



February 1, 2023

Ms. Victoria Venegas
New Mexico OCD
(575)-909-0269
Victoria.venegas@emnrd.nm.gov

Re: Libby Pit Plan of Action Clarification

Ms. Venegas,

This letter is in response to your request via email for clarification of the proposed plan of action to repair the primary liner and renew the permit/re-permit the Libby Pit (1RF-024). Each point from the email correspondence between V. Venegas and M. Ratke has been addressed in an independent section of this submittal. Included in this submittal are the following items.

1. Leak Detection and soil sample records from the Libby Pit
2. Permit Modification Request with C-147 forms filled out to allow for a 3rd layer of liner to be installed at the Libby Pit
3. Variance request to add a 3rd layer of liner and use 60 mil HDPE liner at the Libby Facility
4. Engineering Details Stamped by a Licensed Engineer for a 3 layered liner system
5. Letter showing intent to remove aerators from the pit

If you have any questions or concerns about the plan of action outlined previously or about the contents of this clarification letter, please feel free to reach out to me via email or telephone at the information listed below. We look forward to hearing back from you.

A handwritten signature in black ink, appearing to read 'Mitchell Ratke'.

Mitchell Ratke
ENVIROTECH ENGINEERING AND CONSULTING
mratke@envirotechconsulting.com
(580)-234-8780

A handwritten signature in blue ink, appearing to read 'Harry Lewis'.

Harry Lewis
Delek Logistics

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: Recycling Facility Recycling Containment*
Type of action: Permit Registration
 Modification Extension
 Closure Other (explain) _____

* At the time C-147 is submitted to the division for a Recycling Containment, a copy shall be provided to the surface owner.

Be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: 3Bear Field Services, LLC (For multiple operators attach page with information) OGRID #: 372603
Address: 7102 Commerce Way, Brentwood, TX 37027
Facility or well name (include API# if associated with a well): Libby Berry Fee SWD #1
OCD Permit Number: (1RF-024) (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr SW/4 Section 26 Township 20 South Range 34 East County: Lea
Surface Owner: Federal State Private Tribal Trust or Indian Allotment

2.
 Recycling Facility:
Location of recycling facility (if applicable): Latitude 32.543858° Longitude -103.525344° NAD83
Proposed Use: Drilling* Completion* Production* Plugging*
**The re-use of produced water may NOT be used until fresh water zones are cased and cemented*
 Other, *requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.*
 Fluid Storage
 Above ground tanks Recycling containment Activity permitted under 19.15.17 NMAC explain type _____
 Activity permitted under 19.15.36 NMAC explain type: _____ Other explain _____
 For multiple or additional recycling containments, attach design and location information of each containment
 Closure Report (required within 60 days of closure completion): Recycling Facility Closure Completion Date: _____

3.
 Recycling Containment:
 Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.544383° Longitude -103.526851° NAD83
 For multiple or additional recycling containments, attach design and location information of each containment
 Lined Liner type: Thickness 60/60/60 mil LLDPE HDPE PVC Other _____
 String-Reinforced
Liner Seams: Welded Factory Other Field Welded Seams Volume: 279,558 bbl Dimensions: L 810' x W 810' x D 13'
 Recycling Containment Closure Completion Date: _____

4.

Bonding:

Covered under bonding pursuant to 19.15.8 NMAC per 19.15.34.15(A)(2) NMAC (These containments are limited to only the wells owned or operated by the owners of the containment.)

Bonding in accordance with 19.15.34.15(A)(1). Amount of bond \$ 2,192,173 (work on these facilities cannot commence until bonding amounts are approved)

Attach closure cost estimate and documentation on how the closure cost was calculated.

5.

Fencing:

Four foot height, four strands of barbed wire evenly spaced between one and four feet

Alternate. Please specify 6' game fence with 4" mesh

6.

Signs:

12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

Signed in compliance with 19.15.16.8 NMAC

7.

Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation.

8.

Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting	
Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. FEMA map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

9.

Recycling Facility and/or Containment Checklist:

Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- Design Plan - based upon the appropriate requirements.
- Operating and Maintenance Plan - based upon the appropriate requirements.
- Closure Plan - based upon the appropriate requirements.
- Site Specific Groundwater Data -
- Siting Criteria Compliance Demonstrations -
- Certify that notice of the C-147 (only) has been sent to the surface owner(s)

10.

Operator Application Certification:

I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Harry Lewis Title: Sr. Director, EHS
 Signature: [Handwritten Signature] Date: February 2, 2023
 e-mail address: harry.lewis@dclchlogistics.com Telephone: 469.704.7379

11.

OCD Representative Signature: Victoria Venegas Approval Date: 02/10/2023

Title: Environmental Specialist OCD Permit Number: 1RF-24

- OCD Conditions
- Additional OCD Conditions on Attachment

Leak Detection Results & Soil Sample Results

3 Bear Energy - Libby Water Recycling and Containment Facility								LOCATION:	LIBBY WATER PLANT	
WEEKLY READINGS								MONTH/YEAR	Jul-22	
				DAILY				DAILY		
		Containment	Liner	Containment	Containment	Sump Riser	Sump Level	Leak Detection	Inspect	
		Pond	Integrity	Pond	Pond	Integrity	Guages	Flow Meeter	Containment	
		(Oil Skim)	Water Level Gauge		Water Level Gauge		Inspected/Tested	Reading	Dead Wild Life	
Operators			>3 Feet	Water Level	Leaks?	< 1 Foot	Flow Volume	Birds/animals		
Initials	Date	Visual/Weekly	Inspect Monthly	Visual/Daily	Record Weekly	Visual/Weekly	Record Weekly	Record Weekly	Visual/Daily	Comments
blo	7/1/2022	YES	Yes	4	4	GOOD	0.1	1157.91	GOOD	Filling Pit
blo	7/2/2022	YES	Yes	5	5	GOOD	0.15	1157.91	GOOD	Filling Pit
blo	7/3/2022	YES	Yes	5	5	GOOD	0.55	1157.91	GOOD	Filling Pit
blo	7/4/2022	YES	Yes	5	5	GOOD	0.75	1157.91	GOOD	Filling Pit
blo	7/5/2022	YES	Yes	5	5	GOOD	1.2	1157.91	GOOD	pumped sump out-4bbls
blo	7/6/2022	YES	Yes	6	6	GOOD	0.8	1157.91	GOOD	Filling Pit
blo	7/7/2022	YES	Yes	6	6	GOOD	0.9	1157.91	GOOD	pumped sump out-8bbls
blo	7/8/2022	YES	Yes	6	6	GOOD	0.75	1157.91	GOOD	Filling Pit
blo	7/9/2022	YES	Yes	6	6	GOOD	1.2	1157.91	GOOD	Filling Pit
blo	7/10/2022	YES	Yes	6	6	GOOD	2.17	1157.91	GOOD	pumped sump out-20
blo	7/11/2022	YES	Yes	6	6	GOOD	5.5	1157.91	GOOD	pumped sump out-89
blo	7/12/2022	YES	Yes	6	6	GOOD	3.63	1157.91	GOOD	pumped sump out-50
blo	7/13/2022	YES	Yes	6	6	GOOD	3.48	1157.91	GOOD	pumped sump out-46
blo	7/14/2022	YES	Yes	6	6	GOOD	3.78	1157.91	GOOD	pumped sump out-40
blo	7/15/2022	YES	Possible Breach	6	6	GOOD	3.7	1157.91	GOOD	begin to empty pit
blo	7/16/2022	YES	Possible Breach	6	6	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/17/2022	YES	Possible Breach	6	6	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/18/2022	YES	Possible Breach	6	6	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/19/2022	YES	Possible Breach	6	6	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/20/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/21/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/22/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/23/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/24/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/25/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/26/2022	YES	Possible Breach	5	5	GOOD	3.7	1157.91	GOOD	empty pit
blo	7/27/2022	YES	Possible Breach	5	5	GOOD	3.5	1157.91	GOOD	empty pit
blo	7/28/2022	YES	Possible Breach	5	5	GOOD	3.5	1157.91	GOOD	empty pit
blo	7/29/2022	YES	Possible Breach	5	5	GOOD	3.5	1158.91	GOOD	empty pit
blo	7/30/2022	YES	Possible Breach	4	4	GOOD	3.5	1159.91	GOOD	empty pit
blo	7/31/2022	YES	Possible Breach	4	4	GOOD	3.5	1159.91	GOOD	empty pit
Notes	Turned on pump, Performed bucket test, Water rate is 10-12 GPM out Leak Detction,									



HRL
COMPLIANCE
SOLUTIONS

P.O. Box 1708 • Artesia, NM 88211
www.hrlcomp.com

August 1, 2018

Re: 1RF-24 Libby Recycling Containment

Gerald G. Wyche
Manager of Operations – Hobbs Area
674 Marathon Road
PO Box 5581
Hobbs, NM 88241

Mr. Wyche,

HRL Compliance Solutions is providing this summary of actions and results at the Recycling Containment for 3Bear Energy.

