A.)
Phone (706) 693-3440 Fax (706) 693-3450
E-mail: info@skaps.com

Sales Office:
Engineered Synthetic Product Inc.
Phone: (770)564-1857
Fax: (770)564-1818

November 6, 2006
Falcon Environmental
P.O. Box 4306
Odessa, TX 79760
PO : 7304
BOL : 3424

Dear Sir/Madam:

This is to certify that SKAPS GT180 is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric. SKAPS GT180 resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GT180 conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight(Typical)	ASTM D 5261	oz/sy (g/m^2)	8.00 (271)
Grab Tensile	ASTM D 4632	lbs (kN)	205 (0.91)
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lbs (kN)	85 (0.38)
Puncture Resistance	ASTM D 4833	lbs (kN)	130 (0.58)
Permittivity*	ASTM D 4491	sec^{-1}	1.40
Water Flow*	ASTM D 4491	gpm/ft^2($l/min/m^2$)	90 (3667)
AOS*	ASTM D 4751	US Sieve (mm)	80 (0.18)
UV Resistance	ASTM D 4355	%/hrs	70/500

Notes:
* At the time of manufacturing. Handling may change these properties.

ANURAG SHAH
QUALITY CONTROL MANAGER

Product : GT180-180

ROLL # ASTM METHOD UNITS TARGET	WEIGHT* D5261 oz/sq yd 8.00	MD TENSILE D4632 lbs. 205	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 205	XMD ELONG D4632 % 50	MD TRAP D4533 lbs. 85	XMD TRAP D4533 lbs 85	PUNCTURE D4833 lbs. 130	AOS D4751 US Sieve 80	WATER FLOW D4491 gpm/ft^2 90	PERMITTIVITY D4491 sec^{-1} 1.40
030060180	8.13	213	73	237	86	94	113	137	80	113	1.51
030060346	7.55	210	70	231	81	90	101	133	80	109	1.46
030060358	8.46	215	75	239	89	92	109	139	80	109	1.46
030060385	8.01	205	66	233	83	88	105	135	80	109	1.46
030060506	8.19	209	69	240	75	91	100	131	80	115	1.53
030060519	8.07	207	62	225	84	85	112	138	80	115	1.53
030060526	7.68	212	67	229	81	93	108	133	80	115	1.53
030060527	7.68	212	67	229	81	93	108	133	80	115	1.53
030060686	8.14	210	64	227	88	90	104	140	80	111	1.48
030060723	8.10	214	69	237	83	95	110	136	80	114	1.52
030061948	8.46	208	60	231	85	87	106	139	80	112	1.49
030061996	8.12	211	66	239	80	92	111	135	80	112	1.49
030061997	8.12	211	66	239	80	92	111	135	80	112	1.49
030061998	8.12	211	66	239	80	92	111	135	80	112	1.49
030062080	8.37	206	63	235	90	85	109	137	80	113	1.51
030062081	8.37	206	63	235	90	85	109	137	80	113	1.51
030062082	8.37	206	63	235	90	85	109	137	80	113	1.51
030062083	8.37	206	63	235	90	85	109	137	80	113	1.51
030062084	8.37	206	63	235	90	85	109	137	80	113	1.51
030062086	8.33	214	68	233	76	85	109	137	80	113	1.51
030062088	8.33	214	68	233	76	85	109	137	80	113	1.51
030062089	8.33	214	68	233	76	85	109	137	80	113	1.51
030062090	8.50	212	65	237	86	89	113	132	80	113	1.51
030062092	8.50	212	65	237	86	89	113	132	80	113	1.51
030062104	7.68	208	61	228	82	93	105	136	80	108	1.44
040017463	8.29	211	66	231	77	91	112	134	80	110	1.47
040017468	8.14	205	63	225	75	91	112	134	80	110	1.47
040017474	8.39	215	67	240	85	95	104	139	80	110	1.47
040017475	8.30	207	64	229	81	95	104	139	80	110	1.47
040017610	8.43	213	68	233	89	90	111	135	80	112	1.49
040017611	8.43	213	68	233	89	90	111	135	80	112	1.49
040017616	8.12	210	60	230	83	90	111	135	80	112	1.49
040017617	8.12	210	60	230	83	90	111	135	80	112	1.49
040017623	8.36	212	69	237	87	92	106	138	80	112	1.49
040017628	8.30	205	62	231	84	92	106	138	80	112	1.49
040017925	8.48	209	65	235	82	88	109	130	80	115	1.53

*Weight is typical. All other values are MARV.

Product : GT180-180

ROLL # ASTM METHOD UNITS TARGET	WEIGHT* D5261 oz/sq yd 8.00	MD TENSILE D4632 lbs. 205	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 205	XMD ELONG D4632 % 50	MD TRAP D4533 lbs. 85	XMD TRAP D4533 lbs 85	PUNCTURE D4833 lbs. 130	AOS D4751 US Sieve 80	WATER FLOW D4491 gpm/ft^2 90	PERMITTIVITY D4491 sec^{-1} 1.40
090083412	8.13	207	61	228	90	94	103	136	80	112	1.50
090084820	8.48	214	67	236	81	87	112	134	80	114	1.52
090084821	8.48	214	67	236	81	87	112	134	80	114	1.52
090084824	8.48	214	67	236	81	87	112	134	80	114	1.52
090084825	8.01	208	64	233	86	87	112	134	80	114	1.52
090084828	8.01	208	64	233	86	87	112	134	80	114	1.52
090084838	8.40	211	68	240	84	93	105	131	80	114	1.52
090085095	8.13	206	60	229	89	91	110	137	80	109	1.45
090085096	8.13	206	60	229	89	91	110	137	80	109	1.45
090085098	8.13	206	60	229	89	91	110	137	80	109	1.45

*Weight is typical. All other values are MARV.

PRE-WELD TEST DATA

Job Name: Loco Hills N.M. Machine # 300

Date: 11-4-06. Type weld: wedge ✓ extruder ___

Weld Tech J.g. Speed Setting: 12.

Liner Matl. 40 mil Temp Setting: 750.

AM TEST RESULTS

9.30

	in-side	out-side	shear test	pass fail
1.	93	94	114	P ✓ F ___
2.	95	91	116	P ✓ F ___
3.	90	98	114	P ___ F ___

PM TEST RESULTS

12.10

	in-side	out-side	shear test	pass fail
1.	90	92	112	P ✓ F ___
2.	93	91	114	P ✓ F ___
3.	92	92	112	P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-5-06

Weld Tech J B-E

Liner Matl. 40 mil

Machine # 2000

Type weld: wedge ___ extruder ✓

Speed Setting: ___

Temp Setting: 265

AM TEST RESULTS

9:30

	in-side	out-side	shear test	pass fail
1.	97		124	P ✓ F ___
2.	101		130	P ✓ F ___
3.	98		132	P ___ F ___

PM TEST RESULTS

	in-side	out-side	shear test	pass fail
1.				P ___ F ___
2.				P ___ F ___
3.				P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-6.06

Weld Tech JG

Liner Matl. 60 M.

Machine # 300

Type weld: wedge ✓ extruder ___

Speed Setting: 7

Temp Setting: 750

AM TEST RESULTS

9:15

	in-side	out-side		shear test	pass fail
1.	118	124	1.	169	P ✓ F ___
2.	123	129	2.	164	P ✓ F ___
3.	124	130	3.	171	P ✓ F ___

PM TEST RESULTS

12.15.

	in-side	out-side		shear test	pass fail
1.	118	120	1.	150	P ✓ F ___
2.	120	124	2.	148	P ✓ F ___
3.	124	116	3.	156	P ✓ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills Machine # 300

Date: 11-7-06 Type weld: wedge ✓ extruder ___

Weld Tech J.G. Speed Setting: 12

Liner Matl. 40 M Temp Setting: 750

AM TEST RESULTS

7:35

	in-side	out-side		shear test	pass fail
1.	95	101	1.	119	P ✓ F ___
2.	92	103	2.	117	P ___ F ___
3.	93	100	3.	119	P ___ F ___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P ___ F ___
2.			2.		P ___ F ___
3.			3.		P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills
Date: 11-7-06
Weld Tech C.H.
Liner Matl. 60 mil

Machine # 21
Type weld: wedge ✓ extruder ___
Speed Setting: 13.
Temp Setting: 750

AM TEST RESULTS

8.30

	in-side	out-side		shear test	pass fail
1.	101	108	1.	140	P ✓ F ___
2.	118	118	2.	142	P ✓ F ___
3.	112	120	3.	145	P ✓ F ___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P ___ F ___
2.			2.		P ___ F ___
3.			3.		P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-9-06

Weld Tech JG.

Liner Matl. 40 M.

Machine # 300

Type weld: wedge ✓ extruder ___

Speed Setting: 17

Temp Setting: 7.5@

AM TEST RESULTS

7:35

	in-side	out-side		shear test	pass fail
1.	98	101	1.	127	P ✓ F ___
2.	101	106	2.	131	P ✓ F ___
3.	99	107	3.	127	P ✓ F ___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P ___ F ___
2.			2.		P ___ F ___
3.			3.		P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco-Hills N.M. Machine # 2000

Date: 11-9-06 Type weld: wedge ___ extruder ✓

Weld Tech R.M. Speed Setting: ___

Liner Matl. 40 mil Temp Setting: 265.

AM TEST RESULTS

	in-side	out-side		shear test	pass	fail
1.			1.		P___	F___
2.			2.		P___	F___
3.			3.		P___	F___

PM TEST RESULTS

2.30.

	in-side	out-side		shear test	pass	fail
1.	87		1.	113.	P ✓	F___
2.	90		2.	109.	P ✓	F___
3.	90		3.	110	P ✓	F___

PRE-WELD TEST DATA

Job Name: Loco Hills N.M. Machine # 2000

Date: 11-7-01 Type weld: wedge ___ extruder ✓

Weld Tech B-D Speed Setting: ___

Liner Matl. 40 mil Temp Setting: 265.

AM TEST RESULTS

11.00

	in-side	out-side		shear test	pass fail
1.	90		1.	110	P ✓ F ___
2.	91		2.	112	P ✓ F ___
3.	90		3.	109	P ✓ F ___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P ___ F ___
2.			2.		P ___ F ___
3.			3.		P ___ F ___

PRE-WELD TEST DATA

Job Name: Los Hills N.M.
Date: 11-5-06.
Weld Tech B.D.
Liner Matl. 40mil

Machine # 2000
Type weld: wedge___ extruder ✓
Speed Setting:
Temp Setting: 265

AM TEST RESULTS

900

	in-side	out-side		shear test	pass fail
1.	97		1.	112.	P ✓ F___
2.	80		2.	114.	P ✓ F___
3.	96		3.	116	P ✓ F___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P___ F___
2.			2.		P___ F___
3.			3.		P___ F___

PRE-WELD TEST DATA

Job Name: Loco-Hills Machine # 2000

Date: 11-10-06 Type weld: wedge ___ extruder ✓

Weld Tech B-D Speed Setting: ___

Liner Matl. 60 mil Temp Setting: 285

AM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.	___	___	1.	___	P___ F___
2.	___	___	2.	___	P___ F___
3.	___	___	3.	___	P___ F___

PM TEST RESULTS

12:30

	in-side	out-side		shear test	pass fail
1.	124	___	1.	150	P ✓ F___
2.	118	___	2.	148	P ✓ F___
3.	121	___	3.	152	P ✓ F___

PRE-WELD TEST DATA

Job Name: Loco-Hills

Date: 11-8-06

Weld Tech B-D.

Liner Matl. 60mil

Machine # 2000

Type weld: wedge ___ extruder ✓

Speed Setting: ___

Temp Setting: 285.

AM TEST RESULTS

10.00

	in-side	out-side		shear test	pass fail
1.	124	___	1.	186	P ✓ F ___
2.	130	___	2.	174	P ✓ F ___
3.	132	___	3.	170	P ✓ F ___

PM TEST RESULTS

12.40

	in-side	out-side		shear test	pass fail
1.	118	___	1.	145	P ✓ F ___
2.	120	___	2.	152	P ✓ F ___
3.	121	___	3.	150	P ✓ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-10-06

Weld Tech C-H

Liner Matl. Gamil

Machine # 21

Type weld: wedge ✓ extruder___

Speed Setting: 7

Temp Setting: 750

AM TEST RESULTS

7.20

	in-side	out-side		shear test	pass	fail
1.	113	104	1.	170	P ✓	F___
2.	118	112	2.	160	P ✓	F___
3.	120	121	3.	164	P ✓	F___

PM TEST RESULTS

	in-side	out-side		shear test	pass	fail
1.			1.		P___	F___
2.			2.		P___	F___
3.			3.		P___	F___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-10-06

Weld Tech JG

Liner Matl. 60 M.

Machine # 300

Type weld: wedge ✓ extruder ___

Speed Setting: 7

Temp Setting: 750

AM TEST RESULTS

6:45

	in-side	out-side		shear test	pass fail
1.	120	124	1.	153	P___ F___
2.	~~118~~	~~121~~	2.	~~149~~	P___ F___
3.	~~119~~	~~123~~	3.	~~159~~	P___ F___

PM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P___ F___
2.			2.		P___ F___
3.			3.		P___ F___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-8-06

Weld Tech JG-

Liner Matl. 60 M.

Machine # 300

Type weld: wedge ✓ extruder ___

Speed Setting: 7

Temp Setting: 750

AM TEST RESULTS

7:25

	in-side	out-side	shear test	pass fail
1.	121	129	182	P ✓ F ___
2.	120	131	179	P ___ F ___
3.	119	123	181	P ✓ F ___

PM TEST RESULTS

	in-side	out-side	shear test	pass fail
1.				P ___ F ___
2.				P ___ F ___
3.				P ___ F ___

PRE-WELD TEST DATA

Job Name: Loco Hills

Machine # 21

Date: 11-7-06

Type weld: wedge ✓ extruder ___

Weld Tech C.H.

Speed Setting: 7

Liner Matl. 60mil

Temp Setting: 750

AM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.			1.		P___ F___
2.			2.		P___ F___
3.			3.		P___ F___

PM TEST RESULTS

2.45

	in-side	out-side		shear test	pass fail
1.	118	124	1.	154	P___ F___
2.	121	116	2.	150	P___ F___
3.	116	121	3.	148	P___ F___

PRE-WELD TEST DATA

Job Name: Loco Hills

Machine # 300

Date: 11-7-06

Type weld: wedge ✓ extruder ___

Weld Tech J.G.

Speed Setting: 7

Liner Matl. 60 M.

Temp Setting: 750

AM TEST RESULTS

	in-side	out-side		shear test	pass fail
1.	[redacted]	[redacted]	1.		P___ F___
2.			2.		P___ F___
3.			3.		P___ F___

PM TEST RESULTS

2:22

	in-side	out-side		shear test	pass fail
1.	117	118	1.	151	P ✓ F___
2.	115	119	2.	155	P ✓ F___
3.	121	123	3.	149	P ✓ F___

PRE-WELD TEST DATA

Job Name: Loco Hills

Date: 11-6-06

Weld Tech C.H.

Liner Matl. 60mil

Machine # 21

Type weld: wedge ✓ extruder ___

Speed Setting: 7

Temp Setting: 750

AM TEST RESULTS

10.20

	in-side	out-side		shear test	pass fail
1.	118	118	1.	157	P ✓ F ___
2.	122	123	2.	160	P ✓ F ___
3.	107	116	3.	162	P ✓ F ___

PM TEST RESULTS

12.20

	in-side	out-side		shear test	pass fail
1.	112	124	1.	162	P ✓ F ___
2.	118	121	2.	160	P ✓ F ___
3.	116	116	3.	148	P ✓ F ___

FALCON ENVIRONMENTAL LINING SYSTEMS INC.
P.O. BOX 4306 ODESSA, TEXAS 79760
5200 JOHNSON RD. ODESSA, TEXAS 79764
PH. (432)366-2611 (800)842-0945 FAX(432)366-2999

Project Name: Pond					Job Number					
Field Supervisor: A-LAM					Page 1 of					
Location Loco-Hills. N.M					Sheet Thickness and Type 60 mil					
Seam number	Test Date	Tested By	Air Test PSI Before	/ After	Time Begin	/ End	No. of Repairs	Air Test Results Pass	/ Fail	Accepted Date
1-2	11-7-06	R.M	30	30	10.15	10.20	0	✓		11-7-06
2-3	11-7-06	R.M	30	30	10.22	10.27	0	✓		11-7-06
3-4	11-7-06	R.M	30	30	10.29	10.34	0	✓		11-7-06
4-5	11-7-06	R.M	30	30	10.36	10.41	0	✓		11-7-06
5-6	11-7-06	R.M	30	30	10.43	10.48	0	✓		11-7-06
6-7	11-7-06	R.M	30	30	10.50	10.55	0	✓		11-7-06
5-7	11-7-06	R.M	30	30	11.32	11.37	0	✓		11-7-06
7-8	11-7-06	R.M	30	30	10.57	11.02	0	✓		11-7-06
4-8	11-7-06	R.M	30	30	11.25	11.30	0	✓		11-7-06
8-9	11-7-06	R.M	30	30	11.04	11.09	0	✓		11-7-06
9-3	11-7-06	R.M	30	30	11.18	11.23	0	✓		11-7-06
9-10	11-7-06	R.M	30	30	11.11	11.16	0	✓		11-7-06
10-3	11-7-06	R.M	30	30	11.39	11.44	0	✓		11-7-06
10-11	11-7-06	R.M	30	30	11.46	11.51	0	✓		11-7-06
3-11	11-7-06	R.M	30	30	2.35	2.40	0	✓		11-7-06
11-12	11-7-06	R.M	30	30	11.53	11.58	0	✓		11-7-06
21-12	11-7-06	R.M	30	30	2.28	2.33	0	✓		11-7-06
12-13	11-7-06	R.M	30	30	12.33	12.38	0	✓		11-7-06
21-13	11-7-06	R.M	30	30	2.21	2.26	0	✓		11-7-06
13-14	11-7-06	R.M	30	30	12.40	12.45	0	✓		11-7-06
14-21	11-7-06	R.M	26	30	2.14	2.19	0	✓		11-7-06
14-15	11-7-06	R.M	30	30	12.47	12.52	0	✓		11-7-06
15-21	11-7-06	R.M.	30	30	2.07	2.12	0	✓		11-7-06

FALCON ENVIRONMENTAL LINING SYSTEMS INC.
P.O. BOX 4306 ODESSA, TEXAS 79760
5200 JOHNSON RD. ODESSA, TEXAS 79764
PH. (432)366-2611 (800)842-0945 FAX(432)366-2999

Project Name: Pond					Job Number					
Field Supervisor: ALAN					Page 2 of					
Location Loco-Hills. N.M.					Sheet Thickness and Type 60 mil					
Seam number	Test Date	Tested By	Air Test PSI Before	/ After	Time Begin	/ End	No. of Repairs	Air Test Results Pass	/ Fail	Accepted Date
20-21	11-7-06	RM	30	30	11.31	11.36	0	✓		11-7-06
15-20	11-7-06	RM	30	30	200	2.05	0	✓		11-7-06
15-16	11-7-06	RM	30	30	12.54	12.59	0	✓		11-7-06
16-20	11-7-06	RM	30	30	1.53	1.58	0	✓		11-7-06
16-19	11-7-06	RM	30	30	1.46	1.51	0	✓		11-7-06
16-17	11-7-06	RM	30	30	1.03	1.08	0	✓		11-7-06
17-18	11-7-06	RM	30	30	1.10	1.15	0	✓		11-7-06
18-19	11-7-06	RM	30	30	1.17	1.22	0	✓		11-7-06
19-20	11-7-06	RM	30	30	1.24	1.29	0	✓		11-7-06
21-22	11-7-06	RM	30	30	1.38	1.43	0	✓		11-7-06
21-22	11-7-06	RM	30	30	2.45	2.50	0	✓		11-7-06
11-34	11-8-06	RM	30	30	8.20	8.25	0	✓		11-8-06
12-34	11-8-06	RM	30	30	8.27	8.32	0	✓		11-8-06
21-34	11-8-06	RM	30	30	8.35	8.30	0	✓		11-8-06
22-35	11-8-06	RM	30	30	9.03	9.08	0	✓		11-8-06
23-36	11-8-06	RM	30	30	9.24	9.29	0	✓		11-8-06
1-36	11-8-06	RM	30	30	9.17	9.22	0	✓		11-8-06
2-35	11-8-06	RM	30	30	8.56	9.01	0	✓		11-8-06
3-34	11-8-06	RM	30	30	8.42	8.47	0	✓		11-8-06
34-35	11-8-06	RM	30	30	8.49	8.54	0	✓		11-8-06
35-36	11-8-06	RM	30	30	9.10	9.15	0	✓		11-8-06
22-23	11-8-06	RM	30	30	9.35	9.40	0	✓		11-8-06
22-23	11-8-06	RM	30	30	9.42	9.47	0	✓		11-8-06

FALCON ENVIRONMENTAL LINING SYSTEMS INC.
P.O. BOX 4306 ODESSA, TEXAS 79760
5200 JOHNSON RD. ODESSA, TEXAS 79764
PH. (432)366-2611 (800)842-0945 FAX(432)366-2999

Project Name: Pond					Job Number					
Field Supervisor: A-LAAA					Page 3 of					
Location Loco Hills N.M.					Sheet Thickness and Type 60mil					
Seam number	Test Date	Tested By	Air Test PSI Before	Air Test PSI After	Time Begin	Time End	No. of Repairs	Air Test Results Pass	Air Test Results Fail	Accepted Date
23-24	11-8-06	R.M	30	30	9.50	9.55	0	✓		11-8-06
24-25	11-8-06	R.M	30	30	9.57	10.02	0	✓		11-8-06
25-26	11-8-06	R.M	30	30	10.04	10.09	0	✓		11-8-06
26-27	11-8-06	R.M	30	30	10.11	10.16	0	✓		11-8-06
27-28	11-8-06	R.M	30	30	10.18	10.23	0	✓		11-8-06
28-29	11-8-06	R.M	30	30	10.25	10.30	0	✓		11-8-06
27-29	11-8-06	R.M	30	30	10.46	10.51	0	✓		11-8-06
27-29	11-8-06	R.M	30	30	10.39	10.44	0	✓		11-8-06
29-30	11-8-06	R.M	30	30	10.32	10.37	0	✓		11-8-06
27-30	11-8-06	R.M	30	30	10.53	10.58	0	✓		11-8-06
26-30	11-8-06	R.M	30	30	11.01	11.06	0	✓		11-8-06
30-31	11-8-06	R.M	30	30	9.30	9.35	0	✓		11-8-06
26-31	11-8-06	R.M	30	30	9.37	9.42	0	✓		11-8-06
25-31	11-8-06	R.M	30	30	9.44	9.49	0	✓		11-8-06
31-32	11-8-06	R.M	30	30	9.51	9.56	0	✓		11-8-06
32-33	11-8-06	R.L	30	30	10.05	10.10	0	✓		11-8-06
33-34	11-8-06	R.L	30	30	10.12	10.17	0	✓		11-8-06
32-34	11-8-06	R.L	30	30	10.12	10.17	0	✓		11-8-06
31-34	11-8-06	R.L	30	30	9.58	10.03	0	✓		11-8-06
33-37	11-10-06	R.M	30	30	9.31	9.36	0	✓		11-10-06
31-38	11-10-06	R.M	30	30	9.24	9.29	0	✓		11-10-06
38-39	11-10-06	R.M	30	30	9.17	9.22	0	✓		11-10-06
39-40	11-10-06	R.M	30	30	9.10	9.15	0	✓		11-10-06

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Project Name: Pond.					Job Number					
Field Supervisor: Alan					Page 4. of					
Location Loco-Hills, N.M.					Sheet Thickness and Type 60mil					
Seam number	Test Date	Tested By	Air Test PSI Before	/ After	Time Begin	/ End	No. of Repairs	Air Test Results Pass	/ Fail	Accepted Date
40-41	11-10-06	RM	30	30	11:31	11:36	0	✓		11-10-06
41-42	11-10-06	RM	30	30	11:24	11:29	0	✓		11-10-06
45-24	11-10-06	RM	30	30	9:53	9:58	0	✓		11-10-06
36-45	11-10-06	RM	30	30	10:01	10:06	0	✓		11-10-06
1-45	11-10-06	RM	30	30	10:08	10:13	0	✓		11-10-06
38-45A	11-10-06	RM	30	30	10:15	10:20	0	✓		11-10-06
38-45B	11-10-06	RM	30	30	10:36	10:41	0	✓		11-10-06
37-45	11-10-06	RM	30	30	10:22	10:27	0	✓		11-10-06
37-24	11-10-06	RM	30	30	10:29	10:34	0	✓		11-10-06
39-45	11-10-06	RM	30	30	10:43	10:48	0	✓		11-10-06
40-45	11-10-06	RM	30	30	10:50	10:55	0	✓		11-10-06
44-45	11-10-06	RM	30	30	11:38	11:43	0	✓		11-10-06
40-44	11-10-06	RM	30	30	10:57	11:02	0	✓		11-10-06
41-44	11-10-06	RM	30	30	11:04	11:09	0	✓		11-10-06
41-43	11-10-06	RM	30	30	11:10	11:15	0	✓		11-10-06
42-43	11-10-06	RM	30	30	11:17	11:22	0	✓		11-10-06
43-44	11-10-06	RM	30	30	11:45	11:50	0	✓		11-10-06
18-18A	11-10-06	RM	30	30	11:46	11:51	0	✓		11-10-06
17-18A	11-10-06	RM	30	30	11:47	11:52	0	✓		11-10-06
43-43A	11-10-06	RM	30	30	11:50	11:55	0	✓		11-10-06
42-43A	11-10-06	RM	30	30	11:51	11:56	0	✓		11-10-06

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JOB NAME Loco Hills Drain Pond MATERIAL TYPE 60mil

GEOMENBRANE SEAMING LOG

Seam #	TECH	WELDER #	DATE	Start Time	Finish Time
24-33	J.g	300	11-7-06	4.43	4.48
24-32	J.g	300	11-7-06	4.48	4.53
24-31	J.g.	300	11-7-06	4.53	4.54
24-25	C.H.	21	11-7-06	3.10	3.25
33-32	J.g.	300	11-7-06	4.17	4.35
32-31	J.g.	300	11-7-06	3.53	4.12
31-25	C.H	21	11-7-06	4.46	4.53
31-26	C.H	21	11-7-06	4.45	4.46
30-26	C.H	21	11-7-06	4.40	4.45
27-30	C.H	21	11-7-06	4.35	4.40
27-29	C.H	21	11-7-06	4.33	4.35
28-29	C.H.	21	11-7-06	4.32	4.33
31-30	C.H	21	11-7-06	4.05	4.17
29-30	C.H	21	11-7-06	4.19	4.25
28-27	J.g.	300	11-7-06	3.46	3.50
27-26	C.H	21	11-7-06	3.45	3.52
26-25	C.H.	21	11-7-06	3.30	3.47
21-34	J.g	300	11-8-06	8.02	8.07
22-35	J.g	300	11-8-06	8.08	8.13
23-36	J.g	300	11-8-06	8.13	8.18
36-1	J.g	300	11-8-06	8.20	8.25
35-2	J.g	300	11-8-06	8.25	8.30
34-3	J.g	300	11-8-06	8.30	8.35
34-11	J.g	300	11-8-06	7.59	7.59
34-12	J.g	300	11-8-06	7.59	8.00
34-22	J.g	300	11-8-06	7.53	7.54
35-36	J.g	300	11-8-06	7.49	7.50
33-37	J.g	300	11-10-06	7.45	8.02
37-38	J.g	300	11-10-06	8.05	8.22
38-39	J.g	300	11-10-06	8.24	8.40
39-40	J.g.	300	11-10-06	8.42	8.57
40-41	C.H	21	11-10-06	8.42	8.55
41-42	C.H	21.	11-10-06	8.57	9.05
42-43	J.g	300	11-10-06	9.13	9.19
43-44	C.H	21	11-10-06	8.55	9.06
44-45	C.H	21	11-10-06	7.48	8.05

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JOB NAME Loco-Hills Rim-Pond MATERIAL TYPE 60mil

GEOMENBRANE SEAMING LOG

Seam #	TECH	WELDER #	DATE	Start Time	Finish Time
1-2	J.G	300	11-6-06	10.38	11.09
2-3	J.G	300	11-6-06	10.02	10.35
3-4	C.H	21	11-6-06	11.05	1.20
4-5	J.G	300	11-6-06	11.12	11.22
5-6	C.H	21	11-6-06	11.26	11.32
6-7	J.G	300	11-6-06	12.55	1.00
7-8	C.H	21	11-6-06	1.00	1.12
8-9	C.H	21	11-6-06	1.15	1.32
5-7	J.G	300	11-6-06	1.05	1.13
4-8	J.G	300	11-6-06	1.13	1.20
9-10	J.G	300	11-6-06	1.21	1.38
10-11	C.H	21	11-6-06	1.36	1.51
11-12	J.G	300	11-6-06	1.42	2.00
12-13	C.H	21	11-6-06	1.56	2.11
13-14	J.G	300	11-6-06	2.15	2.34
14-15	C.H	21	11-6-06	2.16	2.34
15-16	C.H	21	11-6-06	303	3.16
16-17	J.G	300	11-6-06	3.11	3.16
18-19	C.H	21	11-6-06	2.45	2.52
19-20	J.G	300	11-6-06	2.45	2.55
15-20	C.H	21	11-6-06	3.20	3.26
16-20	C.H	21	11-6-06	3.26	3.28
16-19	C.H	21	11-6-06	3.28	3.34
17-18	C.H	21	11-6-06	3.31	3.41
3-9	J.G	300	11-6-06	3.37	3.42
3-10	J.G	300	11-6-06	3.42	3.47
3-11	J.G	300	11-6-06	3.47	3.52
12-21	J.G	300	11-6-06	4.00	4.05
13-21	J.G	300	11-6-06	4.05	4.10
14-21	J.G	300	11-6-06	4.10	4.15
15-21	J.G	300	11-6-06	4.15	4.17
20-21	J.G	300	11-6-06	4.17	4.35
21-22	J.G	300	11-6-06	4.38	4.53
21-22	J.G	300	11-6-06	4.53	5.10
22-23	J.G	300	11-7-06	2.39	3.10
23-24	J.G	300	11-7-06	3.12	3.42

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JOB NAME 200-H.A.S.-N.M.-Pond MATERIAL TYPE 60 mil

GEOMENBRANE SEAMING LOG

Seam #	TECH	WELDER #	DATE	Start Time	Finish Time
45-1	J.G	300	11-10-06	6.57	7.28.
40-44	J.G	300	11-10-06	9.04	9.05
41-44	J.G	300	11-10-06	9.05	9.12
41-43	J.G	300	11-10-06	9.12	9.13
45-36	J.G	300	11-10-06	7.28.	7.30
45-24	J.G	300	11-10-06	7.31	7.36.
24-37	J.G	300	11-10-06	9.51	9.54.
37-45	J.G	300	11-10-06	9.48	9.49
38-45-A	J.G	300	11-10-06	9.47.	9.48
38-45.	J.G	300	11-10-06	9.41	9.44
39-45.	J.G	300	11-10-06	9.36.	9.41
40-45	J.G.	300	11-10-06	9.31	9.36.
18-18-A	J.G.	300.	11-10-06	9.37.	9.42.
17-18.	J.G.	300	11-10-06	9.43.	9.47
43-43A	J.G.	300	11-10-06	9.50.	9.53.
42-43A	J.G.	300.	11-10-06.	9.55	9.59

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JOB NAME Loco Hills N.M. Pond MATERIAL TYPE 60mil

GEOMENBRANE REPAIR LOG

REPAIR #	TECH	WELDER #	DATE	TIME	PATCH SIZE
1	B.D	2000	11-8-06	10:15	2-2
2	B.D	2000	11-8-06	10:17	2-4
3	B.D	2000	11-8-06	10:23	5-5
4	B.D	2000	11-8-06	10:24	2-2
5	B.D	2000	11-8-06	10:25	1½-1½
6	B.D	2000	11-8-06	10:27	1½-2
7	B.D	2000	11-8-06	10:30	1½-1½
8	B.D	2000	11-8-06	10:33	1½-2
9	B.D	2000	11-8-06	10:36	2-2
10	B.D	2000	11-8-06	10:40	2-3
11	B.D	2000	11-8-06	10:42	1½-2
12	B.D	2000	11-8-06	10:45	1½-2
13	B.D	2000	11-8-06	10:49	1½-1½
14	B.D	2000	11-8-06	10:52	1½-1½
15	B.D	2000	11-8-06	10:55	1½-1½
16	B.D	2000	11-8-06	11:00	2-2
17	B.D	2000	11-8-06	11:07	2-3
18	B.D	2000	11-8-06	11:09	2-6
19	B.D	2000	11-8-06	11:14	2-6
20	B.D	2000	11-8-06	11:18	2-3
21	B.D	2000	11-8-06	11:25	2-6
22	B.D	2000	11-8-06	11:30	1½-1½
23	B.D	2000	11-8-06	11:32	1½-1½
24	B.D	2000	11-8-06	11:34	1½-1½
25	B.D	2000	11-8-06	11:36	1½-1½
26	B.D	2000	11-8-06	11:40	2-2
27	B.D	2000	11-8-06	11:45	2-2
28	B.D	2000	11-8-06	12:50	1½-1½
29	B.D	2000	11-8-06	12:55	1½-1½
30	B.D	2000	11-8-06	1:00	1½-1½
31	B.D	2000	11-8-06	1:10	1½-1½
32	B.D	2000	11-8-06	1:15	2-4
33	B.D	2000	11-10-06	12:39	2-5
34	B.D	2000	11-10-06	12:45	2-2
35	B.D	2000	11-10-06	12:48	1½-1½
36	B.D	2000	11-10-06	12:50	1½-1½

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JOB NAME Loco Hills N.M. Pond MATERIAL TYPE 60mil

GEOMENBRANE REPAIR LOG

REPAIR #	TECH	WELDER #	DATE	TIME	PATCH SIZE
37	B.D	2000	11-10-06	12.55	1½ x 1½
38	B.D	2000	11-10-06	1.00	1½ x 1½
39	B.D	2000	11-10-06	1.04	2-2
40	B.D	2000	11-10-06	1.08	2-2
41	B.D	2000	11-10-06	1.12	1½ x 1½
42	B.D	2000	11-10-06	1.14	1½-1½
43	B.D	2000	11-10-06	1.20	5-5
44	B.D	2000	11-10-06	1.25	1½ x 1½

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JOB NAME Loco-Hills Pond- MATERIAL TYPE 40 mil

GEOMENBRANE SEAMING LOG

Seam #	TECH	WELDER #	DATE	Start Time	Finish Time
1-2	J-g	300	11-4-06	10:19	10:26
2-3	J-g	300	11-4-06	10:30	10:35
4-5	J-g	300	11-4-06	10:42	10:46
5-6	J-g	300	11-4-06	10:49	10:57
6-7	J-g	300	11-4-06	11:15	11:25
7-8	J-g	300	11-4-06	11:27	11:35
8-9	J-g	300	11-4-06	12:39	12:49
9-10	J-g	300	11-4-06	12:51	12:59
10-11	J-g	300	11-4-06	1:02	1:10
3-4	J-g	300	11-4-06	11:00	11:04
2-4	J-g	300	11-4-06	11:04	11:06
2-5	J-g	300	11-4-06	11:06	11:09
1-5	J-g	300	11-4-06	11:09	11:12
1-6	J-g	300	11-4-06	11:12	11:14
11-12	J-g	300	11-4-06	1:16	1:25
12-13	J-g	300	11-4-06	1:30	1:39
13-14	J-g	300	11-4-06	1:45	1:50
15-16	J-g	300	11-4-06	1:52	1:56
16-17	J-g	300	11-4-06	1:59	2:05
14-15	J-g	300	11-4-06	2:10	2:13
14-16	J-g	300	11-4-06	2:13	2:16
13-16	J-g	300	11-4-06	2:16	2:18
13-17	J-g	300	11-4-06	2:18	2:20
12-17	J-g	300	11-4-06	2:20	2:21
17-18	J-g	300	11-4-06	2:50	2:58
12-18	J-g	300	11-4-06	2:58	3:00
11-18	J-g	300	11-4-06	3:00	3:02
10-18	J-g	300	11-4-06	3:02	3:05
9-18	J-g	300	11-4-06	3:05	3:08
8-18	J-g	300	11-4-06	3:08	3:11
7-18	J-g	300	11-4-06	3:11	3:14
6-18	J-g	300	11-4-06	3:14	3:17
1-18	J-g	300	11-4-06	3:17	3:25
18-19	J-g	300	11-4-06	3:27	4:00
19-20	J-g	300	11-4-06	4:06	4:10
20-21	J-g	300	11-7-06	8:05	8:22

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JOB NAME Loco Hills - Pond MATERIAL TYPE 40 mil

GEOMENBRANE SEAMING LOG

Seam #	TECH	WELDER #	DATE	Start Time	Finish Time
22-23	J.G	300	11-7-06	8.30	8.38
23-24	J.G	300	11-7-06	8.40	8.44
24-25	C.H	21	11-7-06	8.54	8.56
24-26	C.H	21	11-7-06	8.56	8.28
23-26	C.H	21	11-7-06	8.58	9.02
25-26	J.G	300	11-7-06	8.56	9.00
26-27	J.G	300	11-7-06	9.06	9.12
27-28	C.H	21	11-7-06	9.14	9.23
28-29	J.G	300	11-7-06	9.18	9.28
29-30	C.H	21	11-7-06	9.29	9.37
22-27	C.H	21	11-7-06	10.31	10.35
21-30	J.G	300	11-7-06	10.30	10.32
21-29	J.G	300	11-7-06	10.32	10.35
21-28	J.G	300	11-7-06	10.35	10.38
21-27	J.G	300	11-7-06	10.38	10.40
21-22	J.G	300	11-7-06	10.40	10.47
30-31	J.G	300	11-7-06	8.22	8.31
31-32	J.G	300	11-7-06	8.35	8.43
32-33	J.G	300	11-7-06	8.47	8.57
33-34	J.G	300	11-7-06	1.14	1.24
34-35	J.G	300	11-7-06	1.42	1.48
35-36	J.G	300	11-7-06	2.23	225
36-37	J.G	300	11-7-06	2.08	2.09
32-38	J.G	300	11-7-06	2.04	2.06
38-39	J.G	300	11-7-06	12.55	1.03
39-20	J.G	300	11-7-06	11.11	11.28
36-38	J.G	300	11-7-06	1.52	1.58
35-37	J.G	300	11-7-06	2.21	2.23
34-38	J.G	300	11-7-06	2.18	2.21
34-39	J.G	300	11-7-06	2.13	2.14
33-39A	J.G	300	11-7-06	2.15	2.16
33-39B	J.G	300	11-7-06	12.42	12.44
32-39	J.G	300	11-7-06	12.44	12.47
31-39	J.G	300	11-7-06	12.47	12.50
30-39	J.G	300	11-7-06	11.32	11.33
21-39	J.G	300	11-7-06	11.36	11.39