Empty tanks were stored on the east side of the containment. During a windstorm the tanks were blown into the containment and the t-posts attached to the tanks ripped the liner. OCD provided the following guidance via email on June 14, 2018:

- NMOCD advised 3Bear to collect discrete samples from each of the identified areas where the liner(s) have been torn. Soil samples will be collected by an environmental professional and sent to an accredited laboratory.
- Samples will be taken from the surface and at least 1 ft. bgs for verification. Soil samples will be tested for BTEX, TPH extended (GRO, DRO, and MRO), and chlorides via these respective EPA methods 8260 or 8021, 8015, and 300. Permissible levels are 10 mg/kg Benzene, 50 mg/kg BTEX, 5000 mg/kg TPH, and 600 mg/kg chlorides.
- Windblown soil currently in the containment must be removed to complete inspection of the liner for any additional defects affecting liner integrity.
- Please contact Mr. Bradford Billings to obtain more specific instructions on the use of a tracer dye for leak detection after repairs are completed.
- 3Bear will inform NMOCD of subsequent site visit opportunities and will provide photo documentation of the repair process.

3Bear Energy retained HRL to obtain the samples from 5 identified locations where the liner(s) were torn. The Sample Location Map is shown with the five locations identified relative to the southeast corner of the containment for reference. Samples were analyzed for chlorides via Method 4500 on 6/27/2018. The sampling results are presented below:

INNOVATIVE SOLUTIONS DELIVERED



	SP1	SP2	SP3	SP4	SP5
Surface	592	672	128	576	288
1' bgs	64	656	96	144	32
2' bgs	133	864	--	256	--

Based on these results, additional excavation at SP2 was necessary.

On 6/29/2018, a small track hoe was used to excavate the contaminated material in a 10-foot radius centered around SP2. Samples were taken along the side wall and bottom of the excavation. Samples were analyzed for chlorides via Method 4500 on 6/29/2018.

	W Side	E Side	N Side	S Side	Bottom
4' bgs	3690	4240	4480	6260	
6' bgs					3120

On June 29, 2018, on behalf of 3Bear Energy, HRL communicated the results of this sampling with OCD and asked to for an alternate closure standard via email. This was approved on July 2, 2018. 3Bear commenced with repairs to the liner and pressure tested all repairs on the liner. A “spark test” was also conducted on the liner per ASTM D7240. The spark test was completed satisfactorily on July 14, 2018 and the pit was put back into service. OCD was informed of this via email on 7/19/2018. It will take several weeks for the facility to be fully operational. During this phase, the leak detection system will be monitored.

Liquid Leak Detection

The liquid leak detection (LLD) drain will be an open three-dimensional HDPE synthetic drainage net. The liquid leak detection drain will be supported by the secondary flexible membrane liner. The entire liner, including the leak detection drainage net, will be graded to drain to a leak detection drain sump that is filled with graded fine gravel supported by the secondary flexible membrane liner.

A leak detection drainage net is located in the gravel-filled sump and in the adjacent surface runoff between the primary flexible membrane liner and the secondary flexible membrane liner. The liquid leak detection header and associated gravel-filled trench will be graded to an associated leak detection sump. A geotextile cushion or additional geocomposite will be placed over the top of the gravel filling the gravel-filled leak detection trench to reduce the potential for damage to the overlying primary flexible membrane liner. A leachate collection underdrain lateral will be installed beneath the geonet drainage layer and will extend from the east end of the containment pond to the leachate detection sump. This will increase the total capacity of



the leak detection drainage system to convey the necessary leachate flow along the primary flow path at the center of the pond to the sump.

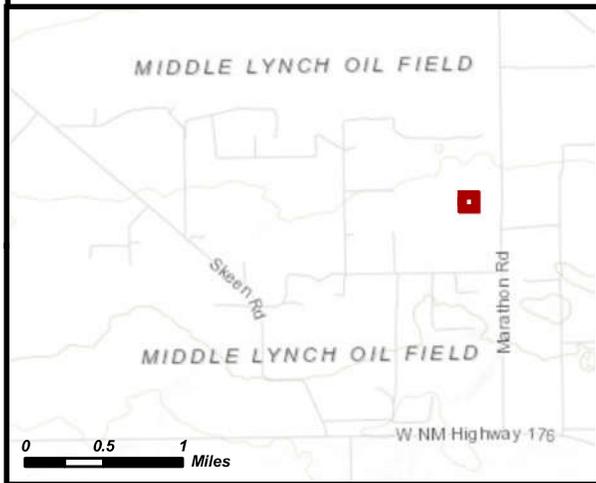
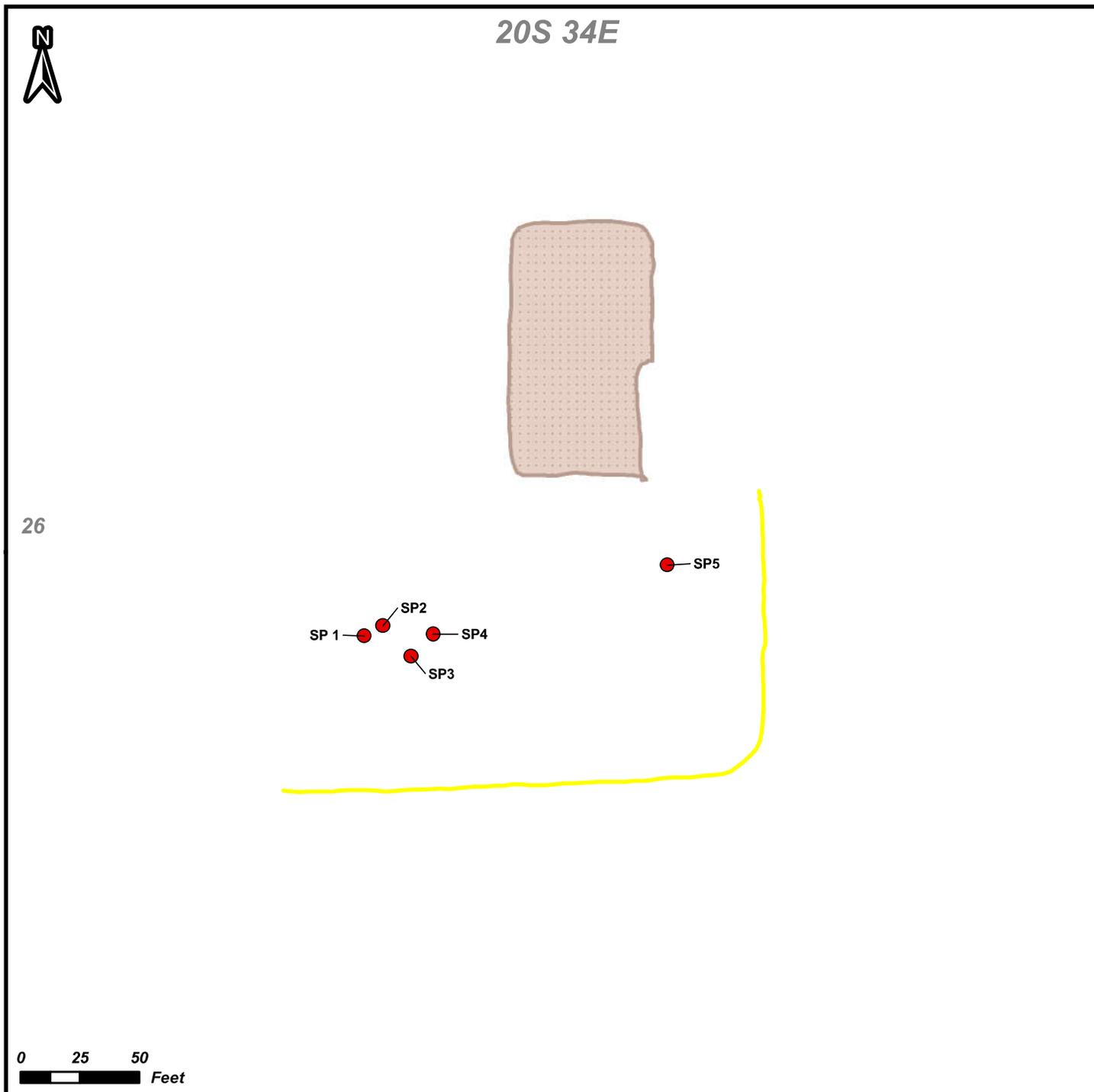
Liquid levels in the leak detection drain sump are monitored via an electronic system that is monitored in the control room. Alarms are set for any measurable liquid and any alarm will result in an immediate investigation.