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JOB NAME Loco Hills N.M. Pond **MATERIAL TYPE** 40-mil

GEOMENBRANE REPAIR LOG

REPAIR #	TECH	WELDER #	DATE	TIME	PATCH SIZE
1	B.D	2000	11-5-06	9.30	1½-1½
2	B.D	2000	11-5-06	9.32	1½-1½
3	B.D	2000	11-5-06	9.38	1½-1½
4	B.D	2000	11-5-06	9.40	1½-1½
5	B.D	2000	11-5-06	9.42	1½-1½
6	B.D	2000	11-5-06	9.47	1½-1½
7	B.D	2000	11-5-06	10.00	2-2
8	B.D	2000	11-5-06	10.05	2-2
9	B.D	2000	11-5-06	10.08	1½-1½
10	B.D	2000	11-5-06	10.15	1½-1½
11	B.D	2000	11-5-06	10.20	1½-1½
12	B.D	2000	11-5-06	10.24	1½-1½
13	B.D	2000	11-5-06	10.32	1½-1½
14	B.D	2000	11-5-06	10.44	1½-1½
15	B.D	2000	11-5-06	10.52	1½-1½
16	B.D	2000	11-5-06	11.00	1½-1½
17	B.D	2000	11-7-06	11.05	1½-1½
18	B.D	2000	11-7-06	11.12	1½-1½
19	B.D	2000	11-7-06	11.18	1½-1½
20	B.D	2000	11-7-06	11.21	1½-1½
21	B.D	2000	11-7-06	11.24	1½-1½
22	B.D	2000	11-7-06	11.30	1½-1½
23	B.D	2000	11-7-06	11.34	1½-1½
24	B.D	2000	11-7-06	11.40	1½-1½
25	R.M	2000	11-9-06	3.00	1½-1½
26	R.M	2000	11-9-06	3.02	1-1
27	R.M	2000	11-9-06	3.05	1-1
28	R.M	2000	11-9-06	3.06	1½-1½
29	R.M	2000	11-9-06	3.07	2-2
30	R.M	2000	11-9-06	3.08	1½-1½
31	R.M	2000	11-9-06	3.09	1½-1½
32	R.M	2000	11-9-06	3.10	1½-1½
33	R.M	2000	11-9-06	3.11	1-1
34	R.M	2000	11-9-06	3.12	1½-1½
35	R.M	2000	11-9-06	3.04	1-1
36	R.M	2000	11-9-06	3.13	2-2

FALCON ENVIRONMENTAL LINING SYSTEM'S INC.
P.O. BOX 4306 ODESSA, TEXAS 79760
5200 JOHNSON RD. ODESSA, TEXAS 79764
Ph. 915/366-2611 1/800/842-0945 Fax 915/366-2999

JOB NAME Loco Hills N.M. Pond **MATERIAL TYPE** 40 mil

GEOMENBRANE REPAIR LOG

REPAIR #	TECH	WELDER #	DATE	TIME	PATCH SIZE
37.	R.M	2000	11-9-06	3.15	2-2.
38.	R.M.	2000	11-9-06	3.16.	1½-1½

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PH. (432)366-2611 (800)842-0945 FAX(432)366-2999

Project Name: Loco-Hills Pond					Job Number					
Field Supervisor: A-Lann					Page 1. of					
Location Loco-Hills N.M.					Sheet Thickness and Type 40 mil.					
Seam number	Test Date	Tested By	Air Test PSI Before	Air Test PSI After	Time Begin	Time End	No. of Repairs	Air Test Results Pass	Air Test Results Fail	Accepted Date
1-2	11-5-06	R.L	25	25	8.41	8.46	0	✓		11-5-06
2-5	11-5-06	R.M	25	25	8.47	8.52	0	✓		11-5-06
4-5	11-5-06	R.L.	25	25	8.48	8.53	0	✓		11-5-06
2-4	11-5-06	R.M	25	25	8.54	8.59	0	✓		11-5-06
2-3	11-5-06	R.M	25	25	9.02	9.07	0	✓		11-5-06
3-4	11-5-06	R.L.	25	25	8.55	9.00	0	✓		11-5-06
18-19	11-5-06	R.L.	25	25	9.04	9.09	0	✓		11-5-06
19-20	11-5-06	R.M	25	25	9.10	9.15	0	✓		11-5-06
20-21	11-7-06	R.L.	25	25	8.36	8.41	0	✓		11-7-06
21-30	11-7-06	R.L.	25	25	10.40	10.45	0	✓		11-7-06
30-29	11-7-06	R.M	25	25	9.45	9.50	0	✓		11-7-06
29-21	11-7-06	R.L.	25	25	10.47	10.52	0	✓		11-7-06
29-21	11-7-06	R.L.	25	25	10.54	10.59	0	✓		11-7-06
29-28	11-7-06	R.M	25	25	9.35	9.40	0	✓		11-7-06
28-21	11-7-06	R.L.	25	25	11.00	11.07	0	✓		11-7-06
28-27	11-7-06	R.L.	25	25	9.28	9.33	0	✓		11-7-06
27-21	11-7-06	R.L	25	25	11.07	11.14	0	✓		11-7-06
27-22	11-7-06	R.L	25	25	11.16	11.21	0	✓		11-7-06
21-22	11-7-06	R.L.	25	25	11.23	11.28	0	✓		11-7-06
22-23	11-7-06	R.M	25	25	9.53	9.58	0	✓		11-7-06
23-26	11-7-06	R.L.	25	25	9.50	9.55	0	✓		11-7-06
26-27	11-7-06	R.L	25	25	9.42	9.47	0	✓		11-7-06
23-24	11-7-06	R.L	25	25	9.58	10.03	0	✓		11-7-06

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PH. (432)366-2611 (800)842-0945 FAX(432)366-2999

Project Name: Pond-					Job Number					
Field Supervisor: A. Luna					Page 2- of					
Location Loco Hills. NM.					Sheet Thickness and Type 40-mil					
Seam number	Test Date	Tested By	Air Test PSI Before	Air Test PSI After	Time Begin	Time End	No. of Repairs	Air Test Results Pass	Air Test Results Fail	Accepted Date
24-26	11-9-06	RM	25	25	9.00	9.05	0	✓		11-9-06
24-25	11-9-06	RM	25	25	9.07	9.12	0	✓		11-9-06
25-26	11-9-06	RM	25	25	9.15	9.20	0	✓		11-9-06
30-31	11-9-06	RL	25	25	2.20	2.26	0	✓		11-9-06
31-32	11-9-06	RL	25	25	2.26	2.31	0	✓		11-9-06
32-33	11-9-06	RL	25	25	2.56	3.01	0	✓		11-9-06
33-34A	11-9-06	RM	25	25	2.38	2.43	0	✓		11-9-06
33-34B	11-9-06	RM	25	25	2.32	2.37	0	✓		11-9-06
34-35	11-9-06	RM	25	25	2.20	2.25	0	✓		11-9-06
35-36	11-9-06	RM	25	25	2.45	2.50	0	✓		11-9-06
36-37	11-9-06	RL	25	25	2.44	2.49	0	✓		11-9-06
37-38	11-9-06	JG	25	25	2.30	2.35	0	✓		11-9-06
36-38	11-9-06	JG	25	25	2.36	2.41	0	✓		11-9-06
38-39	11-9-06	JG	25	25	2.42	2.47	0	✓		11-9-06
39-40	11-9-06	JG	25	25	2.48	2.53	0	✓		11-9-06
39-41	11-9-06	JG	25	25	2.54	2.59	0	✓		11-9-06
30-39	11-9-06	JG	25	25	3.06	3.11	0	✓		11-9-06
31-39	11-9-06	JG	25	25	3.00	3.05	0	✓		11-9-06
32-39	11-9-06	JG	25	25	2.38	2.43	0	✓		11-9-06
33-39	11-9-06	JG	25	25	2.50	2.55	0	✓		11-9-06
34-39	11-9-06	JG	25	25	2.26	2.31	0	✓		11-9-06
34-38	11-9-06	JG	25	25	10.05	10.10	0	✓		11-9-06
35-39	11-9-06	RM	25	25	9.05	9.10	0	✓		11-9-06

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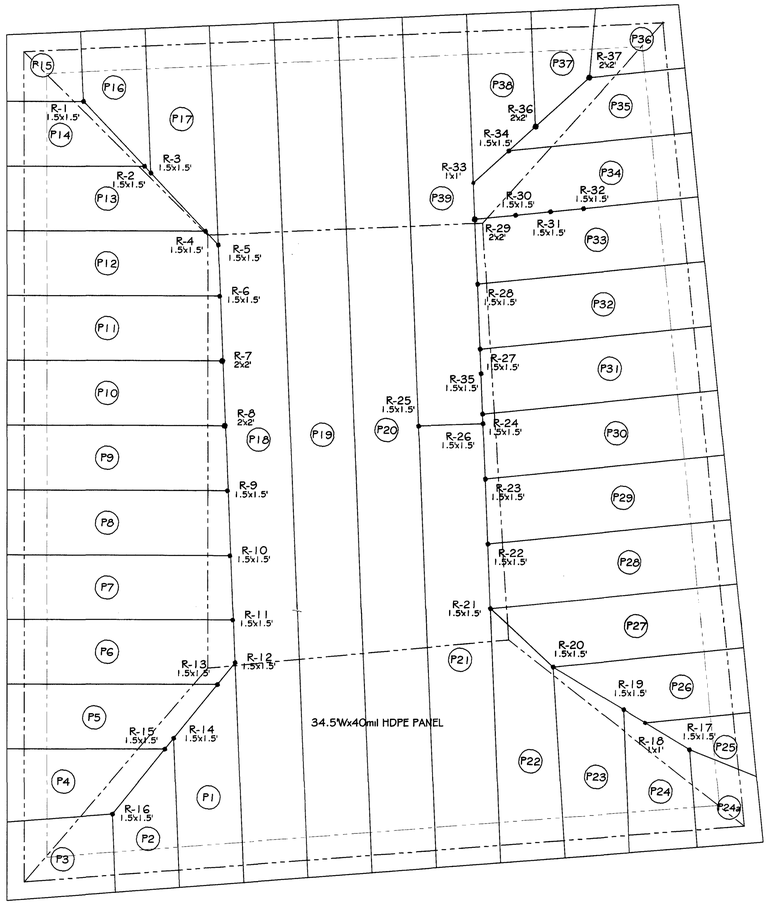
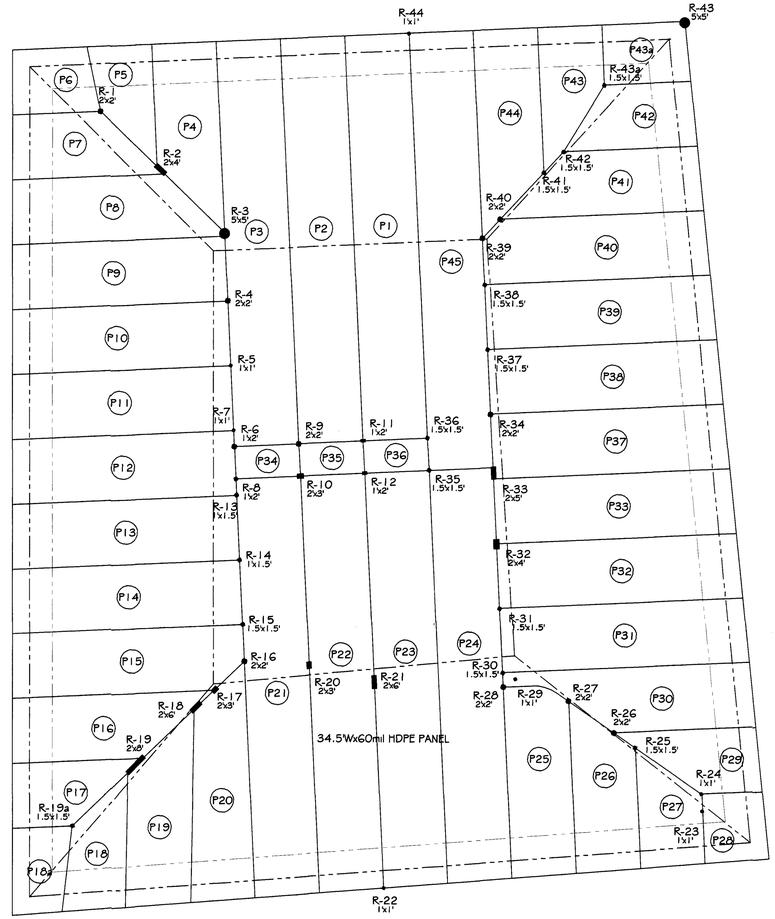
Project Name: Pond.	Job Number
Field Supervisor: A. Larn	Page 3. of
Location Loco Hills. N.M.	Sheet Thickness and Type 40 mil.

Seam number	Test Date	Tested By	Air Test PSI Before	After	Time Begin	End	No. of Repairs	Air Test Results Pass	Fail	Accepted Date
33-34.	11-9-06.	R.L.	25	25.	2:32.	2:37.	0	✓		11-9-06.





BRINE POND LIMITS

HDPE WELD SEAM

P26 HDPE PANEL NUMBER

R-26 2x2 REPAIR NUMBER & SIZE

AS-BUILT 40mil HD PANEL LAYOUT

0 20 40 80

SCALE : 1" = 40'

AS-BUILT 60mil HD PANEL LAYOUT

0 20 40 80

SCALE : 1" = 40'

FALCON ENVIRONMENTAL LINING SYSTEMS, INC.

5200 Johnson Road, Odessa, TX 79764

(432) 366 2611 FAX - 366 2999

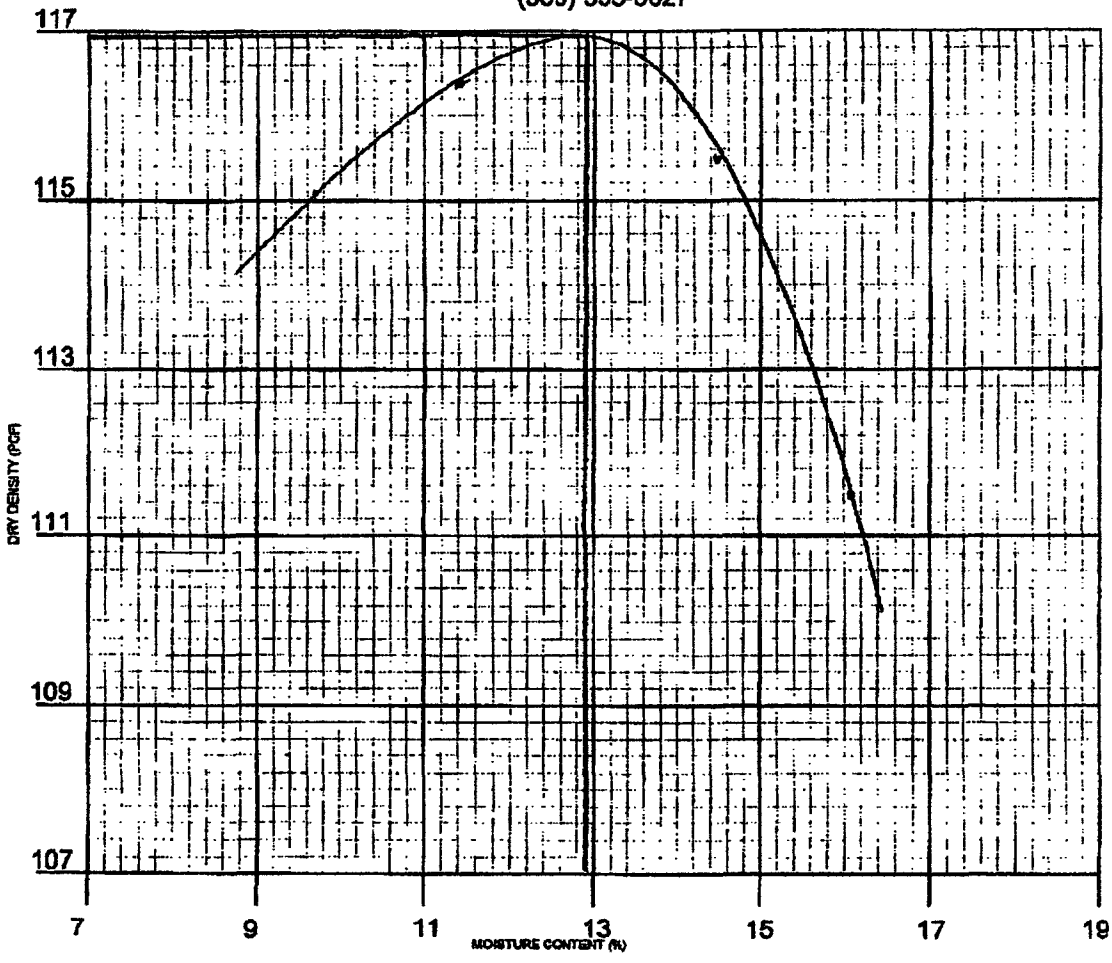
AS-BUILT PANEL LAYOUT

LOCO HILLS BRINE POND

LOCO HILLS, NM

Drawn By :	JASMIN	Material :	Sheet No.
Date :	11/21/06	60 mil HD 40mil HD	1/1
Checked By :			
Scale :	1" = 40'		

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES ST.
HOBBS, NM 88240
(505) 393-9827



CLIENT: Constructors Inc. PROJECT: Loco Hills Brine Pond - Job #960665 Project No. 2006.1001

SAMPLE LOCATION: Stockpile on East Side of Brine Ponds

SOIL DESCRIPTION: Existing Red Silty Sand

SOIL CLASSIFICATION: ____ TEST METHOD: ASTM: D 698

ATTERBERG: LL ___ PI ___ Sampled & Delivered 10/27/06

DATE: 10/30/06 LAB NO. 06 10685

DRY WEIGHT LB/CU. FT. 117.0 MOISTURE CONTENT % 12.9

SIEVE ANALYSIS - % PASSING									

PETTIGREW & ASSOCIATES

COPIES: Constructors Inc.

BY: _____

BY: _____ P.E.

PETTIGREW & ASSOCIATES, P.A.
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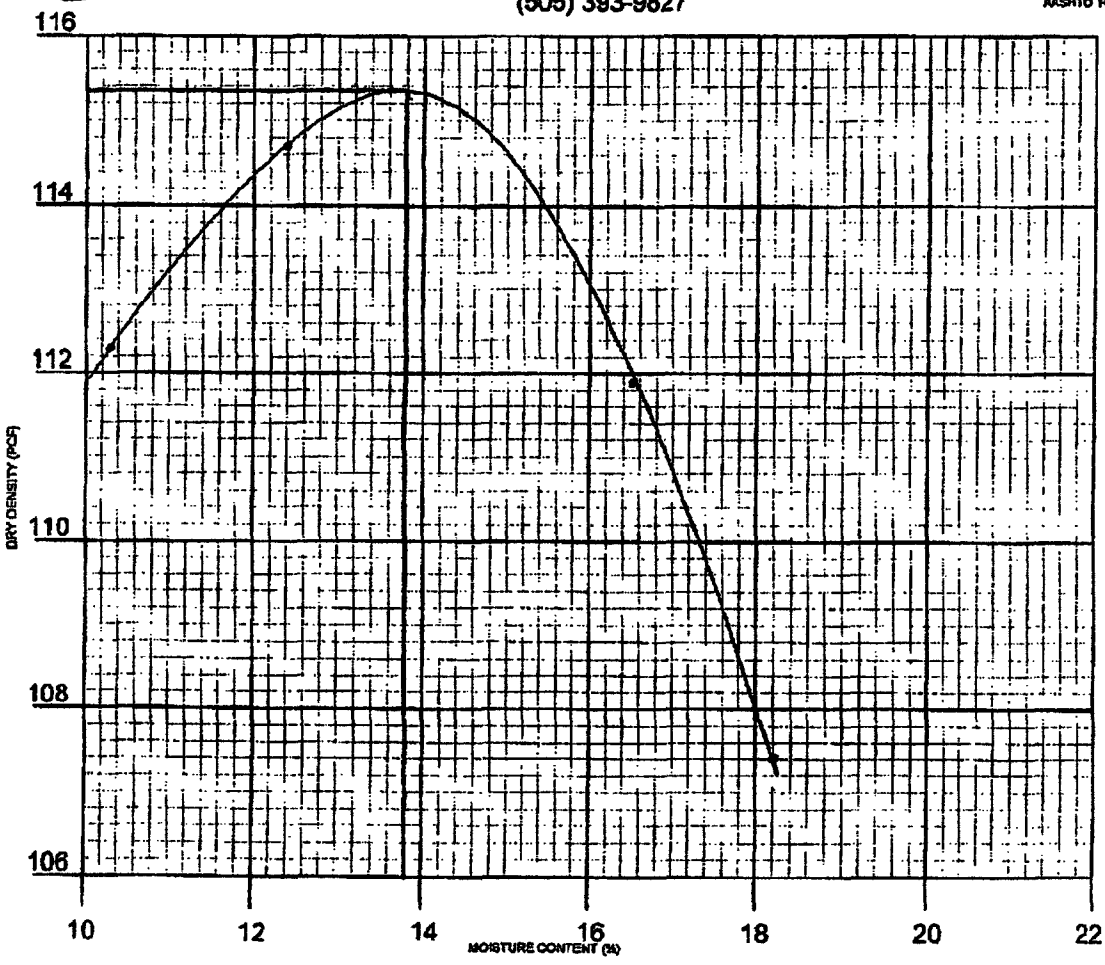
(505) 393-9827

AASHTO R18



Loco Hills Brine Pond - Job #960665

CLIENT: Constructors Inc. PROJECT: Project No. 2006.1001

SAMPLE LOCATION: Stockpile on East Side of Brine Ponds

SOIL DESCRIPTION: Red Sand

SOIL CLASSIFICATION: _____ TEST METHOD: ASTM: D 698

ATTERBERG: LL ___ PI ___ Sampled & Delivered 10/27/06

DATE: 10/30/06 LAB NO. 06 10683-10684

DRY WEIGHT LB/CU. FT. 115.3 MOISTURE CONTENT % 13.8

SIEVE ANALYSIS - % PASSING									

PETTIGREW & ASSOCIATES

COPIES: Constructors Inc.

BY: Erica M Dent

BY: Dennis P.E.

LABORATORY TEST REPORT
PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors, Inc.
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: October 30, 2006

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 1	Center of Trench	69.2	17.1	1st Lift Above Line
SG 2	50' E. of W. Edge Centerline	84.5	12.3	1st Lift Above Line
SG 3	Center of Trench	86.9	14.4	1st Lift Above 2nd Line
SG 4	40' E. of W. Edge Centerline	86.6	13.2	1st Lift Above 2nd Line

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10912-10916

Copies To: Constructors, Inc.

PETTIGREW & ASSOCIATES

BY: Erica McHart

BY: ______ E.I.
For Debra Hicks PE/LSI

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: October 31, 2006

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 5	Water Line Trench - E/B - 60' E. of Centerline	89.8	16.2	18' Below Finished Subgrade
RTSG 5	Water Line Trench - E/B - 60' E. of Centerline	95.0	16.1	18' Below Finished Subgrade
SG 6	Water Line Trench - E/B - 15' E. & 2' N. of Centerline	92.8	16.4	18' Below Finished Subgrade
RTSG 6	Water Line Trench - E/B - 15' E. & 2' N. of Centerline	95.1	15.5	18' Below Finished Subgrade
SG 7	Water Line Trench - E/B - 20' E. of Centerline	90.5	15.9	17' Below Finished Subgrade
RTSG 7	Water Line Trench - E/B - 20' E. of Centerline	95.2	15.9	17' Below Finished Subgrade

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10917-10922

Copies To: Constructors

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ E.I.
FOR DEBRA HICKS PE/LS

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: October 31, 2006

Depth: 16' Below Finished Subgrade

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 8	Water Line Trench - E/B - 60' E. of Centerline	95.0	14.7	

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10923-10924

Copies To: Constructors

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ E.I.
FOR DEBRA HICK PE/LSI

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: November 1, 2006

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 9	Water Line Ditch - E/B - 10' E. of W. Edge Centerline	97.1	15.9	15' Below Finished Subgrade
SG 10	Water Line Ditch - E/B - 10' E. of W. Edge Centerline	87.4	15.9	14' Below Finished Subgrade
RTSG 10	Water Line Ditch - E/B - 10' E. of W. Edge Centerline	96.4	15.4	14' Below Finished Subgrade
SG 11	Water Line Ditch - E/B - 10' E. of W. Edge Centerline	94.8	16.6	13' Below Finished Subgrade
SG 12	Water Line Trench - E/B - Center of Trench	95.9	14.6	12' Below Finished Subgrade

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10925-10929

Copies To: Constructors

PETTIGREW & ASSOCIATES

BY: [signature]

BY: [signature] E.I.
For Debra Hicks PE/LSI

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors, Inc.
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: November 1, 2006

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 13	Water Line Trench - E/B - Center of Trench	96.1	15.0	11' Below Finished Subgrade
SG 14	Water Line Trench - E/B - Center of Trench	94.7	14.6	10' Below Finished Subgrade

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10930-10932

Copies To: Constructors

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ E.I.
For Debra Hicks PE/LSI

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To:	Constructors, Inc. 3003 S. Boyd Drive Carlsbad, NM 88220	**Material:**	Clay
		Test Method:	ASTM: D 2922
Project:	Loco Hills Brine Ponds Project No. 2006.1001		
Date of Test:	November 2, 2006	**Depth:**	See Below
		Depth of Probe:	12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 15	Trench - 15' E. of W. Edge Centerline	95.4	14.3	9' Below Finished Subgrade
SG 16	Trench - 15' E. of W. Edge Centeline	95.1	14.9	8' Below Finished Subgrade
SG 17	Trench - Center of Trench	94.7	15.4	7' Below Finished Subgrade
SG 18	Trench - 15' E of W. Edge Centerline	94.8	15.0	6' Below Finished Subgrade
SG 19	Trench - Center of Trench	96.7	12.7	5' Below Finished Subgrade

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10933-10938

Copies To: Constructors, Inc.

PETTIGREW & ASSOCIATES

BY: Erica M. Hunt

BY: Corey Nelson E.I.
Corey Nelson for Debra Hicks P.E./L.S.I.

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18
DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors, Inc.
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: November 3, 2006

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 20	Center of Trench - E/B	94.9	16.4	4' Below Finished Subgrade
SG 21	Center of Trench - E/B	89.9	17.2	3' Below Finished Subgrade
RTSG 21	Center of Trench - E/B	96.3	15.0	3' Below Finished Subgrade
SG 22	Center of Trench - E/B	90.0	12.9	2' Below Finished Subgrade
RTSG 22	Center of Trench - E/B	96.6	14.8	2' Below Finished Subgrade
SG 23	Center of Trench - E/B	96.7	13.7	1' Below Finished Subgrade

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10939-10944

Copies To: Constructors

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ E.I.
FOR DEBRA HICKS PE/LSI

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AAP AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Constructors, Inc.
3003 S. Boyd Drive
Carlsbad, NM 88220

Material: Clay

Test Method: ASTM: D 2922

Project: Loco Hills Brine Ponds
Project No. 2006.1001

Date of Test: November 3, 2006

Depth: Finished Subgrade

Depth of Probe: 12"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 24	Center of Trench - E/B	97.2	14.8	

Control Density: 115.3
ASTM: D 698

Optimum Moisture: 13.8%

Required Compaction: 95%

Lab No.: 06 10945-10946

Copies To: Constructors, Inc.

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ E.I.
For Debra Hicks PE/LSI

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Friday, December 15, 2006 4:46 PM
To: mitchel_lhgsf@hotmail.com
Subject: C-144 Pit approval Conditions:

OCD is in receipt of the approval conditions and hereby approves of the construction and use of the brine pond.

Please be advised that approval of this permit does not relieve the owner/operator of responsibility should operations result in pollution of surface water, ground water or the environment. Nor does approval of the permit relieve the owner/operator of its responsibility to comply with any other applicable governmental authority's rules and regulations.

1.Inlet/outlet line run in same cut as leak

detector line. Drawing enclosed

2006 DEC 15 PM 1 54

2.All documented field tests including descriptive photo"s of installation. Enclosed.

3.Form placed on top of secondary liner[1 ft.below ground level-1 ft above ground level] Cement poured-after form removed coated with epoxy.Gravel placed at base of cement pad,covered with geo-textile[corners renforced with extra geo-textile fabric].Primary liner made to conform with cement pad.Welded to primary liner and double stainless steel clamps around stand pipe.

4.Open end stand pipe in pond;as water level permits plug open end and pressure up.

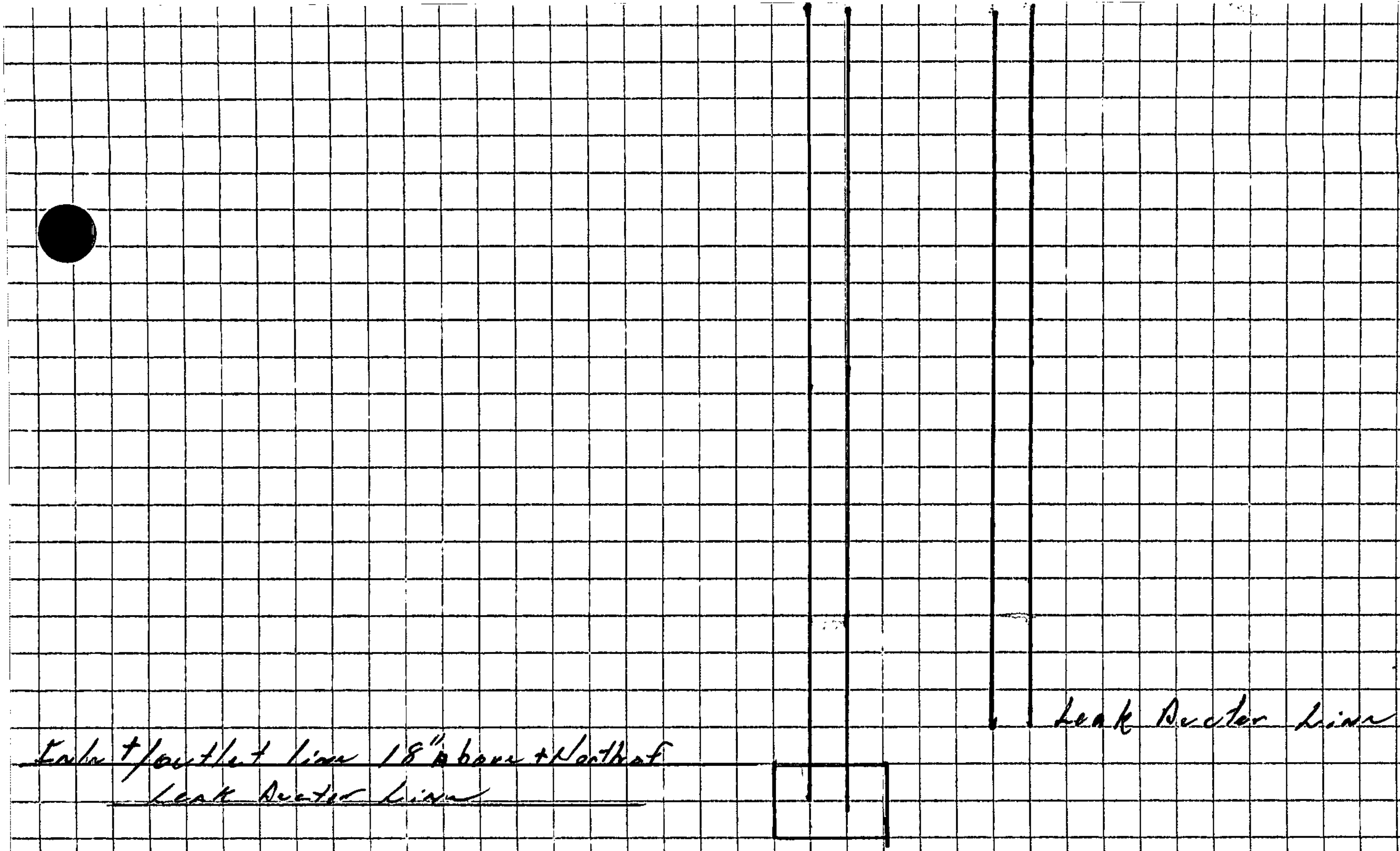
5.Monthly inspection of wet well.If water is detected pump out and record outage.Continue until average is attained.If average is exceded,note pond level.Pump out again;if average is exceded again drop pond level monitor accordling.If leakage is suppected notify O.C.D.

6.Volume of pond at freeboard-13,075,800 gallons.
90% of total volume for wells #1,2,3-12,029,623 gallons.
Freeboard should never be attained as it exceeds our total capacity.
When pond level is high a visual inspection will be performed daily to insure freeboard is not exceeded.

7.Wet Well should atest to leaking pond.A spill should not occur if freeboard is maintained.If burm is breeched call service company for backhoe or blade to contain spill.

8.April thru October water will be displaced into pond by injection of product into wells.
October thru March brine water will be injected into wells as product is needed.

9.Owl decoys will be placed around pond.


Leak Detector Line
Inlet +/outlet line 18" above + North of Leak Detector Line

Loco Hills GSF GW-019 OCD Chronologic Order Table

DATE	Event
June 10, 2002	Amerigas Notifies OCD of pending sale of facility to Loco Hills GSF
July 08, 2002	OCD receives fax copy from Loco Hills certifying to comply with terms and conditions of Discharge Plan GW-019
Dec 13, 2002	OCD approves $5000 letter of Credit- expires Jun 28, 2003
Jan 28, 2003	Loco Hills submits C-103 for LPG well #1 06192 tubing repair, ran MIT open-hole nitrogen test 260 psig 4 hours. Passed after well is stabilized.
Jan 28, 2003	OCD notifies LHGSF well bonds are deficient and OCD will require hard copy of commitment to terms and conditions of Discharge Plan.
Feb 07, 2003	OCD sends E-mail concerning well Bonding and requires monitoring wells around the existing brine pond.
Feb 20, 2003	OCD approves two $5000 letters of credit- expires Feb 07, 2004
Feb 24, 2003	OCD approves monitor well installation near existing brine storage pond
April 28, 2003	LHGSF submits drawing of new proposed 186,540 bbl Brine Pond.
May 15, 2003	OCD receives LPG well #1 MIT results-Failed Test. Received C-103 for well repair and groundwater results and log for new monitor well located SE corner of existing Brine Pond.
May 15, 2003	OCD request information for the LPG Well #1, New Brine Pond, Groundwater investigation. (some of information has never been received)
May 16, 2003	OCD receives analytical soil results from existing brine pond monitoring well.
May 22, 2003	OCD receives sonar log from LPG well #1
May 28, 2003	LHGSF sends response to OCD May 22, 2003 E-mail
June 03, 2003	OCD responds to LHGSF E-mail -- approves well test procedure, request schedule for repairing existing brine pond, explains groundwater investigation process.
June 04, 2003	LHGSF faxes another round of analytical results from new monitor well.
June 16, 2003	LHGSF faxes approved C-103 for LPG well #1
June 25, 2003	Copy received of C-103 sent from LHGSF to OCD District II
July 07, 2003	LHGSF submits survey of site- no copy in file
July 16, 2003	OCD request DP modification for new Brine Pond to be double lined with leak detection
July 17, 2003	OCD request information concerning the design of New Brine Pond
July 17, 2003	LHGSF E-mail additional info for the new brine pond.
July 21, 2003	LHGSF request permission to sell Brine water
July 21, 2003	OCD approves of brine sells for short term period. OCD expressed concern that make-up water will dilute the brine water and cause the salt caverns to enlarge.
July 24, 2003	LHGSF submits DP modification for construction of New Brine Pond.
July 24, 2003	OCD issues Public Notice for modification
Aug 29, 2003	LHGSF Sends E-mail up-dating progress
Sept 12, 2003	LHGSF request to use old salt pile dirt for construction material
Sept 15, 2003	OCD recommends to LHGSF contact State Land Office concerning bury the salt pile waste on-site-
Sept 24, 2003	State land office approves if OCD approves.
Oct 09, 2003	LHGSF notifies OCD they have retained R.T. Hicks Consultant, LTD. to perform an environment assessment for the facility. The assessment included risk posed by burying chloride-rich pond sediment, regulatory compliance and design changes to the new proposed brine pond.

	Hicks' Recommendations and Conclusions were as follows: • Recommended a method to bury the salt pile waste which included a clay and capillary barrier. • Recommended selling of Brine water to facilitate more groundwater removal. ◦ Recommended LHGSF terminate the WQCC Discharge Plan for the facility. • WQCC Regulations do not apply to this site. • Oil and Gas Act and NMOCD Rules do apply to this site. • The groundwater contamination beneath the facility is a result of Natural conditions or man-made that occurred before LHGSF. • Determining the cause of groundwater contamination is not warranted. • The existing contamination of the groundwater and other natural conditions of the site eliminates any environmental rational for minimizing seepage from the brine storage ponds. • The existing thick clay beneath the site will act as an effective barrier to pond seepage and prevent migration off of site. • Employing the native clay to create a low-permeability liner for the new brine pond may provide more operational flexibility. • Maintaining the existing brine pond as is creates no threat to health or the environment. This pond primary liner has failed.
Oct 09, 2003	RT Hicks request a one hour turn around time for above submittal.
Oct 10, 2003	OCD approves of disposing of waste soil salt pile on-site. OCD notified LHGSF/Hicks that Bear Grass Draw is a protectable water course and defers approval for clay-lined pond.
Oct 10-Dec 16	LHGSF/Hicks proceed constructing a clay-lined pond without OCD approval.
Dec 16, 2003	LHGSF/Hicks submits Discharge Plan Modification amendment for OCD approval. Highlights of the Plan: Hypothesis is that high TDS water beneath site was caused by seepage from old unlined ponds causing an artificial groundwater mound under the site. Groundwater with a TDS below 10,000 mg/l does not exist below the site. Implies that Bear Grass Draw groundwater is under confined conditions, but may have been impacted by past seepage. Noted that the extent of saline groundwater is unknown. Proposes to install a down gradient well in Bear Grass Draw. States that there is no evidence that Bear Grass Draw is an active watercourse. Did not submit groundwater flow data because the hydrostratigraphic units were not identified. Provided engineering documentation (Pettigrew and Associates) certifying the liner infiltration specifications of 1×10^{-08} cm/sec and pond construction. Hicks estimated the pond will not leak more than 1 bbl/day. Provided an operational plan to extract a minimum of 100 bbls/week of groundwater to off-set any pond seepage.
Dec 2003	Technical meeting- OCD Environmental Bureau Chief informs LHGSF that point of compliance for meeting groundwater standards is directly under the pond since LHGSF does not own property. WPrice, BOlson, RAnderson, RHicks,
Jan 05, 2004	LHGSF request status of Discharge Plan amendment and request suggestions on how they could get their #1 LPG well to pass the MIT.

Jan 05, 2004	OCD notifies LHGSF that the OCD Environmental Bureau Chief will require LHGSF to demonstrate that the current contamination did not come from the site and any new contamination be contained on-site. OCD recommended that LHGSF contact the OCD District office concerning their well problem. OCD recommended to LHGSF that they proceed with the double lined system as proposed.
Jan 09, 2004	Meeting
Jan 12, 2004	OCD notified LHGSF they shall provide additional information in order for OCD to continue the evaluation of the DP amendment. In addition OCD requires LPG Well #1 shall not be used until it passes a MIT.
Jan 12, 2004	LHGSF provides proposal to acquire property
Feb 04, 2004	LHGSF submits C-103 for LPG well #1
Feb 12, 2004	LHGSF/Hicks submits minor modification to discharge plan (not for approval) Highlights of Plan: • Install synthetic liner over clay liner • Start a Brine Sales Program • If LHGSF obtains land, then will submit investigation program that might demonstrate that a clay-lined pond is most appropriate for this unique site. • LHGSF/Hicks will notify 10 days before installation of liner. • Will provide drawings of leak detection between liner.
March 03, 2004	• Hicks request approval of minor modification submitted Feb 12, 2004 if land acquisition fails. • Hicks request cancellation of minor modification If land acquisition goes through and re-request OCD approval of discharge plan amendment submitted in December 2003 (single clay line pond) with condition of approval that LHGSF will provide land acquisition documentation.
March 04, 2004	OCD notifies LHGSF/Hicks that plans for leak detection system was not submitted. OCD notifies LHGSF/Hicks about new Pit Rule
March 04, 2004	LHGSF/Hicks acknowledge OCD's needs leak detection info. LHGSF/Hicks request OCD's opinion on path forward??? LHGSF/Hicks denies new OCD Pit rule will effect project. LHGSF/Hicks points out that site is under WQCC rules and point of compliance will be new down-gradient property line not immediately adjacent to new pond.
May 12, 2004	LHGSF/Hicks submits Major Modification to Discharge Plan- Special note: all previous minor and major modifications have not been cancelled. OCD doesn't have a clue as to which one we are to evaluate??????????? Highlights of Modification: LHGSF/Hicks proposes approximately 30 changes "as highlighted in new plan" contingent upon OCD approval. Most of these changes were same as previous submittals. Significant changes for OCD to accept: • LHGSF wants to discharge into the un-permitted clay pond for 120 days before OCD approves the major modification. • Request OCD approve the plan prior to any property acquisition. • Notified OCD that LHGSF is completing an acquisition of 40 acres due east of the facility and wants to start groundwater pumping immediately.

	◦ LHGSF/Hicks remains confident that the 40 gal/day (1 bbl/day) designed seepage from the newly constructed pond will not cause ground water to exceed WQCC standards at a place of reasonable foreseeable future use. (i.e. at the new property boundary) OCD note: No documentation was provided that guaranteed property transfer!!! Only promises!!!!! ◦ If plan is approved LHGSF will install a pond seepage monitor well on east side of pond and new monitor well in Bear Grass Draw. • Request that OCD issue Public Notice. Contingency Plan: • If groundwater quality doesn't improve in one year LHGSF will increase ground water pumping. • If seepage detection wells suggest unacceptable seepage from Clay-lined pond then LHGSF will meet with NMOCD to determine best course of action. • Alternatives: 1. Increase groundwater pumping 2. Repair clay liner 3. Install synthetic liner over clay liner and install leak detection.
May 27, 2004	OCD notifies LHGSF/Hicks of technical meeting concerning major modification.
May 31, 2004	LHGSF/Hicks provides draft response for technical meeting. Highlights of Response: • Hicks points out OCD must approve plan pursuant to WQCC regulations. • States that LHGSF/Hicks went through with land transfer with SLO in order to satisfy point of compliance issue. • Request OCD to issue Public Notice as soon as possible. • Request meeting for June 03, 2004
June 01, 2004	LHGSF/Hicks E-mail agenda for meeting-noted land will be in possession of Loco Hills GSF by Mid-August????????
June 03, 2004	Technical Meeting with LHGSF/Hicks conclusions: 1. OCD will make legal determination which regulatory path will be required i.e OCD Rules or WQCC. 2. OCD would consider a request made during the meeting for pond testing. 3. Final approval of the plan shall be contingent upon Loco Hills properly demonstrating that local groundwater and Bear Grass Draw will be protected in the foreseeable future and the possibility this case may go to a hearing.
June 09, 2004	Technical Meeting with LHGSF/Hicks: Highlights of Meeting: • Notified OCD LHGSF has begun a quarterly monitoring of groundwater at site. • Requested permission to conduct a long-term (60-90 days) infiltration/seepage test for the new 9 mm gal clay constructed pond. • Proposed a new 2 mm gal. Clay lined pond • Contingency: LHGSF noted that If pond test shows excessive seepage. LHGSF propose installing a synthetic liner over the clay pond and install leak detection. • OCD notified LHGSF that facility would be regulated under the Oil and Gas Act and Rule 50.
June 14, 2004	LHGSF/Hicks notifies OCD of drilling plans and that LHGSF will began to sell brine water to help remove fluid from existing pond #1. Will submit plans for new clay lined pond #3 after characterization program.

June 17-18	OCD Representative Mike Stubblefield witness drilling of P1- collect soil cutting samples
June 21, 2004	LHGSF/Hicks provide up-date on drilling program for new monitor wells
June 22, 2004	LHGSF/Hicks provide up-date on drilling program for new monitor wells
June 24, 2004	OCD personal visit site- Observe gypsum in clay liner
July 08, 2004	• LHGSF/Hicks provide up-date on drilling program notified OCD that there is no groundwater in P2 (north of new clay lined pond) and concludes there is no groundwater in that portion of site. • LHGSF notifies OCD groundwater appears to be restricted to the Bear Grass Draw. • Notified OCD they will be requesting permission to install third pond. • LHGSF/Hicks notifies OCD that the existing pond #1 is now full and nobody is purchasing or even taking any brine for drilling because of the impact of the new pit rule. • Notified OCD LHGSF will be re-submitting a revision to the latest revision with a formal request to transfer fluids to the new clay lined pond to relieve pond #1 and perform a infilitration/seepage test. • HGSF/Hicks will respond to OCD's concern about finding gypsum in the clay liner.
July 09, 2004	OCD- internal memo- Recommends OCD deny transfer of fluids until certain condition are met.
July 12, 2004	**LHGSF/Hicks submits new working Hypothesis:** **Highlights of New Hypothesis:** • Seepage from the unlined ponds used in the 1950-60's caused groundwater to be impaired. The on-site supply well created a conduit that allowed the migration of brine seepage from the pond to a near-surface caliche bed, then into the groundwater zone. • LHGSF/Hicks states they are certain there is no fresh water beneath the proposed clay-lined Pond. • Submitted a revised plan for post testing of the new pond. • LHGSF requested Pettigrew to speak to OCD about gypsum in liner. • Request OCD to delay conclusions about liner integrity until the next edition of the permit application is issued and conversations with Pettigrew. ◦ LHGSF/Hicks state the hydrogeologic data appear quite favorable.
July 16, 2004	Pettigrew submit Technical Response to OCD
July 16, 2004	LHGSF/Hicks submits response for three technical issues and notified OCD of post testing of pond. (did not seek approval) • Presence of gypsum in liner and its effect on the compaction and permeability. LHGSF/Hicks proposes 1 x 10-7 cm/sec or less. • Thickness of liner. • Underlying strata and hydrogeologic Special Note: LHGSF changes from $1x10^{-8}$ to $1x10^{-7}$ cm/sec. Referenced draft March 16, 2004 guidelines??????? Did not seek OCD approval
July 19, 2004	LHGSF/Hicks submits infiltrometer protocol
July 21, 2004	OCD inspects facility and witness post sampling and testing-see inspection report
July 22, 2004	Hicks request information on Pit Guidelines- makes complaint about regulatory change
July 22, 2004	LHGSF request information on site original order

July 22, 2004	***OCD notifies LHGSF by letter:*** ◦ ***OCD denies permit modification for single lined clay brine pond.*** ◦ ***Informs LHGSF that facility will be permitted under:*** ◦ ***Rule 701.H*** ◦ ***Rule 50*** ◦ ***Rule 19***
July 23, 2004	Hicks submits seepage test protocol.
August 03, 2004	Technical Meeting with LHGSF/Hicks: Highlights of Meeting: ◦ Notifies OCD that post testing revealed that the pond failed the test. ◦ Post soil samples bottom and sides permeability was 1 x 10-5 cm/sec ◦ Infiltration device showed similar results Special note: OCD did not get copy of lab post testing • LHGSF/Hicks indicated the pond failure is actually a good thing. They now realize they must build a better mouse trap and is committed to doing that. (comment made during meeting) • LHGSF/Hicks demands that OCD help define then approve a path forward which will allow a clay-lines pond if certain standards are met. • LHGSF/Hicks suggest Alternate Abatement Standards could provide sufficient reason to approve a clay-lined pond with seepage detection devices.
Aug 05, 2004	OCD sends LHGSF a letter listing path forward requirements. Highlights of Requirements: 1. LHGSF must submit Abatement Plan pursuant to Rule 19. 2. Pond must be equivalent to double line system with leak detection $1x10^{-8}$ cm/sec with seepage collection system. 3. QA/QC construction requirements. 4. Operational and monitoring plan. 5. Provide detailed plans and drawings. 6. Groundwater monitor plan. 7. Address well repairs.
Aug 17, 2004	Letter from Holland&Hart to Mark Fesmire-Director OCD LHGSF submits Stage I and Stage II Abatement Plan, BMP, and exemption to Rule 50. Request for Hearing.
Aug 30, 2004	E-mail from Mitchel Johnson-Notifiying OCD will receive a State I/II abatement plan and BMP plan and exemption to Rule 50.
Sep 01, 2004	OCD submits Motion to Dismiss-Rule 19 Process Infraction and Public notice
Sept 02, 2004	LHGSF-Holland-Hart not opposing motion to dismiss
Sept 15, 2004	LHGSF files complaint with NM Lt. Governor
Sept 24, 2004	OCD response to Lt. Gov Office
Oct 19, 2004	Meeting with LHGSF/Hicks- LHGSF requested outline of process for seeking approval of a clay-lined brine pit with a designed seepage rate.
Oct 21, 2004	OCD sends letter to LHGSF/Hicks process for seeking approval.
Oct 26, 2004	LHGSF/Hicks request technical and process meeting
Oct 28, 2004	Meeting- LHGSF describes it's ideal for a path forward for exemption to Rule 50. Presented stage I/II and BMP plan.
November 01,	LHGSF gives overview of plans to be submitted.

2004	
Nov 10, 2004	LHGSF/Hicks submits BMP, exemption to secondary liner requirement from Rule 50, Petition for provisional alternate abatement standards and Stage I/II Abatement Plan.
Dec 01, 2004	LGHSF inquires about Public notice/ OCD responds
Dec 21, 2004	LHGSF submits a copy of a Public Notice for OCD review
Dec 21, 2004	Pettigrew submits plans and specs for the bentonite amendmended pond at Loco Hills
Dec 21-Jan 05 2005	Several E-mails between OCD and LHGSF concerning Public Notice
Jan 05, 2005	OCD issues notice to LHGSF that the Stage I/II abatement plan is administrative complete and requires LHGSF to issue public notice approved by OCD. OCD sets application for Commission Hearing for March 08, 2005.
Jan 06, 2005	OCD request a legible drawing and cover letter for spec and drawings.
Jan 10, 2005	OCD receives copy of Pond Drawing
Feb 10, 2005	OCD receives C-103 for LPG well #2
Feb 14, 2005	LHGSF/Hicks request pre-hearing meeting
Feb 14, 2005	OCD responds to pre-hearing meeting- Not Required
Feb 21, 2005	OCD receives response to Public Notice from BLM.
Feb 24/25, 2005	OCD sends requirements for C-103 remedial work, well testing and logging. OCD receives LHGSF Public Notice Requirements
Mar 01, 2005	LHGSF-OCD E-mail Technical issues Carol Leach NM EMNRD Attorney responds
Mar 07, 2005	LHGSF (Attorney Bill Carr to OCD Fesmire) request March 08 Hearing continued to April 14, 2005. information from NM State Engr. Office-
Mar 08, 2005	March 08, 2005 OCD letter to LHGSF approving continuence of Hearing to April 14, 2005 and major concerns.
Mar 22, 2005	BLM response- Deed restriction issue
March 23, 2005	OCD inspects LHGSF facility
March 31, 2005	LHGSF request meeting concerning March 08, letter. LHGSF did not bring legal counsel and requested OCD respond to some technical questions. See minutes of meeting. LHGSF informed OCD of Infiltration test that included discharging concentrated Brine water. OCD Informed LHGSF that permission would be required.
April 01, 2005	OCD requested technical information concerning infiltration test and informed LHGSF that OCD was seeking administrative approval for discharge.
April 03, 2005 Sunday 9:08 pm	E-mail LHGSF informed OCD that construction of test plots to begin on Monday morning April 04,2005.
April 4, 2005	OCD notifies LHGSF that discharging brine water is denied.
April 08, 2005	OCD request info from State Engr. Office
April 08, 2005	State Engr. Office notifies OCD LHGSF does not have any water rights on record.
April 08, 2005	LHGSF/Carr request the hearing set for April 14, 2005 be continued to May 12, 2005.
April 27, 2005	OCD receives copy of LHGSF letter to Lt. Gov. Denish- requesting regulation under WQCC.

PIT

AND

BELOW-GRADE TANK

GUIDELINES

November 1, 2004

NEW MEXICO OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
SANTA FE, NEW MEXICO 87505

TABLE OF CONTENTS

INTRODUCTION

The following guidelines apply to pits and below-grade tanks used for the containment of exploration, production, processing and storage wastes regulated by the New Mexico Oil Conservation Division (OCD), and classified as 1) exempt from Federal Resource Conservation and Recovery Act (RCRA) Subtitle C Regulations, or 2) non-hazardous by characteristic testing. These guidelines replace the OCD's October 1991 "GUIDELINES FOR THE SELECTION AND INSTALLATION OF BELOW-GRADE PRODUCED WATER TANKS", February 1993 "UNLINED SURFACE IMPOUNDMENT CLOSURE GUIDELINES" and May 28, 2004 "INTERIM PIT AND BELOW-GRADE TANK GUIDELINES".

The intent of the guidelines is to outline the methods and specifications the OCD has approved for the design, construction, operation, maintenance and closure of pits and below-grade tanks in a manner that protects fresh waters, public health and the environment. To obtain a permit for a pit or below-grade tank or to close a pit or below-grade tank under 19.15.2.50 NMAC, an operator must either follow the guidelines or obtain the OCD's approval for an alternative method. To obtain approval for an alternate method, the operator must demonstrate that the alternative method will meet the requirements of 19.15.2.50 NMAC and statutory requirements to prevent contamination of fresh water, and protect public health and the environment.

Compliance with the guidelines, or receipt of a permit under 19.15.2.50 NMAC, does not relieve an operator of liability for any releases or contamination which may pose a threat to fresh waters, human health and the environment, or relieve an operator of responsibility for compliance with any other federal, state or local laws and regulations.

DEFINITIONS

A "pit" is defined as any surface or sub-surface impoundment, man-made or natural depression, or diked area on the surface. Excluded from this definition are berms constructed around tanks or other facilities solely for the purpose of safety and secondary containment. The term "pit" includes but is not limited to: produced water pits, dehydrator pits, blowdown pits, separator pits, tank drain pits, pipeline drip collector pits, compressor scrubber pits, flare pits, drilling pits, reserve pits, workover pits and all other pits which receive exploration, production and processing wastes regulated by OCD.

"Below-grade tanks" are defined as vessels, excluding sumps and pressurized pipeline drip tanks, where any portion of the sidewalls of the tank is below the surface of the ground and not visible.

"Soil" is defined as that earth material which has been so modified and acted upon by physical, chemical, and biological agents that it will support rooted plants.

"Sumps" are defined as any impermeable single wall vessel with a capacity less than 500 gallons, where any portion of the sidewalls of the reservoir is below the surface of the ground and not visible which vessel remains predominantly empty, serves as a drain or receptacle for spilled or leaked liquids on an intermittent basis, and is not used to store, treat, dispose of, or evaporate products or wastes.

The New Mexico State Engineer has designated fresh waters as all surface waters and ground waters of

the state containing 10,000 milligrams per liter or less of total dissolved solids (TDS) for which there is a present or reasonably foreseeable beneficial use. The term "reasonably foreseeable" is generally taken to mean a time period of not less than 200 years into the future, but could be thousands of years.

I. PERMITTING PROCEDURES

A. APPLICATION FOR PERMIT

After April 15, 2004, an operator must apply for a permit to construct or use any pit or below-grade tank on Form C-144, an application for permit to drill, or on the sundry notices and reports on wells, as appropriate. OCD approval of such form constitutes a permit for all pits and below-grade tanks annotated on the form. For pits and below-grade tanks in existence prior to April 15, 2004 that have not received an exemption after hearing as allowed by OCC Order R-3221 through R-3221D inclusive and that the operator proposes to continue to use, a permit application is required on, or prior to, September 30, 2004. If an operator intends to use the same procedures for construction of pits and below-grade tanks at multiple sites, the operator may submit one general plan. For subsequent pits or below-grade tanks constructed under the general plan, the operator must only notify OCD of the location of the pit or below-grade tank on Form C-144, an application for permit to drill, or on the sundry notices and reports on wells, as appropriate. Deviation from an approved general permit requires OCD notification and approval.

If any pit, berm or levee to be constructed is more than ten feet (10') in height from ground level, or if a pit volume is more than 10 acre-feet, the State Engineer Office must also review and issue a construction permit.

B. DEFINITIONS FOR USE IN FILING FORMS C-101, C-103, OR C-144

1. Depth to Groundwater is defined as the vertical distance from the lowermost water contaminants to the seasonal high water elevation of the ground water. If the exact depth to ground water is unknown, the ground water depth can be estimated using either local water well information, published regional ground water information, data on file with the New Mexico State Engineer Office or the vertical distance from adjacent ground water or surface water.

2. Distance to the Nearest Fresh Water Well is calculated as the horizontal distance to the nearest fresh water well or spring within 1000 feet of the site.

3. Distance to Nearest Surface Water Body is calculated as the horizontal distance to the nearest wetland, playa lake, sinkhole, or any lake bed, gully, draw, stream bed, wash, arroyo, natural or human-made channel through which water flows or has flowed within 1000 feet of the site.

C. CLOSURE PLANS

A pit or below-grade tank will be closed within six months after cessation of use. The division for good cause shown may grant a six-month extension of time to accomplish closure. Prior to commencing closure of a storage, disposal, drilling, workover or emergency pit, or below-grade tank, a closure plan must be submitted to and approved by OCD. If a number of pits or below-grade tanks are to be closed by a single company, the company may submit one general plan stating the areas and types of facilities to be closed, along with the procedures to be used during closure. Deviations from approved plans require OCD notification and approval.

Prior to final closure, the operator of an unlined pit, or a pit or below-grade tank that has had a release into the environment will perform an assessment to evaluate the extent to which soils and/or ground water may have been impacted by its operation. Assessment results will form the basis of any required remediation. Sites at which there have been releases will be assessed for the severity of contamination and potential environmental and public health threats, and remediated in accordance with the OCD's August 13, 1993 "GUIDELINES FOR REMEDIATION OF LEAKS, SPILLS AND RELEASES".

At a minimum, a closure plan will include the following elements:

1. Procedures that will be used to assess the extent of contamination if the closure involves an unlined pit, or a pit or below-grade tank that has had a release into the environment.

2. Procedures to be used to manage, remediate, or dispose of all contaminated soil and wastes.

3. Schedules for submission of closure reports on each pit or below-grade tank.

D. CLOSURE REPORTS

Closure of pits and below-grade tanks must be reported on OCD Form C-144, or sundry notices and reports on wells accompanied by the information necessary to evaluate the closure. If a pit or below-grade tank closure report is made on sundry notices and reports on wells, the operator shall include the same information as would be filed with OCD Form C-144.

II. DESIGN AND CONSTRUCTION

A. GENERAL

1. Location

Pursuant to 19.15.2.50.C(2)(a), no pit shall be located in any watercourse, lakebed, sinkhole, or playa lake. Pits adjacent to any such watercourse or depression shall be located safely above the high-water level of such watercourse or depression. No pit shall be located in any wetland. The OCD

may require additional protective measures for pits located in ground water sensitive areas or wellhead protection areas.

2. Stockpiling of Topsoil

Prior to constructing any pit, except a pit constructed in an emergency, wherever possible, topsoil must be stripped and stockpiled for use as the final cover of fill at the time of closure.

3. Exclusion of Runoff Water

A pit must be constructed and maintained so that runoff water from outside the location is not allowed to enter the pit. Berms surrounding the pit must be maintained.

4. Freeboard

Freeboard is the distance between the uppermost pit fluid level to the top of the pit berm. The designed freeboard allowance must take wave action into account to prevent overtopping due to wave action.

B. DRILLING AND WORKOVER PITS

Unless otherwise provided in 19.15.2.50 NMAC, each drilling and workover pit will be constructed with a minimum of a single liner. Liners will be designed and constructed as follows:

1. Liners will be composed of an impervious, reinforced, synthetic or fabricated material at least 12 mils in thickness.

2. All materials used for lining pits must be resistant to hydrocarbons, salts, and acidic and alkaline solutions. Liner materials will be resistant to tears and punctures, and be suitable for outdoor exposure. Liner compatibility must comply with EPA Method 9090A, *Compatibility Test for Wastes and Membrane Liners.*

3. The bed of the pit and inside grade of the berm will be smooth and compacted, free of holes, rocks, stumps, clods, or any other debris that may rupture the liner. In rocky areas, it may be necessary to cover the pit bed with a felt pad, compacted six-inch layer of sand, or other suitable cushioning materials.

4. The liner will rest smoothly on the pit bed and the inner face of the berms. In locations where temperature variations are significant, wrinkles or folds will be placed at each corner of the pit to allow for the contraction and expansion

of the membrane due to temperature variations. The membrane manufacturer should be consulted on this matter.

5. At any point of discharge into the pit, the discharge shall be directed away from the liner, or the liner will be protected from the fluid force of discharges.

C. EMERGENCY PITS

In accordance with 19.15.2.50.D. NMAC, in an emergency an operator may construct a pit without a permit to contain fluids, solids, or wastes if an immediate danger to fresh water, public health, or the environment exists. A pit constructed in an emergency shall be constructed, to the extent possible given the emergency, in a manner that is consistent with the requirements of 19.15.2.50 NMAC and that prevents the contamination of fresh water, and protects public health and the environment. The pit may be used only for the duration of the emergency. If the emergency lasts more than forty-eight (48) hours, the operator must seek approval from the division for continued use of the pit. All fluids, solids or wastes must be removed within 24 hours after cessation of use unless the division extends that time period.

Subsection D of 19.15.2.50 NMAC shall not be construed to allow construction or use of so-called "emergency pits," which are pits constructed as a precautionary matter to contain a spill in the event of a release. Construction or use of any such pit shall require a permit issued pursuant to 19.15.2.50 NMAC unless the pit is described in a spill prevention, control and countermeasure (SPCC) plan required by the United States environmental protection agency, all fluids are removed from the pit within 24 hours, and the operator has filed a notice of the location of the pit with the division.

D. DISPOSAL AND STORAGE PITS

Unless otherwise provided in 19.15.2.50 NMAC, disposal and storage pits must be constructed with a primary and secondary liner with a leak detection system installed between the two liners. The liners may be synthetic liners, clay liners where the bottoms and sides have a hydraulic conductivity no greater than 1×10^{-7} centimeters per second, or an alternative liner or barrier approved by the OCD which is certified by a professional engineer registered to practice in the State of New Mexico. All disposal and storage pits must contain a leak detection system as described in Section II.F. Pit liner systems will be designed and constructed as follows:

1. Wall Slopes

The outside slope of pit walls will be no steeper than 3:1 horizontal to vertical (Figure 1). The inside slope of pit walls will be no steeper than 2:1 horizontal to vertical, except for clay liners which have slope specifications as set out in subsection 2 below.

2. Clay Liners

(a) Barriers constructed with natural clay materials will be at least two feet thick, placed in six-inch lifts, and compacted to 95 percent of the material's Standard Proctor Density (ASTM D-698).

(b) Clay materials used in a liner will undergo permeability testing before and after construction.

(c) Pre-construction permeability testing will consist of laboratory permeability tests on at least two specimens of representative clay liner materials compacted in the laboratory to 95 percent of the material's Standard Proctor Density (ASTM D-698).

(d) Post-construction permeability testing will consist of at least two laboratory permeability tests on the completed clay liner or one field permeability test on the completed soil liner. Particular emphasis will be placed on selecting the location(s) for permeability tests or test samples where non-uniformity in soil texture or color can be observed.

(e) Laboratory permeability test procedures must conform to one of the methods described for fine-grained soils in the Corps of Engineers Manual EM-1110-2-1906 Appendix VII. In no case will the pressure differential across the specimen exceed five feet of water per inch of specimen length. Field permeability tests will be conducted by the double ring infiltrometer method as described in ASTM D-3385, or equivalent methods approved by OCD. Written OCD approval must be obtained prior to use of alternate test methods.

(f) If permeability testing shows that addition of bentonite or other approved material is needed to assist the clay in meeting the permeability standard, it will be applied at a minimum rate specified by the testing or engineering firm. Any bentonite used for liner material must not have been previously used as drilling mud.

(g) Any clay liner will be constructed by disturbing the native materials to the depth of the bottom of the liner, applying fresh water as necessary to the clay materials to achieve a moisture content wet of optimum, then re-compacting it in six-inch lifts with heavy construction equipment, such as a footed roller, until the required density is achieved.

(h) Any clay liner must cover the bottom and interior of the pit entirely.

(i) Inside slopes of any clay liner will be no steeper than 3:1 horizontal to vertical.

3. Synthetic Liners

(a) Synthetic materials must be impervious, may be rigid, semi-rigid, or flexible, and will be at least 40 mils thick.

(b) If rigid or semi-rigid materials are used, leak-proof expansion joints will be provided, or the material shall be of sufficient thickness and strength to withstand, without cracking, expansion, contraction, and settling movements in the underlying earth.

(c) If flexible membrane materials are used, they will be resistant to tears and punctures.

(d) All materials used for lining pits must be resistant to hydrocarbons, salts, and acidic and alkaline solutions. Liner materials will also be resistant to ultraviolet light or provision must be made to protect the material from the sun. Liner compatibility will comply with EPA Method 9090A, *Compatibility Test for Wastes and Membrane Liners.*

(e) The bed of the pit and inside grade of the berm will be smooth and compacted, free of holes, rocks, stumps, clods, or any other debris that may rupture the liner. In rocky areas, it may be necessary to cover the pit bed with a compacted six-inch layer of sand or other suitable materials.

(f) A trench will be excavated on the top of the pit berm around the entire perimeter of the pit for the purpose of anchoring flexible liners. This trench will be located at least nine inches (9") from the slope break and will be at least twelve inches (12") deep. See Figure 3.

(g) The liner will rest smoothly on the pit bed and the inner face of the berms, and must be of sufficient size to extend down to the bottom of the anchor trench and come back out a minimum of two inches (2") from the trench on the side furthest from the pit. See Figure 3. Wrinkles or folds must be placed at each corner of the pit to allow for the contraction and expansion of the membrane due to temperature variations. The membrane manufacturer should be consulted on this matter.

(h) An anchor of used pipe or other similar material will be placed over the liner in the anchor trench and the trench back-filled.

(i) Certain conditions require the venting of gas that may accumulate beneath a liner. If organic matter exists in the soils under the liner, or if natural gas is present in the region, gas production is likely. When a

fluctuating water table is present immediately below the pit bottom, pockets of air may also accumulate below the liner. The net result of gas or air accumulation below the liner may be the "floating" of the liner to the pit surface. Two possible vent designs are illustrated in Figure 4. A uniform layer of sand (which less than 5% will pass the 200 sieve) or a geotextile beneath the liners will allow the accumulated gas to vent. To achieve the best results from either of these media, the slope from the lowest point of the pit to the toe of the dike must be at least 2%. The venting medium is carried across the entire bottom and up the side slopes. Vents will be located approximately one foot (1') down from the crown of the dike. (See Figure 3)

(j) If the lining material used for the primary liner is not sun-resistant, at least one inch (1") of sand or other suitable material must be spread uniformly to cover the liner over the floor of the pit. Gravel or other wave-resistant material with sufficient angle of repose to remain in place will be used to cover the sloping inner wall of the berm. A geotextile liner must be placed beneath any gravel layer to provide protection for the membrane liner. Any gravel or sand layers used to protect the membrane liner from the sun will extend to the anchor trench.

(k) Placement of any sand or gravel layers on top of a membrane liner will be done in such a manner that the liner is not torn.

(l) At any point of discharge into the pit, the discharge will be directed away from the liner or the liner must be protected from the fluid force of discharges.

E. BELOW-GRADE TANKS

Tanks located below the ground surface where the sidewalls are completely visible to detect leaks are not defined as below-grade tanks, and secondary containment and leak detection systems are not required.

Below-grade tanks will be designed and constructed as follows.

1. The tank will be of sufficient capacity to contain all intended fluids and wastes during periods of inclement weather when it is not possible to drain the tank on a regular schedule.

2. Tanks must be constructed of materials resistant to the particular contents of the tank. If fiber reinforced plastic tanks are used, the material must be resistant to sunlight and the tank's design must allow for expansion and contraction due to wide temperature shifts. If metal tanks are used that are not

constructed of metallurgies that resist corrosion, protective coatings or cathodic protection will be used to inhibit corrosion. The plans and specifications submitted for approval will include the type of material selected and its thickness.

3. The surface upon which the tank system rests must be level and free of rocks to prevent puncturing, cracking, or indentation of the liner or tank bottom.

4. All below grade tanks must have secondary containment and a leak detection system. Below-grade tank systems will consist of either a double wall system with a mechanism for determining leaks, a tank in a drainage and collection system, or other OCD approved system.

5. Tanks in a drainage and collection system will be constructed as follows:

   (a) First place a synthetic, impermeable liner at least 40 mils thick upon a smooth soil surface that will support the tank with the liner extending above the ground surface.

   (b) Place a slotted or perforated drainage pipe (lateral) on the impermeable layer with the drainage pipe sloped at least one inch per 10 feet towards the collection system. The drainage pipe will be at least one inch in diameter.

   (c) Cover the drainage pipe with sand, gravel, or other material with sufficient permeability to convey fluids to the drainage pipe.

   (d) Place the tank on this surface and connect a riser pipe to the collection system. The riser pipe will be at least 2 inches in diameter.

   (e) Strap the secondary liner to the tank above the ground surface in a manner to prevent rainwater from entering the space between the tank and liner.

6. Avoid placing tanks within ground water. If a tank is placed within ground water, the tank system will be placed in a one (1) foot thick reinforced concrete vault. The vault will be maintained in a dry condition at all times.

F. PIT LEAK DETECTION SYSTEMS

1. Leak detection systems may consist of fail-safe electric detection systems or drainage and collection systems.

2. If an electric grid detection system is used, provision must be made for adequately testing all components to ensure the system remains functional.

3. If a drainage and collection system is used, a network of slotted or perforated drainage pipes will be installed between the primary and secondary liners. The network must be of sufficient density so that no point in the pit bed is more than twenty feet (20') from such drainage pipe or lateral thereof. The material placed between the pipes and laterals must be sufficiently permeable to allow transport of the fluids to the drainage pipe. The slope for all drainage lines and laterals will be at least 12 inches (12") per hundred feet (100'). The slope of the pit bed must also conform to these values to assure fluid flow towards the leak detection system. The drainage pipe will convey liquids to a corrosion-proof collection system located outside the perimeter of the pit (see Figure 2).

4. Double lined disposal and storage pits constructed with synthetic liners shall be designed to allow slippage between the primary and secondary liner as the weight of fluid in the pit causes movement in the primary liner.

G. FENCES, SIGNS AND NETTING

1. A fence will be constructed and maintained in good condition around the pit perimeter. The fences will be constructed so as to prevent livestock from entering the pit area. Active drilling or workover pits may have a portion of the pit unfenced to facilitate operations. In issuing a permit, the division may impose additional fencing requirements for protection of wildlife in particular areas.

2. Unless the pit is located on a well site controlled by the operator of the pit, a sign not less than 12" x 24" with lettering of not less than two inches (2") will be posted in a conspicuous place on the fence surrounding the pit. The sign will be maintained in legible condition and must identify the operator of the pits, the location of the facility by quarter-quarter or unit letter, section, township, and range, and provide emergency telephone numbers.

3. To protect migratory birds, all tanks exceeding 16 feet in diameter, and exposed pits and ponds must be screened, netted or covered. Upon written application by the operator, an exception to screening, netting or covering of a facility may be granted by the district supervisor upon a showing that an alternative method will protect migratory birds or that the facility is not hazardous to migratory birds. Drilling and workover pits are exempt from this netting requirement, if any visible or measurable layer of oil present is removed from the surface immediately after cessation of operations.

H. NOTIFICATION

At least twenty-four hours prior to installing primary liners over leak detection systems of disposal or storage pits, the operator of the pit will notify the OCD

District Office so that an inspection can be scheduled. The operator will take photographs of the installation and retain the records for OCD inspection if required.

III. OPERATION AND MAINTENANCE OF BELOW-GRADE TANKS AND DISPOSAL AND STORAGE PITS

A. Leak detection systems will be inspected at least once every thirty (30) days. The proposed frequency will be included with plans submitted for approval.

B. The operator will report the detection of fluid within the leak detection system to the appropriate OCD District Office within 24 hours of discovery. The operator will obtain a sample of the fluid, and have the sample analyzed for major cations/anions, benzene, toluene, ethylbenzene, total xylenes (BTEX), and any other potential water contaminant within the pit or below-grade tank. A copy of the analysis will be sent to the appropriate OCD District Office. An analysis of the fluids in the pit or tank may be required for comparison with the above analysis. If the presence of fluid in the leak detection system is due to a leak, the contingency plan will be implemented.

C. The operator will prepare and maintain a contingency plan outlining the procedure for repairing the pit liner or tank in an expeditious manner in the event of a leak, or upon discovery of tears or punctures in liners. It must describe how the operator proposes to guard against such accidents and detect them when they have occurred. The contingency plan also must describe the steps proposed to contain and remove the spilled substance or mitigate the damage caused by the discharge such that ground water is protected, or movement into surface waters is prevented.

D. The operator of the pit or below-grade tank must report releases from pits or below-grade tanks to the OCD pursuant to 19.15.3.116 NMAC.

E. No measurable or visible layer of oil may be allowed to accumulate or remain anywhere on the surface of any disposal or storage pit.

F. Spray evaporation systems shall be operated such that all spray-borne suspended or dissolved solids remain within the perimeter of the pond's lined portion.

IV. WASTE MANAGEMENT

The following discussion summarizes alternatives for management of pit and below grade tank wastes. All procedures used are to be approved by OCD prior to commencement. Separate OCD-approval is not required if the OCD has approved a general closure plan which includes the techniques used at any particular site. All procedures that deviate from the general closure plan, however, must be approved by OCD prior to commencement.

RCRA exempt or RCRA nonhazardous oil and natural gas related wastes will be remediated and managed according to the criteria described below.

A. RESIDUAL WASTES

Residual wastes remaining in any pit or below-grade tank will be handled in the following manner:

1. Remaining liquids will be removed from the pit or below-grade tank to the maximum extent practicable; and

2. Remaining solid wastes (i.e. buckets, cans, miscellaneous trash, debris, contaminated solids, etc.) will be removed from the pit or below-grade tank, except for dried mud and cuttings, cement, and frac materials in drilling and reserve pits which have been approved by the OCD for encapsulation under Section IV.B.2. and Section IV.B.3.

B. WASTE MANAGEMENT OPTIONS

Waste management options must be submitted to and approved by OCD prior to commencement of remediation activities. The following is a list of disposal options:

1. Excavated or removed wastes may be disposed of at an off-site OCD-approved facility.

2. Contents of drilling and workover pits from wells which have not penetrated a salt section, and where less than 9.5 lb. brine was used during drilling or workover may be encapsulated below-grade. Encapsulation will be accomplished by mixing earthen materials with the pit contents to stiffen the pit contents, as necessary, folding the edges of the liner over the stiffened mud and cuttings and covering the encapsulated wastes and liner with a minimum of 3 feet of clean soil or like material that is capable of supporting native plant growth. The operator is encouraged to notify the landowner of the property upon which the drilling or workover pit is located of the proposed encapsulation of the wastes prior to conducting the activities.

3. Contents of drilling and workover pits from wells which have penetrated a salt section or 9.5 lb. brine or greater was used during drilling or workover may be capped and encapsulated insitu or be deep trench buried and capped below-grade as set out below if the liner has maintained its integrity. The operator is encouraged to notify the landowner of the property upon which the drilling or workover pit is located of the proposed deep trench burial of the wastes prior to conducting the activities.

   (a) Capping and encapsulation insitu will be accomplished by mixing earthen materials with the pit contents, as necessary to stiffen the pit contents sufficiently to provide physical stability and support for the pit cover; folding the edges of the liner over the stiffened mud and cuttings;

capping the pit with either a 1-foot thick clay cap compacted to ASTM standards, or a 20 mil minimum thickness impervious, reinforced, synthetic or fabricated liner meeting ASTM standards that is designed to be resistant to the material encapsulated; and covering the cap with a minimum of 3 feet of clean soil or like material that is capable of supporting native plant growth.