All documentation and agency correspondence are attached to this summary.

Sincerely,

A handwritten signature in blue ink, which appears to read "Jennifer Knowlton". The signature is written in a cursive, flowing style.

Jennifer Knowlton
Regional Manager – Permian



3Bear Energy

Sample Location Map

3Bear Energy Libby Gas Plant Pit Sampling

32.544005220 -103.526006738
Section 26, Township 20 South, Range 34 East

Mapped Features

- Sample Points
- Edge of Pit
- Sump

DISCLAIMER: This representation and the Geographic Information System (GIS) used to create it are designed as a source of reference and not intended to replace official records and/or legal surveys. HCS assumes no responsibility for any risks, dangers, or liabilities that may result from its use and makes no guarantee as to the quality or accuracy of the underlying data.



Author: A. Asay
Revision: 0
Date: 6/28/2018

CLIENTS:3BEAR ENERGY\2019\LIBBY PLANT AND OIL TERMINAL\SRW\3Bear Energy Libby Gas Plant Pit Sampling No Background 062818.mxd

Jennifer Knowlton

From: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Sent: Friday, July 27, 2018 9:37 AM
To: Jennifer Knowlton; Yu, Olivia, EMNRD
Cc: Hernandez, Christina, EMNRD; gerald@3bearllc.com; scott@3bearllc.com
Subject: RE: soil sampling for the 1RF-24 Libby Recycling Containment

Hello all,

Thank you for the synopsis. The plan to closely monitor volume/flow in the “leak detection aspect” may be as good as we have at the moment. Please be sure to watch closely early during fill-up, so that we may better estimate normal volumes of collection in system versus any increase of volume that might be indicative of additional “issues”. In essence, get a baseline for comparison.

Also,

OCD did not allow “alternate closure” values at time of closure. We are aware of the values to obtain at closure, by rule, what we were looking for in soil evaluation while working on the tear, was an idea of scope and depth. While values were found that might trigger a release case, if leak were from say a pipe, they do not necessarily do so under a containment and not a surface release. Keep in mind this location of the leak(s) will likely be looked at a bit closer at closure. As the values allowed under a containment for Cl at closure are based on extremely minimal release/loss. In hopes this makes sense to all.

In any event, thank you again for this report. Please keep us informed of progress on refill.

Sincerely,

Bradford Billings
 EMNRD/OCD
 Santa Fe

From: Jennifer Knowlton <jknowlton@hrlcomp.com>
Sent: Friday, June 29, 2018 5:08 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Cc: Hernandez, Christina, EMNRD <Christina.Hernandez@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; gerald@3bearllc.com; scott@3bearllc.com
Subject: RE: soil sampling for the 1RF-24 Libby Recycling Containment

Ms. Yu,

After conducting the initial sampling at the Libby Recycle Containment, I believe that I mentioned that we did have samples that were above the chloride threshold of 600 mg/kg for one of the five sampling points.

Sample Identification	Depth	Results
SP1	Surface	592
	1 ft bgs	64
SP2	Surface	672
	1 ft bgs	656

SP3	Surface	128
	1 ft bgs	96
SP4	Surface	576
	1 ft bgs	144
SP5	Surface	288
	1 ft bgs	32

I would like some clarification on the source of your stated chloride threshold of 600 mg/kg.

In the approved application for the Libby Recycling Facility (1RF-24-0), the closure standards for the facility are per NMAC 19.15.34.14. No variances to these standards were requested. Per 19.15.34.14 Table 1 lists the applicable closure standard for this location as 20,000 mg/kg chlorides.

The location obviously meets the current closure standards and it isn't appropriate to apply standards from the spill rule to the subsurface of a recycling facility. We propose to mark SP2 via GPS marker so when the facility is closed, this area can be characterized in more detail during the closure process.

Jennifer Knowlton, PE | Regional Manager-Permian

HRL Compliance Solutions, Inc.

112 S. 6th Street, Unit Bldg A | Artesia, NM 88210

main 575.616.7398 Ex. 414 | mobile 505-238-3588

[Web](#) | [vCard](#) | [Map](#) | |



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From: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>
Sent: Wednesday, June 20, 2018 8:43 AM
To: Jennifer Knowlton <jknowlton@hrlcomp.com>
Cc: Hernandez, Christina, EMNRD <Christina.Hernandez@state.nm.us>; Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; gerald@3bearllc.com
Subject: FW: soil sampling for the 1RF-24 Libby Recycling Containment

Good morning Ms. Knowlton:

I received your call this morning at 8:17 am MST, regarding the liner at 1RF-24. Please see below for requirements in terms of release characterization. Please note that if 1 ft. bgs samples are not within permissible levels, then samples further in depth would be required. Will the samples be collected by dry vacuuming or another process?

As for your question regarding remediation permit, no. A 1RP has not been issued, although current release guidelines are in effect. This incident will be documented under 1RF-24.

Thanks,
 Olivia

From: Scott Spicher <scott@3bearllc.com>
Sent: Thursday, June 14, 2018 8:17 PM
To: Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us>

Cc: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>; Griswold, Jim, EMNRD <Jim.Griswold@state.nm.us>; Hernandez, Christina, EMNRD <Christina.Hernandez@state.nm.us>; Gerald Wyche <gerald@3bearllc.com>; Bo Buescher <bbuescher@3bearllc.com>; Mike Solomon <msolomon@3bearllc.com>

Subject: Re: soil sampling for the 1RF-24 Libby Recycling Containment

Ms. Yu,

Nice to meet you today as well. We will coordinate the sampling and testing per your guidance and keep you and Mr. Billings informed of all results.

Thanks,

Scott

On Jun 14, 2018, at 5:03 PM, Yu, Olivia, EMNRD <Olivia.Yu@state.nm.us> wrote:

Mr. Spicher:

A pleasure meeting you this morning, June 14, 2018, around 9 am MST, at the 3Bear Libby Recycling Containment (1RF-24) location. A summary of NMOCD's field visit regarding the incident at 1RF-24:

- NMOCD was shown 3 locations where the primary and secondary liners were not intact.
- NMOCD advised 3Bear to collect discrete samples from each of the identified areas where the liner(s) have been torn. Soil samples will be collected by an environmental professional and sent to an accredited laboratory.
- Samples will be taken from the surface and at least 1 ft. bgs for verification. Soil samples will be tested for BTEX, TPH extended (GRO, DRO, and MRO), and chlorides via these respective EPA methods 8260 or 8021, 8015, and 300. Permissible levels are 10 mg/kg Benzene, 50 mg/kg BTEX, 5000 mg/kg TPH, and 600 mg/kg chlorides.
- Windblown soil currently in the containment must be removed to complete inspection of the liner for any additional defects affecting liner integrity.
- Please contact Mr. Bradford Billings to obtain more specific instructions on the use of a tracer dye for leak detection after repairs are completed.
- 3Bear will inform NMOCD of subsequent site visit opportunities and will provide photo documentation of the repair process.

Please confirm or inform if the above information was misunderstood or miscommunicated. Also, please pass this message to Mr. Gerald White. I do not have his email address.

NMOCD appreciates 3Bear Energy's cooperation and compliance with NMOCD environmental regulations.

Thanks,

Olivia Yu
Environmental Specialist
NMOCD, District I
Olivia.yu@state.nm.us
575-393-6161 x113

OCD approval does not relieve the operator of liability should their operations fail to adequately investigate and remediate contamination that may pose a threat to ground water, surface water, human

health or the environment. In addition, OCD approval does not relieve the operator of responsibility for compliance with any other federal, state, local laws and/or regulations.

**ELECTRICAL LEAK LOCATION SURVEY
GENERAL GUIDE**



AUGUST 2014



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ATTACHMENTS

- Attachment 1: DESIGNING FOR LINER INTEGRITY SURVEYS
- Attachment 2: ELECTRICAL LEAK LOCATION SURVEY OPERATOR
 CERTIFICATION

1.0 HANDBOOK INSTRUCTIONS

This handbook is intended for use by design engineers, regulatory agencies, construction quality assurance agencies, and any individuals seeking a basic knowledge of electrical leak location surveys. It is not a comprehensive guide for the performance of leak location surveys. It describes the most commonly used mobile liner integrity / leak location methods.

For more specific information related to your project, contact Abigail Beck, TRI Environmental Director of Liner Integrity Services, at abeck@tri-env.com, 512-623-0511. TRI Environmental is a world-wide educational and service platform for liner integrity and leak location surveys. TRI performs electrical leak location surveys, provides leak location survey equipment, refers leak location companies world-wide, and provides technician training and certification.