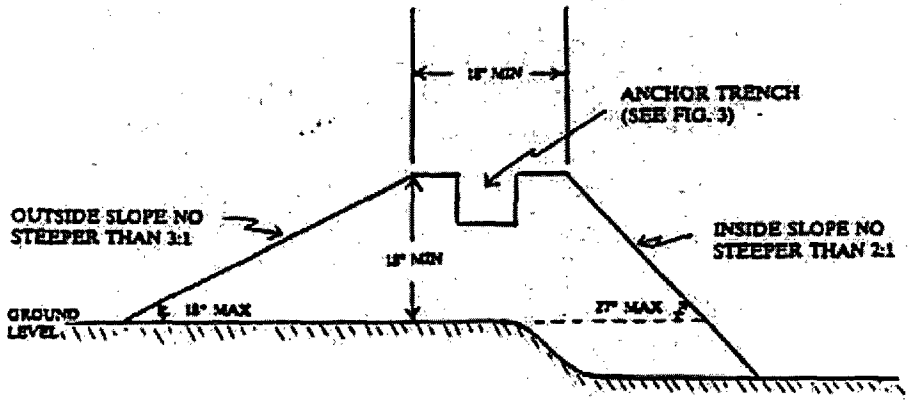
(b) Deep trench burial and capping will be accomplished by digging a trench adjacent to the drilling or workover pit; lining the trench with an impervious, reinforced, synthetic or fabricated liner at least 12 mils in thickness; mixing earthen materials with the pit contents, as necessary to stiffen the pit contents sufficiently to provide physical stability and support for the trench cap; emplacing the drilling or workover pit contents and liner into the lined trench; folding the edges of the trench liner over the stiffened mud and cuttings; capping the trench with either a 1-foot thick clay cap compacted to ASTM standards, or a 20 mil minimum thickness impervious, fiber reinforced, synthetic or fabricated liner meeting ASTM standards that is designed to be resistant to the material encapsulated; and covering the cap with a minimum of 3 feet of clean soil or like material that is capable of supporting native plant growth.

(c) When constructing the cap, the synthetic liner or clay cap will overlap the underlying pit or trench area by at least 3 feet in all directions. Once capping of the pit or trench is complete, the synthetic or clay cap will not be disturbed in the future without prior approval of the OCD.

V. FINAL CLOSURE

Upon termination of any required actions, the surface where the pit or below-grade tank was located will be contoured to prevent erosion and ponding of rainwater over the site.

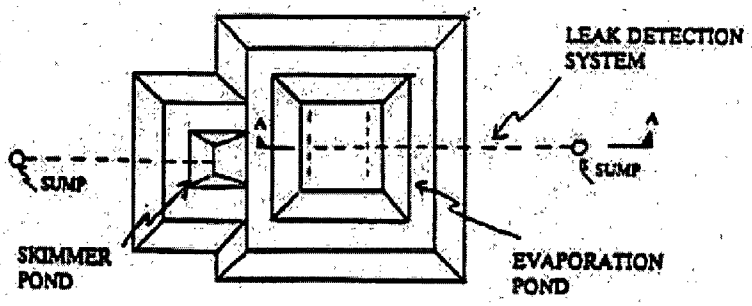
FIGURE 1: PIT CONSTRUCTION



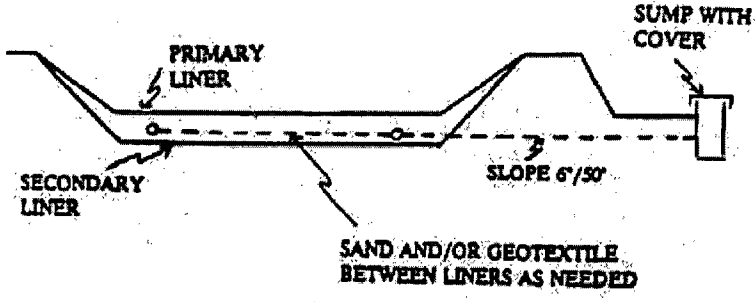
NOTE: LEVEE TO BE CONSTRUCTED IN A MANNER SUCH THAT DESIGN COMPACTION AND DIMENSIONS PROVIDE FOR A MINIMUM SAFETY FACTOR OF TWO FOR FORCES ACTING AGAINST THE LEVEE.

FIGURE 2 - LEAK DETECTION SYSTEM

PLAN



SECTION A-A



NOTE: SKIMMER POND TO HAVE SEPARATE LEAK DETECTION SYSTEM AND SUMP.

FIGURE 3 - ANCHOR TRENCH

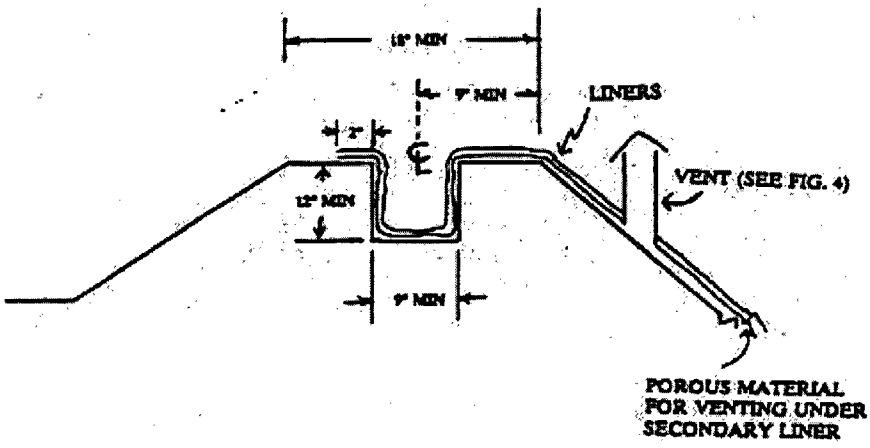
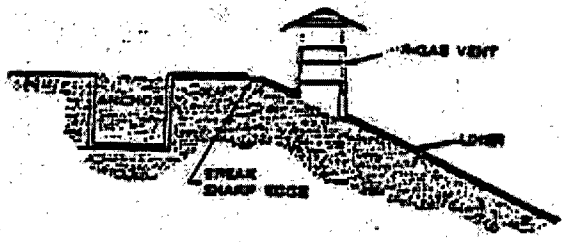
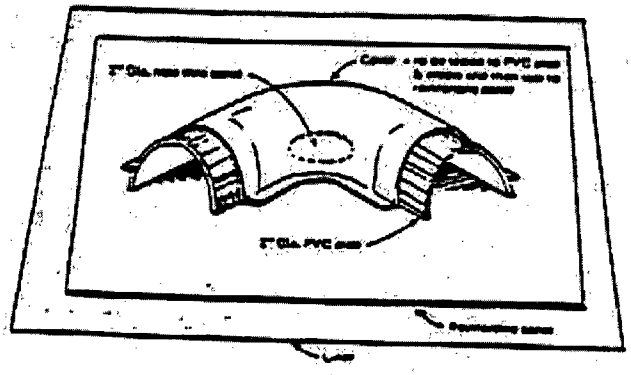


FIGURE 4 - VENT DESIGNS

SOURCE: EPA REPORT #SW-870, "LINING OF WASTE IMPOUNDMENT FACILITIES", PG. 260





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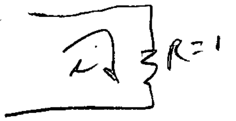
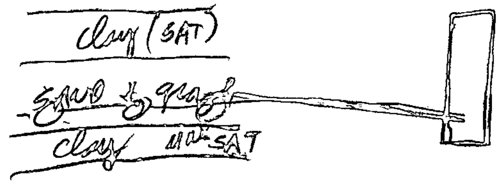
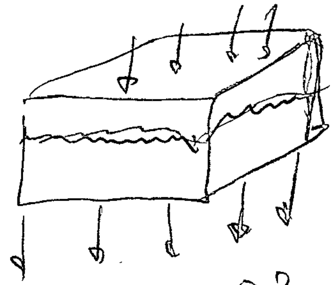
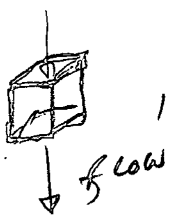






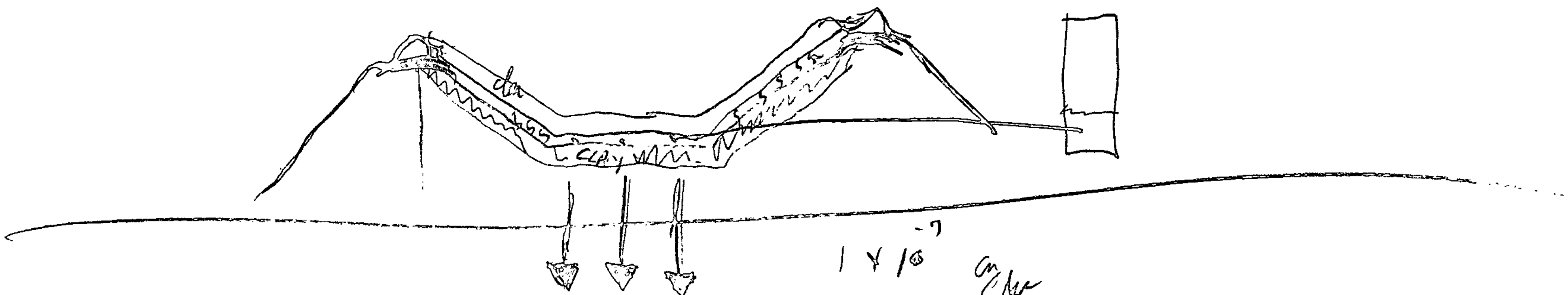
1×10^{-7} cm/sec

1×10^{-7} $\frac{cm^3}{sec}$



1×10^{-5} $\frac{cm^3}{sec}$

$\frac{cm}{sec} \times cm^2 = \frac{cm^3}{sec}$



1×10^{-7} cm/sec

Price, Wayne

From: Brooks, David K
Sent: Monday, May 02, 2005 5:43 PM
To: Fesmire, Mark; Anderson, Roger; MacQuesten, Gail
Subject: Why Loco Hills is not under the Water Quality Act

The Water Quality Act (Sec 74-6-12.G NMSA 1978) provides:

"The Water Quality Act does not apply to any activity or condition subject to the authority of the oil conservation commission pursuant to provisions of the Oil and Gas Act [Chapter 70, Article 2 NMSA 1978], Section 70-2-12 NMSA 1978 and other laws conferring power on the oil conservation commission to prevent or abate water pollution."

The Oil and Gas Act [Sec 70-2-12.B(13)] provides that:

"the [Oil Conservation] division is authorized to make rules, regulations and orders for the purposes and with respect to the subject matter stated in this subsection:
(13) to regulate the methods and devices employed for storage in this state of oil or natural gas or any product of either, including subsurface storage;"

Based on these two provisions, it would seem that the storage of products is an "activity or condition subject to the authority of the oil conservation commission pursuant to provisions of the Oil and Gas Act." As such, it is expressly excluded from the operation of the Water Quality Act.

Of course, the Oil and Gas Act expressly allows OCD to regulate certain types of activities under the Water Quality Act. That provision is Sec 70-2-12.B(22) NMAC 1978, which confers on the Division the power to:

"regulate the disposition of nondomestic wastes resulting from the oil field service industry, the transportation of crude oil or natural gas, the treatment of natural gas or the refinement of crude oil to protect public health and the environment, including administering the Water Quality Act [74-6-1 NMSA 1978] as provided in Subsection E of Section 74-6-4 NMSA 1978."

I think tho that rather clearly that storage of product is not "the transportation of crude oil or natural gas, the treatment of natural gas or the refinement of crude oil." Is it the "oil field service industry"? That term is vague enough to leave some wiggle room. If it is not (and I think in the common understanding of that term, it probably is not), however, there would seem to be no basis for Water Quality Act jurisdiction.

DB

Price, Wayne

From: Jeremy Baker [jbaker@pettigrew.us]
Sent: Tuesday, December 21, 2004 4:22 PM
To: Tim Gum; Randall Hicks; Mitchel Johnson; Wayne Price
Subject: Loco Hills GSF

SW101.pdf | Field Construction and Quality... | Loco Hills GSFR5.pdf | SW 101.pdf | Field Const & Qual Control Pra...

Plans and specs for the bentonite amendmended pond at Loco Hills.

Jeremy Baker, P.E.
Pettigrew & Associates, P.A.
ph. (505) 393-9827 ext. 25

THERE IS NOTHING DESCRIBING THE ACTIVITIES

- HOW WILL THEY DO THIS
- SCOPE OF WORK

Field Construction and Quality Control Practices

The contractor and project engineer shall work together to implement construction practices. Construction practices may be modified as necessary to achieve the designed performance criteria. Application of good quality control and construction methods will ensure the best product for the owner.

For this project, the WYO-BEN Field Construction and Quality Control Practices for High Quality compacted soil membranes shall be followed as modified below.

Raw Material Selection

Natural clay existing on site will be used. SW101 (Sea water tolerant bentonite product for slury applications) will be used as amendment.

Material Mixing

Material mixing shall be accomplished in site. A mixing depth of 8" loose, 6" compacted shall be used also as lift thickness.

Soil/Bentonite Mixing

Blending of the natural clay with the SW101 bentonite amendment shall be by rototilling.

Test Pads

Two 20'x20' test pads will be constructed prior to liner construction. The results of these tests will determine the rate at which the bentonite will be applied to achieve $1xE^{-8}$.

Protective Covers

Water shall be stored during winter months to prevent liner from freezing. Sides may need to be protected with 18" thick layer of material depending on water levels.

Quality Control and Quality Assurance Testing

The contractor and project engineer shall work together to achieve the highest quality product. In order for this to happen, testing shall be performed at the following minimums.

VEGA METHOD

Materials testing nondestructive bachscatter methods will be used for determining in place densities and moistures so as to not disturb the liner. One random test per lift each 2500 square feet or portion thereof will be taken over the entire lines area. A minimum of one proctor shall be taken, with additional proctors taken as directed by project engineer.

VEGA METHOD

Full time construction observation as well as quality assurance testing will be performed during liner construction under the direction of the project engineer.

Post construction permeability verification will be completed in-site by use of ring infiltrometer as required by NMOCD guidance.

TECHNICAL INFORMATION SHEET

WYO-BEN, INC.
550 South 24th Street West, Suite 201
P. O. Box 1979
Billings, Montana 59103 USA
Tel: 406~652-6351 / Fax: 406~656-0748
www.wyoben.com

SUBJECT: **SW 101**
Sea Water tolerant bentonite product for slurry applications.

COLOR: Light Gray

TYPICAL CHEMICAL ANALYSIS:	%
SiO_2	59.2
Al_2O_3	17.4
Fe_2O_3	3.4
Na_2O	2.7
MgO	1.6
CaO	.4
TiO_2	.2
K_2O	.1
Other	3.2
H_2O	7.2
L.O.I.	4.6

E.P. TOXICITY ANALYSIS:

TRACE METALS:	P.P.M.
Arsenic	0.1
Barium	< 1.0
Cadmium	< 0.01
Chromium	< 0.05
Lead	< 0.1
Mercury	< 0.02
Selenium	< 0.02
Silver	< 0.05

SPECIFIC GRAVITY: 2.55 ± 0.1

pH (5% SUSPENSION): 9.1

SURFACE AREA (m^2/gm):

External Surface	82
All Surfaces	800

PARTICLE SIZE:

% Passing 200 Mesh Sieve 80% ±

PRODUCT PERFORMANCE:

SW101 in Seawater

	600 RPM	300 RPM	PV/ YP	API Fluid Loss	Marsh Funnel Viscosity Qt/Sec
60 Kg/M^3	15	10	7/1	13.7	34
70 Kg/m^3	19	11	8/3	11.5	36
80 Kg/m^3	24	14	10/4	9.5	38

USES:
Viscosifier and fluid loss control agent for seatwater contaminated slurries.

SW 101

The product of choice for seawater exposure and salt contaminated environments.

Wyo-Ben's unique SW 101 is an innovative breakthrough in drilling fluids and containment slurries. This contamination resistant bentonite is engineered for use in slurry cutoff walls and drilling operations where exposure to seawater is expected. It is highly recommended for use in well drilling, caisson drilling, horizontal boring and slurry wall application where traditional bentonite fluids will not perform.

SW 101

- Hydrates easily in fresh water, brackish water, seawater or a combination – WHAT ABOUT BRINE WATER
- Displays excellent fluid loss control so formation sloughing is minimized
- Costs less than CMC polymer systems and builds a superior wall cake
- Has superior flow properties due to excellent bore hole stability

The salinity of typical seawater is such that conventional fresh water components cannot function properly. Similarly, materials used in saturated salt muds are not able to respond properly in the limited saline environment of seawater. The table below illustrates the properties achieved by various mud systems mixed in seawater. SW101 demonstrates superior performance and durability and is very cost effective.

Product	Percent Weight	Funnel Viscosity	600 Fann Rdg.	Fluid Loss
SW 101	6	34	15	13.7
	7	36	19	11.5
	8	38	24	9.5
API Grade Hydrogel	6	28	5	92
	7	28	5	87
	8	29	6	81
Extended Extra High Yield	6	30	11	109
	7	32	13	101
	8	34	17	95
Attapulgite Clay	6	35	24	144
	7	38	34	129
	8	44	48	120

In most operations, adding SW101 at a 7% rate to seawater is ideal (four 50# bags per 300 gallons of make-up water). For best results, establish and maintain a 45 sec/quart marsh funnel viscosity. Drilling in unconsolidated formations may require increased addition rates.

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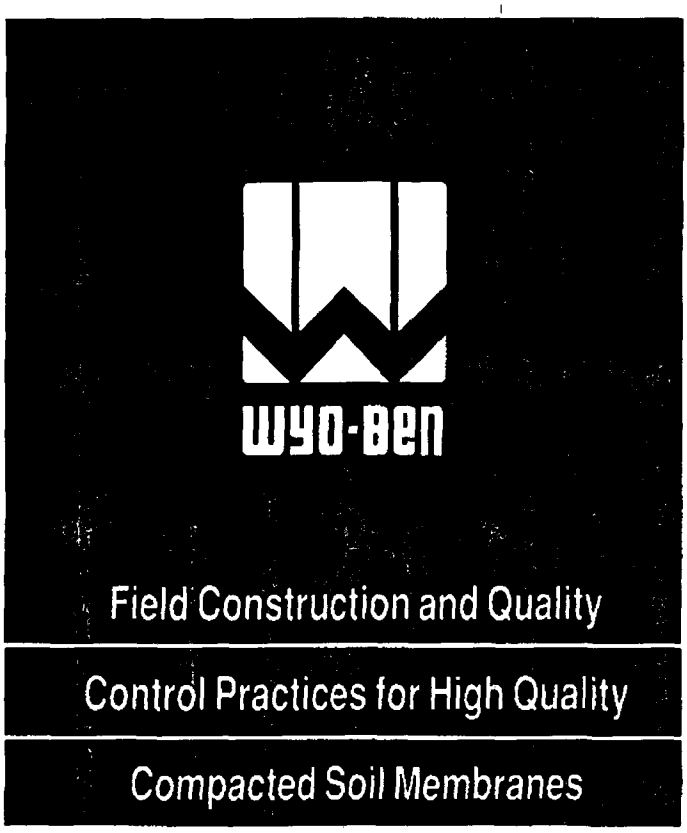

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FIELD CONSTRUCTION AND QUALITY CONTROL PRACTICES FOR HIGH QUALITY COMPACTED SOIL MEMBRANES

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ABSTRACT

Construction practices can dramatically affect the quality of compacted native clay and amended-soil membrane fluid barriers. When properly constructed, however, these membranes can provide secure, long-term, low permeability liners and closure covers for landfills and lagoons. Knowledgeable use of appropriate construction practices and application of good quality control methods are necessary to help ensure that these structures will meet designed performance criteria.

KEY WORDS

Bentonite, Closure Cover, Compacted Soil Membrane, Compaction, Landfill, Liner, Native Clay, Permeameter, Quality Control, Soil-Bentonite Membrane

INTRODUCTION

Safe, long term storage of municipal, industrial and hazardous wastes is one of society's most pressing environmental problems. For the foreseeable future the most practical and feasible method of containing these materials remains that of landfilling. Badly contaminated soils and water near many old landfills and lagoons continue to dramatically show, however, that the old "bury it and forget it" practices of the past are no longer acceptable. As a result, modern landfills and lagoons are now designed to seal their contents off from the outside world by enclosing them in a secure envelope composed of a liner and closure cover. The types of low permeability membranes that are used to create the elements of these enclosures will vary depending upon the hazard potential of the waste. Compacted soil membranes (CSM's) are frequently used for this purpose, either by themselves as simple membranes, or with plastic films as part of composite membrane systems. In the past, most CSM construction has used low permeability native "clay" soils. The materials needed to create native clay membranes (NCM's) are no longer readily available in many areas of the U.S. and Canada, however. As a result, mixtures of native soils and various amendment materials have been developed as substitutes. The most successful of these substitutes are those using high swelling (Wyoming-grade) sodium bentonite. Soil-bentonite membranes (SBM's) created from these blends are now the most widely used type of CSM. Discussion of amended CSM's in this paper will, therefore, be limited to SBM's. The construction techniques currently used for building CSM's have evolved over the past 15 to 20 years from practices used in constructing highways, dams and other earth filled structures. As many engineers and contractors have discovered, however, there are numerous differences between these

"parent" practices and those used for CSM construction. If left unrecognized, these differences can significantly affect the quality of the completed membrane. This paper, therefore, presents a brief discussion of some of the construction practices and quality control methods that have been shown to lead to high quality, low permeability, leak free CSM's for landfill and lagoon liners and closure covers. Unless otherwise noted, the remarks presented here will be pertinent to the construction of both native clay soil and bentonite amended soil CSM's.

RAW MATERIAL SELECTION

The type and quality of the soil, water and bentonite amendment, if any, which are chosen for use will directly affect the construction methods and equipment used, the rate at which construction proceeds, the project cost and the ultimate quality of the completed membrane. It is, therefore, important that selection of the raw materials, for use in all types of CSM's, receive careful consideration well before the start of construction.

SOIL

To be potentially useful for CSM construction, soils must be free of: 1) any chemical contamination that might later leach out of the membrane or which might adversely affect its performance; 2) waste materials or construction debris that might generate leachable contaminants, complicate construction or compromise membrane integrity; 3) vegetative material, such as roots, branches or sod, which might later decay leaving voids in the membrane. Additionally, useful borrow soils should be essentially non-organic and non-micaceous. Soils containing high levels of mica or organic materials, such as humus or peat, should be avoided because they tend to be quite springy and are difficult to adequately compact.

Potential borrow soils must be sampled and tested to determine their actual suitability. Multiple bore hole and/or test pit samples should be taken through the full soil profile of each possible soil. The number of samples points and their location, as well as the number of samples taken, can vary significantly between soils. The sampling program must always, however, be sufficient to allow the variability in properties of each soil to be determined. An understanding of this variability is fundamental to the creation of a high quality CSM.

Testing of individual soil samples should include particle size distribution (ASTM D-422), Atterberg limits (ASTM D-4318) and water content (ASTM D-2216, D-4643 or D-4959). Testing of composite samples representative of each soil source should include all these tests as well as compaction curves (ASTM D-698 and/or D-1557) and chemical analysis to determine the chemical compatibility of the soil with the waste or waste leachate with which it will come in contact. It may also be desirable to include various engineering tests to determine the structural capabilities of the soil, especially where membrane construction on steep slopes is anticipated. The information obtained from this testing can then be used to establish reference quality control criteria for use during the excavation of the borrow soil that is selected.

CSM construction projects occurring in the northern U.S. and Canada often face the possibility of freezing conditions. It is, therefore, important to recognize that frozen soils must never be used, and membrane construction should never take place during freezing weather, regardless of the type of CSM being built. Frozen soils form very hard clods that are extremely difficult to adequately pulverize. As a result it is impossible to ensure that a homogeneous mixture of raw materials will be obtained when frozen soils are used. This is particularly important for SBM

construction. In addition, clods of frozen soil tend to act like pieces of gravel making them nearly impossible to adequately remold and compact. The use of these materials virtually guarantees a looser, more highly permeable membrane than could be obtained if non-frozen materials were used.

FOR NATIVE CLAY MEMBRANES

The soils selected most often for use in or native clay NCM construction are those falling into U.S.C.S. classes ML, MH, CL or CH. As a whole, these soils can be characterized as fine-grained, plastic and cohesive materials. Research has shown that both the particle size distribution and plasticity properties of a soil can significantly influence its hydraulic conductivity in a compacted membrane. Acceptable hydraulic conductivities are more difficult to obtain with soils having low fines content (< 200 mesh fraction). Daniel (1990) recommended that soils used for liner construction have a minimum fines content of 30% to obtain permeability values of 1×10^{-7} cm/s or less. Others have found that the minimum soil fines content should be 50% in order to achieve similar permeabilities (Benson et al., 1992). Acceptable hydraulic conductivities are also difficult to obtain with soils having low plasticity values. Daniel (1987) reported a positive, though weak correlation between decreasing hydraulic conductivity and increasing plastic index values for laboratory compacted soil samples. He recommended that soils used for NCM construction have PI's 10% in order to achieve permeabilities of 1×10^{-7}cm/s or less. Research by Benson et al. (1992), on actual construction projects having a broad range of soil materials, construction conditions and quality control practices, confirmed that many soils with PI's as low as 10% can be compacted to achieve permeabilities of this order. However, the data obtained by these researchers shows that the relationship between soil fines/plastic index values and hydraulic conductivity is, at best, a general one. As a result, standardized laboratory hydraulic conductivity testing (ASTM D-5084) must ultimately be conducted on each candidate soil in order to fully assess its potential usefulness.

This research does point out that it would be logical to seek out soils having high fines contents and high PI values in order to help assure attainment of low hydraulic conductivity in a NCM. It must be recognized, however, that fine-grained, high plasticity (PI > about 30%) soils tend to be very difficult to work with during construction. These soils tend to form sticky clods when wet and hard, durable clods when dry. As a result, these soils are often difficult to uniformly moisten or dry out. Additionally, they tend to shrink when dried and swell when wetted. These characteristics require that close attention be paid to the initial soil processing, compaction and protective covering phases of construction if a high quality native clay CSM is to result.

FOR BENTONITE AMENDED MEMBRANES

Literally any "soil" material can be sealed with bentonite and used in SBM construction. In most cases, however, the easiest and most economical soils for SBM construction are loam-type soils falling into U.S.C.S. classes SM and SC. These soils are typically non-plastic to slightly plastic, have only slight to moderate cohesion and form weak, easily disrupted clods. This makes these soils much easier to manipulate during construction than the soils normally used for native clay NCM's. Additionally, because they are composed of a variety of particle sizes and tend to be self void-filling, these soils usually require less bentonite to achieve a desired hydraulic conductivity than do other soils with more uniform particle size (pure sands, silts and clays). Mixtures of

sand and bentonite have, however, been used to form high quality SBM liners (Haug, et al., 1988; Williams, et al., 1992). These authors report that the consistent quality and rapid pace of construction afforded by sand-bentonite mixtures compensates for the cost of the additional bentonite required (Haug, 1991; Williams, 1994).

Regardless of type, the soils used for SBM construction must be free of contaminants such as concentrations of leachable non-sodium cations, especially calcium, magnesium and iron, high concentrations of soluble chloride or sulfate, and organic solutions. The use of soils containing these contaminants will adversely affect the performance of the bentonite sealant by reducing its swelling capacity. Methods are available, however, to deal with the effect of contamination on the bentonite sealant when the contamination potential is known in advance of construction. In one method the bentonite may be treated with a variety of polymer, chemical chelating and/or Ph buffering agents to delay or mute the effects of contaminants. In another method, the soil-bentonite mixture is prehydrated with a dilute salt solution prior to compaction. This effectively eliminates any change of volume in the SBM which might otherwise occur after compaction due to contaminant induced dehydration of the bentonite sealant (Haug, 1988).

After the soil is selected, laboratory hydraulic conductivity testing (ASTM D-5084) must be undertaken to determine the rate of bentonite addition necessary to achieve the membrane permeability required for the project. This can best be accomplished by testing several soil-bentonite mixtures, each having a different bentonite content, and plotting the results in relation to the hydraulic conductivity required. It is prudent to increase the laboratory determined rate of bentonite addition somewhat in order to compensate for those variables which may be encountered during construction that cannot be duplicated or quantified under laboratory conditions. Increases of 10% to 25% are typical with the actual rate of increase dependent upon on-site conditions.

WATER

Water used to adjust the soil moisture in CSM construction should be clean and free of organic contaminants and concentrations of dissolved salts. This is particularly important for SBM construction since contaminated water may reduce the swelling capacity of the bentonite and thereby limit its sealing capability. As a general rule, potable water with a total non-sodium hardness of less than 250 ppm will be acceptable for all CSM construction. In cases where the non-sodium cation concentrations are marginally high, the water may be effectively treated with soda ash (Na_2CO_3) and used. Heavily chlorinated water from municipal sources should be avoided for SBM construction, however, because the chlorine can adversely affect the performance of the bentonite.

BENTONITE

For maximum sealing efficiency and cost effectiveness, only high-swelling Wyoming-grade sodium bentonite should be used in SBM construction. It is well known that the properties of Wyoming sodium bentonite are unique and not obtainable with other clays. Even sodium treated clays from other areas do not develop the properties of Wyoming sodium bentonite (Grim, 1968). Calcium-type or other sodium-type bentonite's should be used with caution and with the knowledge that application rates for these materials may be significantly higher than those required for Wyoming sodium bentonite. This has the obvious drawback of increasing project costs. Not as obvious is the adverse impact which significant increases in bentonite concentration may have on the structural stability of SBM's which are placed on side slopes.

The capability of bentonite to swell in the presence of water is well known. In an SBM this swelling ability enables the bentonite to fill and seal the soil voids when it is wetted, reducing the hydraulic conductivity of the membrane in the process. As a result, although many other quality control tests for bentonite are available, the measurement of the swelling capability of bentonite in water is the most meaningful test for gauging quality in bentonite sealant products. The free swell test measures this capability. Using this test calcium bentonites are typically found to have free swell values on the order of 6 cc./2 gm. or less while low grade sodium-type bentonites will have free swell values of between 8 and 15 cc./2 gm. In comparison, high quality Wyoming-grade sodium bentonite will have free swell values of 18 cc./2 gm. or higher. As a result, if the problems associated with using low quality bentonites are to be avoided, all bentonite products used for SBM construction should be specified to have a minimum free swell of 18 cc./2 gm. Unfortunately, there is not yet an accepted standard method for the free swell test, although ASTM is currently in the process of developing one. Copies of the test method generally used by the bentonite industry can be obtained from bentonite sealant manufacturers until the ASTM standard is completed, however.

Sodium bentonite products for environmental sealing use are available in a number of forms. Products may be natural or chemically treated and may be powdered ("200 mesh") or granular (typically 8 mesh). These products may be obtained in a variety of packaging including 50 to 100 pound paper bags, 500 to 4000 pound bulk sacks and full bulk shipments. Bentonite sealant manufactures should be consulted to determine the most appropriate product and packaging to use for any particular application.

SOIL EXCAVATION AND PROCESSING

Periodic sampling and testing of a borrow soil during excavation is an important aspect of quality control for any CSM project. The data obtained from this testing can be compared with pre-established reference criteria to define and segregate out undesirable soils or other materials which might later cause problems. Daniel (1990) summarized various tests and minimum testing frequencies which have been suggested by others for use in assessing borrow soil uniformity. These include Percent Fines (ASTM D-1140), 1 test/1000 yd^3 (785 m^3); Percent Gravel (ASTM D-422), 1 test/1000 yd^3; Atterberg Limits (ASTM D-4381), 1 test/1000 yd^3; Water Content (ASTM D-4643), 1 test/200 yd^3 (153 m^3), confirmed by (ASTM D-2216), 1 test/1000 yd^3 Ultimately, however, the frequency of testing during excavation must be dictated by the amount of soil variability encountered. Regardless of the minimum testing frequency used, an experienced soil inspector who is capable of spotting changes in soil properties should always be present during excavation.

It can be beneficial to process some borrow soils during excavation and stockpiling operations. Soils that are stratified, or that have small inclusions of off-spec material which can not be easily removed can be mixed during excavation to make them more homogenous. Gravel (>4 mesh fraction) can also be removed by screening to make soils more suitable for use. Although soil gravel content of up to about 50% has been found to have little affect on the hydraulic conductivity of laboratory compacted soil specimens (Shelly and Daniel, 1993) the uniformity of such a soil is difficult to maintain in the field. As a result, it is generally advantageous to keep both the particle size of the gravel and the gravel content in the soil as small as possible. A safe rule is to limit the maximum gravel particle size to 10% of the thickness of the membrane or, where multi-lift membranes are built, 10% of each lift thickness. The gravel content should also be limited to 20% of the total soil weight. This will help to minimize the potential for developing zones of high porosity which can result from stacking and bridging of concentrations of gravel in the membrane.

This also helps to facilitate the construction of a very smooth final membrane surface which is normally required by plastic film manufacturers where a geosynthetic membrane will immediately overlay the CSM in a composite system.

Soil clod size in cohesive soils may also be adjusted at this time. Benson and Daniel (1990) report that small clod size is very important if soils are to be easily wetted, remolded and compacted to produce uniform, low permeability membranes. The properties of each soil will ultimately determine the size of the clods which can be tolerated. Nevertheless, the size of soil clods should be kept to a minimum, usually 1 cm. For SBM's this has the further benefit of helping to ensure that a fully homogenous soil-bentonite mixture is obtained.

SUBGRADE CONSTRUCTION

All CSM's must have a dense, stable, structurally compatible subgrade on which to rest. It must be recognized that CSM's are only intended to reduce the rate of fluid flow, not to eliminate it. As a result, when these membranes are placed immediately on top of subgrades composed of clean gravel, crushed rock or other highly porous material they have the potential to erode from the bottom up. This can occur as fluid moves through the membrane and passes into the void spaces in the subgrade material. Over time the erosional cavitation caused by this process can progress upward through the membrane, compromising its integrity and increasing the potential for failure. In lagoon structures these failures can be spectacular. A thorough geotechnical survey of the subgrade material must be undertaken prior to construction to eliminate this possibility. Daniel and Fluet (1992) recommend that subgrade material testing should include a minimum of one compaction curve (ASTM D-698) per 5 acres (2.0 ha.) and one soil density (ASTM D-1556, D-2922 or D-2937) per acre (0.4 ha.). It is also wise to check water content (ASTM D-3017, confirmed periodically by ASTM D-2216, D-4643 or D-4959) at least once per acre, and soil particle size distribution (ASTM D-422) whenever very coarse or porous materials are observed. Any highly porous zones which are discovered must be removed or, if that is impractical, capped with layers of progressively finer graded materials. In all cases the subgrade material immediately underlying the CSM should be of sufficient fineness to guarantee that erosional cavitation will not occur. In addition, the compaction level of the subgrade must be at least equal to the compaction level required for the CSM. Where this is not the case the subgrade must be further compacted. This may require the incorporation of additional water into the subgrade soil to moisten it sufficiently so that adequate compaction can be obtained. Failure to properly compact the subgrade prior to CSM construction can make it difficult or impossible to achieve required densities in the CSM.

MATERIAL MIXING

Material mixing in NCM construction is typically limited to adjustment of the soil moisture in order to facilitate proper compaction. The construction of SBM's, however, may require accurate mixing of one or more soil materials, the bentonite sealant and the compaction water to produce a constant quality mixture ready for compaction. Mixing of the ingredients to be used in any CSM may be accomplished using either in-situ or plant (pugmill) mixing methods.

IN-SITU METHODS

In-situ or "on-the-ground" mixing methods are most typically and effectively used for projects where on-site, in-place soils will be used and where the CSM will only be a single layer or lift in thickness (usually 15 cm.). This method may also be modified to accommodate construction of thicker, multi-lift membranes through the use of off-site mixing pads. Use of this method for thicker membranes is often not cost effective, however, due to the increased number of times that the soil materials must be handled. The in-situ method can be composed of as many as 4 phases, depending upon the type of CSM being built: Bentonite application and Soil/bentonite mixing (for SBM's only) and, Water addition and Water incorporation (for NCM's and SBM's).

BENTONITE APPLICATION

Soil should be reasonably dry at the time bentonite is applied in order to facilitate proper soil and bentonite blending. Bentonite will rapidly adsorb moisture from wet soils causing it to become sticky. When this occurs the bentonite may ball up or coat the surface of soil clods during mixing. This makes it very difficult to completely and evenly distribute the bentonite through the soil. Soil moisture is appropriate for bentonite application when the soil is dry, preferably by several percent, of Proctor optimum. Soils having a moisture content which is wet of optimum should be dried before any bentonite is applied in order to avoid mixing problems.

Granular bentonite products are typically used for in-situ SBM construction. These products were developed to replace powdered products in order to limit the amount of air borne dust generated during application and mixing. They have a particle size range grading from 100% passing an 8 mesh sieve down to fine powder with 20% passing a 200 mesh sieve. Unfortunately, the larger particle size of the granular products also makes them less efficient than the powdered varieties, particularly when used with finer grained soils such as silts or clays. Despite this, granular products remain the products of choice for in-situ applications due to their lower dusting potential.

The bentonite must be applied in a consistent and accurate fashion to ensure a uniform concentration in the SBM mix. On smaller jobs this may most easily be accomplished by obtaining the bentonite in paper bags. A rectangular grid-work of sufficient size so that one bag supplies the bentonite requirement for each grid space can then be inscribed on the ground. Bags of bentonite may then be placed in the grid-work, broken open, and the contents evenly hand raked over the grid area. This procedure is very labor intensive, however, and is typically too expensive to use on most jobs. As a result virtually all projects receive the bentonite in bulk sacks or in full bulk and use mechanized equipment to spread it. Here, drop-type spreaders of various types have proven to be the cleanest and easiest spreaders to use. Although drop-type agricultural lime or fertilizer spreaders may be used, mechanized conveyor-fed material spreader boxes have been demonstrated to be the most efficient and accurate spreaders now available. Rotary or "whirly-bird" type spreaders should be avoided. These machines are highly inaccurate and can create significant dust problems.

Regardless of the application method used, it is important to periodically reconfirm the rate at which the bentonite is being applied. Where mechanized spreaders are used, this is most easily accomplished by laying cloth panels of known area in the path of the spreader so that they are covered with bentonite as the spreader passes. Each cloth panel may then be picked up and weighed and the application rate calculated. This quality control method is accurate, quick and easy and should be repeated often during the course of bentonite application. At a minimum, one test should be conducted at the start of each day to calibrate the spreader equipment and,

thereafter, one test should be conducted for each hour of spreader operation or for each acre covered. In this way timely adjustments of the spreader equipment can be made which will help to ensure that the proper application rate is maintained over the entire project area. The bentonite should be incorporated into the soil immediately after spreading to avoid the possibility of it becoming wind blown.

SOIL/BENTONITE MIXING

The purpose of this process is to fully blend the bentonite into an accurately defined thickness of soil to achieve a completely homogenous mixture having a known, uniform bentonite concentration. A variety of implements, such as tractor drawn agricultural harrows, disks and plows have been tried as mixers. Unfortunately, they are all ineffective in achieving the degree of mixing necessary to produce high quality SBM blends. The only way to obtain truly effective in-situ mixing is through the use of rototillers. Small and medium sized tractor-drawn rototillers are quite suitable for smaller jobs as long as they are capable of digging to a depth at least equal one compacted lift thickness. However, large, self-propelled industrial rototillers, or cross-shaft mixers, are the mixer of choice for most jobs. The independent control of forward rate of travel, tiller rotation speed, and depth of cut offered by these machines gives them sufficient flexibility to cope with nearly any soil condition. The capability offered by these machines for very slow forward rates of travel also allows for increased residence time of the soil within the mixing chamber. When coupled with high tiller rotations speeds this ensures that the soil will be well pulverized resulting in a fine grained homogenous soil/bentonite mixture.