2.0 EXPOSED GEOMEMBRANE SURVEYS

- References:**
- ASTM D6747: Standard Guide for Selection of Techniques for Electrical Detection of Leaks in Geomembranes
 - ASTM D7002: Standard Practice for Leak Location on Exposed Geomembranes Using the Water Puddle System
 - ASTM D7703: Standard Practice for Electrical Leak Location on Exposed Geomembranes Using the Water Lance System
 - ASTM D7240: Leak Location using Geomembranes with an Insulating Layer in Intimate Contact with a Conductive Layer via Electrical Capacitance Technique (Conductive Geomembrane Spark Test)
 - ASTM D7953: Standard Practice for Electrical Leak Location on Exposed Geomembranes Using the Arc Testing Method

2.1 Water Puddle Method (ASTM D7002)

The water puddle method is generally the preferred method for bare, non-conductive geomembrane due to its speed, but it requires a water source and becomes less sensitive on extreme side slopes and on sites with poor boundary conditions. When slopes are steeper than 2H:1V, the water lance method or arc testing method should be used. The minimum sensitivity is a 1 mm diameter leak.

A low voltage direct current source is introduced to the water sprayed above the geomembrane and grounded to the subgrade underneath the geomembrane. An ammeter in series with the circuit converts the increase in voltage to an audible signal when the equipment passes over a leak.

The water sprayed onto the survey area to perform the test must be contained in the survey area (above the geomembrane to be tested). Conductive features such as concrete sumps and batten strips must be isolated and cannot be tested, since they will ground out the survey (give a false positive signal). Holes will not likely be detected on wrinkles unless conductive-backed geomembrane is used, or if the operator makes a successful attempt to push down the wrinkles and create intimate contact between the geomembrane and the subgrade.

2.2 Water Lance Method (ASTM D7703)

The water lance method is generally used when slopes are steeper than 2H:1V, but it can also be used on flat areas. It requires a water source and becomes less sensitive on sites with poor boundary conditions. The minimum sensitivity is a 1 mm diameter leak.

A low voltage direct current source is introduced to the water sprayed above the geomembrane and

grounded to the subgrade underneath the geomembrane. An ammeter in series with the circuit converts the increase in voltage to an audible signal when the equipment passes over a leak.

The water sprayed onto the survey area to perform the test must be contained in the survey area (above the geomembrane to be tested). Conductive features such as concrete sumps and batten strips must be isolated and cannot be tested, since they will ground out the survey (give a false positive signal). Holes will not likely be detected on wrinkles unless conductive-backed geomembrane is used, or if the operator makes a successful to push down the wrinkles and create intimate contact with the subgrade.

2.3 Conductive-Backed Geomembrane Spark Testing Method (ASTM D7240)

The conductive-backed geomembrane spark testing method is generally preferred for bare conductive-backed geomembranes, since no water is required to perform the test and it is typically performed by installers. The minimum sensitivity is a 1 mm diameter leak per current ASTM.

A high voltage pulsed power supply charges a capacitor formed by the underlying conductive layer, the non-conductive layer of the geomembrane and a coupling pad. The area is swept with a brush-like test wand to locate points where the capacitor discharges through a leak. When the system senses the discharge current, it is converted into a visible spark and an audible alarm.

The surface of the geomembrane must be clean and dry. Unless the conductive geomembrane has been installed with the conductive layer sufficiently broken in the fusion weld, this method cannot be used to test fusion-welded seams. Holes can be detected on wrinkles and other "poor contact" conditions due to the conductive backing of the geomembrane.

2.4 Arc Testing Method (ASTM D7953)

The arc testing method is generally preferred for bare geomembranes, since no water is required to perform the test and it can be more sensitive than the water-based methods because the leak detection does not depend on water getting through the leak. The minimum sensitivity is a 1 mm diameter leak per ASTM D7953, but leaks smaller than that have regularly been located.

A high voltage power supply is applied to a test wand above the geomembrane and is grounded to the underlying conductive layer. The area is swept with a test wand and an electrical arc is formed in the presence of a leak. When the system senses the discharge current arc, it is converted into visual and audio alarms. The test wand can be custom sizes and shapes for specific applications.

This type of test requires that the geomembrane is in contact with the subgrade. If the separation distance is greater than 3 cm, such as on a wrinkle or other "poor contact" conditions, the instrument is not likely to arc. The surface of the geomembrane must be clean and dry.

3.0 COVERED GEOMEMBRANE SURVEYS

References: ASTM D6747: Standard Guide for Selection of Techniques for Electrical Detection of Leaks in Geomembranes

ASTM D7007: Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth Materials

3.1 Dipole Method – Soil Covered Geomembrane (ASTM D7007)

This dipole method is used for geomembranes covered with earth, gravel, concrete, sand or any other conductive medium. The sensitivity of the survey depends highly on site conditions and the lining system materials. The suggested minimum sensitivity for earthen materials less than 0.6 meters thick is a 6.4 mm diameter leak, though adverse site conditions can decrease the sensitivity.

A high voltage is applied to the cover material with a positive electrode. The power source is grounded to the subgrade underneath the geomembrane. Voltage measurements are taken in a grid pattern

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throughout the survey area using a dipole instrument. Leak locations cause a sine wave pattern in the voltage measurements as the dipole instrument travels across a hole location.

The survey area must be electrically isolated from the surrounding ground. Generally, a perimeter isolation trench surrounds the survey area, with the geomembrane exposed. Any conductive objects such as access roads, metal sump pipes, or standing water must be removed before the survey can be performed. Holes will not likely be detected on wrinkles unless conductive-backed geomembrane is used, or if the hole on a wrinkle is significant enough for soil to create continuous contact between the cover soil and subgrade.

The data collected by the roving dipole instrument is recorded and downloaded into computer software for analysis. The ASTM requires the data to be recorded but does not specify how it is analyzed. Data can be analyzed graphically or by mapping the voltage contours. Graphical data analysis displays the data as voltage slices of the survey area, as graphed in software such as Excel. Voltage contour mapping data analysis shows the voltage measurements in plan view of the survey area. An example of graphical data analysis is shown in Figure 1. An example of voltage contour mapping data analysis is shown in Figure 2.

A sensitivity test is performed before beginning the survey using either a real or an artificial leak. An artificial leak is essentially a metal disk of a given diameter to mimic an actual leak. The metal disc is grounded to the conductive layer underlying the geomembrane. The distance from the artificial leak ground and the power source ground should be an adequate distance to mimic an actual leak. The sensitivity test protocol requires that the magnitude of the sine wave signal produced by the real or artificial leak be at least three times that of the background voltage oscillations as measured when the leak is not there. This is known as the signal to noise ratio. A sample of sensitivity test results are shown in Figure 3.

Once a leak is located by the survey, it must be excavated and the leak cleaned off and removed from the electrical circuit so that the area around the leak can be checked for leaks in the surrounding area, since large leaks can mask smaller adjacent leaks.

Figure 1: Graphical Data Analysis.

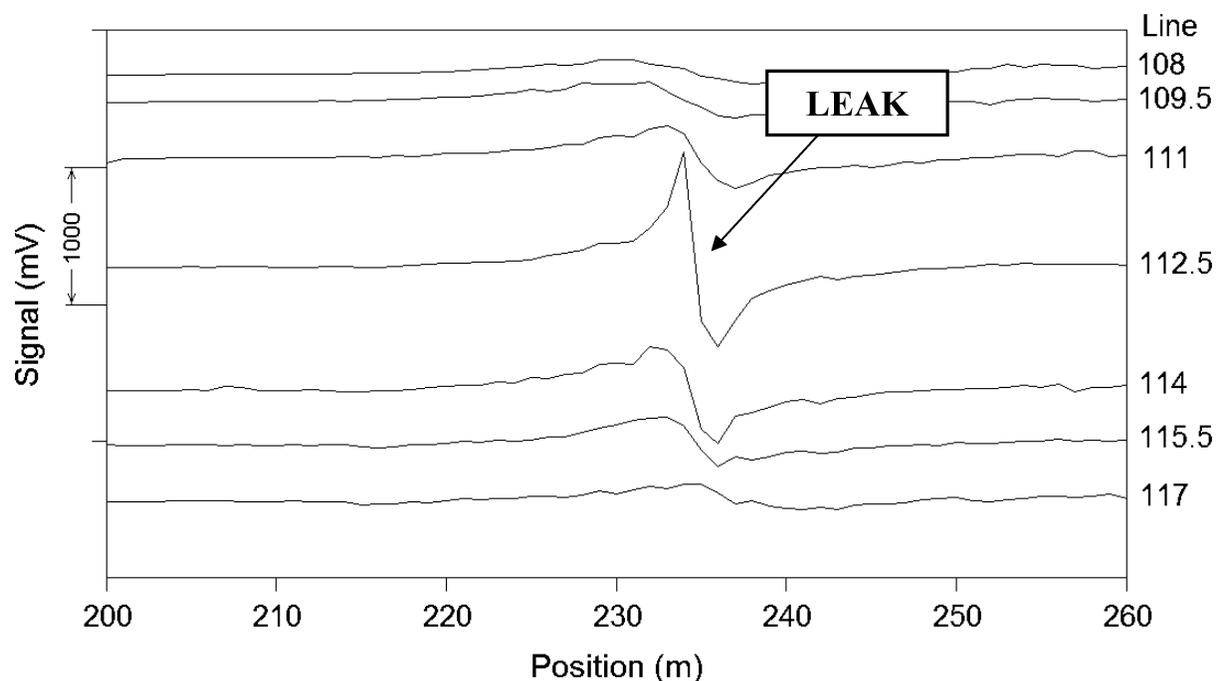
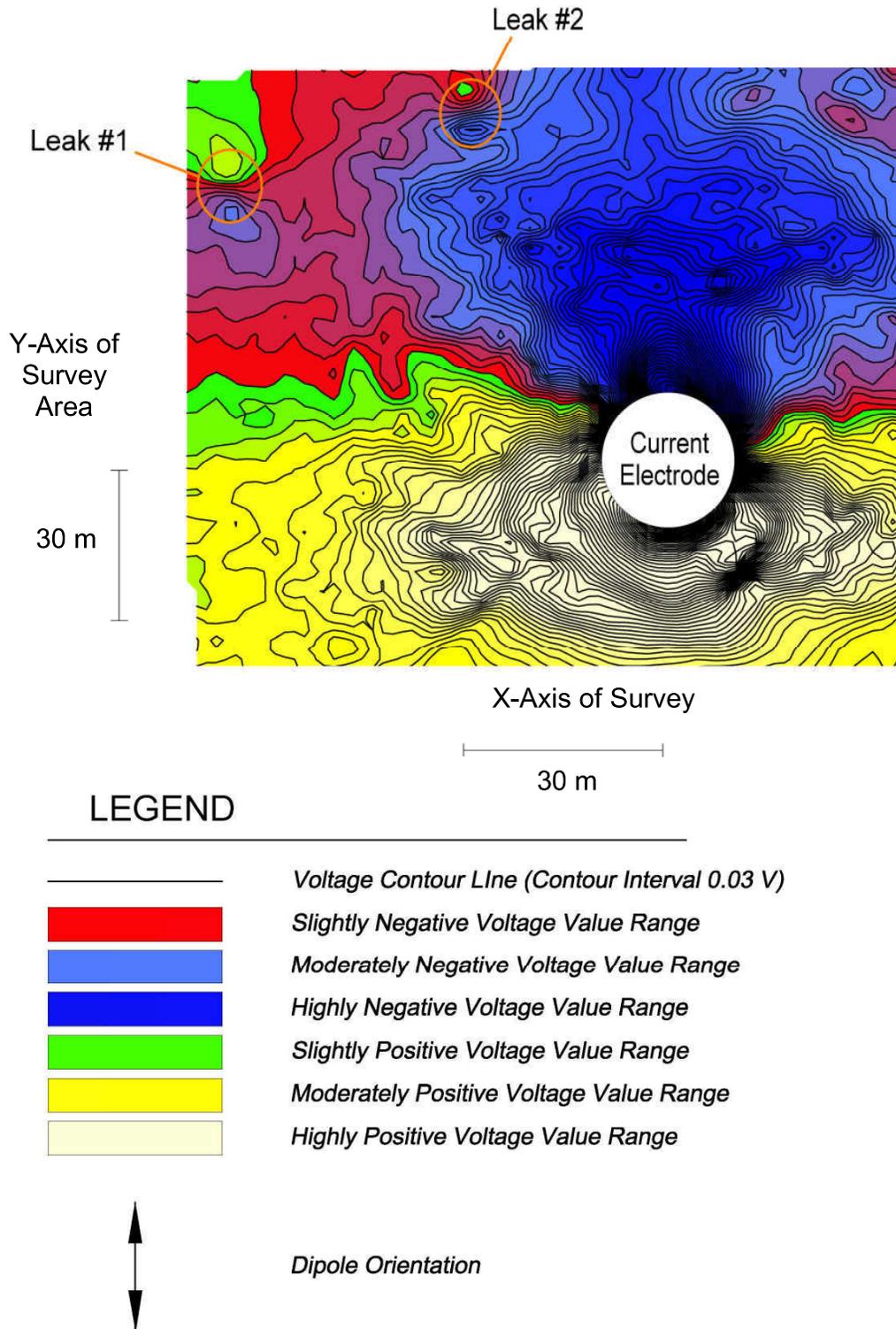


Figure 2: Voltage Contour Mapping Data Analysis.



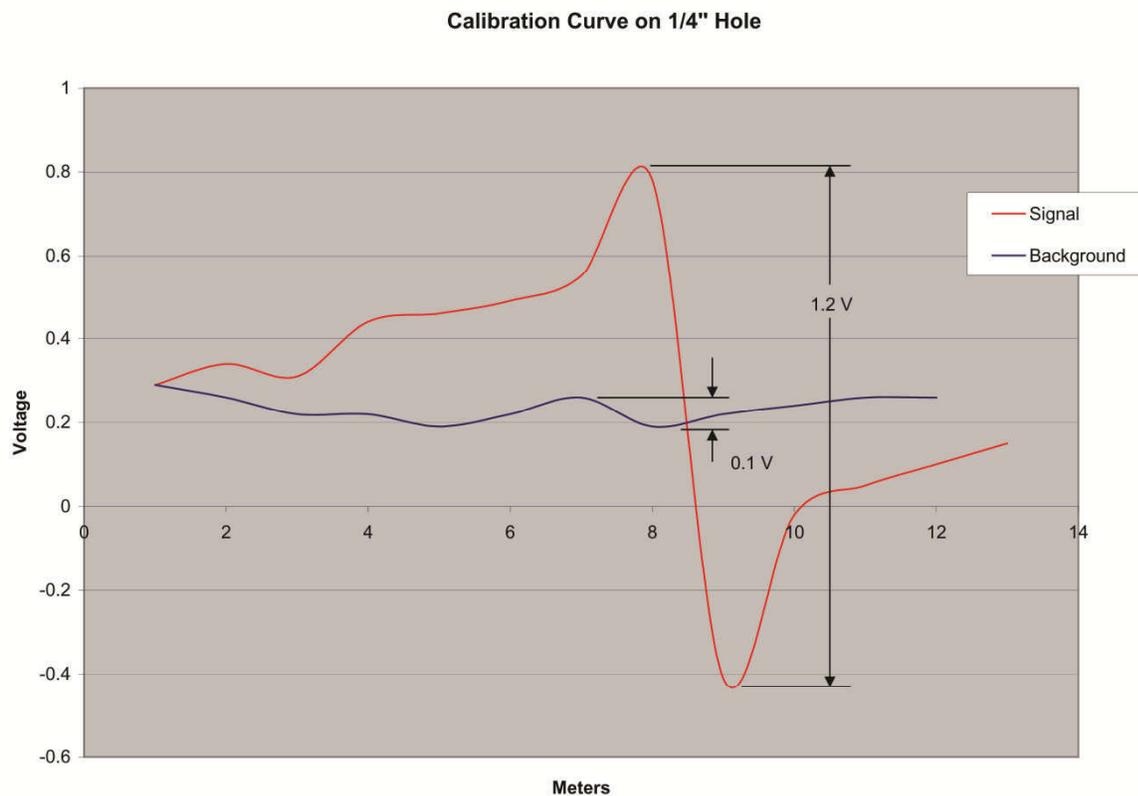
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Table 1: Dipole Survey Methodology Comparison

Method	Pros	Cons
Graphical Data Analysis	<ul style="list-style-type: none"> -Does not require high-precision GPS or sophisticated data recording software 	<ul style="list-style-type: none"> -Data typically requires manual manipulation -Can be difficult to relocate leak locations from data -Relies on string lines for measurement accuracy
Voltage Contour Mapping Data Analysis	<ul style="list-style-type: none"> -Faster than graphical data analysis if GPS is used to guide measurement grid rather than string lines -Measurement locations highly accurate due to GPS-guided grid lines -Leak locations highly accurate due to high-precision GPS -Provides meaningful quality control documentation (voltage map) -Does not require high level of operator skill with senior review of data 	<ul style="list-style-type: none"> -Requires high-precision GPS and sophisticated data recording software

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Figure 3: A Sensitivity Test, also known as a Calibration Curve. The graph shows the sine wave pattern produced by an artificial leak. In this case, the signal to noise ratio is 12.



2.5 Dipole Method – Water Covered Geomembrane (ASTM D7007)

The survey setup and methodology for water-covered geomembrane is essentially the same as the soil-covered survey method. The same data recording and analysis techniques can be used, but the ASTM does not require data recording for water-covered geomembranes, since the leak signal can be converted to a real-time audible alarm. The minimum sensitivity for water-covered geomembrane is a 1.4 mm diameter leak. Although the ASTM specified minimum sensitivity of this method is lower than that specified for the water puddle and water lance methods, this method is typically more sensitive than the aforementioned methods due to the hydraulic head over leak locations, which provides better hole contact.