Industrial-type rototillers are quite capable of digging and mixing to depths of 45 cm. or more in a single pass. However, in some cases where single pass mixing of soil and bentonite has been attempted, a disproportionately large amount of the applied bentonite was left near the bottom of the mixed layer. A much more even distribution of bentonite in soil is obtained when two passes of the mixer are used and the mixing depth during the first pass is set to approximately 1/2 of the full lift depth. The mixer is then reset for full depth mixing for the second pass. The use of this technique for all rototiller mixing operations will help to ensure that fully homogenous soil-bentonite mixtures are obtained.

WATER ADDITION AND INCORPORATION

On most NCM and SBM projects, water must be added to the soil or soil-bentonite mixture to bring it up to the proper moisture level for compaction. This water is typically applied using spray bar-equipped, truck mounted tanks which are driven over the loose soil-bentonite mixture as the water is sprayed out. Water applied in this fashion should be immediately coarsely incorporated into the soil mixture to eliminate surface ponding and enable the rototiller to operate without loss of traction. A few passes of a tractor drawn agricultural disk across the wetted area seems to be the easiest method to accomplish this. Following this, a minimum of two passes of the rototiller mixer are typically required to fully incorporate and homogenize the water into the soil mixture. Some rototillers are equipped with spray bars mounted inside the mixing chamber so that water can be added during the mixing process. Where this arrangement is to be used it is wise to mix the bentonite into the soil before adding any water. The combination of loose bentonite and water in the rototiller mixing chamber can lead to significant "mudding-up" problems as well as non-homogenous mixing.

The amount of water added should be sufficient to bring the mixture moisture to a level somewhat "wet of optimum". Compaction of cohesive soils at moisture levels wet of optimum is well

known to yield lower permeabilities than those obtainable when compaction moisture is dry of optimum (Mitchell, et al, 1965). It is felt that the added water allows further softening of the soil clods. This permits more complete remolding of the soil clods during compaction, reducing the soil pore volume and decreasing soil permeability (Daniel, 1984, Olsen, 1962). In most in-situ mixing operations, it is advisable to initially add extra water to the soil mixture to allow for evaporative loss during the mixing process. This is particularly important when rototillers are used for mixing. The high rate moisture loss resulting from the large volumes of air that are pulled into the mixing chamber during mixing makes these machines very efficient soil driers. As a result, the moisture content of the soil mixture should be checked (ASTM D-4959, D-4643 or D-2216) at least once every 250 m^2 to ensure that it is consistently at the correct level. Proper adjustment of the moisture level in the finished soil mixture is one of the most difficult facets of the in-situ mixing method.

PLANT MIXING METHODS

Plant or pugmill-type mixers are the most recent addition to the list of equipment which is useful for making soil mixtures for CSM's. Although they may be employed to moisture condition soils for NCM construction their primary use is in preparing soil-bentonite mixes. These machines are particularly effective for this application because of the very tight control which they allow over ingredient feed rates. The newest of these machines incorporate computer controlled feed systems from which periodic printouts of process input and output data can be obtained. This is a very useful quality control feature for both contractors and project engineers. Calibration of the material feed systems on a pugmill depend upon accurate soil bulk density information, however. As a result, changes in the composition or moisture of the soil can lead to changes in the moisture and bentonite content of the resulting soil mix. This makes periodic testing of the mixed product a necessity to confirm the computer generated data. At a minimum, moisture content should be checked once for every two hours of plant operation, or every 225 m^2 of mix produced using ASTM D-4959, D-4643 or D-2216. For SBM's, the bentonite content should also be checked with the same frequency using the methylene blue dye method of Alther (1983) or API (1993).

Most plant mix systems have enclosed mixing chambers which reduce the potential for moisture loss during mixing. This enables mixed soil products with very consistent and precise moisture levels to be produced. The only significant drawback to most plant mix systems is that their mixing chambers are typically short, usually around 3 meters in length. This results in rather short residence times for the soil mix within the mixing chamber and can produce uneven, non-homogenous mixes with certain soils. Further, though vigorous, the mixing action within the mixing chamber is frequently insufficient to fully break down soil clods, especially when the soils are moist, heavy silt and clay types. This problem may be reduced or eliminated by passing the soil through a soil pulverizer or hammermill to precondition it prior to placing it in the feed bin of the pugmill. Despite these problems plant mixing systems have become the "state-of-the-art" for use in manufacturing high quality soil mixes. This is due primarily to their capability of accurately controlling additive and moisture content in the mixture.

The mixed soil product produced by a plant mixing system should be transported to the job site and placed as rapidly as possible to avoid detrimental changes in product moisture. Although quantities of plant mixed product have, in some cases, been stockpiled in anticipation of future use, this practice is not typically recommended because it invites changes in the moisture content of the mixture which may require expensive reprocessing to correct. Where advance stockpiling is necessary it is prudent to cover the stockpile with plastic sheeting or other materials to minimize moisture loss during the storage period.

MATERIAL SPREADING

All soil mixtures which are prepared off site, either by in-situ or plant mix methods, must be transported to the job site and spread. Spreading may be most easily accomplished for thick, multi-lift membranes by using a small dozer. The dozer merely pushes the deposited loose soil mix into lifts of approximately the correct thickness, typically about 20 cm, one at a time. Thickness measurements are made on a continuous basis following compaction of each new lift with adjustments being made in each succeeding lift thickness to ensure that the total membrane thickness will be as specified. Major advantages of this method are that it is a quick and continuous process that does not produce any seams within each lift that could produce leaks.

Control of lift thickness is much more critical for single lift, plant-mixed membranes and multi-lift membranes that are prepared from cohesive soils which are prone to bridging during compaction. Under these conditions, it may be useful to spread the soil mix using a small asphalt spreader. When this method is used, care must be taken to ensure that the seams between adjacent lines of previously spread soil mixture are tight and without gaps after compaction. All seams represent discontinuities in the membrane structure. As a result, it is important to plan the lay-down pattern so that the seams within each lift are not crossed or directly overlain by seams in the lift above it. Failure to take this precaution will result in points or zones of high leakage potential in the membrane where seam overlaps occur. This situation may be avoided by ensuring that all lay-down seams are parallel and that they are staggered horizontally from one lift to the next.

INTER-LIFT SCARIFICATION

The contact between any two lifts in a multi-lift CSM represents a zone of discontinuity in the membrane. When the surface of an underlying lift is relatively smooth at the time it is covered by another lift the resulting interface can allow fairly rapid lateral movement of water within the membrane. As a result, water passing through a flaw or porous spot in an overlying lift can spread out and flow along this interface until another flaw or porous spot is found in the lift underlying it. This process can significantly speed up the rate of water flow through a CSM, even when it is several lifts in thickness. A smooth interface also represents a potential structural weakness in the fabric of the membrane. When CSM's are placed on slopes, this weakness may allow the membrane to slip or fracture, resulting in its failure.

The problems created by the inter-lift interface may be significantly reduced by loosening or scarifying the upper most 2 cm. or so of each compacted lift prior to placement of the loose soil for the next lift. This creates a very rough, uneven surface on the lower lift which will help to break up the hydrologic continuity of the interface and limit water flow. It also allows the loose soil from the overlying lift to blend into the underlying lift during compaction to create a stronger, more continuous membrane.

COMPACTION

According to Daniel and Trautwein (1986), and Herman and Elsbury (1987) soil permeability is controlled by the size, number and degree of interconnection of the pore spaces in a mass of soil. As a result, loose soils having an abundance of large, well connected pore spaces will have high permeability values. In contrast, dense soils with limited numbers of small, poorly connected pore spaces will have low permeability values. It is readily apparent, therefore, that proper compaction of the soil in a CSM is particularly important to reduce the soil pore space and produce a lower permeability. In SBM's proper compaction has an additional benefit. Since the bentonite in an SBM occupies and seals the soil pores, a reduction in the pore space will also decrease the bentonite requirement.

The type of compaction equipment which is used for CSM construction will significantly influence the compaction results which are obtained. Care must be always be taken to select the compaction equipment which best suits the type of soil to be used and the lift thickness to be produced. Heavy, footed roller compactors can be expected to produce the greatest amount of clod remolding in cohesive soils due to their kneading type of compactive effort (Daniel, 1987). For most projects, the broad, penetrating feet of a pad foot-type roller compactor appear to produce the best and most rapid results. The large pad footprint on these machines reduces the number of passes which they must make to achieve good compaction. These large pads also minimize the possibility that penetrations might be left in the membrane. Pad foot compactors are available with either fully or partially penetrating feet. According to Daniel (1987), fully penetrating pads produce superior clod remolding and compaction. These machines may not be appropriate for low cohesion soils, however, where long compactor feet tend to break up the membrane as they are being withdrawn from the soil. This problem can often be eliminated by using a partially penetrating pad foot compactor. Partially penetrating pad foot compactors are also more generally available than are the fully penetrating type.

Other types of footed roller compactors, such as sheepsfoot rollers, should generally be avoided. These compactors have long, narrow, fully penetrating feet and require many passes to ensure good compaction. In addition, they tend to leave penetrations in the compacted membrane if improperly used. It has also been reported that sheepsfoot rollers can leave layered or laminated inconsistencies in a membrane (Williams, 1992). It is possible to use a sheepsfoot roller to compact heavy clay soils, however, the number of passes required to achieve full compaction without leaving any penetrations usually makes this method uneconomical.

The inability of smooth drum roller compactors to produce a kneading type of compaction limits their ability to remold clods in cohesive soils. As a result these compactors are most effective on non-cohesive or low cohesion soil mixtures such as sand, or sandy loam and bentonite where few, if any clods are present. When smooth drum compactors are used to compact more cohesive soils or soil mixtures the thickness of each lift must be reduced to minimize under compaction in the lower part of the membrane and maximize clod remolding. Smooth drum compactors should not be used to compact highly cohesive soils such as clays.

Regardless of the compactor type used, the best compaction will always be obtained by the heaviest machines. Weight may be imposed either by static mass or, in the case of vibratory models, by dynamic movement. Machine weights of 35,000 pounds or more are desirable to consistently produce optimum compaction results. Even with the heaviest of compactors, however, it is wise to restrict the thickness of the compacted lifts to no more than 15 cm. This will help to ensure that soil bridging does not occur and that each lift is completely and uniformly compacted.

Compaction of side slopes presents some unique problems which require a slightly different approach. Where slopes are steeper than 3H:1V, slippage of the compactor drum or drive wheels of self powered compactors on the compacted membrane surface may occur. This can cause fracturing of the membrane to occur resulting in zones of potential leakage. A solution to this problem can be found by using a crawler-tractor mounted side-boom cable-winch to assist the compactor up and down the slope. Slopes of up to 1.5H:1V have been effectively compacted using this technique. When compacting membranes on steep slopes it is advisable not to use the vibratory mode on vibratory compactors. Vibration of the soil mass frequently causes it to creep downhill resulting in fracturing and thinning of the membrane.

MEMBRANE QUALITY CONTROL

GENERAL QC TESTING

The quality control practices used during actual CSM construction are principally directed toward determining the quality of the compacted membrane. All testing of mix materials to ensure quality and consistency should have been completed prior to their use. Periodic testing of soil characteristics such as moisture, particle size distribution and Atterberg limits can, however, be useful to reverify the quality of the soil. This is particularly true if the soil is known to be variable in nature. Here, the frequency of testing will be dependent upon the degree of variability observed.

Daniel (1990) summarized several tests and minimum testing frequencies which have been suggested by others for use in assessing compacted membrane characteristics. These include Water Content (ASTM D-3017 or D-4643), 5/acre (0.4 ha)/lift, confirmed by (ASTM D-2216), 1/acre/lift; Density (ASTM D-2922 or D-2937), 5/acre/lift, confirmed by (ASTM D-1556), 1/acre/lift; Number of Compactor Passes (observation); and "Continuous Construction Oversight", or monitoring, by observation. Additional testing which must also be conducted will include the direct measurement of Compacted Lift Thickness, at a minimum frequency of five times for each 250 m^2 of membrane, per lift, and measurement of Hydraulic Conductivity.

Hydraulic conductivity testing may be conducted in the laboratory on recompacted loose soil samples, or with "undisturbed" shelby-tube samples (ASTM D-1587), using the flexible-wall permeameter methods described in ASTM D-5084. This testing has the advantages of being very rapid, taking as little as a few hours when necessary, and of being conducted under controlled laboratory conditions. The major disadvantage of this method is that only small volumes of material are tested with each test. This requires that many such tests be conducted if the results are to be representative of an entire CSM. Tests may also be conducted in the field on the in-place CSM using a wide variety of in-situ permeameter test methods and equipment (Daniel, 1989; Fernuik and Haug, 1990; Sai, et al., 1991). Although many of these methods also enable determinations of hydraulic conductivity to be made in a matter of hours (eg. air-entry and various borehole-type permeameter methods) the size of the area which is tested in each test is usually quite small. Important variations in the CSM may also be missed with these methods unless many tests are conducted. Where hydraulic conductivity testing will be done on recompacted or selby-tube samples in the lab, or using small in-situ permeameters in the field, a minimum of three tests/acre (0.4 ha)/lift should be conducted to ensure that representative values are obtained.

Those methods which enable testing of large areas (eg. various infiltrometer methods) are, in contrast, typically very slow, requiring weeks or even months for testing to be completed. Despite the fact that fewer individual tests are required these methods can cause expensive delays in construction due to the length of time needed for each test. This is particularly true when multi-lift membranes are being built which require hydraulic conductivity confirmation testing for each lift. The length of time required to conduct these tests also makes them subject to changes in environmental conditions. Knowledgeable control of the effect of these changes is essential if the test results obtained are to be meaningful. Where large, in-situ permeameters are being used a minimum testing frequency of one test/acre (0.4 ha)/lift should be used. Ultimately, the choice of which hydraulic conductivity test method to use must be based upon regulatory requirements and the construction time frame which has been established for each project.

Regardless of the test method chosen, it is important to recognize that sufficient time must be allowed for the bentonite to hydrate when testing SBM's. This normally takes a minimum of two days. Tests of SBM's which are conducted more rapidly than this can not be expected to yield meaningful data.

TEST PADS

Test pads are miniature renditions of full scale CSM's which are constructed prior to construction of the actual soil liner or cover. They are often used as a convenient method of verifying that the materials and construction practices proposed for use for a CSM will actually lead to a low permeability membrane (Daniel, 1990; Daniel and Fluet, 1992; Williams, et al., 1992). In addition, they may be used as a reference gauge for rapid evaluation of quality in the actual liner or cover as it is built. In order to be useful, the test pads must be constructed using exactly the same materials, construction equipment and construction methods that will be used in the CSM. They must also be of sufficient size to ensure that all construction equipment can operate at normal speeds and that "edge affects" do not alter the characteristics of the test membrane. This means that test pads will usually be about 7 to 10 meters wide and 15 to 25 meters long. All quality control testing that will be conducted on the CSM must also be conducted on the test pad. The results of these tests should meet the predefined quality control parameters established in the project specifications. These test values can then be used as reference points for the actual CSM construction.

During CSM construction, the quality control test results that are obtained for the membrane can be compared to those obtained from the test pad. If all of the CSM test values are found to be equal to, or better than, those from the test pad, and if the test pad was found to meet permeability specifications, then the CSM may also reasonably be assumed to meet the specified permeability requirements. This assumption can be periodically verified by laboratory permeability testing of recompacted loose samples or shelby-tube samples taken from the CSM. This method of quality assessment is advantageous because it enables rapid evaluation of the permeability characteristics of the CSM to take place by eliminating the normal delays caused by in-situ permeability testing.

PROTECTIVE COVERS

All CSM's should be covered with a protective covering immediately after compaction is completed to maintain the integrity of the membrane. These protective layers function primarily to prevent loss of moisture from the membrane which can cause loss of density, shrinkage and desiccation cracking. A compacted soil layer is usually used for simple CSM's which will not be covered by a plastic liner or cover. Although the thickness of the soil layer will be determined by the site specific conditions of the project, it generally should not be less than 15 cm thick. Compacted soil layers also provide protection against mechanical damage from ongoing construction activities. Where composite membrane systems are being constructed, immediate installation of the plastic membrane over the CSM is recommended. If this is not possible lightweight plastic film can be substituted as a temporary covering.

Native clay CSM's must be kept from freezing after they are completed. The adverse affect of freezing on the hydraulic conductivity of native clay membranes is well documented in the literature (Chamberlain and Gow, 1979; Wong and Haug, 1991; Zimmie and La Plante, 1990). Thick, compacted layers of soil or waste can be used to cover native clay CSM's to keep them below the frost zone. Wong and Haug (1991) have shown that freezing does not adversely affect sand-bentonite membranes in the laboratory. This indicates that suitably constructed SBM's may offer a solution to the hydraulic conductivity-freezing problem of native clay membranes.

CONSTRUCTION WORK SCHEDULE

To ensure a consistently high level of quality in the finished CSM it is necessary that the construction work schedule be planned so that all membrane started can be completed, through installation of the protective covering, during one working day. Failure to adhere to this policy can result in compromised membrane integrity requiring expensive remediation efforts.

CONCLUSIONS

Construction of high quality, low permeability native clay membranes and soil-bentonite membranes need not be a difficult task. It does require, however, that all parties involved in construction of the membrane recognize the key nature of certain construction elements. These include the advance selection of the membrane raw materials and adherence to the proper methods for subgrade preparation, raw material blending, spreading of blended materials, compaction of blended materials, inter-lift scarification, protection of the completed membrane, and quality control testing. If proper procedures are followed for each of these elements a secure, low permeability soil/bentonite membrane will result.

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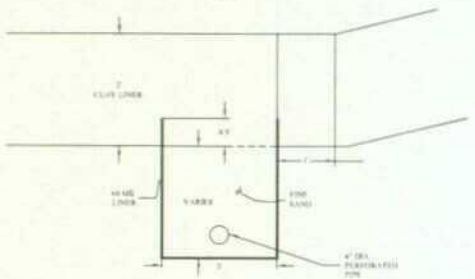
TYPICAL "A"–"A"
N.T.S



SEEPAGE MONITORING
SYSTEM DETAIL
N.T.S

NOTES:
1) CONTRACTOR SHALL VERIFY QUANTITY ESTIMATES.
2) ALL MATERIALS AND SUBSTITUTIONS OF MATERIALS MUST MEET OR EXCEED NAMED REQUIREMENTS AND REQUIRES APPROVAL OF PROJECT ENGINEER.
3) CONTRACTOR TO ADD BENTONITE TO EXISTING 2' THICK CLAY LINER & RECOMPACT TO 95% ASTM D-698 @ OPTIMUM TO +4 ABOVE OPTIMUM MOISTURE.
4) PERCENTAGE OF BENTONITE TO BE ADDED WILL BE DETERMINED BY FIELD TEST PLOTS PRIOR TO CONSTRUCTION.
5) SW 101 BENTONITE TO BE PROVIDED BY OWNER.
6) SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

CLAY LINED BRINE POND

PETTIGREW AND ASSOCIATES

LOCO HILLS CORP, LTD.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

May 4, 2005

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

The Honorable Diane Denish
Lt. Governor, State of New Mexico
State Capitol Suite 417
Santa Fe. New Mexico, 87501

Re: LOCO HILLS GSF

Dear Lt. Governor Denish:

I am in receipt of a copy of a letter addressed to you from Loco Hills Gas Storage Facility (LHGSF) dated April 27, 2005. In this letter, the owner of the facility, Mitch Johnson, requests your assistance with respect to his attempts to expand the Loco Hills Gas Storage Facility in Eddy County. If the facility is expanded it will store up to 11 million gallons of salt saturated brine in a surface pit for significant periods of time during the warmer months of the year.

The facility is located in Bear Grass Draw, which is one of the only sources of usable ground water in the Loco Hills area. The groundwater quality up gradient and down gradient from the site is very good and the OCD is mandated to protect this underground source of water. Using Loco Hills GSF's geologic parameters, OCD estimates the amount of fresh groundwater in Bear Grass Draw could exceed 2 billion gallons. The brine storage facility is a substantial threat to the groundwater because it only takes one gallon of concentrated brine to contaminate over 1000 gallons of fresh water and render it non-potable.

This facility was initially permitted by a previous owner under Water Quality Control Commission (WQCC) regulations, and Mr. Johnson's original application was also made under those regulations. During an analysis of his application, however, OCD discovered that the facility should be regulated pursuant to Oil and Gas Act.

Mr. Johnson's consultant agreed with that analysis. In fact, in a letter to the OCD dated October 9, 2003, Randall Hicks wrote, "We recommend that Loco Hills GSF terminate the WQCC Discharge Plan for the facility." Mr. Hicks further stated, "We believe that Oil and Gas Act and NMOCD Rules provide environmental regulation for the facility." In closing this letter, Mr. Hicks said, "The WQCC Regulations do not apply to this site" and "The Oil and Gas Act and NMOCD Rules apply to this site."

Mr. Hicks, who is still the consultant on the project, was correct. NMSA 74-6-12(G) states:

> "The Water Quality Act does not apply to any activity or condition subject to the authority of the oil conservation commission pursuant to provisions of the Oil and Gas Act [Chapter 70, Article 2 NMSA 1978], Section 70-2-12 NMSA 1978 and other laws conferring power on the oil conservation commission to prevent or abate water pollution."

The Oil and Gas Act, NMSA 70-2-12.B(13), provides that:

> "the [Oil Conservation] division is authorized to make rules, regulations and orders for the purposes and with respect to the subject matter stated in this subsection:
> (13) to regulate the methods and devices employed for storage in this state of oil or natural gas or any product of either, including subsurface storage;"

Based on these two provisions, it appears the storage of gas as proposed for Loco Hills is an "activity or condition subject to the authority of the oil conservation commission pursuant to provisions of the Oil and Gas Act." As such, it is expressly excluded from the operation of the Water Quality Act, and is properly and exclusively regulated under the Oil and Gas Act.

Mr. Johnson's concerns address NMOCD Rule 50 and the requirements that his brine pit be adequately lined. He states that "only ponds with synthetic pond liners could meet the design criteria" and that "the WQCC Regulations are performance criteria, not design criteria." The provision that is the subject of Mr. Johnson's complaint is NMAC 19.15.2.50(C)(2)(b)(ii). It states in pertinent part

> "...each storage pit (including any brine pit, salt water pit, fluid storage pit for an LPG system, or production pit) shall contain, at a minimum, a primary and a secondary liner appropriate to the conditions at the site. Liners shall be designed,

constructed, and maintained so as to prevent the contamination of fresh water, and protect public health and the environment."

As you can see there is no specific design criteria or requirement for a synthetic liner. Rather the rule focuses on the performance criterion of preventing contamination of fresh water. Other rules also specifically provide for an alternative liner design if it meets these performance standards. This OCD rule is certainly a performance criterion, which appears to be what Mr. Johnson is seeking in proposing to be regulated under the WQCC rules.

Mr. Johnson's original proposal "was an approvable plan" as he states in his letter. The original plan proposed two synthetic liners and a leak detection system. OCD staff believes such a plan would be approved, however, the proposal has changed drastically from the original application.

At one time the applicant favored a single clay liner system. Unfortunately, Mr. Johnson could not show that this plan would comply with the OCD's prohibition against the contamination of ground water. In fact, the Environment Department had entered an appearance in the case in opposition to the plan for the gas storage facility because of this threat.

The OCD has worked diligently on this project and has dedicated a significant number of staff hours to attempting to assist LHGSF with its application. OCD has evaluated each LHGSF proposal only to see many of LHGSF's primary engineering assumptions fail miserably under the scrutiny of testing. Additionally, LHGSF has authorized the construction of a clay liner that had not been approved by the OCD. The construction included a number of problems such as large rocks in the structure that would cause seepage and insufficient amounts of the clay in the material to prevent leakage. Finally, at the last meeting with OCD, the consultant for LHGSF expressed a preference for a plan that would incorporate a synthetic liner, leak detection and a clay liner. OCD Staff believed this plan would be approvable, but no final decision could be made until OCD received a written application for this proposal. No such plan was presented for consideration. Instead, LHGSF has taken the matter to you.

At present, the Loco Hills application hearing is set for May 12th. Counsel for LHGSF has requested an extension for one month and that extension will be granted. Because of that extension, there is still time for LHGSF to submit a proposal OCD staff can support. Alternatively, LHGSF may proceed with its current application, but OCD staff and the Environment Department will oppose that proposal. Any decision by the Oil

Conservation Commission will depend on the evidence LHGSF is able to present in support of its position.

The bottom line is that Loco Hills GSF is proposing to store salt saturated brine in one of the largest pits in the state. This brine is a significant threat to groundwater if it is not adequately contained. OCD staff does not believe that Mr. Johnson's current proposal will protect that groundwater.

OCD also believes that the Loco Hills GSF is properly regulated pursuant to the Oil and Gas Act, and that compliance with the OCD rules is necessary to protect a usable water source. OCD has been, and still is, willing to work with Mr. Johnson to achieve his objectives. However, OCD must comply with its mandate to protect the useable waters of New Mexico.

Sincerely,

Mark E. Fesmire, PE
Director, NMOCD

Loco Hills

Background.

Loco Hills GSF operates a liquid petroleum gas storage facility. The LPG is stored in man-made salt caverns. When LPG is needed, saturated brine is pumped into the caverns, displacing the LPG. When Loco Hills needs more room for LPG, they pump it in, displace the brine and store it in a pit at the surface.

Loco Hills acquired the facility from a prior owner, who constructed the caverns. When Loco Hills acquired the facility, groundwater at the site was contaminated with salts. The basic theory on the contamination is that the original operators generated and used a large amount of brine during construction, and stored it in an unlined pit. How the brine got from that pit to groundwater is disputed. Loco Hills' original theory (when they were proposing a double-lined pit) is that the brine in the unlined pit leached down to groundwater, and that the use of a liner would prevent that. Now that Loco Hills is proposing a clay-lined pit their theory is that the brine did not soak down directly to groundwater, but traveled horizontally along a caliche layer until it reached a water supply well that acted as a conduit to groundwater.

There are other possible sources of contamination. There are many wells in the area, and presumably there have been many unlined pit. Also, Loco Hills currently has a lined pit on the site that has a leak. But given the large amount of contamination at the site, it certainly appears that the main source was the brine in the unlined pit during the construction phase.

Loco Hills' various proposals

Wayne can fill you in on the chronology. Loco Hills originally obtained approval for a standard double-lined pit with leak detection. During construction, Loco Hills decided that conditions at the site were ideal for a single lined clay pit, constructed the pit that way, and asked for approval after the fact. They claimed a very low permeability factor. Tests showed, however, that the pit did not come close to meeting the promised permeability factor.

Loco Hills' current proposal is to "fix" their design for a clay-lined pit. They claim that they can reach their promised permeability factor by adding bentonite to the clay. Here's my understanding of their current proposal, based on our conversations with them and the proposal itself: the clay-lined pit will leak a very small amount of brine, but that brine will never reach groundwater because of the geologic conditions at the site. If a small amount does reach groundwater, that will not be a problem, because they will pump more brine out of the ground for use at the facility (and possibly for brine sales) than they will ever put in through the leaking pit, so there is a net environmental gain. In fact, by pumping brine from the ground and "natural attenuation," the existing contamination will be completely remediated.

Of course, with Hicks, the proposal keeps changing. We have been concerned that Loco Hills will argue that it is not responsible for existing contamination, or will argue that it is permissible for it to contaminate groundwater so long as the contamination does not extend past their property lines. ED is concerned about this also, and will have Bill Olson there to testify.

OCD concerns

Pit Exception Request:
We believe the pit will leak, and that the brine will reach groundwater.

1. They claim they can meet or exceed the permeability standard in the guidelines, and they seem to assume that is all they need to show. But the standard is that they need to show that their alternative protects fresh water, human health and the environment as well as a liner constructed under the guidelines. The rule, and the guidelines, require a double-liner with leak detection. The permeability factor for the liner is just one part of the requirement.
2. We aren't even convinced they can meet that permeability factor.
    a. Their last plan for an unlined pit was a disaster, and they haven't corrected the problems they had with that pit. Wayne has some amazing soil samples from the original clay lined pit that show that the clay had a great many impurities that would affect its use as a liner. The proposal does not deal with that, although at the meeting they told us that they planned to remove the clay liner, roto-till it to break up the chunks and impurities, and then mix in the bentonite and compact it.
    b. That brings us to our next issue: their proposal is short on information about how the pit will be constructed, and how adding the bentonite will help. They don't have test results to show us. They only have a product information sheet from the bentonite company. At our meeting last week they told us that they were going to do on-site testing by creating bermed cells and adding different amounts of bentonite. Mark nixed the idea of putting saturated brine into unpermitted clay lined pits to test their theories. They may bring this up at the hearing. But check with the enviro guys – I think they will say that laboratory tests would have been just as useful. And it doesn't appear that they have done anything like that.
3. We aren't convinced that the brine will not reach groundwater.
    a. They rely on information on the geology at the WIPP site 35 miles away. Jack can help with information that the geology at the pit location itself is heterogeneous, and that contaminants may very well go down to the groundwater under the site.
    b. Glenn also has info about the hydrology at the site that suggests that the contamination will reach groundwater, and can discuss their "contained aquifer" theory.

Abatement plan:

1. They want to postpone doing any meaningful stage 1 abatement plan for about 2 years. We feel there is no reason to delay, and that we need the information the stage one plan would provide to evaluate their abatement plan. Be careful, Carol indicated to them that the stage 1 plan could be an on-going thing, and didn't need to be completed before the stage 2 plan, and they will complain about our request for a stage 1 plan up front. But

we can't see any reason for them to delay, except that they don't want to spend the money.

2. They really haven't provided an abatement plan. In a nutshell, their abatement plan is to pump and use the salt contaminated water. Sounds OK, but they haven't told us how much water will be removed. They will use some water in the 9 million gallon pit, but we don't know how much of that will be "new" water, and how much of that is water that is currently in the caverns or in the existing pit. We don't know how much water will need to be pumped to compensate for evaporation. They say they hope to sell brine, but they don't make any promises. So, we have no guarantee on how much water will be removed, or a timeline for the removal. The only supplement to this plan is "natural attenuation," i.e., that they will contaminate enough fresh water coming in to dilute the salts to an acceptable level.

3. So long as they are still introducing contaminants through the leaking pit, they will never meet standards. We told them that, and explained the "alternative abatement standard" concept. You'll see that in some correspondence. When they filed their proposal, they specifically limited their "provisional" alternative abatement standards to their request for an exception to the pit rule, and not to their abatement proposal. I suspect that is because Hicks thought he could get away with not cleaning up existing contamination off site. But now he is probably in trouble if he needs alternative abatement standards to get his abatement plan through – I think he will need to re-do the public notice. And that will take time.

LOCO HILLS GSF
158 Deer Creek Drive ▲ Aledo, Texas 76008 ▲ 817 441 6568▲ Fax: 817-441-5880

April 27, 2005

Lt. Governor Diane Denish
State Capitol, Suite 417
Santa Fe, New Mexico, 87501

RE: Loco Hills GSF

Dear Lt. Governor Denish:

We wish to bring your office up to date with respect to our attempts to expand the Loco Hills Gas Storage Facility and ask for additional assistance from your office. Without your assistance, we are convinced that expansion of our facility will not occur in time to store lower-cost summer propane in 2005. We ask that you request that chief counsel for NMOCD and our attorney meet to identify a path forward for regulating our brine storage pond under the WQCC Regulations rather than Rule 50. The original construction of our brine storage pond was constructed while under the WQCC Regulations.

Although approval of our expansion proposal is not guaranteed under the WQCC Regulations, we see NMOCD's decision to regulate the facility under the new NMOCD Rule 50 rather than the time-tested Water Quality Control Commission Regulations (which regulated the site for more than 20 years) as an obstacle for New Mexico rather than a service. Our attorney, consultant and engineer agree that we cannot overcome NMOCD opposition to our requested exemption from Rule 50. Compliance with Rule 50 (without the exemption) is no longer economical for this facility in the near future due to the high oil prices, which drive the cost of synthetic pond liners. Under Rule 50, only ponds with synthetic pond liners could meet the design criteria. However, the environmental mandates set forth in the WQCC Regulations are performance criteria, not design criteria and compliance with the WQCC Regulations *might* be economical, thereby permitting us to proceed with facility expansion later this summer.

We are confident that we can design our proposed expansion to:

1. Comply with the New Mexico Environmental Regulations that have regulated our site and similar sites for more than 20 years.
2. Protect fresh water, public health and the environment.
3. Help us create the cash-flow required to clean-up the ground water impairment caused by others in the most expeditious manner.
4. Provide for additional jobs in Eddy County.
5. Provide lower cost propane and other fuels for New Mexicans

The analysis of our attorney and consultant allow us to conclude that NMOCD can administer a permit for the site under the WQCC Regulations or Rule 50. We believe that NMED chief counsel, NMOCD chief counsel and our attorney can identify a pathway to permit a return to regulation of this facility under the WQCC Regulations. Then our consultant and engineer will work with NMOCD technical staff to obtain a permit for the proposed brine storage pond that protects ground water and the environment. Over a year ago, when we were working with NMOCD under the WQCC Regulations, staff at NMOCD indicated that our original proposal "was an approvable plan". Perhaps, with your assistance, we can return to that level of cooperation and understanding. We thank you in advance for your attention to this matter.

Sincerely,
Loco Hills GSF

Mitch Johnson
President

Copy
Patrick Lyons, State Land Office
Mark Fesmire, NMOCD
Randall Hicks, Hicks Consultants
William Carr, Holland and Hart
Jeremy Baker, Pettigrew and Associates

Price, Wayne

From: Price, Wayne
Sent: Thursday, April 14, 2005 1:15 PM
To: 'kfresquez@ose.state.nm.us'
Subject: RE: Loco Hills GSF LPG Gas Storage system

Dear Ken,

They requested a continuance until May 12. They have been proposing to install a 11 million gallon pond to be constructed out of the on-site clay material. This pond will have a designed seepage of unknown quantity. OCD has a new pit rule and guidelines that require all pit/ponds to be double-lined with leak detection. Loco Hills GSF built the pond without OCD approval. They hired consultants to verify the material and construction of the pond will meet all OCD spec's and the designed seepage will not impact groundwater. OCD witnessed post testing of the pond as-built and it failed miserably. We estimated it was leaking up to 40,000 gals/day. Since that time Loco Hills requested to re-design the pond still using the same material on-site with some bentonite. OCD has not approved that design. As part of their plan they submitted an abatement plan for cleaning up the contaminated groundwater under the site and recover any seepage water from the pond. This would require pumping large quantities of contaminated water (unknown amount at this time) from below the site. This site is located next to Bear Grass Draw which we know has protectable water upstream and downstream.

If Loco Hills does not have water rights then we simply have to ask the question how can they pump water. Their plan calls for reallocation of resources to pump the contaminated groundwater and any pond seepage. Instead of spending $250,000 (their Cost est.) for a proper double lined system they want to use natural soil material found on-site and add bentonite with designed seepage (unknown at this time). They indicated the pumping will mitigate the problem over time. They have not agreed to restoring any contamination down Bear Grass Draw.

The next hearing date is May 12.

Thanks for your input.

-----Original Message-----
From: kfresquez@ose.state.nm.us [mailto:kfresquez@ose.state.nm.us]
Sent: Thursday, April 14, 2005 11:49 AM
To: WPRICE@state.nm.us
Subject: Loco Hills GSF LPG Gas Storage system

Wayne,
How did your hearing go on the proposed plan we discussed regarding the contamination problem. I'm having difficulty understanding exactly what they are wanting to do. Would you please let me know how things turn out at the hearing.
Thanks, Ken

Kenneth M. Fresquez
Staff Manager
Office of the State Engineer
1900 West Second Street
Roswell, New Mexico 88201
Phone: (505)622-6521 ext. 130
Fax:(505)623-8559
e-mail:kfresquez@ose.state.nm.us
Web Page: http://www.seo.state.nm.us

intended recipient(s) and may contain confidential and privileged information. Any unauthorized review,use,disclosure or distribution is prohibited unless specifically provided under the New Mexico Inspection of Public Records Act. If you are not the intended recipient, please contact the sender and destroy all copies of this message. --
This email has been scanned by the MessageLabs Email Security System.

HOLLAND&HART LLP

William F. Carr
wcarr@hollandhart.com

2005 APR 8 PM 3 11

April 8, 2005

BY HAND DELIVERY

Mark E. Fesmire, P. E.
Chairman
Oil Conservation Commission
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Re: Oil Conservation Division Case No. 13402: Consolidated Application of Loco Hills GSF for an Exemption to the Liner and Leak Detection Requirements of 19.15.2.50.C NMAC and Approval of Stage 1 and 2 Abatement Plans, with Provisional Abatement Standards, Eddy County, New Mexico.

Dear Mr. Chairman:

Loco Hills GSF hereby requests that the hearing currently scheduled in the above-referenced case for April 14, 2005 be continued to the May 12, 2005 Commission hearing docket. Following our March 31st meeting with the Division's staff, and in particular comments of Mr. Ford at that meeting, we are re-evaluating our proposal and therefore need to request a continuance of the currently scheduled hearing.

Very truly yours,

William F. Carr

cc: David K. Brooks Esq.
Mitchel Johnson
Randy Hicks

Price, Wayne

From: kfresquez@ose.state.nm.us
Sent: Friday, April 08, 2005 2:53 PM
To: Price, Wayne
Cc: chipple@ose.state.nm.us; art@ose.state.nm.us
Subject: RE: Loco Hills GSF LPG Gas Storage system NW SW Sec 22-Ts 17s-R29e Bear Grass Draw

Mr. Price:
Thank you for notifying this office regarding the contamination problem at Bear Grass Draw.
State Engineer office records do not indicate any type of water right listed under the names you have described. The only thing listed in Section 22,T17S,R29E, is a livestock well (RA-8233) under the name of Bogle Farms. The area you described is part of the Roswell Basin extension that was declared on February 8, 1993. It's possible they may have established a water right before the basin extension but as I stated they have nothing on file and therefore would need to file a declaration. If they are intending to withdraw groundwater to remove or control contamination they need to file an application to do so. They can do this under Section 1-17 of the Office of the State Engineer Rules and Regulations (Application for Pollution Plume Control Wells and Pollution Recovery Wells). As of today I do not believe that they have notified this office. You can find the current rules and regulations on our web site (www.seo.state.nm.us) for reference purposes.