Rather than taking voltage measurements at discrete points throughout the survey area, the voltage is continuously measured by an analog-based voltmeter. When the voltage increases beyond a given threshold, with either a positive or negative magnitude, an audible tone alerts the operator. The equipment is swept along the survey area in lines throughout the survey area.

The sensitivity test consists of finding the “minimum detectable distance” that the equipment can be swept by the artificial or actual leak with the target diameter. The minimum detectable distance is the distance from the actual or artificial leak where the increase in signal is easily discernible from the background noise. This minimum detectable distance dictates the spacing of the survey lines. No signal to noise ratio calculation is required.

It should be noted that a dipole survey in a highly conductive solution such as brine or with poor boundary conditions that cannot be changed is considerably more complicated than in fresh water with good boundary conditions and requires more advanced geophysical survey methodology.

ATTACHMENT 1

**DESIGNING FOR LEAK LOCATION
SURVEYS**

**DESIGNING FOR ELECTRICAL LEAK LOCATION
GENERAL GUIDE**



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1.0 HANDBOOK INSTRUCTIONS

This handbook is intended for use by design engineers and earthworks and liner installer contractors. It does not contend to be comprehensive. An experienced leak location contractor should review project specific construction plans and specifications. ASTM D6747 should also be used as a reference for method selection.

2.0 BOUNDARY CONDITIONS

The four critical boundary conditions in order to conduct an electrical leak location survey are:

1. Conductive material over geomembrane (unless the geomembrane is bare)
2. Conductive material below geomembrane
3. Good contact of material above and below geomembrane through leak
4. Material above and below geomembrane are only in contact through leak locations

The following sections describe how these four conditions must be addressed during the design and construction of a facility where a leak location survey is specified.

3.0 MATERIAL SPECIFICATIONS

3.1 Geomembranes

Geomembranes must be electrically insulative. Polyethylene, polyvinyl chloride, polypropylene, chlorosulfonated polyethylene and bituminous geomembranes are sufficiently electrically insulative. EPDM is not. Excessive leakage in terms of number or size of holes in the geomembrane will compromise the sensitivity of a leak location survey. Any locations of poor hole contact (wrinkles, subgrade depressions) will decrease the sensitivity of a survey and possibly result in undetected leaks. Material and placement methods should minimize the production of wrinkles and areas of trampolining.

If survey sensitivity is a high concern, conductive-backed geomembrane should be specified. When a material is referred to as "conductive-backed geomembrane", it refers to an insulative geomembrane, with a conductive layer beneath the insulative layer, manufactured specifically to assist leak location surveys. The conductive backing allows leak detection on poor hole contact scenarios and also increases overall leak detection sensitivity. Conductive-backed geomembrane installation requires a specialty welder and special installation protocol. GSE's Leak Location Liner fulfills these requirements.

In a double-lined impoundment, a conductive layer must be present under the primary geomembrane. In the absence of a conductive layer (i.e. geocomposite only), conductive-backed geomembrane or other sufficiently conductive products such as conductive geotextile should be specified.

3.2 Geocomposites

Geocomposites alone are not conductive, but the application of water to the geocomposite will enable a leak location survey. Water can be added to the geocomposite during construction, or after construction via rainfall or surface watering, as long as enough water is added to travel down to the geocomposite. With hole contact being an important parameter in survey sensitivity, it can be expected that a geocomposite may decrease method sensitivity.

A conductive geotextile can be specified as the geotextile portion of the geocomposite directly in contact with the geomembrane to be tested in order to enable leak detection.

If a non-conductive geomembrane is used as the primary geomembrane in a double-lined impoundment and a geocomposite is present in the leak detection layer, the leak detection layer must be flooded with

Designing for Electrical Leak Location General Guide

water to perform the survey. The primary geomembrane must also be flooded and the water-covered dipole method should be used.

3.3 Geotextiles

Geotextiles alone are not conductive, but the application of water to the geotextile will enable a leak location survey. Water can be added to the geotextile during construction, or after construction via rainfall or surface watering, as long as enough water is added to travel down to the geotextile. If a geotextile is adjacent to moist soil material and covered, the moisture tends to wick through the geotextile, thus enabling a survey. Geotextiles can be left intact in perimeter isolation trenches as long as they are dry. In the case of rainfall, it is typically necessary to wait for dry weather for the geotextile to dry out before performing a survey.

A conductive geotextile can be specified to be placed underneath the primary geomembrane in a double-lined impoundment in order to enable leak detection of the primary geomembrane. The conductive geotextile/geomembrane interface may still have contact problems unless the leak location is wet or dirty.

3.4 Geosynthetic Clay Liners (GCL)

The high quality clay component of a GCL is highly conductive, however due to the discrete clay granules surrounded by geotextiles, the moisture content of a GCL must be fairly high in order to perform a leak location survey. The minimum moisture content of a GCL required to perform a leak location survey can be estimated at 8%, though this value will vary for different GCL products. A single composite liner with GCL does not require any special preparation; moisture will easily wick into the GCL from the subgrade, since the GCL is extremely hydrophilic. Encapsulated GCL, however, will tend to stay at the moisture content that it was placed at. In arid climates where GCL panels are left uncovered for some time before being covered with the primary liner, the product can desiccate within one working shift. In arid climates, it is advisable to either rehydrate the GCL before covering with the primary liner, or specify a conductive geomembrane as the primary geomembrane. Encapsulated GCLs can also have problems with electrical conductivity over the panel overlaps, especially in arid climates. It is advisable to place a bare copper wire in a network under the GCL. The concept of the layout is to run the network of wires so that each and every panel is connected to at least one wire. The wire is then made accessible to the leak location surveyor by running it out through the anchor trench. At least two discrete wires should be placed, in order for the leak location surveyor to check the conductivity through the bulk of at least one GCL panel.

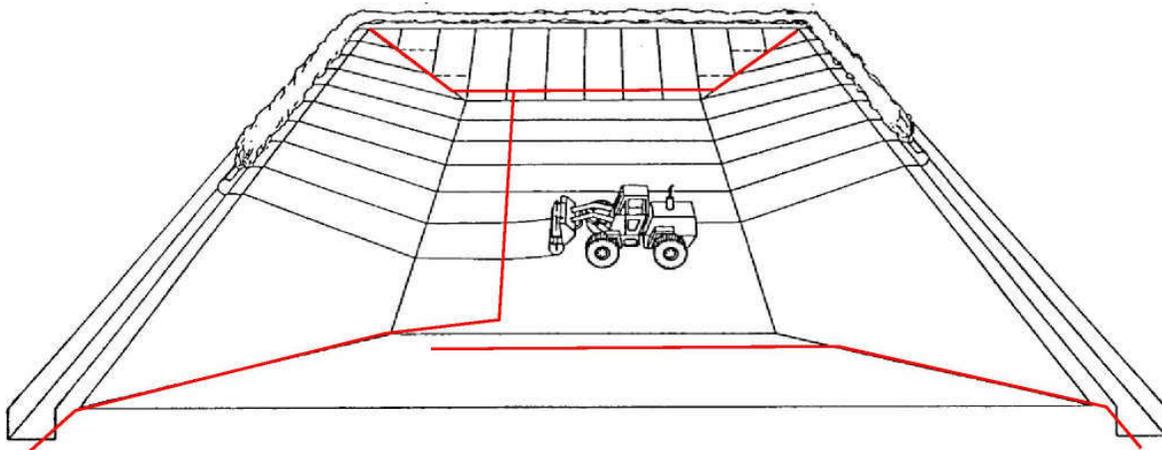


Figure 1: Hypothetical copper wire layout for encapsulated GCL. Copper wire is shown as a red line. Copper wire must be accessible to leak location surveyor.

3.5 Cover Material

The material covering the geomembrane should always be moisture conditioned, unless the project is located in a wet climate and the material is already sufficiently moist. Highly porous material such as gravel does not require moisture conditioning, since the material will require watering during the leak survey regardless. This is only true for large gravel particles (greater than approximately 5 cm). All other materials should have moisture within the mass of the cover layer. Surficial watering directly in front of the leak location survey may be required regardless.

3.6 Subgrade Material

Subgrade conductivity will not be a problem with a compacted clay liner. However, if there is no design requirement for a compacted clay liner and onsite soils are used, there is a small chance that the material will be either too dry or contain a mineral content that is not sufficiently conductive. In that case, the subgrade material must be watered before placement of the geomembrane. Subgrade conductivity testing should be performed in the case of questionable site soils, or a conductive-backed geomembrane should be specified as the geomembrane type.