Sincerely,

Kenneth Fresquez
Staff Manager
Office of the State Engineer
1900 W. 2nd st.
Roswell, New Mexico 88201
Phone: (505)622-6521 ext.130
Fax:(505)623-8559
E-Mail: kfresquez@ose.state.nm.us

-----Original Message-----
From: WPrice
Sent: Friday, April 08, 2005 11:28 AM
To: Andy Morley; chipple; kfresquez
Subject: Loco Hills GSF LPG Gas Storage system NW SW Sec 22-Ts 17s-R29e Bear Grass Draw

Dear Gentlemen:

OCD recently made an inquiry concerning whether this company has water rights in this area. There is a hearing scheduled for next Thursday to determine if this company will be allowed to construct a pond with designed
seepage of salt water. Their plan is they propose to pump groundwater to
off-set any contaminated water they may put into the groundwater and pump
extra water over time to clean-up the groundwater. OCD still has the same
question, does this company have water rights in this area and if so how much? This is a precedence setting case and any help will be greatly appreciated?

History of site: 1950's Sacra Brothers, after that Arrow Gas,

National
Propane, Amer-gas Eagle Propane, and now Loco Hills GSF.

If you could respond before next Thursday we would really appreciate it.
Thanks for your Help!

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Friday, April 08, 2005 11:28 AM
To: 'amorley@ose.state.nm.us'; 'chipple@ose.state.nm.us'; 'kfresquez@ose.state.nm.us'
Subject: Loco Hills GSF LPG Gas Storage system NW SW Sec 22-Ts 17s-R29e Bear Grass Draw

Dear Gentlemen:

OCD recently made an inquiry concerning whether this company has water rights in this area. There is a hearing scheduled for next Thursday to determine if this company will be allowed to construct a pond with designed seepage of salt water. Their plan is they propose to pump groundwater to off-set any contaminated water they may put into the groundwater and pump extra water over time to clean-up the groundwater. OCD still has the same question, does this company have water rights in this area and if so how much? This is a precedence setting case and any help will be greatly appreciated?

History of site: 1950's Sacra Brothers, after that Arrow Gas, National Propane, Amer-gas Eagle Propane, and now Loco Hills GSF.

If you could respond before next Thursday we would really appreciate it. Thanks for your Help!

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: MacQuesten, Gail
Sent: Monday, April 04, 2005 11:39 AM
To: William Carr (E-mail)
Cc: Price, Wayne
Subject: FW: Discharge of concentrated brine water into un-permitted pond

Bill- Wayne just sent this to your Loco Hills clients. Gail

-----Original Message-----
From: Price, Wayne
Sent: Monday, April 04, 2005 11:33 AM
To: Mitch Johnson (E-mail); Randall Hicks (E-mail)
Cc: MacQuesten, Gail; Anderson, Roger; VonGonten, Glenn; Gum, Tim
Subject: Discharge of concentrated brine water into un-permitted pond

Dear Mr. Johnson:

Your request to discharge concentrated brine water into the un-permitted pond is hereby denied. Since the implementation of the New Pit Rule 50, the Division has not allowed such discharges without first being approved through the OCD hearing process. OCD recommends that you include this request in the hearing scheduled for this Case # 13402, on April 14, 2005.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

To: Mitch Johnson (E-mail); Randall Hicks (E-mail)
Cc: MacQuesten, Gail; Anderson, Roger; VonGonten, Glenn
Subject: *Discharge of concentrated brine water into un-permitted pond*

Dear Mr. Johnson:

Your request to discharge concentrated brine water into the un-permitted pond is hereby denied. Since the implementation of the New Pit Rule 50, the Division has not allowed such discharges without first being approved through the OCD hearing process. OCD recommends you include this request in the hearing scheduled for this Case # 13402 April 14, 2005.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

Memorandum of Meeting or Conversation

Telephone __X___
Personal _____
E-Mail _____

Time: morning
Date: April 01, 2005

Originating Party: MacQuesten, Price, vonGonten

Other Parties: RC Anderson

Subject: LHGSF- Infiltration test

Discussion:

Informed Roger Anderson-OCD Environmenmtal Bureau Chief of LHGSF request to construct infiltration test plots to include discharging of brine water.

Conclusions or Agreements:

Anderson informed staff that OCD-Division had already made a decision that all discharges to unlined un-permitted ponds must go to hearing for approval.

Signed:____ _____

CC: Mark Fesmire

PRICE/MACQUESTEN MET WITH DIRECTOR-FESMIRE TO CONFIRM OCD-POSITION ON RULE 50 ISSUES! 4/9/05 JP

Price, Wayne

From: Mitchel Johnson [mitchel_lhgsf@hotmail.com]
Sent: Sunday, April 03, 2005 9:08 PM
To: wprice@state.nm.us
Cc: r@rthicksconsult.com; GMacQuesten@state.nm.us; rcanderson@state.nm.us; JWFORD@state.nm.us; Glenn.VonGonten@state.nm.us; dhicks@pettigrew.us; jbaker@pettigrew.us
Subject: FW: Fwd: Loci Hills GSF LPG facility test plot infiltration test

Untitled Attachment

Wayne,

As discussed in our meeting Thursday, construction of the test plots is to begin on Monday. I am not sure how long it will take to build them. I've asked Pettigrew, our engineering firm, to answer most of your questions. I've, also, instructed them to put "on behalf of Loco Hills GSF" on all correspondence per your instructions from Thursdays meeting. If I may be of any further help, please call my cell phone 817-371-7933 because I will be traveling or on site (505-677-2331) to witness the construction. Please let me know of the NMOCD decision on the brine in the test plots.

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

----Original Message Follows----
From: Mitchel Johnson <mitchel_sacenergy@yahoo.com>
To: mitchel_lhgsf@hotmail.com
Subject: Fwd: Loci Hills GSF LPG facility test plot infiltration test
Date: Sun, 3 Apr 2005 19:55:24 -0700 (PDT)

Note: forwarded message attached.

Yahoo! Messenger
Show us what our next emoticon should look like. Join the fun.

PRELIMINARY DOCKET: COMMISSION MEETING – THURSDAY – APRIL 14, 2005
9:00 A.M. – Porter Hall
1220 South St. Francis Drive
Santa Fe, New Mexico

Land Commissioner, Patrick H. Lyons, may designate Jami Bailey as his representative for this hearing, or may participate himself.

Notice: The minutes of the March 8, 2005, Commission meeting will be adopted.

Notice: During this meeting, the Commission may conduct a closed executive session during which it will deliberate in connection with an administrative adjudicatory proceeding pending before the Commission or consult with Commission counsel under the attorney-client privilege concerning threatened or pending litigation in which the Commission is or may become a participant.

Order Instituting Rulemaking: The Commission will consider entry of an Order Instituting Rulemaking to propose amendments to Rules 1201, 1203 through 1209, 1211, 1212 and 1220, in accordance with the recommendations of the committee heretofore appointed to review the procedural rules of the Commission and Division.

Final Action May be Taken in the Following:

CASE 13351: De Novo
Application of Edge Petroleum Exploration Company to Restrict the Effect of the Special Rules and Regulations for the Dos Hermanos-Morrow Gas Pool, Eddy County, New Mexico.

CASE 13357: De Novo
Application of Matrix New Mexico Holdings, LLC, for Compulsory Pooling, Lea County, New Mexico.

CASE 13453: Order of the New Mexico Oil Conservation Commission Instituting Rulemaking, Proposing Amendments to OCD Rules 104 (Well Spacing and Location) and 701 (Injection of Fluids into Reservoirs). The Oil Conservation Commission on its own motion proposes to amend Rule 104 [10.15.3.104 NMAC] and Rule 701 [19.15.9.701 NMAC] to authorize the operation of infill wells within a spacing or proration unit by an operator other than the operator of an existing well in the same unit, subject to certain provisions and exceptions. Copies of the text of the proposed amendments are available from Division Administrator Florene Davidson at (505)-476-3458 or from the Division's web site at http://www.emnrd.state.nm.us/ocd/whatsnew.htm. Written comments on the proposed amendments must be received no later than 5:00 P.M. on Thursday, April 7, 2004. Written comments may be hand-delivered or mailed to the Division office at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, or may be faxed to Ms. Davidson at 476-3462. The application of the proposed rule amendments is STATEWIDE.

CASE 13348: De Novo - Continued from March 8, 2005, Commission Meeting.
Application of Marbob Energy Corporation for Compulsory Pooling, Eddy County, New Mexico. Applicant seeks an order pooling all mineral interests from the surface to the base of the Morrow formation in the following described spacing and proration units located in the S/2 of Section 12, Township 17 South, Range 31 East: the S/2 for all formations and/or pools developed on 320-acre spacing which includes but is not limited to the Undesignated Fren-Morrow Gas Pool; the SW/4 for all formations and/or pools developed on 160-acre spacing; and the NE/4 SW/4 for all formations and/or pools developed on 40-acre spacing which includes but is not necessarily limited to the Undesignated Grayburg-Jackson (Seven Rivers-Queen-Grayburg-San Andres) Pool and the Undesignated East Fren-Paddock Pool. Said units are to be dedicated to its Knockabout Federal Well No. 1 to be drilled at a standard gas well location 1830 feet from the South line and 1980 feet from the West line (Unit K) of said Section 12. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of Hudson Oil Company of Texas as operator of the well and a charge for risk involved in

drilling said well. Said area is located approximately 3 miles East of Maljamar, New Mexico. Upon application of Mary T. Ard, Trustee of the Edward R. Hudson Trust 4, Ard Energy Group, Ltd. and Ard Oil, Ltd., this case will be heard De Novo pursuant to the provisions of Rule 1220.

CASE 13402: ***Continued from March 8, 2005, Commission Meeting.***
Consolidated Application of Loco Hills GSF for an Exemption to the Liner and Leak Detection Requirements of 19.15.2.50.C NMAC and Approval of Stage 1 and 2 Abatement Plans, with Provisional Alternate Abatement Standards, Eddy County, New Mexico. Applicant seeks an order granting an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC to allow a clay-lined storage pond for saturated brine, with monitoring devices to detect designed leakage, at the Loco Hills LPG storage facility located in Section 22, Township 17 South, Range 29 East. Applicant also seeks approval of its proposed Stage 1 and 2 abatement plans to restore groundwater quality at the site to background concentrations or to an alternate abatement standard of 5000/mg/l TDS through a pump and use strategy. The site is located on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, just west of where Bear Grass Draw crosses the highway.

CASE 13359: ***De Novo***
Application of Mewbourne Oil Company for Compulsory Pooling, Lea County, New Mexico. Applicant seeks an order pooling all mineral interests from the surface to the base of the Morrow formation underlying the following described acreage in Section 9, Township 21 South, Range 35 East, and in the following manner: The N/2 to form a standard 320-acre gas spacing and proration unit for any and all formations developed on 320-acre spacing within that vertical extent, including the Undesignated South Osudo-Morrow Gas Pool; the NE/4 to form a standard 160-acre gas spacing and proration unit for any and all formations developed on 160-acre spacing within that vertical extent, including the Undesignated South Osudo-Wolfcamp Gas Pool; and the SE/4 NE/4 to form a standard 40-acre oil spacing and proration unit for any and all formations developed on 40-acre spacing within that vertical extent, including the Undesignated Osudo-Wolfcamp Pool and Undesignated Osudo-Strawn Pool. The units are to be dedicated to the proposed Osudo "9" State Com. Well No. 1, to be drilled at an orthodox location in the SE/4 NE/4 (Unit H) of Section 9. Also to be considered will be the cost of drilling and completing the well and the allocation of the cost thereof, as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a 200% charge for the risk involved in drilling said well. Upon application of Finley Resources, Inc. and Chesapeake Operating Inc., this case will be heard De Novo pursuant to the provisions of Rule 1220.

Price, Wayne

To: Mitch Johnson (E-mail); Randall Hicks (E-mail)
Cc: MacQuesten, Gail; Anderson, Roger; Ford, Jack; VonGonten, Glenn
Subject: Loci Hills GSF LPG facility test plot infiltration test

April 01, 2005

Dear Mr. Johnson and Hicks:

Pursuant to our meeting yesterday, please find attached a copy of the minutes of the meeting. OCD understands you want to proceed with an infiltration test which includes discharging concentrated brine water into the new pond.

We are in the process of seeking administrative approval and OCD needs the following information to assist us in our decision.

1. Provide a plot plan or sketch showing the location and size of the test plots.
2. Provide a brief written description on how the test plots will be constructed.
3. Provide the method of infiltration test procedure, i.e. ASTM number etc.
4. Provide the source, chemical composition and amount of brine water to be discharged.
5. Provide a commitment to post test the soils of the test plots using a certified Soils Laboratory.
6. Provide OCD a schedule for construction and testing so OCD may have the opportunity to witness.
7. Provide OCD a closure plan for these test plots.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us


meeting_033105.DOC

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark Fesmire
Director
Oil Conservation Division

Memorandum of Meeting or Conversation

Telephone _____
Personal *XX OCD conference room*
E-Mail _____

Time: 1:30 pm
Date: 03/31/2005

Originating Party: **Loco Hills GSF- Michael Johnson ,Randy Hicks**

Other Parties: **OCD –WPrice, Glenn von Gonten, Gail MacQuesten, Jack Ford**

Subject: **March 08, 2005 Letter OCD to Mr. Carr(LHGSF)**

Discussion:

Since LHGSF did not bring legal counsel, Mr. Hicks wanted to take the opportunity to ask some technical questions and inform OCD of a pond infiltration test to be conducted next week at the site.

LHGSF requested clarification on the March 08, 2005 letter page 2, item 2a. and item 2d. on (page 3). Item 2.c was discussed with OCD counsel who informed LHGSF that this would probably be an issue for LHGSF to demonstrate in the hearing scheduled for April 14, 2005.

LHGSF informed OCD it intends to perform a test plot(s) pond infiltration test in the new pond. This test would include construction of test pads with berms and the discharge of concentrated brine water into them.

LHGSF and OCD discussed different methods of pond design utilizing secondary containment with leak detection.

Mitchael Johnson expressed his concern about spending time and money on delineating the historic groundwater contamination in Bear Grass Draw and reiterated that LHGSF has voluntarily conducted remediation.

OCD requested copies of the last soils post testing.

Conclusions or Agreements:

OCD will respond in writing concerning the two technical questions raised by LHGSF.

LHGSF must obtain prior approval before conducting the infiltration test(s). OCD will seek Environmental Bureau Chief's input for proper approval process.

Signed:_____ _____

Environmental Facility Inspection

Facility Name: LOCO HILLS GAS STORAGE | Time Out: 8:00 | Time In: 13:00 | Hrs:

Inspector: Wayne Price | Dt Mod: 3/28/2005 | Purpose: Normal Routine Activity

Inspection Date: 03/23/2005 | Inspect No: eLWP0508757717 | Type: Field Inspection

Violations / Documentation

Addtional Violation Notes

List Violations or Indicate Compliance

Specific Violation
No Violations Identified - All O.K.

Documentation Acquired: ☑ Samples ☐ Statements ☐ Sketch ☐ Video ☑ Photos

Compliance Items (Checked Items Denote Non-Compliance)

Write Compliance Based on this Inspection

☐ Drums ☐ Process ☐ AG Tanks ☐ AG Saddle Tk ☐ Labeling ☐ Tanks/Sumps ☐ Permits

☐ UG Lines ☐ WD Practice ☐ Class V ☐ Housekeepin ☐ Spill Rpt ☐ Potential ENV ☐ Wtr Wells

Describe Remedial Action Required: Measured water levels and collected water samples

Use [SHIFT] + [F2] to Expand any Notes or Comment Field

Environmental Facility Inspection

NOTES

Measure water levels in all supply and monitoring wells. Collected water samples from P2-1 deep well, BGD MW-1&P-1, SW1 and SW2

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

TraceAnalysis, Inc.

4725 Ripley Dr., Ste A
El Paso, Texas 79922-1028
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID #

Company Name: Phone #:

Address: (Street, City, Zip) Fax #:

Contact Person:

Invoice to:
(If different from above)

Project #: Project Name:

Project Location: Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL	HNO3	$NaHSO_4$	H_2SO_4	NaOH	ICE	NONE		SAMPLING: DATE	TIME

MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC-MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH					Turn Around Time if different from standard	Hold

Relinquished by: Date: Time: Received by: Date: Time:

Relinquished by: Date: Time: Received by: Date: Time:

Relinquished by: Date: Time: Received at Laboratory by: Date: Time:

LAB USE ONLY

Intact Y / N

Headspace Y / N

Temp °

Log-in Review

REMARKS:

Carrier #

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

CHART COPY

3/23/2005

P2-2 TAGGED @ 83.5'
P2-3 TAGGED @ 63.5'

↳ 09:10 PARK & LU

09:22 → P1-3 42'11" DRY
P1-2 85-7½ (84'10)
P1-2 = 84'4½"
P1-1 = 85 - 8¾
P1-1 84'-3¼ (84'10'

SW-2
09:45 80 - 1'4½"
78'7½"

MW-1 (2")
09:49 81 - 7"½
80'4½" (vs 80'7½")

SW-1
10:05 ~~78~~ 75' - 1'7½"
75' 4½" vs 76'8½"

VIS 10 03038 NO VISIBLE OILTRAP

BGD-MW1 @ 10:34
75-4
MW1 (2" INCH) ~~76-4~~
~~75-8"~~
74'-8"

BGD P1 74'-8"

- SAMPLE - NO PURGE
- WAYNE 32.817688 N / 104.06495 W
- MILCE 32.817676 N / 104.06498 W

12:25 - SW2
4 VOCs (PRES) HCL, 1 METAL (PRESERVED), 1 GEN CHEM.

12:35 SW1 - DO NOT
1 GEN CHEM SAMPLE MW2

Price, Wayne

To: mitchel Johnson-son (E-mail); Mitch Johnson (E-mail)
Cc: Anderson, Roger; MacQuesten, Gail; Leach, Carol
Subject: Loco Hills GSF Inspection Trip

Dear Mitchel:

Pursuant to our telephone conversation OCD requested permission to inspect your facility starting at approximately 8 am next Wednesday Morning March 23, 2005. It is OCD's understanding you have granted such permission and will have Mr. Smith or maybe yourself available to witness and assist during the inspection.

Our agenda is as follows:

1. Collect water samples from the Water Supply Well #2, brine pond, Bear Grass Draw MW and P2 (which is now wet according to JB Smith). Collect soil samples if time allows.

2. Shoot water levels in all of the monitoring wells and supply wells if possible.

3. Perform a walk-through of the entire facility noting any problems and take photo's.

4. Discuss LPG well operations and anticipated walkovers, sonar log, other logs, etc.

5. Introduce the facility and area to our new staff hydro geologist. Collect data to help OCD in the evaluation of the submitted abatement plan.

To answer your question and concern of timing of the inspection, OCD has not conducted a formal inspection of the facility since January 24, 2000. This is a routine inspection and OCD has schedule other inspections in the area.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Billy_Lacewell@nm.blm.gov
Sent: Tuesday, March 22, 2005 1:59 PM
To: WPrice@state.nm.us
Subject: Fw: Loco Hills GSF

Wayne, I finally got someone's attention, see informal e-mail below. I sent McGee (zoned hydrologist for both Carlsbad and Roswell) a hard copy of proposal, including disk, yesterday so he should have it first thing next week. Too bad I was out of town all last week and not able to be more timely with his question while it was fresh on his mind. From his initial response in below e-mail, it appears the two of you may need to talk. I gave him your name and number in addition to offering to call you myself.

Thanks again for arranging the conversation with Ed. Will be in touch.

Link
----- Forwarded by Billy Lacewell/CFO/NM/BLM/DOI on 03/17/2005 09:53 AM -----

Billy Lacewell/CFO/NM/BLM/DOI
03/14/2005 10:29 AM

To: Michael McGee/RFO/NM/BLM/DOI
cc: Peg Sorensen/CFO/NM/BLM/DOI@BLM
Subject: Re: Fw: Loco Hills GSF(Document link: Billy Lacewell)

Hi Mike, last I knew of the proposal package was Peg had it and was considering BLM's response. Her number is 5983. Our archy lead looked at maps and seems to have concluded it is not on federal surface. I have not heard what realty shop said about deed restriction or exchange proposal. And, OCD very well may have documented groundwater contamination, I can ask if you wish. Thanks,

Link

Michael McGee/RFO/NM/BLM/DOI
03/07/2005 11:46 AM

To: Billy Lacewell/CFO/NM/BLM/DOI@BLM
cc:
Subject: Re: Fw: Loco Hills GSF(Document link: Billy Lacewell)

Link,

I would like to review the maps and the proposal. When and where can I take a look at them. Do you also need depth to groundwater and direction of groundwater flow? I could also weigh in on the possible negative affects to the playa and BLM resources.

The comment of: "deed restriction" on the BLM property to restrict anyone from drilling a water well in the draw. This way they claim the contamination will not impact public health. My question to you is can they
do that on your land???" The answer to that would be no. For one thing, no one knows for sure if the groundwater they are drilling into has been contaminated yet. The well would first have to be drilled and then the water would be tested for contaminants. The groundwater contamination they speak of would have to mapped with a groundwater model in order to determine if a proposed groundwater well would enter into contaminated groundwater and impact public health. The rule of thumb is to drill the water well and then have the water tested and then don't use the water well if the water is contaminated. It is my opinion that they cannot put a deed restriction on public lands.

Michael

Michael J. McGee
Hydrologist
Roswell Field Office BLM
2909 W. Second Street
Roswell, NM 88201

Ph:505-627-0340
Email:mmcgee@blm.gov

Price, Wayne

From: Price, Wayne
Sent: Wednesday, March 09, 2005 1:57 PM
To: Anderson, Roger
Cc: Leach, Carol; MacQuesten, Gail; Fesmire, Mark; Sanchez, Daniel
Subject: Loco Hills GSF well testing

Loco Hills has submitted a C-103 for repair, sonar log, and testing for the LPG Well #2. OCD district office has approved and the Santa Fe Environmental Bureau has amended the approval. The previous approved discharge plan required them to test each well (MIT) annually and a requirement for them to run a sonar log on all wells before renewal of the discharge plan which expired February 27, 2005. We have not received any notification about well #3.
Well #1 in my opinion is ok to skip the MIT because we have an MIT within the past year and they have submitted the sonar Log. There is an operating pressure issue, but I need to do some research on that issue.

On July 22, 2004 OCD notified LHGSF that they would be permitted under the Oil and Gas Act Rules and Regulations, not under the WQCC regulations. We also notified them OCD's intent is to amend the original order by rolling over the existing permit conditions into the new amended order. OCD has not completed that task as of to date. Our plan is to amend the order Administratively which would probably be under Mark's signature. I will be working on that letter today and tomorrow.

In the mean time I recommend we send Mitchel Johnson an E-mail telling him that if they want to continue operating well #3 they must test this well and run the sonar log before their summer LPG buying season starts.

Please advise me if this procedure is ok.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

ice, Wayne

From: Price, Wayne
Sent: Tuesday, March 08, 2005 2:49 PM
To: Price, Wayne; 'Billy_Lacewell@nm.blm.gov'
Subject: RE: Loco Hills GSF

Dear Link,

Have you gotten any feedback on the issue of deed restricting the BLM property. Also I might have mis-spoke in the earlier E-mail when I said OCD was opposing the application. We have never opposed the application as long as the Operator could assure OCD that Public Health, Fresh water, both surface and groundwater would be protected in the foreseeable future. As of today we feel the Operator has not made a proper demonstration to that effect. It's my understanding we will continue to have technical meetings with this operator. If it cannot be resolved then it will probably go to Hearing on April 14, 2005. If BLM has an issue, please let us know if someone with BLM wants to testify or submit comments.

-----Original Message-----
From: Price, Wayne
Sent: Wednesday, March 02, 2005 4:19 PM
To: 'Billy_Lacewell@nm.blm.gov'; Price, Wayne
Subject: RE: Loco Hills GSF

Hi Link how are you doing. Bear Grass Draw appears to be mostly BLM land except right at the site. We know there is groundwater contamination in the draw. What we don't know at this time is how far down Bear Grass Draw the contamination goes. The operator has submitted a plan to OCD for a 9 million gallon single-lined clay pond. The post testing on this pond showed it to have failed. They still want to install the pond with some modifications. The pond is designed to leak concentrated brine water. They are claiming it will never reach groundwater, but test results in the draw show groundwater already to be contaminated.

The operator's consultant Randy Hicks has indicated to us they are planning on placing some type of "deed restriction" on the BLM property to restrict anyone from drilling a water well in the draw. This way they claim the contamination will not impact public health. My question to you is can they do that on your land??? The other issue is it may be possible that this water outcrops in a playa lake at the end of the draw, this has not been proven. There also may be a surface issue if the seepage water doesn't drain vertically but horizontally then eventually it may be possible for it to drain in the draw. If this happens then it would definitely impact this watercourse. OCD has been opposing the application and we were suppose to go to a hearing on this matter next Tuesday, but it look like it may be delayed until April 14. BLM is more than welcome to attend this hearing. If you think BLM might want to testify please let me know.

-----Original Message-----
From: Billy_Lacewell@nm.blm.gov [mailto:Billy_Lacewell@nm.blm.gov]
Sent: Wednesday, March 02, 2005 1:40 PM
To: WPrice@state.nm.us
Subject: Fw: Loco Hills GSF

Hi Wayne, I was speaking with Larry Gandy just awhile ago, who said you had mentioned this proposal. Here is quick update: I sent below e-mail to specialists and managers I thought would be affected, and then called the information numbers listed for more details and land status. The GSF people sent me a disk with maps and complete proposal package about 3 weeks

Attention BLM and NM State Land Office:

OCD has received an application which proposes to install one of the largest
brine water storage ponds in New Mexico to be located in the Bear Grass Draw
, Loco Hills, NM area. The plan requests an exception to OCD rule 50 and proposes groundwater abatement with provisional alternate abatement standards. The Operator has indicated they are working with the State of NM
Land Office for land swaps and BLM concerning this issue. Please find enclosed a copy of the public notice concerning this issue and the plan. If
you have any question please don't hesitate to call or write. A hearing has
been set for March 08, 2005 in Santa Fe, NM.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

March 8, 2005

Mr. William F. Carr
Holland & Hart
P.O. Box 2208
Santa Fe NM 87504-2208

Fax: (505) 983-6043

Re: Oil Conservation Division Case No. 13402: Consolidated Application of Loco Hills GSF for an Exemption to the Liner and Leak Detection Requirements of 19.15.2.50.C NMAC and Approval of Stage 1 and 2 Abatement Plans, with Provisional Abatement Standards, Eddy County, New Mexico.

Dear Bill,

The Oil Conservation Division (OCD) does not oppose the request of Loco Hills GSF (Loco Hills) to continue case 13402, currently scheduled for hearing March 8, 2005, until the April 14, 2005 Commission hearing docket. The OCD wishes to make clear, however, that this continuance is at the request of Loco Hills and not at the request of the OCD.

The OCD is well aware of Loco Hills' desire that this matter be resolved quickly. At Loco Hills' request, the OCD provided Loco Hills with a "path forward" letter detailing the applicable rules, the showing that Loco Hills would have to make to obtain approval of its plan, and the procedure for seeking approval. See letter from Mark Fesmire to Loco Hills, dated October 21, 2004. As Mr. Fesmire stated in the letter, "The OCD is committed to a prompt review of the application, a prompt hearing (if necessary) and a prompt decision on the application." By setting the application for the March 8, 2005 hearing docket, the OCD has made every effort to bring this matter to a prompt resolution.

It remains Loco Hills' responsibility to demonstrate at the hearing that its proposal meets the requirements of the applicable statutes and rules. The OCD has repeatedly pointed out its concerns about Loco Hills' plans, both in correspondence with Loco Hills and at meetings with Loco Hills. It is disingenuous, to say the least, to state that last week Loco Hills "discovered" that the OCD's environmental bureau still had problems with the proposal.

This letter outlines OCD's major concerns with Loco Hills' proposal. It is not meant to be exhaustive in detail, and OCD reserves the right to raise additional concerns at the hearing, especially based on your presentation of evidence.

Rule 50 Issues

Loco Hills seeks an exception to Rule 50's requirement that storage pits have, "at a minimum, a primary and secondary liner" (Rule 50.C(2)(b)(ii)) and "a leak detection system...installed between the primary and secondary liner." Rule 50.C(2)(c).

Applicable Provisions

"The division may approve liners that are not constructed in accordance with division guidelines only if the operator demonstrates to the division's satisfaction that the alternative liner protects fresh water, public health and the environment as effectively as those prescribed in division guidelines." Rule 50.C(2)(b)(iii).

Division guidelines include the following requirements:
-- For clay liners, the bottoms and sides must have a hydraulic conductivity no greater than 1 x 10-7 centimeters per second. Pit Guidelines, II D, p. 7.
-- Leak detection systems may consist of fail-safe electric detection systems or drainage and collection systems. Pit Guidelines, II F(1), p. 11.

"The division may grant an exception from any requirement [of Rule 50] if the operator demonstrates that the granting of such exemption will not endanger fresh water, public health or the environment." Rule 50.G(2).

OCD Concerns

Loco Hills has not demonstrated to the satisfaction of OCD staff that its liner design will protect fresh water, public health and the environment. In particular:

1. Loco Hills has not demonstrated that its alternative pit design will protect fresh water, human health and the environment as effectively as a double-lined pit with leak detection constructed according to division guidelines, or that it will not endanger fresh water, public health or the environment. This concern was raised in the OCD's letter of October 21, 2004. See also OCD's letter of July 22, 2004, and Mr. Price's e-mail of January 12, 2004.

   a. Loco Hills assumes that if its single clay liner meets the guideline's requirement that a clay liner have a hydraulic conductivity no greater than 1 x 10-7 centimeters per second, it has made the necessary showing. But Rule 50 and the guidelines also require a secondary liner, with leak detection. Loco Hills has not shown that a single-lined pond with designed leakage will protect fresh water, human health and the environment as effectively as a double-lined pit with leak detection constructed according to division guidelines, or that its leaking pit will not endanger fresh water, public health or the environment. See OCD letter of October 21, 2004.

   b. A properly designed double-lined pit with leak detection should prevent contaminants from reaching ground water. Loco Hills' alternative is a pit that is designed to leak. Loco Hills argues that its "abatement plan" will remove more contamination than is introduced through the leaking pit, leading to a net environmental gain. But, as discussed below, Loco Hills proposal will result in the continued release of contaminants, preventing the groundwater from ever reaching standards. See OCD letter of October 21, 2004.

2. Loco Hills has not demonstrated that the pit will have a hydraulic conductivity no greater than their 1 x 10-8 centimeters per second target rate, or their 1 x 10-7 centimeters per second proposed rate.

   a. Loco Hills has not provided detailed plans and specifications for the pit. See the 7 points identified in the OCD's letter of August 5, 2004.

   b. Loco Hills' prior design for a clay-lined pond failed; Loco Hills has not demonstrated that it has corrected the problems present in the original design.
   Ex.: One issue with the original clay liner was that the liner material was heterogeneous, including rocks, sand, gypsum, caliche, anhydrite and other impurities that affect permeability. This issue was discussed at the August 3, 2004 meeting with Loco Hills, and is also mentioned in OCD's letter to Loco Hills of August 5, 2004. The current proposal makes no provision for removing these impurities.

   c. Loco Hills has provided insufficient data on the effect of adding bentonite.
   Ex.: Loco Hills provided a product information sheet from the bentonite supplier. Loco Hils has not demonstrated that the addition of bentonite in the proposed amount to the onsite material will result in a

hydraulic conductivity rate no greater than 1 x 10-7 centimeters per second. This is a particularly glaring deficiency given the failure of Loco Hills' original design to meet the hydraulic conductivity requirements.

d. Loco Hills' pre- and post-construction testing proposals are insufficient.

3. Loco Hills has not demonstrated that contaminants leaking from the pit will not reach groundwater.

a. Because Loco Hills has not conducted a stage I investigation (see discussion below), they do not have enough site-specific information to support their theory that brine from the pit will saturate the soil to 10 meters below the bottom of the pit, and remain sequestered there by "natural barriers."

b. The OCD disagrees with Loco Hills' theory that geology at the location matches the geology 35 miles away at the WIPP site, and will protect the groundwater. Instead the available information suggests that the geology at the site is heterogeneous, and that brine could migrate to groundwater.

Alternative Abatement Standards Issues

Although Loco Hills suggests that a formal application for alternative abatement standards is "premature," it has submitted an application for "provisional" alternative abatement standards of 5,000 mg/l TDS and 3,000 mg/l chloride to take effect if a system failure occurs at the clay-lined pond. Their proposed point of compliance for these standards is the on-site supply well SW-2, and the point at which ground water will meet background quality is the monitoring well in Bear Grass Draw BGD MW-1. BMP, pages 18-19.

Applicable Provisions

The division may approve alternative abatement standards if the petitioner demonstrates three things:
1) either that compliance with the abatement standard is not feasible by the maximum use of technology within the economic capability of the responsible person, or there is no reasonable relationship between the economic and social costs and benefits (including attainment of the standards set forth in Rule 19); and
2) the proposed alternative standard is technically achievable and cost-benefit justifiable; and
3) compliance with the proposed alternative abatement standard will not create a present or future hazard to public health or undue damage to property. Rule 19.B(6).

OCD Concerns with Loco Hills' Alternative Abatement Standards

1. The OCD's October 21, 2004 letter stated, "Because it appears that Loco Hill's abatement plan may not result in the groundwater meeting the standards for contaminants, Loco Hills may also need to petition for approval of alternative abatement standards under 19.15.1.19.B(6)(a) NMAC." The "provisional" alternative abatement standards proposed by Loco Hills were filed as part of its application for an exception to Rule 50, and address only system failure at the clay-lined pond. Loco Hills' "provisional" alternative abatement standards do not address the OCD's concern that Loco Hills' abatement plan will not result in the groundwater meeting the standards for contaminants. Instead, Loco Hills disavows responsibility for existing contamination: "Alternative Abatement Standards are not proposed as a strategy for restoration ground water quality due to the past actions of previous operators and are not part of the Abatement Plan." BMP, page 18.

2. Loco Hills has not met the three-part showing required under Rule 19.B(6) to support approval of alternative abatement standards for the contamination caused by the clay-lined pond, much less for the existing contamination.

Abatement Plan Issues

Loco Hills seeks postponement of a stage I abatement plan, and approval of its stage II abatement plan.

Applicable Provisions, General

An abatement plan "shall mean a description of any operational, monitoring, contingency and closure requirements and conditions for the prevention, investigation and abatement of water pollution." Rule 7.A(2).

Ground water pollution at any place of withdrawal for the present or reasonably foreseeable future use, where the TDS concentration is 10,000 mg/l or less, must be abated to 250.0 mg/l chloride and 1000.0 mg/l TDS. Rule 19.B(2)(b) and 20.6.2.3103.B NMAC.

The vadose zone shall be abated so that water contaminants in the vadose zone will not with reasonable probability contaminate the groundwater or surface water in excess of that standard, through leaching, percolation or other transport mechanism, or as the water table elevation fluctuates. Rule 19.B(1).

If the background concentration of any water contaminant exceeds the standard, pollution shall be abated to the background concentration. Rule 19.A(2).

"Background" means "the amount of ground-water contaminants naturally occurring from undisturbed geologic sources or water contaminants occurring from a course other than the responsible person's facility. This definition shall not prevent the director from requiring abatement of commingled plumes of pollution...." Rule 7.B(2).

Applicable Provisions for a Stage I Plan

"The purpose of stage I of the abatement plan shall be to design and conduct a site investigation that will adequately define site conditions, and provide the data necessary to select and design an effective abatement option." Rule 19.E(3). Ordinarily a stage I plan is to be submitted with, or before, a stage II plan, so that the stage II plan can address the particular conditions at the site. See Rule 19.E(4)(a). By letter dated October 21, 2004, Division Director Mark Fesmire stated that "If Loco Hills does not have complete information defining site conditions, OCD may establish assumed conditions for the plan with a timetable for additional information and provide for revision of the permit to reflect the conditions as they exist at that time."

OCD Concerns Regarding Loco Hills' Stage I Plan

Loco Hills proposes the following: "Before two years of Abatement Plan activities are complete, Loco Hills will present a plan to better define the southern extent of high TDS ground water. We will also present a plan to better define the vertical extent and magnitude of the release." Stage I and II Abatement Plan, page 10.

Based on information submitted with the application, the OCD has calculated that existing contamination may have migrated as much as 15,000 feet down gradient from the site. Loco Hills has not shown a need to wait for two years before making a plan for defining the southern extent of the contamination. At a minimum, the OCD will recommend to the Oil Conservation Commission that Loco Hills be required to submit a plan for determining the extent of the contamination within 60 days, and complete the work required under the plan within 6 months. Loco Hills should then be required to modify its abatement plan, if necessary to address the contamination.

Applicable Provisions for a Stage II Plan

"The purpose of stage 2 of the abatement plan shall be to select and design, if necessary, an abatement option that, when implemented, will result in attainment of the abatement standards and requirements set forth in Section 19.15.1.19 NMAC, Subsection B including post-closure maintenance activities." Rule 19.E(4)(a).

OCD Concerns Regarding Loco Hills' Stage II Plan

Loco Hills has not demonstrated that its abatement plan will result in attainment of the abatement standards and requirements set out in Rule 19: abatement of contamination to no more than 250.0 mg/l chlorides and 1000.0 mg/l TDS.

1. It is unclear from Loco Hill's proposal whether it intends to abate contamination to the standards set out in Rule 19, or maintain current contamination levels.

OCD takes the position that Loco Hills, as operator of the gas storage facility, is the "responsible person" under Rule 19 required to return water quality to standards. OCD is concerned that Loco Hills believes its only responsibility is to remove additional contamination resulting from its clay-lined pit with designed seepage. For example, in its discussion of alternative abatement standards Loco Hills states, "Alternative Abatement Standards are not proposed as a strategy for restoration [of] ground water quality due to the past actions of previous operators and are not part of the Abatement Plan." BMP, page 18.

2. It appears from Loco Hills' proposal that it takes the position that it may contaminate groundwater so long as the contamination does not extend beyond its property lines. For example, Loco Hills emphasizes that it is "currently negotiating a land transfer with the State Land Office and [is] planning to acquire adjacent land from a private landowner." BMP, page 3. In addition, it hopes to restrict use of water down gradient, emphasizing that the State Land Office "plans to prohibit construction of any supply wells on this down gradient property," and Loco Hills is "currently communicating with the BLM regarding a similar restriction for any U.S. Government land."

OCD takes the position that the waters of New Mexico are public, and that New Mexico will have a reasonably foreseeable future use for any fresh water in the state. A landowner cannot be permitted to contaminate the water, and placing restrictions on water use is not a substitute for an abatement plan. In any event, such restrictions, if obtained, may not be enforceable.

3. Loco Hills' abatement plan does not state how much brine will be removed, over what period of time. The plan relies entirely on the incidental environmental benefits accruing from Loco Hills' removal of brine for its business uses, and "natural attenuation." Natural attenuation of salts does not happen. Salts are not biodegradable and will remain in the environment. The plan does not estimate, much less guarantee, how much brine will be removed. The proposed pond can contain 9 million gallons of brine (assuming a 3 foot freeboard). But millions of gallons of brine currently stored in the salt caverns and in existing pits will be moved to the proposed pit, and Loco Hills has not calculated how much salt-contaminated ground water will be removed to complete the filling of the pit. Similarly, Loco Hills has not provided a calculation of how much brine will be needed to compensate for evaporation at the pit. Any other uses for the brine, such as brine sales or the construction and use of additional salt caverns, are speculative. Loco Hills has not shown that the removal of some unknown amount of brine to complete the filling of the pit, plus an unknown additional amount to compensate for evaporation, will return groundwater to Rule 19 standards.

4. Loco Hills' abatement plan does not include source elimination. Loco Hills acknowledges that an existing brine pit at the site is leaking, and theorizes that two water supply wells may have acted as conduits for brine to reach the groundwater. In addition, there are several "unknown wells" located in the area. Loco Hills' abatement plan does not include provisions for identifying and eliminating the possible sources of the contamination including vadose zone contamination. The OCD's concern about plugging any present conduits was expressed in its letter of August 5, 2004.

5. Loco Hills relies on a "net environmental gain" theory: it asserts that it will be removing more brine from the groundwater than it will introduce to the groundwater through its leaking pit. As discussed above, the OCD does not believe that Loco Hills' abatement plan will return the groundwater to standards. And as long as Loco Hills continues to introduce brine into the groundwater, it will not achieve standards no matter how much brine is pumped out of the groundwater. For that reason, the OCD's October 21, 2004 letter suggested that Loco Hills apply for alternative abatement standards in connection with its abatement plan. As discussed above, Loco Hills limited its request for alternative abatement standards to abatement of the additional contamination that will be caused by its leaking pit – it has made no provision for alternative abatement standards for clean-up of the existing contamination. Loco Hills cannot satisfy the requirements of a stage 2 abatement plan.

Bill, in your letter of March 7, 2005 you state that the purpose of the continuance is to enable Loco Hills to meet with representatives of the Environmental Bureau to identify and respond to their concerns. We hope this letter is a first step toward identifying the Bureau's concerns. We are willing to meet with you to continue the discussion. Please give me a call to set a mutually agreeable date.

Sincerely,

Gail MacQuesten
Oil Conservation Division Attorney

cc: Sonya Carrasco-Trujillo
Roger Anderson

Price, Wayne

From: amorley@ose.state.nm.us
Sent: Monday, March 07, 2005 2:53 PM
To: Price, Wayne
Cc: amorley@ose.state.nm.us; chipple@ose.state.nm.us; kfresquez@ose.state.nm.us
Subject: RE: Loco Hills GSF LPG Storage system

Wayne, This project is located in the Roswell Artesian Basin, the Basin Supervisor is Craig Hipple and I have forwarded a copy to him. Craig will respond to you request. Thanks Andy

-----Original Message-----
From: WPrice
Sent: Monday, March 07, 2005 1:42 PM
To: Andy Morley
Cc: RCANDERSON; GMacQuesten
Subject: Loco Hills GSF LPG Storage system

Dear Mr. Morley:
NM Office of State Engineer

* Pursuant to our telephone conversation today OCD would like to know if Loco Hills GSF has water rights for two supply wells located in NW SW Section 22, Township 17s, Range 29E. The name of the previous operators are as follows: Sacra Brothers (1950's),Arrow Gas, National Propane, Columbia Propane, Amer-Gas Eagle Propane, Loco Hills GSF (June 2002). Loco Hills GSF has constructed a 11 million gallon single clay lined pond designed to have seepage. Would this pond be classified as a Dam and permitted by your agency?

OCD has been requested to evaluate an application to allow use of this pond and abatement of groundwater contamination. The abatement would consist of pumping salt (brine water) contaminated water from under the site to be used in the process. The site is located adjacent to Bear Grass Draw. I have included a map showing the location of the site and photo of the pond.

OCD is requesting your assistance and information concerning this site. Before we approve any groundwater pumping project we want to make sure there is adequate water rights available and the construction of the Pond (Dam) is appropriate for this location.

<<DCP01147.JPG>> <<...OLE_Obj...>>

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462

E-mail: WPRICE@state.nm.us

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Price, Wayne

From: Price, Wayne
Sent: Monday, March 07, 2005 1:42 PM
To: 'amorley@ose.state.nm.us'
Cc: Anderson, Roger; MacQuesten, Gail
Subject: Loco Hills GSF LPG Storage system

Dear Mr. Morley:
NM Office of State Engineer

- Pursuant to our telephone conversation today OCD would like to know if Loco Hills GSF has water rights for two supply wells located in NW SW Section 22, Township 17s, Range 29E. The name of the previous operators are as follows: Sacra Brothers (1950's),Arrow Gas, National Propane, Columbia Propane, Amer-Gas Eagle Propane, Loco Hills GSF (June 2002). Loco Hills GSF has constructed a 11 million gallon single clay lined pond designed to have seepage. Would this pond be classified as a Dam and permitted by your agency?

OCD has been requested to evaluate an application to allow use of this pond and abatement of groundwater contamination. The abatement would consist of pumping salt (brine water) contaminated water from under the site to be used in the process. The site is located adjacent to Bear Grass Draw. I have included a map showing the location of the site and photo of the pond.

OCD is requesting your assistance and information concerning this site. Before we approve any groundwater pumping project we want to make sure there is adequate water rights available and the construction of the Pond (Dam) is appropriate for this location.

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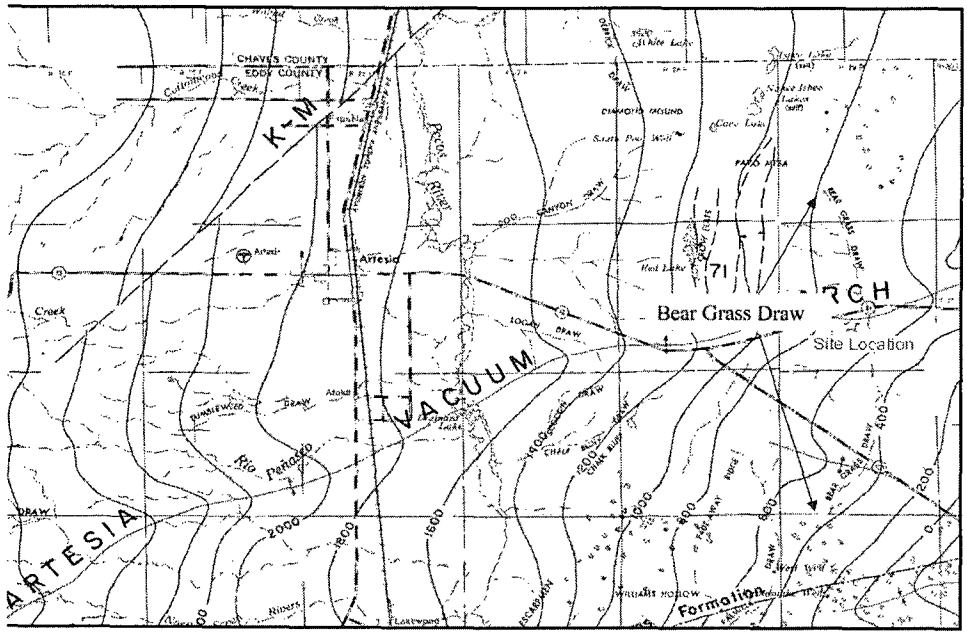


Sincerely:

Wayne Price

New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Gail FYI CL

Leach, Carol

From: Leach, Carol
Sent: Monday, March 07, 2005 7:53 AM
To: 'Mitchel Johnson'
Cc: Bill Carr (E-mail)
Subject: RE: Loco Hills GSF concerns

Mitchell,

Thank you for your e-mail sent after the close of business on Friday. I guess you chose to do that instead of following up on the phone call I returned to you.

As we have discussed on the telephone I appreciate you are upset with the current circumstances of your application. As I told you with the limited staff we have here we are not able to do a final review of your application until we are preparing for the hearing. We were in the process of that review when staff determined they believe there are problems with the application. That concern was reported to your attorney.

Since then you have made several efforts to convince me that the identification of problems was a complete surprise to you. I have been sympathetic and discussed with you and your attorney a process by which the OCD staff identifies the issues they have with your application in writing and then meets with you to narrow issues. I thought you and your attorney agreed with this process, but you have chosen not to mention it in your most recent e-mail to me.

I am afraid this type of inaccurate communication may be part of the overall problem between you and this agency. You and I had a good discussion and an agreement as to how to proceed and then you send a long e-mail that does not mention that arrangement, does not include all the facts and does not accurately characterize the situation. Nevertheless we will stay on course of working with you as outlined previously with you and your attorney. That will include a meeting. Hopefully all issues can be worked out and staff can support your application. If not, then the Oil Conservation Commission will have to decide the outstanding issues.

Let us hope for a smooth resolution.

-----Original Message-----
From: Mitchel Johnson [mailto:mitchel_lhgsf@hotmail.com]
Sent: Friday, March 04, 2005 5:26 PM
To: CLeach@state.nm.us
Cc: wcarr@hollandhart.com
Subject: Loco Hills GSF concerns

Carol,

Good afternoon. I awoke this morning with the same sick feeling deep down in my gut that something is still wrong here and that we truly were being set up for failure at the hearing that was scheduled for March 8th. As I mentioned to you over the last couple of days we had not heard any concerns from the NMOCD suggesting that we would have had a problem from the NMOCD at hearing. I've gone back through my emails to see if there was some things that we had not covered that the NMOCD had asked for, and not to say I may have missed something, but I did not find anything. I thought we had completed everything they asked for. I came across the following recent email as an example of how we asked (on February 14th) for a meeting to discuss any outstanding issues before we go to hearing.

Wayne writes (February 22), "OCD is planning on presenting technical issues concerning the protection of fresh water, public health and the environment. OCD does not see a need for a pre-hearing meeting, but we thank you for the offer."

Wayne's wording is neutral, therefore I questioned Randy HIcks and Bill Carr if they thought the wording from Wayne was a negative, and they believed that if the NMOCD had issues they would favor a pre-hearing meeting to work out what the issues were. When Randy called Wayne to double-check, Wayne referred Randy to counsel because he believed that discussions before a hearing in the absence of counsel may create a problem. Bill Carr discovered that the NMOCD planned to oppose us at the hearing. This shocking news is clearly inconsistent with the outcome of our meeting with the Lt. Governor and with Roger Anderson's comment to me at our last meeting that "we will get it done". I can only conclude that the strategy of not meeting with us to resolve outstanding issues in advance of the hearing is simply an attempt to undermine our business efforts.

Please understand that we did not expect our submissions to be perfect and initially accepted by NMOCD, however we have been working on this for so long that everyone knows the issues. The lack of comment for the last several months led me to believe that the NMOCD was in general agreement with us. We expected questions, comments and some give-and-take on the part of each of us to work out the issues and move toward an approvable plan. As our February 14 email shows, we expected to meet with NMOCD in advance of any hearing to resolve any issues. Please correct my belief that NMOCD is simply attempting to embarrass us at hearing and disapprove our plans. Please tell me how not meeting with us to resolve the issues in advance of a hearing engenders a spirit of cooperation and problem-solving. I requested a list via email from NMOCD on March 1 for a list of these concerns and as of today still not received them (though I am aware you are trying to get them to give us this information and I appreciate that).

We have spoken with Lt. Governor Denish informally on several occasions since our October 2004 meeting and had been able to let her know things were going well and progressing. However, I now believe that we need to have another meeting with Lt. Governor Denish so that we can bring her up to speed on the project. If you remember Lt. Governor Denish stated in our meeting in October that we should work together to get this done. As a reminder, she stated that she had spoken with the Governor, and that he agreed with her that that this project is good for the people of the state of New Mexico and for us to try and work this out.

I welcome your feedback.

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

----Original Message Follows----
From: "Price, Wayne" <WPrice@state.nm.us>
To: 'Randall Hicks' <R@rthicksconsult.com>, "Price, Wayne" <WPrice@state.nm.us>
CC: 'Mitchel Johnson' <mitchel_lhgsf@hotmail.com>, "'William F. Carr'" <WCarr@hollandhart.com>
Subject: RE: Loco Hills GSF Hearing March 8
Date: Tue, 22 Feb 2005 16:26:42 -0700

Dear Randy, sorry I didn't get back with you sooner, but I have been out for a week with the flu. It is my understanding that OCD will hold a public hearing on March 08, 2005 allowing Loco Hills the opportunity to demonstrate the validity of their proposal. OCD is planning on presenting technical issues concerning the protection of fresh water, public health and the environment. OCD does not see a need for a pre-hearing meeting, but we thank you for the offer.

-----Original Message-----
From: Randall Hicks [mailto:R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

The 30-day public notice period will end February 18. A Public Hearing is tentatively scheduled for March 8, provided there is sufficient public interest.

If a hearing is required, we would like to meet with NMOCD in sufficient time to address any of your concerns. We would also like the opportunity to discuss any concerns voiced by the public with NMOCD. We would also like to discuss our proposal with those individuals who have asked for the hearing.

In the absence of a public hearing, we would like to resolve any outstanding issues with the NMOCD as soon as possible. We have selected a contractor to install the clay/soil liner and should be able to secure a construction start date when the bentonite arrives on site: mid-March to mid-April. Needless to say, we do not wish to order the bentonite until NMOCD is prepared to issue the exemption to Rule 50. The absence of a public hearing allows us to order the bentonite sooner than March 9 - provided we can address any residual NMOCD concerns. Because of the demand for bentonite, 4-8 weeks are required between placing the order and delivery of the product. Therefore, NMOCD approval of the exemption is the critical path for moving the project forward.

Can we schedule a meeting for next week?

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

HOLLAND&HART LLP

William F. Carr
wcarr@hollandhart.com

2005 MAR 7 AM 9 58

March 7, 2005

BY HAND DELIVERY

Mark E. Fesmire, P. E.
Chairman
Oil Conservation Commission
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Re: Oil Conservation Division Case No. 13402: Consolidated Application of Loco Hills GSF for an Exemption to the Liner and Leak Detection Requirements of 19.15.2.50.C NMAC and Approval of Stage 1 and 2 Abatement Plans, with Provisional Abatement Standards, Eddy County, New Mexico.

Dear Mr. Chairman:

Loco Hills GSF hereby requests that the hearing currently scheduled in the above-referenced case for March 8, 2005 be continued to the April 14, 2005 Commission hearing docket.

The purpose of this request is to enable us to meet with representatives of the Division's Environmental Bureau to identify and respond to the concerns they have about Loco Hills GSF's proposal. Although another delay in the approval process for this project creates difficult business issues for Loco Hills GSF, we believe this continuance is necessary. As you may know, Loco Hills GSF had requested a pre-hearing meeting with the Division's Environmental Bureau to define the issues to be addressed at the hearing. This request was denied. Last week we discovered that the Environmental Bureau still had problems with the Loco Hills GSF proposal and, instead of meeting with us to discuss these issues, planned to oppose us before the Commission and at that time announce their concerns.

We believe that if we engage in good faith discussions, we will be able to eliminate some of the remaining issues or, where we cannot, at least be aware of the concerns and prepared to respond thereto at the Commission hearing in April.

Very truly yours,

William F. Carr

cc: Gail MacQuesten
Mitchel Johnson
Randy Hicks

Price, Wayne

From: Leach, Carol
Sent: Tuesday, March 01, 2005 4:14 PM
To: 'Mitchel Johnson'; Price, Wayne
Cc: Fesmire, Mark; Anderson, Roger; Leach, Carol; MacQuesten, Gail; wcarr@hollandhart.com; r@rthicksconsult.com
Subject: RE: Loco Hills GSF: Technical Issues

Mitchell,
After we spoke for the second time today I went over to OCD to discuss getting you an immediate reply to your e-mail. Basically I was persuaded that would not be a good thing. As I told you OCD staff has been evaluating your application in preparation for the hearing set for next Tuesday. That evaluation is not yet complete. We fear if we get you a list and then add to it as the evaluation continues, you may think this is not fair. We hope to get a letter to you at the end of the week, but I can't guarantee that. Among other things, your unique proposal has presented some complex issues for staff to consider. Again it is our goal to have an evaluation to you that you may consider and respond to before a hearing in mid-April in order to narrow the issues for the hearing. That should save time and the amount of expert testimony you have to present at the hearing.

-----Original Message-----
From: Mitchel Johnson [mailto:mitchel_lhgsf@hotmail.com]
Sent: Tuesday, March 01, 2005 8:32 AM
To: wprice@state.nm.us
Cc: mfesmire@state.nm.us; rcanderson@state.nm.us; CLeach@state.nm.us; GMacQuesten@state.nm.us; wcarr@hollandhart.com; r@rthicksconsult.com
Subject: Loco Hills GSF: Technical Issues

Wayne,

Good morning. As a follow up to my voice mail this morning, it has come to my attention that the NMOCD still has some technicall issues about the pit. Please email me a list of these issues so that we can address them.

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

Price, Wayne

From: Mitchel Johnson [mitchel_lhgsf@hotmail.com]
Sent: Tuesday, March 01, 2005 8:32 AM
To: wprice@state.nm.us
Cc: mfesmire@state.nm.us; rcanderson@state.nm.us; CLeach@state.nm.us; GMacQuesten@state.nm.us; wcarr@hollandhart.com; r@rthicksconsult.com
Subject: Loco Hills GSF: Technical Issues

Wayne,

Good morning. As a follow up to my voice mail this morning, it has come to my attention that the NMOCD still has some technicall issues about the pit. Please email me a list of these issues so that we can address them.

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

Loco Hills GSF
1231 Old Annetta Rd
Aledo, TX 76008

2/24/04

NM Oil Conservation Division
Wayne Price
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Price,

Please find enclosed documentation required by the NMOCD in accordance with OCD Rule 19.G:

1. Proof of publication
2. Proof of written notice in accordance with OCD Rule 19.G
3. Map of surface owners of record within one mile of the perimeter of the site

If you have any questions or need further information please contact me at 817-441-6568 or by email at mitchel_lhgsf@hotmail.com

Thank you,

Mitchel Johnson

Well #	Depth to Water
Supply Well #1 North of Hwy 82	76' 8½" Feb 24, 2005
Supply Well #2 South of Above ground Tanks	79' 6¾" Feb 25, 2005
Monitor Well South East corner Old Pond	80' 7½ Feb 25, 2005
Monitor Well North Side New Pond	P-1 79' 6¾ P-2 Dry P-3 Dry Feb 26, 2005
Monitor Well East side New Pond	O - Dry P-1 84'10" P-2 84'10" Feb 26, 2005
Monitor Well Bear Grass Draw	M-W 2" 74' 9" P-1 74'6½" Feb 28, 2005

New Mexico O.C.D.

Attention Wayne Price

From Loco Hills G.S.F

STAGE I & II ABATEMENT PLAN – Loco Hills GSF

General Comments

1. The data confirms that a release of NaCl from concentrated brine from one or both of the two impoundments has contaminated ground water. The contamination exceeds the ground water protection standards specified in Subsection A of 20.6.2.3103 NMAC and/or background concentrations. Although LH GSF has not conducted a Stage I investigation, the data strongly indicate that the brine contamination has already migrated off-site.

2. LH GSF is a responsible person (RP) as defined by the regulations; therefore, all discussion that places blame on previous owner/operators is irrelevant. LH GSF, as the RP, is required to submit an Abatement Plan that meets the performance standards specified in Rule 19.

3. LH GSF is required to submit an Stage I and/or II Abatement Plan (AP). The 2004 BMP in general does not meet all of the standards specified in Subsections E(3) and E(4) of Rule 19. The BMP does not provide sufficient information based on a ground water investigation to meet the requirements for a Stage I, nor does the BMP propose an abatement option (*i.e.,* Stage II) that "...when implemented, will result in attainment of the abatement standards."

4. The BMP proposes that LH GSF will submit a Stage I work plan in 2007 after collecting additional routine ground water monitoring data for two more years. However, in order to meet the Stage I requirements, the BMP must provide a detailed Stage I work plan now. LH GSF must propose a ground water investigation program that will delineate the nature, rate, and extent of the brine contamination. The work plan must also provide for the collection of and interpretation of routine hydrogeological data. This data must characterize the vadose zone and the aquifer(s). This Stage I data would enable LH GSF to meet the Stage I requirements of adequately defining the site conditions and would provide the data necessary to select and design an effective abatement option. The BMP provides some useful information, but does not adequately characterize the site. Because LH GSF has not characterized the site, it is not possible for OCD to determine whether the proposed abatement option can meet the required performance standards.

5. Although LH GSF has not characterized the site, a presumptive remedy, such as pump and treat would probably be appropriate while the Stage I data is collected. However, the proposed preferred option of combining a limited amount of "pumping and using" during normal plant operation (not pump and treat) with "natural attenuation" is not compelling. LH GSF has provided no detailed information, such as pumping rates, to justify its assumption that any center-of-mass contamination (source) will be remediated, much less that the off-site contamination will be remediated or contained. LH GSF has not demonstrated that the proposed amount of pumping will be sufficient to address the brine plume's center-of-mass or remaining source.

LH GSF's proposal to rely solely on natural attenuation to remediate the remaining larger volume of brine contaminated ground water is unacceptable. First, the "natural attenuation" process that LH GSF is relying on appears to consist wholly on dilution of the brine plume by

uncontaminated ground water. LH GSF has not addressed whether the mixing and dilution will occur in a reasonable time frame, although they do mention "decades." The proposed dilution would contaminate an even larger volume of the area's extremely limited ground water resources than has already been contaminated.

6. LH GSF has presented a local site model for the contamination of the aquifer that is not compelling. LH GSF has not demonstrated that the proposed alternate liner (single clay liner) would protect ground water as effectively as the prescribed design (Subsection C(2)(b)(iii) of Rule 50). (Nb., there is no provision for a waiver for the LDS). The limited amount of data contained in the design specs and plates indicate that the designed-to-leak clay liner would be in direct contact with what LH GSF has asserted, but not proved, to be a highly transmissive surficial layer (caliche). Without the data that must be collected during a Stage I, LH GSF cannot convince OCD that the proposed alternate single clay liner will meet the specified general performance standards.

7. The local site model presented in the BMP does not convince OCD because it is based too often on suggestions, future proposals, assumptions, presumptions, or estimates when it should be based on data collected during the Stage I. (Detailed data first, then interpretations). LH GSF does not provide an estimate on the total volume of brine contamination, the concentrations that exceed either background or the §3103 standards, the amount of time need to pump out the volume, the amount of time needed to dilute the plume to standards, the distance that the plume would migrate, etc.

8. The theory that the majority of the brine contamination traveled from the leaking pond(s) horizontally in a caliche deposit and then vertically down a "split" casing down to a confined unit is not compelling. LH GSF has not demonstrated that the aquifer is confined, although it would certainly possible to do so with a slug test or well test with the existing wells and piezometers. LH GSF's model that all of the contamination migrated down a split casing is unrealistic because at least some the brine contamination would still be present in the caliche in the BGD area (see Page 2, which refers to the brine-saturated caliche layer). Shallow concentrated brine would probably result in stressed vegetation.

OCD's interpretation is that the two ponds leaked brine over a long period of time. The brine migrated vertically and horizontally through the laterally discontinuous facies in the vadose zone and contaminated a water table aquifer, not a confined aquifer. Confining units are generally associated with laterally continuous facies of low hydraulic conductivity. Discontinuous units are far more likely to leak rather than act as a aquitard.

9. LH GSF BMP inappropriately proposes to defer implementing the required Stage I; does not provide sufficient detail in schematics and diagrams; does not provide volumetric analyses, and therefore, cannot demonstrate that it can meet any performance standard;

19.25.12 NMAC 12

E. Specifications: Specifications shall be prepared for each project describing work to be done and materials to be used to supplement construction drawings. Specifications must be clear and concise and include detailed methods of construction, qualities and sizes of materials, unit amounts to be used and methods of testing and quality control, construction supervision and inspection. Specifications shall be prepared by a professional engineer licensed in the state of New Mexico qualified in the design and construction of dams. The specifications shall meet the following requirements:

(1) The front cover of the specifications shall show the name of the dam (identical to the application) and the county in which the dam is located. The first page behind the front cover shall show the name of the dam (identical to the dam name on the application), the county in which the dam is located, certifications in accordance with Subsections B and E of 19.25.12.12 NMAC and a statement recognizing the authority of the state engineer. An approved model statement recognizing the authority of the state engineer is provided below. Changes to the model statement require prior approval of the state engineer.

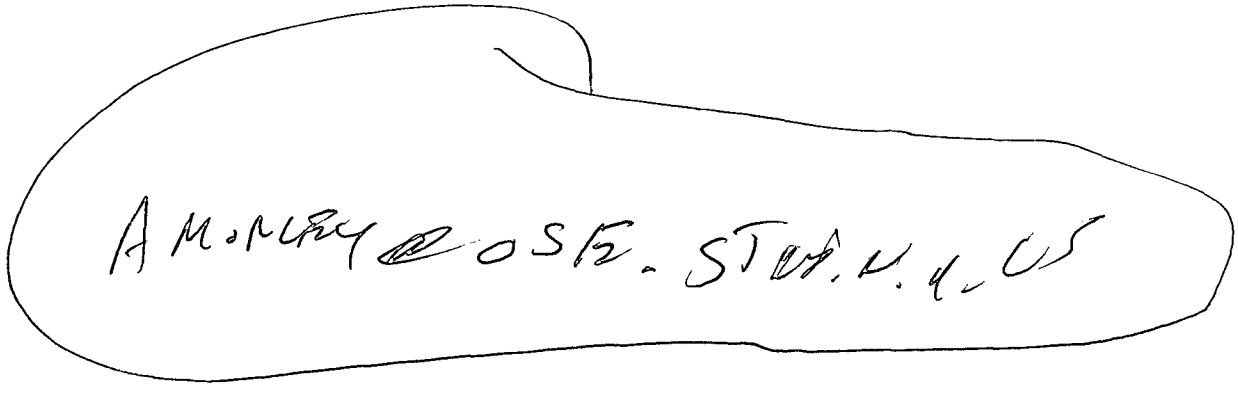
"All construction shall be performed in strict accordance with the accepted plans and specifications. Representatives of the state engineer shall have full authority to perform inspections during construction and shall have full power to act pursuant to the law and in accordance with Title 19, Chapter 25, Part 12, Dam Design, Construction and Dam Safety of the New Mexico Administrative Code if plans and specifications are not followed."

(2) The specifications shall be indexed.

(3) The specifications shall be bound and submitted on a good grade of white 8 1/2-inch by 11-inch paper.

(4) The general conditions shall include statements that the construction drawings and specifications cannot be significantly changed without the prior written approval of the state engineer.

F. Boundary, easement or right of way plat of survey: A professional surveyor licensed in the state of New Mexico shall prepare a plat of survey showing the dam owner's property boundaries or easement and/or



District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-131A
Revised March 17, 1999

Submit one copy to Santa Fe and one copy to appropriate District Office postmarked by 24th day of succeeding month. See Rule 1131.

MONTHLY GAS STORAGE REPORT

Loco Hills GSF LTD (Company)   158 Dove Creek Drive (Address)

NAME OF STORAGE PROJECT Loco Hills GSF   COUNTY Eddy   Month/Year Feb-2005

WELL NAME AND NUMBER	LOCATION UNIT SEC. TWP. RANGE	MAXIMUM INJECTION PRESSURE	INJECTION (MCF)	WITHDRAWAL (MCF)
Leonard State #1 API # 30-15-06192 Loco Hills GSF Well #1	L 22 17S 29E	390#	1,080.25	12,798,624.03

TOTALS

TOTAL CAPACITY (MMCF) 1.06

BEGINNING STORAGE (MMCF) 16.50

NET CHANGE (MMCF) 11.71

ENDING STORAGE (MMCF) 4.79

CALCULATED RESERVOIR PRESSURE @ END OF MONTH 115.5#

I hereby certify that this report is true and complete to the best of my knowledge and belief.

Signature John B Smith

Printed Name & Title John B Smith   General Operator

Date March 1, 2005   Telephone No. (505) 677-2331

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-131A
Revised March 17, 1999

Submit one copy to Santa Fe and one copy to appropriate District Office postmarked by 24th day of succeeding month. See Rule 1131.

MONTHLY GAS STORAGE REPORT

Loco Hills GSF LTD (Company) 158 Deer Creek Drive Aledo, Texas 76008 (Address)

NAME OF STORAGE PROJECT Loco Hills GSF COUNTY Eddy Month/Year Feb 2005

WELL NAME AND NUMBER	LOCATION UNIT SEC. TWP. RANGE	MAXIMUM INJECTION PRESSURE	INJECTION (MCF)	WITHDRAWAL (MCF)
Leonard State #2 Loco Hills GSF #2 30-15-06193	L 22 17S 29E	379.5#	0	0

TOTALS

TOTAL CAPACITY (MMCF) 109.3

BEGINNING STORAGE (MMCF) 0

NET CHANGE (MMCF) 0

ENDING STORAGE (MMCF) 0

CALCULATED RESERVOIR PRESSURE @ END OF MONTH 111.5#

I hereby certify that this report is true and complete to the best of my knowledge and belief.

Signature John B. Smith

Printed Name & Title John B. Smith Technical Operator

Date March 1, 2005 Telephone No. (505) 677-2331

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-131A
Revised March 17, 1999

Submit one copy to Santa Fe and one copy to appropriate District Office postmarked by 24th day of succeeding month. See Rule 1131.

MONTHLY GAS STORAGE REPORT

Loco Hills GSF LTD (Company) 158 Deer Creek Drive Aledo Texas 76008 (Address)

NAME OF STORAGE PROJECT Loco Hills GSF COUNTY Eddy Month/Year Feb 2005

WELL NAME AND NUMBER	LOCATION UNIT SEC. TWP. RANGE	MAXIMUM INJECTION PRESSURE	INJECTION (MCF)	WITHDRAWAL (MCF)
Leonard State #3 API # 30-15-06194 Loco Hills GSF #3	L 22 17S 29E	378#	0	0

TOTALS

TOTAL CAPACITY (MMCF) 109.3

BEGINNING STORAGE (MMCF) 0

NET CHANGE (MMCF) 0

ENDING STORAGE (MMCF) 0

CALCULATED RESERVOIR PRESSURE @ END OF MONTH 110#

I hereby certify that this report is true and complete to the best of my knowledge and belief.

Signature John B Smith

Printed Name & Title John B Smith Operator Technician

Date March 1, 2005 Telephone No. (505)-677-2331

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

A. Signature — X — ☐ Agent ☐ Addressee

B. Received by (*Printed Name*) — C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

1. Article Addressed to:

State Engineer
Water Resources Division
Bataan Building
Santa Fe, NM 87503

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number (*Transfer from service label*) 7003 0500 0000 9281 8362

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

A. Signature — X — ☑ Agent ☐ Addressee

B. Received by (*Printed Name*) — C. Date of Delivery 1-19-05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

1. Article Addressed to:

Soil and Water Conservation Bureau
NM Dept of Agriculture
Agriculture Programs & Resources Div.
Box 30005 / APR
Las Cruces, NM 88003-8005

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number (*Transfer from service label*) 7003 0500 0000 9281 8355

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Director
Department of Game & Fish
Villagra Building
Santa Fe, NM 87503

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number
(Transfer from service label) 7003 0500 0000 9281 8348

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Secretary
NM Environment Dept.
PoB 26110
Santa Fe, NM 87504

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Sig Rivera ☐ Agent ☐ Addressee

B. Received by (Printed Name) Sig Rivera | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SANTA FE NM
JAN 20 2005

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number
(Transfer from service label) 7003 0500 0000 9281 8331

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

State Director
Bureau of Land Management
POB 27115
Santa Fe, NM 87502-0115

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Vicki McCoy ☐ Agent ☐ Addressee

B. Received by (Printed Name) Vicki McCoy C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SANTA FE NM
JAN 20 2005
87505

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8324

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

9261

COMPLETE THIS SECTION

er is 1, 2, and 3. Also complete
st icted Delivery is desired.
ia e ad address on the reverse
so that we ca re urn the card to you.
☑ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Lynn Brandvold
NM Bureau of Mines & Mineral Resources
NM Institute of Mining & Tech.
Socorro, NM 87801

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Paula Garibay ☑ Agent ☐ Addressee

B. Received by (Printed Name) Paula Garibay C. Date of Delivery 1-21-05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below:

CAMPUS STATION
SOCORRO NM
JAN 21 2005
87801

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

00 0000 9281 8317

turn Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE

Track & Confirm

Current Status

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Your item was delivered at 2:26 pm on January 18, 2005 in ALBUQUERQUE, NM 87113.

Shipment Details >

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Enter label number:

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Notification Options

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Certified Fee	2.30	
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Total Postage & Fees	$ 4.42	01/13/05

Sent To: Field Supervisor - US Fish & Wildlife Service

Street, Apt. No.: or PO Box No. 2105 Osuna Rd, NE

City, State, ZIP+4 Albuquerque, NM 87113

PS Form 3800, June 2002 See Reverse for Instructions

7003 0500 0000 9281 8294

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Dr. Harry Bishara
POB 748
Cuba, NM 87013

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Harry Bishara | C. Date of Delivery 1/25/05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number 7003 0500 0000 9281 8300

estic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☑ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Attorney General
POB 1508
Santa Fe, NM 87504

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Paul Gonzales | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8287

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Elmo Baca
State Historic Preservation Officer
228 East Palace Ave.
Villa Rivera Rm 101
Santa Fe, NM 87503

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery: 1/18/05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SANTA FE NM JAN 18 2005

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8270

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Chief
Hazardous Waste Bureau
Runnels Building
Santa Fe, NM 87504

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SANTA FE NM JAN 19 2005 87505

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8263

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☑ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Chief
Ground Water Bureau
Runnels Building
Santa Fe, NM 87504

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SANTA FE NM
JAN 19 2005

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8256

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☑ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

William Turner
NM Trustee for Natural Resources
C/o American Ground Water Consultants
610 Gold St. SW, Suite 111
Albuquerque, NM 87102

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☑ Agent ☐ Addressee

B. Received by (Printed Name) Michelle Garcia | C. Date of Delivery 1-18-05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8249

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

NM Oil & Gas Assn.
POB 1864
Santa Fe, NM 87504-1864

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
A M Gutierrez

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7003 0500 0000 9281 8232

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Director
State Parks & Recreation
1220 S. St. Francis
Santa Fe, NM 87505

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
Kristen Kenna

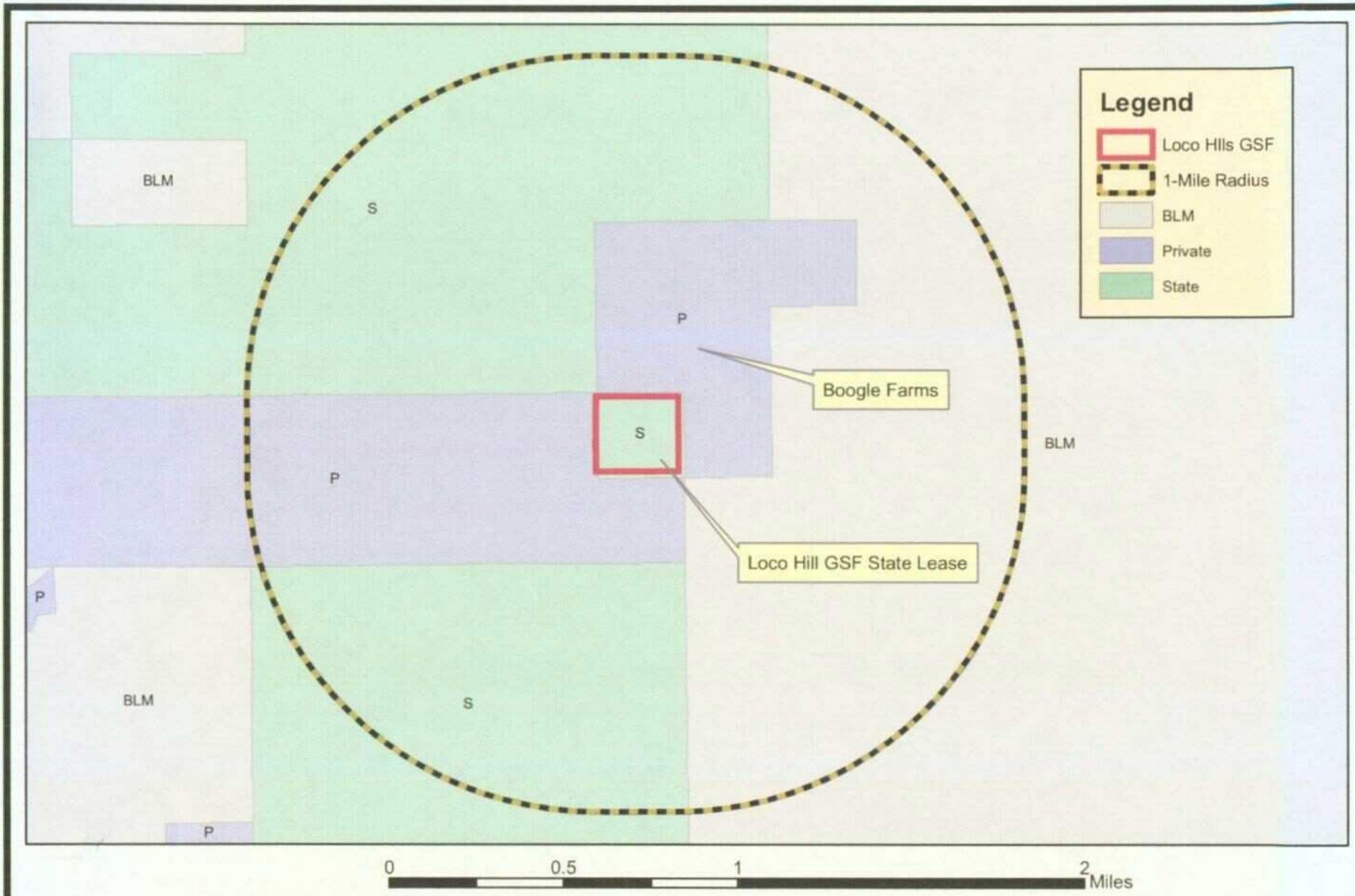
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7003 0500 0000 9281 8225

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Land ownership within one-mile of Loco Hills GSF	
	Loco Hills GSF/Hicks Consultants	February 2005

Price, Wayne

To: Randall Hicks; Price, Wayne

Cc: 'Mitchel Johnson'; 'William F. Carr'

Subject: RE: Loco Hills GSF Hearing March 8

Dear Randy, sorry I didn't get back with you sooner, but I have been out for a week with the flu. It is my understanding that OCD will hold a public hearing on March 08, 2005 allowing Loco Hills the opportunity to demonstrate the validity of their proposal. OCD is planning on presenting technical issues concerning the protection of fresh water, public health and the environment. OCD does not see a need for a pre-hearing meeting, but we thank you for the offer.