Geomembrane rub sheets should not be allowed to remain under the geomembrane to be tested.

4.0 CONSTRUCTION SEQUENCING

4.1 Dipole Method – Soil Covered Geomembrane (ASTM D7007)

An isolation trench must be specified as part of construction sequencing around the perimeter of the survey area. In climates with spells of extreme rain events, a rain flap should also be considered. Rain flaps are welded in the isolation trenches and propped up by soil so that in the case of extreme rain where the trench will fill up with water, electrical isolation will still be provided by the rain flap. The rain flap must be welded to the base geomembrane.

Access roads can typically remain in place, as long as there is a strip of geomembrane or rain flap bisecting the access road, creating electrical isolation.

4.2 Dipole Method – Water Covered Geomembrane (ASTM D7007)

Consideration for the installation of any grounded objects should be given with respect to the construction sequencing. The survey should be performed before any necessary grounded objects are installed.

If a double-lined impoundment lacks a conductive-backed geomembrane for the primary geomembrane or lacks a conductive geotextile underneath the primary geomembrane, the leak detection layer must be flooded in order to survey the primary geomembrane. There must be ballast over the primary geomembrane, or the impoundment must be filled with water at the same rate that the leak detection layer is filled (or before).

4.3 Water Puddle and Water Lance Methods (ASTMs D7002 and D7703)

The geomembrane must be completely installed in the area to be tested. Consideration for the direction of flow should be given for bare geomembrane survey methods using water as a conductive medium. If water is allowed to flow freely out of the survey area, an electrical short will be created. Interim rain flaps can be used where necessary to contain the water within the survey area.

4.4 Arc Testing Method (ASTM D7953)

The geomembrane must be completely installed in the area to be tested.

5.0 GROUNDED OBJECTS

Objects that will provide a source of electrical grounding should be carefully designed, or the construction sequence modified to enable a leak location survey. For example, a metal pipe penetrating the liner system should have a plastic boot so that water sprayed on the geomembrane or soil covering it will not touch the metal pipe. For pond applications, concrete inlet or outlet structures, including metal batten strips, will ground out the survey. In some cases the design cannot be modified, but a rain flap can be welded as an interim measure to intercept water flowing to a grounded object.

6.0 SPECIFYING METHODS

The appropriate survey method will depend on the condition of the geomembrane during the survey in terms of whether it is bare or covered, whether it is the primary geomembrane or the secondary geomembrane, and whether the geomembrane has a conductive backing or not. The “Electrical Leak Location Survey General Guide” covers the various methods and their general applications.

The primary geomembrane of a double-lined impoundment can be surveyed using the dipole with soil as cover if there is ballast material over the primary geomembrane. In that case, the primary geomembrane must be conductive or have a conductive geotextile underneath it, or the leak detection layer must be flooded up to the level of the top of the ballast layer. In order to survey the side slopes, or if there is no ballast material over the geomembrane, the impoundment must be completely filled with water and a dipole with water as cover method must be performed. Alternatively, conductive-backed geomembrane can be specified as the primary geomembrane and subsequently any method can be performed on it (if the conductive-backed geomembrane is installed properly).

A survey can be conducted either before or after cover material placement, or both. The minimum sensitivities of each method, as described in the “Electrical Leak Location Survey General Guide” should be considered. For geomembranes that are to be covered by earthen materials, a survey should be performed both directly after liner installation and after cover material placement. This will result in the maximum leak detection sensitivity. If small holes are not a concern and only one method can be specified due to cost constraints, then a dipole survey should be performed after placement of the cover materials, since this method will locate the major leaks caused by placement of the cover material. The only exception to this is if the geomembrane is covered by gravel and the gravel layer can be flooded during the survey, resulting in increased dipole method sensitivity.

If a dipole survey is specified, the method of data analysis can be specified. The advantages and disadvantages of each method of data analysis is described in the “Electrical Leak Location Survey General Guide”.

6.1 Specifying Leakage Rates

It is impossible to construct a “leak free” lining system, since even in the absence of breaches through the geomembrane, vapor diffusion occurs through a geomembrane and condensation also occurs between geomembranes. Setting an allowable leakage rate should be informed by the existing available technologies and the maximum leakage that would cause impairment to groundwater. Setting an allowable leakage rate too low to achieve with existing technologies is simply a recipe for failure.

Several studies have shown that the Giroud equation is probably not applicable to typical geomembrane

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construction outside of Germany. Rather, the Rowe equation should be used, assuming that the contact between the geomembrane and the underlying subgrade will likely contain wrinkling. The assumed undetected leak frequency can be used to inform the number of leaks contributing to leakage.

In order to stay under a leakage rate of 20 gallons per acre per day, it is recommended to perform both a bare geomembrane survey method and the dipole method after placement of any cover material. In order to stay under a leakage rate of 5 gallons per acre per day, it is recommended to specify either white or conductive-backed geomembrane and perform both a bare geomembrane survey method and the dipole method after placement of any cover material.

With currently available technologies, the lowest level of potential leakage can be achieved by specifying specialty conductive-backed geomembrane installed per GSE's Leak Location Liner installation procedures, performing a bare geomembrane survey directly after geomembrane installation, and then performing the dipole method after the installation of cover material, if applicable. It is technically possible to install a geomembrane without breaches with this prescription since, if installed and surveyed correctly, it eliminates the known sources of limitations in the leak location survey technologies. However, room should always be granted for human error to avoid a specification that cannot be met.

6.2 Quality Control of Surveys

Effective oversight of electrical leak location surveys is probably more effective than prescribing minimum experience qualifications. The main intent of the survey oversight should be the conformance to the applicable ASTM Standard Practice. The sensitivity testing procedures of the applicable Standard Practice should be reviewed and understood by the entity providing oversight. The survey should be performed with the same parameters as were employed during the sensitivity test. In addition, the oversight entity should verify that the method was comprehensively applied to the entire survey area.

If the entity in charge of survey oversight suspects that the sensitivity test performed by the survey contractor does not represent site conditions, then the option to create a "blind actual leak" should be considered. If a blind leak is installed, it should be in accordance with the Standard Guide for Placement of Blind Actual Leaks during Electrical Leak Location Surveys of Geomembranes (ASTM D7909). Per the ASTM Standard Guide, a blind actual leak is "a circular hole in the geomembrane intentionally placed by the owner or owner's representative to ensure that the site conditions are suitable for an electrical leak location survey and that a valid electrical leak location survey is performed." It should be noted that the intentional placement of a leak in an installed geomembrane is not a good geomembrane quality control practice and that additional cost may be incurred by the project for such a practice.

6.3 Minimum Experience Qualifications

The various methods vary significantly in how much skill is required to perform them. It is therefore reasonable to set the minimum experience qualifications according to which method is used.

Spark testing has been historically performed by liner installers. Very little training is required and no minimum experience in terms of square footage of the method completed is usually required. Once an operator learns to use the spark tester, very little can go wrong in terms of site conditions and instrument set up.

The arc tester evolved from spark testing technology, but is even easier to use. In less than one hour, an operator can be competent at performing the arc testing method.

The water-based bare liner testing is a little more complicated in terms of setting up the survey, adjusting the equipment sensitivity and controlling the site conditions so that they do not adversely impact the sensitivity of the survey. It is therefore advisable to set some minimum number of projects and square footage where this method has been performed. A reasonable minimum for the water puddle and water lance methods would be 1-2 projects and a minimum area of 10 hectares.

The dipole method is more closely related to advanced geophysical methods, which require a thorough understanding of the method, the equipment, and the site conditions. Many site conditions can adversely impact the sensitivity of a survey. It is therefore advisable that the highest level of minimum experience

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qualifications be applied to a dipole survey. A reasonable minimum for the dipole method would be 4-5 projects and a minimum area of 50 hectares. The minimum qualifications should apply to the lead operator onsite directing the survey.

ELL Operator certification is available, which can be substituted for the required minimum experience level. The operator certification program requires that an individual performing ELL methods be evaluated for competency and method adherence by a third party.

ATTACHMENT 2

**ELECTRICAL LEAK LOCATION SURVEY
OPERATOR CERTIFICATION**

**ELECTRICAL LEAK LOCATION SURVEY
OPERATOR CERTIFICATION**



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1.0 OPERATOR CERTIFICATION BACKGROUND

The operator certification program intent is to uphold industry standards and provide a way of ensuring that operators are performing the electrical leak location survey (ELL) methods correctly and per ASTM standard methodology. As the world-wide demand for ELL grows, the certification program provides a tool for emerging ELL consultants to gain proficiency and credentials. It also provides a tool for site owners and project engineers and managers to evaluate the capabilities of ELL providers and establish minimum criteria for the demonstration of competency in the applied ELL methods.