-----Original Message-----
From: Randall Hicks [mailto:R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

The 30-day public notice period will end February 18. A Public Hearing is tentatively scheduled for March 8, provided there is sufficient public interest.

If a hearing is required, we would like to meet with NMOCD in sufficient time to address any of your concerns. We would also like the opportunity to discuss any concerns voiced by the public with NMOCD. We would also like to discuss our proposal with those individuals who have asked for the hearing.

In the absence of a public hearing, we would like to resolve any outstanding issues with the NMOCD as soon as possible. We have selected a contractor to install the clay/soil liner and should be able to secure a construction start date when the bentonite arrives on site: mid-March to mid-April. Needless to say, we do not wish to order the bentonite until NMOCD is prepared to issue the exemption to Rule 50. The absence of a public hearing allows us to order the bentonite sooner than March 9 – provided we can address any residual NMOCD concerns. Because of the demand for bentonite, 4-8 weeks are required between placing the order and delivery of the product. Therefore, NMOCD approval of the exemption is the critical path for moving the project forward.

Can we schedule a meeting for next week?

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

Price, Wayne

From: Price, Wayne
Sent: Monday, February 21, 2005 9:02 AM
To: Anderson, Roger; MacQuesten, Gail; Sanchez, Daniel
Subject: FW: Loco Hills GSF Hearing March 8

Any recommendations on how to respond?
-----Original Message-----
From: Randall Hicks [mailto:R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

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Can we schedule a meeting for next week?

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

Price, Wayne

From: Price, Wayne
Sent: Friday, February 25, 2005 11:19 AM
To: Price, Wayne; 'mitchel Johnson-son (E-mail)'; 'Mitch Johnson (E-mail)'
Cc: Gum, Tim; Barton, Van; Anderson, Roger; Ford, Jack; MacQuesten, Gail; Sanchez, Daniel
Subject: RE: Loco Hills GSF MIT, sonor log and CBL logs for LPG well #2

Dear Gentleman:

OCD would prefer that the gamma ray/neutron log to be used should be the new second generation "Pulse Neutron" if possible. We believe this tool will be better at identifying the porosity and lithology of the formation. Also this tool must be run from bottom of the hole to the top.

-----Original Message-----
From: Price, Wayne
Sent: Thursday, February 24, 2005 4:19 PM
To: mitchel Johnson-son (E-mail); Mitch Johnson (E-mail)
Cc: Gum, Tim; Barton, Van; Anderson, Roger; Ford, Jack; MacQuesten, Gail; Sanchez, Daniel
Subject: Loco Hills GSF MIT, sonor log and CBL logs for LPG well #2

Dear Mitchel:

After reviewing the submitted C-103 dated Feb 09, 2005 for the LPG Leonard State Well #2, OCD Santa Fe approves with the following conditions:

1. The Sonor Log shall be ran and a report filed with OCD. The Log shall be the same type and procedure as approved for the #1 well.

2. All Cement Bond Logs (CBL) shall include a variable density log (VDL). The operator shall have a qualified Logging Engineer or Geologist review the log and provide conclusions and recommendations concerning the integrity of the well bore. In addition, OCD highly recommends that a casing integrity caliper i.e. pipe analysis log be ran at the same time if possible.

3. OCD will require a gamma ray/neutron log in addition to the CBL/VDL after the tubing has been removed and before any well test or well workover. This log shall be ran from the surface to the top of the salt formation.

4. The packer set for the MIT shall be within 10 feet of the bottom casing shoe. The hydrostatic test shall be ran for 30 minutes at a minimum of 300 psig or 1 1/2 times normal injection pressure whichever is greater. A calibrated pressure recording chart shall be used for the test. The device shall be calibrated for the maximum expected test pressure (full scale) and set on a one hour clock. No bleed off tolerance will be allowed unless approved by the Santa Fe Environmental Bureau.

4. if the well fails the MIT, operator must obtain OCD approval before installation of the proposed 4 inch liner, or any other work.

5. Operator shall provide OCD a 72 hour written notification (E-mail) so OCD may witness these test.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Thursday, February 24, 2005 4:19 PM
To: mitchel Johnson-son (E-mail); Mitch Johnson (E-mail)
Cc: Gum, Tim; Barton, Van; Anderson, Roger; Ford, Jack; MacQuesten, Gail; Sanchez, Daniel
Subject: Loco Hills GSF MIT, sonor log and CBL logs for LPG well #2

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Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Tuesday, February 22, 2005 4:27 PM
To: 'Randall Hicks'; Price, Wayne
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: RE: Loco Hills GSF Hearing March 8

Dear Randy, sorry I didn't get back with you sooner, but I have been out for a week with the flu. It is my understanding that OCD will hold a public hearing on March 08, 2005 allowing Loco Hills the opportunity to demonstrate the validity of their proposal. OCD is planning on presenting technical issues concerning the protection of fresh water, public health and the environment. OCD does not see a need for a pre-hearing meeting, but we thank you for the offer.

-----Original Message-----
From: Randall Hicks [mailto:R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

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Can we schedule a meeting for next week?

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

Price, Wayne

From: Randall Hicks [R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

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Randy Hicks
505-266-5004 - office
505-238-9515 - cell

STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-6320

BILL RICHARDSON
Governor

February 21, 2005

Mark E. Fesmire, P.E.
Director
Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 S. St. Francis Drive
Santa Fe, NM 87505

Re: Proposed Stage 1 and Stage 2 Abatement Plan for Loco Hills GSF

Dear Mr. Fesmire:

I am writing concerning the public notice I received on the above referenced project. According to the public notice, Loco Hills GSF is located in Section 22, T17S, R29E, NMPM, Eddy County, New Mexico.

I have reviewed our archaeological records database in order to determine if the proposed abatement plan will have an affect on cultural resources. This area has been intensively surveyed by professional archaeologists for facilities associated with oil and gas development and numerous archaeological sites have been identified and recorded. Based on this information, the proposed abatement plan has the potential to adversely affect cultural resources.

In order minimize harm, this office recommends that the cultural resource specialists at the New Mexico State Land Office and the BLM, Carlsbad District Office be consulted regarding survey requirements as well as eligibility and/or effect on any resources, that may exist within the area to be affected by the abatement plan.

If you have any questions regarding these comments, please do not hesitate to contact me. I can be reached by telephone at (505) 827-4064 or email at mensey@dca.state.nm.us.

Sincerely,

Michelle M. Ensey
Staff Archaeologist

Log: 73572
cc/w copy of public notice:
David c. Eck, Cultural Resource Specialist, New Mexico State Land Office
Gary Navarre, Lead Archaeologist, BLM, Carlsbad District Office
Mitchel Johnson, LOco Hills GSF, 158 Deer Creek Drive, Aledo, TX 76008

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.

Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.

Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.

Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.

Copies of plan: Copies of the consolidated application, including the Stage 1 and Stage 2 abatement plan, may be viewed at the Santa Fe and Artesia offices of the Oil Conservation between 8:00 a.m. and 4:00 p.m., Monday through Friday, or on the Division's web site: http://www.emnrd.state.nm.us/ocd/.

Comments: Any interested person may submit written comments or request a public hearing on the abatement plan. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest. Comments and requests for hearing should be mailed to:

Director of the Oil Conservation Division, 1220 S. St. Francis Drive, Santa Fe, New Mexico, 87505, and must be must be received by the Division no more than thirty days after the publication date of this notice.

Determination Procedure: The Director will approve or deny the consolidated application based on information in the application, public comments and, if a hearing is conducted, evidence and testimony submitted at the hearing.

Hearing: The Director has made a preliminary determination that there is significant public interest in the consolidated application, and has scheduled a hearing for 9:00 am Tuesday, March 08, 2005, in Porter Hall at 1220 South St. Francis Drive, Santa Fe, New Mexico, before the Oil Conservation Commission. If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing, please contact Division Administrator Florene Davidson at 505-476-3458 or through the New Mexico Relay Network (1-800-659-1779) by March 01, 2005. Public documents can be provided in various accessible forms. Please contact Ms. Davidson if a summary or other type of accessible form is needed.

Mark E. Fesmire, P.E

Director

Price, Wayne

From: Randall Hicks [R@rthicksconsult.com]
Sent: Monday, February 14, 2005 11:33 AM
To: 'Price, Wayne'
Cc: 'Mitchel Johnson'; 'William F. Carr'
Subject: Loco Hills GSF Hearing March 8

Wayne

The 30-day public notice period will end February 18. A Public Hearing is tentatively scheduled for March 8, provided there is sufficient public interest.

If a hearing is required, we would like to meet with NMOCD in sufficient time to address any of your concerns. We would also like the opportunity to discuss any concerns voiced by the public with NMOCD. We would also like to discuss our proposal with those individuals who have asked for the hearing.

In the absence of a public hearing, we would like to resolve any outstanding issues with the NMOCD as soon as possible. We have selected a contractor to install the clay/soil liner and should be able to secure a construction start date when the bentonite arrives on site: mid-March to mid-April. Needless to say, we do not wish to order the bentonite until NMOCD is prepared to issue the exemption to Rule 50. The absence of a public hearing allows us to order the bentonite sooner than March 9 – provided we can address any residual NMOCD concerns. Because of the demand for bentonite, 4-8 weeks are required between placing the order and delivery of the product. Therefore, NMOCD approval of the exemption is the critical path for moving the project forward.

Can we schedule a meeting for next week?

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

Loco Hills GSF

To
New Mexico OCD
Attention Wayne, Price

NO
103

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised March 25, 1999

WELL API NO. 30-15-06193
5. Indicate Type of Lease: STATE ☑ FEE ☐
6. State Oil & Gas Lease No.
7. Lease Name or Unit Agreement Name:

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well ☐ Gas Well ☐ Other Salt Dome Storage RL-635
2. Name of Operator: Loco Hills GSF LTD
8. Well No. Leonard State #2
3. Address of Operator: 158 Deer Creek Drive Aledo, Texas 76008
9. Pool name or Wildcat
4. Well Location

Unit Letter L : 1892 feet from the South line and 908 feet from the West line

Section 22 Township 12S Range 29E NMPM County Eddy

[redacted]

10. Elevation (Show whether DR, RKB, RT, GR, etc.)

[redacted]

11. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☑	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	PLUG AND ABANDONMENT ☐
PULL OR ALTER CASING ☑ If needed	MULTIPLE COMPLETION ☐	CASING TEST AND CEMENT JOB ☐	
OTHER: ☐		OTHER: ☐	

12. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompilation. Pull 2 7/8" tubing, sonar well run CBL on 5 1/2" casing. Set tension packer as close to shoe as possible (507') but no more than 50' above. MIT on casing (not less than 300# for 30 min). Run new string 2 7/8" tubing.

If MIT fails spot CIBP as close to 507' as possible. Spot sacks cement. Run 4 1/2 10.5# circulate cement up backside to surface. Run CBL + MIT on 4". Inside 4" run string of 2 3/8" 4.7# J55 tubing. Estimated start date March 1, 2005
OCD will be notified prior to start of work and MIT

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

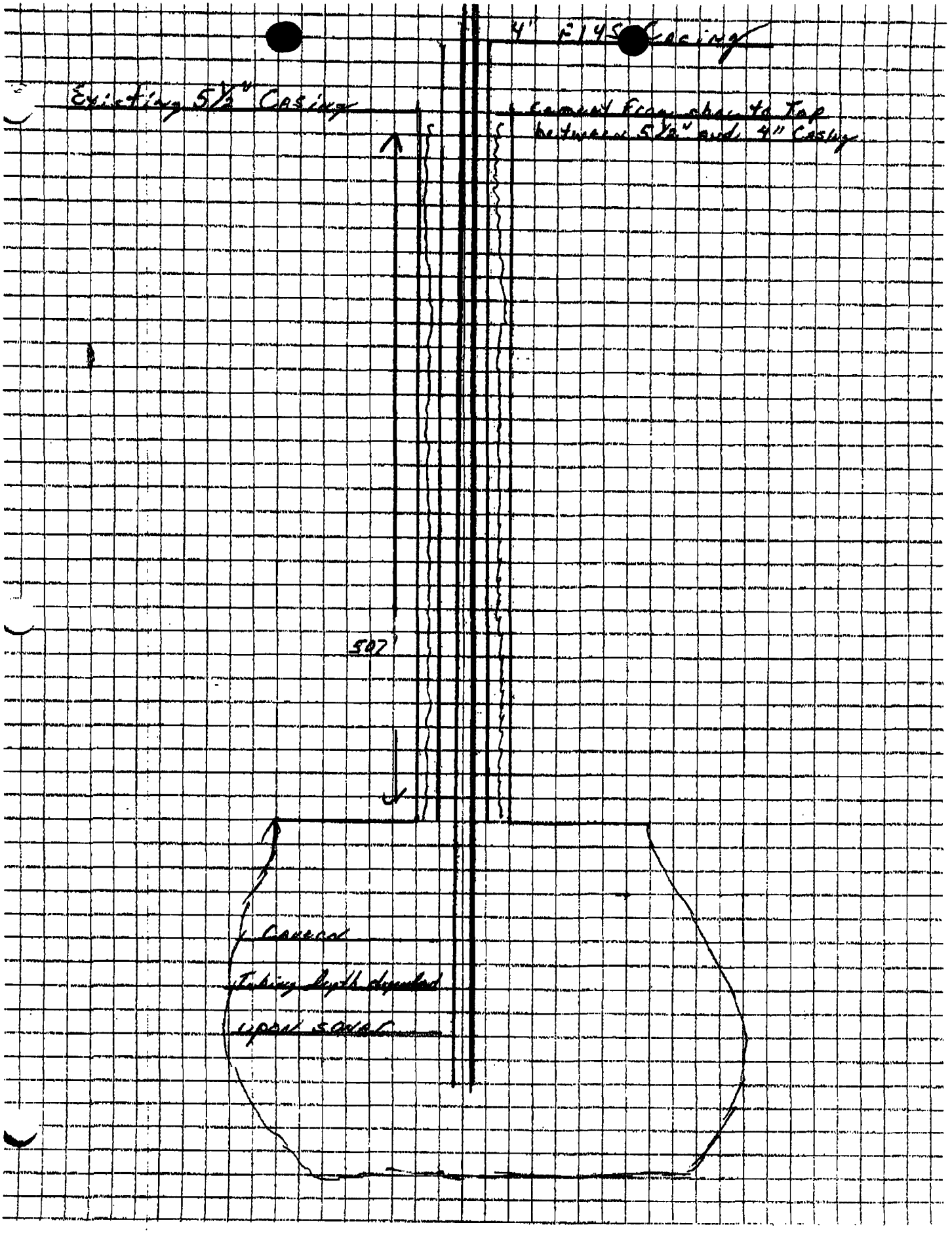
SIGNATURE [signature] TITLE Terminal Operator DATE Feb 9, 2005

Type or print name John B. Smith Telephone No. 677-2331

(This space for State use)

APPPROVED BY ____________ TITLE ____________ DATE ____________

Conditions of approval, if any:


4" EUE Casing
Existing 5½" Casing
Cement from shoe to top between 5½" and 4" Casing
507'
Cement
Tubing Depth dependent upon sand

P.01

TRANSACTION REPORT

FEB-10-2005 THU 07:36 AM

FOR:

RECEIVE

DATE	START	SENDER	RX TIME	PAGES	TYPE	NOTE	M#	DP
FEB-10	07:33 AM	1 505 677 2331	3'12"	3	RECEIVE	OK		

RECEIVED
JAN 12 2005
OIL CONSERVATION DIVISION

LETTER OF TRANSMITTAL

PETTIGREW and ASSOCIATES, PA
1110 N. Grimes
Hobbs, NM 88240
505-393-9827 Phone
505-393-1543 Fax

DATE January 10, 2005

TO: New Mexico Oil Conservation Division
1220 S. St. Francis
Santa Fe, NM 87505

ATTENTION: Wayne Price

RE: Loco Hills GSF

WE ARE SENDING YOU:

☐ **ATTACHED** ☐ **FORWARDED SEPARATELY VIA** _____

☐ Shop Drawings ☐ Prints ☐ Mylar ☐ Samples
☐ Copy of Letter ☒ Plans ☐ Original Documents ☐ Diskettes
☐ Specifications ☐ Other _____

QUANTITY	IDENT. NO.	DATE	DESCRIPTION
1		1/10/05	Clay Lined Brine Pond

THESE ARE TRANSMITTED as checked

☐ For Approval ☐ Approved Resubmit_____Copies for Approval
☐ For Your Use ☐ Approved as Noted Submit _____Copies for Distribution
☒ As Requested ☐ Returned for Corrections Return_____Corrected Prints
☐ For Review and Comment ☐ Other _____

REMARKS

Mitchel Johnson requested that I send this to you.

Copies:

Signed By: Jeremy Baker
Reply To: Jeremy Baker, P.E.

msn Hotmail®

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:30 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:25 PM
To : sricdon@earthlink.net
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice - Chris Shuey, Southwest Research & Information Center

Attachment : noticeofpublicationfinal21.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Chris Shuey
Southwest Research and Information Center
POB 4524
Albuquerque, NM 87106

Dear Chris Shuey:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. The following and attached is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear

Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
Copies of plan: Copies of the consolidated application, including the Stage 1 and Stage 2 abatement plan, may be viewed at the Santa Fe and Artesia offices of the Oil Conservation between 8:00 a.m. and 4:00 p.m., Monday through Friday, or on the Division's web site: http://www.emnrd.state.nm.us/ocd/.
Comments: Any interested person may submit written comments or request a public hearing on the abatement plan. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest. Comments and requests for hearing should be mailed to: Director of the Oil Conservation Division, 1220 S. St. Francis Drive, Santa Fe, New Mexico, 87505, and must be must be received by the Division no more than thirty days after the publication date of this notice.

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msn Hotmail®

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:28 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 8:42 AM
To : r@rthicksconsult.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice

Attachment : noticeofpublicationfinal[2].doc (0.03 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

R.T. Hicks Consultants
901 Rio Grande Blvd NW
Suite F-142
Albuquerque, NM 87104

Dear Mr. Hicks:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. The following and attached is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear

Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
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SENDER: COMPLETE THIS SECTION

- ☑ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☑ Print your name and address on the reverse so that we can return the card to you.
- ☑ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Gerald R. Zimmerman
Colorado River Board of Calif.
770 Fairmont Ave., Ste 100
Glendale, CA 91203-1035

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jung C. Chen ☐ Agent ☐ Addressee

B. Received by (Printed Name) JUNG C. CHEN
C. Date of Delivery 11-2-05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8379

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- ☐ Print your name and address on the reverse so that we can return the card to you.
- ☐ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

County Commissioner
Lewis Derrick
POB 441
Artesia, NM 88211

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Dorothy Crouch ☐ Agent ☐ Addressee

B. Received by (Printed Name) Dorothy Crouch
C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☑ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7003 0500 0000 9281 8393

PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

msn Hotmail

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:31 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:36 PM
To : lazarus@glorietageo.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Jay Lazarus

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Jay Lazarus
POB 5727
Santa Fe, NM 87502

Dear Mr. Lazarus:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
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water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
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msn® Hotmail®

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:31 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:34 PM
To : ron.dutton@xcelenergy.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Ron Dutton Soutwestern Public Service

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Ron Dutton
Southwestern Public Service
POB 1261
Amarillo, TX 79170

Dear Mr. Dutton:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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msn® Hotmail®

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:30 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:28 PM
To : lwa@lwasf.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Lee Wilson & Associates

Attachment : noticeofpublicationfinal21.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Lee Wilson & Associates
POB 931
Santa Fe, NM 87501

Dear Lee Wilson & Associates:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The

water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
Copies of plan: Copies of the consolidated application, including the Stage 1 and Stage 2 abatement plan, may be viewed at the Santa Fe and Artesia offices of the Oil Conservation between 8:00 a.m. and 4:00 p.m., Monday through Friday, or on the Division's web site: http://www.emnrd.state.nm.us/ocd/.
Comments: Any interested person may submit written comments or request a public hearing on the abatement plan. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest. Comments and requests for hearing should be mailed to: Director of the Oil Conservation Division, 1220 S. St. Francis Drive, Santa Fe, New Mexico, 87505, and must be must be received by the Division no more than thirty days after the publication date of this notice.

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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:32 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:39 PM
To : bsg@garbhall.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Bruce S. Garber

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Bruce S. Garber
Attorney at Law
POB 0850
Santa Fe, NM 87504-0850

Dear Mr. Garber:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

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Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
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Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an

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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:32 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:41 PM
To : cgarcia@fs.fed.us
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Regional Forester, USFS Regional Office

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Regional Forester
USFS Regional Office
517 Gold Avenue SW
Albuquerque, NM 87102

Dear Regional Forester:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an

alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:41 AM

From : Mitchel Johnson <mitchel_sacenergy@hotmail.com>
Sent : Monday, January 17, 2005 3:49 PM
To : mitchel_lhgsf@hotmail.com
Subject : RE: Public Notice to Jack A. Barnett

From: "Mitchel Johnson" <mitchel_lhgsf@hotmail.com>
To: jbarnett@barnettwater.com
CC: mitchel_sacenergy@hotmail.com
Subject: Public Notice to Jack A. Barnett
Date: Thu, 13 Jan 2005 17:24:53 -0600

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Jack A. Barnett
Colorado River Basin Ctrl. Forum
106 West 500 South, Suite 101
Bountiful, UT 84010

Dear Mr. Barnettl:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.
Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:35 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:29 PM
To : cadams@pnm.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Colin Adams

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Colin Adams
Environmental Counsel
Public Service Company of NM
414 Silver, Southwest
Albuquerque, NM 87158

Dear Mr. Adams:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

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STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear

Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:33 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 2:44 PM
To : jcc_crb@pacbell.net
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Gerald R. Zimmerman

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Gerald R. Zimmerman
Colorado River Board of Calif.
770 Fairmont Ave., Ste. 100
Glendale, CA 91203-1035

Dear Mr. Zimmerman:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:35 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:31 PM
To : mschulz@theitgroup.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Mike Schulz

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Mike Schulz
International Technology Corp.
5301 Central Avenue, N.E.
Suite 700
Albuquerque, NM 87108

Dear Mr. Schulz:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

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Mitchel Johnson

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ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:36 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:33 PM
To : ekendrick@montand.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Ned Kendrick

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Ned Kendrick
Attorney at Law
325 Paseo de Peralta
Santa Fe, NM 87501

Dear Mr. Kendrick:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in ground water beneath Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a background TDS concentration of approximately 2,500 mg/l.
Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an

alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.
Copies of plan: Copies of the consolidated application, including the Stage 1 and Stage 2 abatement plan, may be viewed at the Santa Fe and Artesia offices of the Oil Conservation between 8:00 a.m. and 4:00 p.m., Monday through Friday, or on the Division's web site: http://www.emnrd.state.nm.us/ocd/ .
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:36 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:33 PM
To : ekendrick@montand.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Ned Kendrick

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Ned Kendrick
Attorney at Law
325 Paseo de Peralta
Santa Fe, NM 87501

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Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:37 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:35 PM
To : ken@crihobbs.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Ken Marsh

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Ken Marsh

Dear Mr. Marsh:

You are receiving this letter in accordance with New.Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:37 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Thursday, January 13, 2005 5:36 PM
To : r@rthicksconsult.com
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Randy Hicks (your on the website contact list now)

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/13/05

Randy Hicks

Dear Mr. Hicks:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(d) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface

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Sent To: Bogle Ltd Co. - Stuart Bogle
Street, Apt. No.; or PO Box No. POB 460
City, State, ZIP+4 Dexter, NM 88230

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mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:38 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Friday, January 14, 2005 11:16 AM
To : jking@slo.state.nm.us
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice sent to Jerry King, NM State Land Office

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/14/05

NM State Land Office
Jerry King
Assistant Commissioner for Surface Resources
310 Old Santa Fe Trail
Santa Fe, NM 87504

Dear Mr. King:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(a) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

Please contact me if you have any questions. I may ,also, reached at mitchel_lhgsf@hotmail.com or 817-441-6568.

Thank you,

Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.
Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.
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msn Hotmail®

mitchel_lhgsf@hotmail.com Printed: Monday, February 21, 2005 10:39 AM

From : Mitchel Johnson <mitchel_lhgsf@hotmail.com>
Sent : Friday, January 14, 2005 11:20 AM
To : russ_sorensen@nm.blm.gov
CC : mitchel_lhgsf@hotmail.com
Subject : Public Notice to Russ Sorensen, BLM

Attachment : LHGSFnoticeofpublication.pdf (0.07 MB)

Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

1/14/05

Bureau of Land Management
Russ Sorensen
620 E. Greene St.
Carlsbad, NM 88220

Dear Mr. Sorensen:

You are receiving this letter in accordance with New Mexico OCD Rule 19.G(1)(a) for those persons requiring written notice. Enclosed is the OCD-approved notice for Loco Hills GSF located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

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Mitchel Johnson

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Hearing: The Director has made a preliminary determination that there is significant public interest in the consolidated application, and has scheduled a hearing for 9:00 am Tuesday, March 08, 2005, in Porter Hall at 1220 South St. Francis Drive, Santa Fe, New Mexico, before the Oil Conservation Commission. If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing, please contact Division Administrator Florene Davidson at 505-476-3458 or through the New Mexico Relay Network (1-800-659-1779) by March 01, 2005. Public documents can be provided in various accessible forms. Please contact Ms. Davidson if a summary or other type of accessible form is needed.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

January 05, 2005

CERTIFIED MAIL
RETURN RECEIPT NO: 7923 4412

Mr. Mitch Johnson
Loco Hills GSF
158 Deer Creek Drive
Aledo, TX 76008

RE: Loco Hills GSF's "Best Management Practices Plan Stage I & II Abatement Plan," dated 11-10-2004

Dear Mr. Johnson:

The New Mexico Oil Conservation Division (OCD) has reviewed Loco Hills GSF's (Loco Hills) November 10, 2004 "Best Management Practices Plan Stage I & II Abatement Plan." This document includes Loco Hill's proposed Stage 1 and Stage 2 abatement plans for investigation and remediation of contamination related to the Loco Hills Gas Storage Facility located in NW SW Section 22 Township 17S Range 29 E near Loco Hills, Eddy County, New Mexico.

The OCD has determined that the above referenced Stage 1 and Stage 2 Abatement Plan Proposals are administratively complete. Before the OCD can complete a review of the Stage 1 and Stage 2 proposals, the OCD requires that Loco Hills:

1. send the enclosed OCD-approved notice to those persons requiring written notice pursuant to OCD Rule 19.G(1). "Those persons, as identified by the Director, who have requested notification" pursuant to OCD Rule 19.G(1)(d) may be found on the OCD Web Site at http://www.emnrd.state.nm.us/ocd/ under the Environmental Bureau section.
2. publish the enclosed OCD-approved notice in a newspaper of general circulation in Eddy County, and in a newspaper of general circulation in the state, as required by OCD Rule 19.G.(2).
3. provide the OCD with proof of publication and proof of written notice as required by OCD Rule 19.G(1)(g). Proof of notice shall include a map of the surface owners of record within one (1) mile of the perimeter of the site and shall identify compliance with each of the provisions of Rule 19.G.

The Division Director has set the consolidated application for hearing before the Oil Conservation Commission on March 8, 2005 at 9:00 a.m. in Porter Hall, 1220 South St. Francis Drive, Santa Fe, New Mexico 87505. Please be advised that Loco Hills GSF must be represented by licensed legal counsel at the hearing.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief,
Oil Conservation Division

Cc: Sonya Carrasco-Trujillo
Tim Gum- OCD Artesia District

Enclosures-1

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.

Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.

Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found directly below the site and TDS concentrations of approximately 40,000 mg/l are found in Bear Grass Draw. Site evidence suggests the source of the contamination is past operations at the site. The applicant estimates that the clay-lined pit proposed in the consolidated application will allow 115 gallons of seepage per day. Ground water most likely to be affected is located in Bear Grass Draw at a depth of approximately 90 feet with a TDS concentration of approximately 2,500 mg/l.

Abatement plan: Applicant proposes to investigate the extent of existing contamination in Bear Grass Draw and restore ground water quality under the site to background concentrations or an alternate groundwater abatement standard of 5000 mg/l TDS through a pump-and-use strategy. The water will be evaporated, sold, or used in Loco Hills' LPG facility where the saturated brine will be stored in a 9,000,000-gallon clay-lined pit, and periodically injected into subsurface storage caverns to cause stored LPG to rise to the surface for distribution. The applicant proposes to allow natural attenuation for the off-site contamination in Bear Grass Draw and proposes to obtain agreements with the New Mexico State Land Office and the Bureau of Land Management (BLM) to restrict the drilling of any water wells in Bear Grass Draw. The consolidated application also addresses the request for exceptions to the liner and leak detection requirements of 19.15.2.50.C NMAC for the brine storage pit, and a provisional request for an alternate abatement standard.

Copies of plan: Copies of the consolidated application, including the Stage 1 and Stage 2 abatement plan, may be viewed at the Santa Fe offices of the Oil Conservation between 8:00 a.m. and 4:00 p.m., Monday through Friday, or on the Division's web site: http://www.emnrd.state.nm.us/ocd/.

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Case 13401 : Consolidated Application of Loco Hills GSF for an Exemption to the Liner and Leak Detection Requirements of 19.15.2.50.C NMAC and Approval of Stage 1 and Stage 2 Abatement Plans, with Provisional Alternate Abatement Standards, Eddy County, New Mexico. Application seeks an order granting an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC to allow a clay-lined storage pond for saturated brine, with monitoring devices to detect designed leakage, at the Loco Hills LPG storage facility located in Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. Applicant also seeks approval of its proposed Stage 1 and Stage 2 abatement plans to restore groundwater quality at the site to background concentrations or to an alternate abatement standard of 5000/mg/l TDS through a pump-and use strategy. The site is located on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, just west of where Bear Grass Draw crosses the highway.

Price, Wayne

From: Price, Wayne
Sent: Wednesday, January 05, 2005 9:57 AM
To: 'Mitchel Johnson'; Price, Wayne
Subject: RE: Loco Hills GSF

Yes, it had to go through our legal department, it's my understanding it will be on the Bureau Chief's desk for signature. We will send it out certified when signed, but I will also E-mail you, hopefully today.

-----Original Message-----
From: Mitchel Johnson [mailto:mitchel_lhgsf@hotmail.com]
Sent: Wednesday, January 05, 2005 2:24 AM
To: WPrice@state.nm.us
Subject: RE: Loco Hills GSF

Wayne,

I didn't hear anything yesterday. Can you please update me on our situation?

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

----Original Message Follows----
From: "Price, Wayne" <WPrice@state.nm.us>
To: 'Mitchel Johnson' <mitchel_lhgsf@hotmail.com>
Subject: RE: Loco Hills GSF
Date: Mon, 3 Jan 2005 16:27:11 -0700

We are working on the notice hope to get it out tomorrow.

-----Original Message-----
From: Mitchel Johnson [mailto:mitchel_lhgsf@hotmail.com]
Sent: Monday, January 03, 2005 12:59 PM
To: wprice@state.nm.us
Subject: Loco Hills GSF

Wayne,

Happy New Year! You were looking over our paperwork last week. Can you update me on the situation?

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

For more information please visit http://www.messagelabs.com/email

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For more information please visit http://www.messagelabs.com/email

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Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

Price, Wayne

From: Randall Hicks [R@rthicksconsult.com]
Sent: Thursday, January 06, 2005 4:41 PM
To: 'Price, Wayne'
Subject: RE: Loco Hills Public Notice

Wayne

ASS U ME

I get it.

Let us know about these changes as soon as you can so we can get it out the door. When I first read it, it sounded like there was water in Bear Grass Draw, so I think we all want that clarified.

I heard a rumor that you were moving to another position outside of the Environmental Bureau – true?

Randy

-----Original Message-----
From: Price, Wayne [mailto:WPrice@state.nm.us]
Sent: Thursday, January 06, 2005 4:31 PM
To: 'Randall Hicks'; Price, Wayne; Anderson, Roger
Cc: 'Mitchel Johnson'; MacQuesten, Gail
Subject: RE: Loco Hills Public Notice

Please never assume a change you make to a division document will be accepted by the division. We will have the attorneys review it and get back with you, If you publish before OCD has time to review it and OCD does not agree with the changes, you will have to re-publish it.

> -----Original Message-----
> **From:** Randall Hicks [mailto:R@rthicksconsult.com]
> **Sent:** Thursday, January 06, 2005 4:20 PM
> **To:** 'Price, Wayne'; 'Anderson, Roger'
> **Cc:** 'Mitchel Johnson'
> **Subject:** Loco Hills Public Notice
> Wayne/Roger
>
> I made three changes of clarification to allow the reader to understand that 40,000 mg/L TDS water is not in Bear Grass Draw but in the ground water beneath Bear Grass Draw. As originally written, a person in Albuquerque could believe that past actions contaminated the surface water.

We submitted a copy of the plans to the Artesia NMOCD office. Since we plan to use the Artesia Daily News as one of the papers for notice (the other is the Albuquerque Journal), we thought we should tell the local population that they can find a copy of the plans at their local office.

Unless you have a problem with these changes, Mitchell will be emailing them to the papers for publication early next week. Tomorrow Loco Hills GSF will be sending out the notice to the "interested parties" listed on the NMOCD web site. Hey – I have asked NMOCD to put me on that mailing list before – would one of you ask somebody to call me so my name can be added?

Thanks for your help on all of this. I thought that the language you used in the notice and setting a preliminary hearing date were very helpful.

Randy Hicks
505-266-5004 - office
505-238-9515 - cell

Price, Wayne

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Cc: 'Mitchel Johnson'; MacQuesten, Gail
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as indicated above. If you are not the intended recipient, any disclosure, copying, distribution, or action taken in reliance on the information contained in this electronic communication is strictly prohibited. If you have received this transmission in error, please notify us immediately by telephone and return the original message to us at the address listed above. Thank you.

Price, Wayne

From: Price, Wayne
Sent: Thursday, January 06, 2005 9:33 AM
To: mitchel Johnson-son (E-mail)
Cc: Mitch Johnson (E-mail)
Subject: Loco Hills GSF

Dear Mitchel:

Recently I received an E-mail from Jeremy Baker of Pettigrew. It was a copy of some plans and specs for the bentonite amendmended pond at Loco Hills with a 8 1/2 x 11 drawing. The details on the drawing were not totally legible due to the small size of the drawing. Would you please send a larger drawing and OCD needs a cover letter from GSF committing to designing and constructing the pond pursuant to the plans and spec's. I think it would be beneficial to send in a complete package with cover letter from Loco Hills GSF.

We issued you an approved Public Notice yesterday. If you have any questions please call or write.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Wednesday, January 05, 2005 3:24 PM
To: mitchel Johnson-son (E-mail)
Cc: Mitch Johnson (E-mail)
Subject: Loco Hills GSF

Dear Mitchel:

The attached letter and public notice was signed and put in the US mail today. Please issue the public notice pursuant to the letter. If you have any questions please do not hesitate to call or write.


revised cover letter 1-4.doc


notice of publication.doc

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Mitchel Johnson [mitchel_lhgsf@hotmail.com]
Sent: Wednesday, January 05, 2005 10:30 AM
To: WPrice@state.nm.us
Subject: RE: Loco Hills GSF

Wayne,

Thank you for the update. Please keep me informed as soon as you hear something.

Thank you,

Mitchel Johnson
Loco Hills GSF
office: 817-441-6568
cell: 817-371-7933

----Original Message Follows----
From: "Price, Wayne" <WPrice@state.nm.us>
To: 'Mitchel Johnson' <mitchel_lhgsf@hotmail.com>, "Price, Wayne" <WPrice@state.nm.us>
Subject: RE: Loco Hills GSF
Date: Wed, 5 Jan 2005 09:57:09 -0700

Yes, it had to go through our legal department, it's my understanding it will be on the Bureau Chief's desk for signature. We will send it out certified when signed, but I will also E-mail you, hopefully today.

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Affidavit of Publication

NO. 18748

STATE OF NEW MEXICO

County of Eddy:

Gary D. Scott being duly

sworn,says: That he is the **Publisher** of The

Artesia Daily Press, a daily newspaper of general

circulation, published in English at Artesia, said county

and county and state, and that the here to attached

Legal Notice

was published in a regular and entire issue of the said

Artesia Daily Press,a daily newspaper duly qualified

for that purpose within the meaning of Chapter 167 of

the 1937 Session Laws of the state of New Mexico for

1 consecutive weeks/days on the same

day as follows:

First Publication January 19 2005

Second Publication

Third Publication

Fourth Publication

Subscribed and sworn to before me this

19th Day January 2005

Notary Public, Eddy County, New Mexico

My Commission expires September 23, 2007

Copy of Publication:

LEGAL NOTICE

NOTICE OF PUBLICATION STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

Loco Hills GSF has submitted a Stage 1 and Stage 2 abatement plan to restore groundwater quality at the site of its liquid petroleum gas (LPG) storage facility as part of a consolidated application that also seeks an exemption to the liner and leak detection requirements of 19.15.2.50.C NMAC (the pit rule) and provisional alternate abatement standards.

Responsible person: Loco Hills GSF, Mr. Mitch Johnson, 158 Deer Creek Drive, Aledo, Texas, 76008, (817) 441-6568.

Location of proposed abatement: Section 22, T17S, R29E, NMPM, Eddy County, New Mexico. The site is on the south side of New Mexico State Highway 82 between Loco Hills and Artesia, immediately to the west of where Bear Grass Draw crosses the highway.

Contamination: Elevated total dissolved solids (TDS) of 100,000 mg/l are found in ground water directly below the site and TDS concentrations of approximately 40,000 mg/l are found in groun water beneath Bea Grass Draw. Site evi dence suggests th source of the contamina tion is past operations a the site. The applican estimates that th clay-lined pit proposed i the consolidated applica tion will allow 115 gallon of seepage per da Ground-water most likel to be affected is locate in Bear Grass Draw at depth of approximatel 90 feet with background TDS con centration of approxi mately 2,500 mg/l.

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STATE OF NEW MEXICO
County of Bernalillo SS

Bill Tafoya, being duly sworn, declares and says that he is Classified Advertising Manager of **The Albuquerque Journal**, and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Session Laws of 1937, and that payment therefore has been made of assessed as court cost; that the notice, copy of which is hereto attached, was published in said paper in the regular daily edition, for 1 times, the first publication being on the 19 day of Jan, 20 05 and the subsequent consecutive publications on _____, 20___.

Sworn and subscribed to before me, a Notary Public, in and for the County of Bernalillo and State of New Mexico this 19 day of Jan of 2005

PRICE $67.17

Statement to come at end of month.

ACCOUNT NUMBER C 81504

CLA-22-A (R-1/93)

My Commiss

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ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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Journal: January 19, 2005