An ELL Steering Committee was assembled to advise the contents of the operator certification. The ELL Steering Committee consists of professionals who have worked closely with ELL methods in different roles, especially in method application. Members of the ELL Steering Committee who specialize in the application of the ELL methods are qualified to oversee the field portion of the Level 2 certification exam.

2.0 THREE-TIERED STRUCTURE

The operator certification program is broken down into three tiers of certification. The intent of the three tiers is to distinguish between the levels of education and practice required in order to illustrate different levels of competency. The certification encompasses both bare and covered ELL methods.

2.1 Level 1 Certification

The first tier of certification illustrates that an individual:

1. Is qualified to specify ELL for projects
2. Understands how boundary conditions affect ELL
3. Understands how the ELL methods are applied
4. Is qualified to review ELL for conformance to ASTM standards

2.2 Level 2 Certification

The second tier of certification illustrates that an individual:

1. Has passed a written exam on the application of ELL methods
2. Has passed a field exam on the application of ELL methods
3. Can competently perform ELL methods per current ASTM standards

2.3 Level 3 Certification

The third tier of certification illustrates that an individual:

1. Has satisfied the Level 1 and 2 certification criteria
2. Has a proven track record of ELL method performance
3. Maintains certification through a minimum level of annual field experience

3.0 LEVEL 1 CRITERIA

The first tier is an educational component. An individual shall receive at least six (6) hours of classroom education (or equivalent) in the following subject areas:

1. ELL terminology, history, background
2. Electrical Basics

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Operator Certification**

3. Bare and covered ELL methodology
4. Criteria for specifying ELL
5. Current ASTM methods for ELL
6. Boundary conditions affecting ELL performance
7. Site safety

An individual shall receive at least four (4) hours of field training in the following subject areas:

1. Operating equipment for bare and covered ELL methods
2. Performing a sensitivity test for bare and covered ELL methods
3. Locating leaks in bare and covered geomembranes
4. Setting up a ELL circuit for bare and covered ELL methods

4.0 LEVEL 2 CRITERIA

The second tier is a demonstration that the Level 1 education and field training can be applied by an individual. The Field Exam can be conducted to a production survey by an individual.

4.1 Written Exam

The written exam, which is administered through a third-party, shall test an individual's ability to:

1. Interpret plans and specifications for ELL
2. Understand electrical measurements
3. Perform methods per ASTM standards
4. Troubleshoot field difficulties
5. Effectively collect and interpret data
6. Identify poor boundary conditions
7. Understand method limitations

4.2 Field Exam

The field exam shall be proctored by a qualified member of the ELL Steering Committee. The proctor shall observe an individual in the field as the individual performs an ELL method and without interfering shall document:

1. Which method is being performed
2. Where electrodes are placed
3. Where artificial leak is placed and grounded, if applicable
4. What voltage is used for the method
5. Survey set up procedures
6. Equipment set up and calibration procedures
7. Sensitivity test procedures
8. Procedures for locating leaks
9. Procedures for recording and analyzing data, if applicable
10. Any ASTM procedures lacking during field observation

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The field exam is method-specific. The documentation of the field exam shall be provided to the ELL Steering Committee. The ELL Steering Committee shall deliberate on whether the individual has demonstrated the ability to locate actual leaks in the field using the applied methodology. If an individual demonstrates the ability to locate actual leaks, but some aspect of the ASTM procedure is lacking, the ELL Steering Committee shall evaluate whether that lacking procedure was crucial for locating leaks and performing a thorough survey. The actual location of leaks shall weigh more heavily on the Committee's pass/fail decision than the following of the ASTM standard.

The results of the field exam, including critiques and comments from the ELL Steering Committee, shall be submitted to the examinee(s) along with a Level 2 certificate if applicable.

The ELL Steering Committee shall maintain a list of all individuals who have passed the written and field examinations and keep on file a copy of the actual examination documentation.

5.0 LEVEL 3 CRITERIA

The third tier is a demonstration that the individual can competently perform the ELL method(s) and has a proven track record of doing so. Although not necessary to show that an operator can successfully perform the methods, an owner or design engineer might opt for this level of experience to reduce project liability. The minimum level of experience is method-specific. The experience for a given method would be called out for a specific project employing that method.

For Level 3 certification, the individual must maintain a minimum level of ELL method performance on an average annual basis as follows:

1. Bare geomembrane arc testing method: 1 project and 0.4 hectares (1 acre)
2. Bare geomembrane spark testing method: 1 project and 0.4 hectares (1 acre)
3. Bare geomembrane water puddle method: 1 project and 2 hectares (5 acres)
4. Bare geomembrane water lance method: 1 project and 2 hectares (5 acres)
5. Water-covered geomembrane dipole method: 2 projects and 4 hectares (10 acres)
6. Soil-covered geomembrane dipole method: 2 projects and 20 hectares (50 acres)

An excess of survey experience one year can carry into the next year, but no longer than three years past the date of the qualifying experience.

In order to receive level 3 certification, an individual must submit documentation of the aforementioned experience requirements to the ELL Steering Committee. The documentation required shall consist of:

1. The name of the project
2. The method applied
3. Sensitivity test set up and results
4. Number and size of located leaks

The ELL Steering Committee shall maintain an actively updated list of all individuals who maintain current level 3 certification, and which method the certification applies to.



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

July 05, 2018

JENNIFER KNOWLTON
HRL COMPLIANCE SOLUTIONS, INC.
2385 F 1/2 ROAD
GRAND JUNCTION, CO 81505

RE: 3 BEAR

Enclosed are the results of analyses for samples received by the laboratory on 06/29/18 14:42.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/ga/lab_accred_certif.html.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene
Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: BACKFILL (H801787-01)

BTEX 8021B		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Benzene*	<0.050	0.050	07/02/2018	ND	1.60	79.8	2.00	6.67		
Toluene*	<0.050	0.050	07/02/2018	ND	1.65	82.4	2.00	6.86		
Ethylbenzene*	<0.050	0.050	07/02/2018	ND	1.67	83.6	2.00	6.82		
Total Xylenes*	<0.150	0.150	07/02/2018	ND	4.92	82.1	6.00	6.91		
Total BTEX	<0.300	0.300	07/02/2018	ND						

Surrogate: 4-Bromofluorobenzene (PIE) 103 % 69.8-142

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	96.0	16.0	07/01/2018	ND	416	104	400	0.00		

TPH 8015M		mg/kg		Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29		
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51		
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND						

Surrogate: 1-Chlorooctane 101 % 41-142

Surrogate: 1-Chlorooctadecane 107 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 SIDE W @4' (H801787-02)

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	07/02/2018	ND	1.60	79.8	2.00	6.67	
Toluene*	<0.050	0.050	07/02/2018	ND	1.65	82.4	2.00	6.86	
Ethylbenzene*	<0.050	0.050	07/02/2018	ND	1.67	83.6	2.00	6.82	
Total Xylenes*	<0.150	0.150	07/02/2018	ND	4.92	82.1	6.00	6.91	
Total BTEX	<0.300	0.300	07/02/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 103 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3960	16.0	07/01/2018	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29	
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51	
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND					

Surrogate: 1-Chlorooctane 85.8 % 41-142

Surrogate: 1-Chlorooctadecane 92.2 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 SIDE E @4' (H801787-03)

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	07/02/2018	ND	1.60	79.8	2.00	6.67	
Toluene*	<0.050	0.050	07/02/2018	ND	1.65	82.4	2.00	6.86	
Ethylbenzene*	<0.050	0.050	07/02/2018	ND	1.67	83.6	2.00	6.82	
Total Xylenes*	<0.150	0.150	07/02/2018	ND	4.92	82.1	6.00	6.91	
Total BTEX	<0.300	0.300	07/02/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 103 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4240	16.0	07/01/2018	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29	
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51	
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND					

Surrogate: 1-Chlorooctane 92.5 % 41-142

Surrogate: 1-Chlorooctadecane 100 % 37.6-147

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 SIDE N @4' (H801787-04)

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	07/02/2018	ND	1.60	79.8	2.00	6.67	
Toluene*	<0.050	0.050	07/02/2018	ND	1.65	82.4	2.00	6.86	
Ethylbenzene*	<0.050	0.050	07/02/2018	ND	1.67	83.6	2.00	6.82	
Total Xylenes*	<0.150	0.150	07/02/2018	ND	4.92	82.1	6.00	6.91	
Total BTEX	<0.300	0.300	07/02/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 101 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4480	16.0	07/01/2018	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29	
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51	
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND					

Surrogate: 1-Chlorooctane 93.6 % 41-142

Surrogate: 1-Chlorooctadecane 103 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 SIDE S @4' (H801787-05)

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	07/02/2018	ND	1.60	79.8	2.00	6.67	
Toluene*	<0.050	0.050	07/02/2018	ND	1.65	82.4	2.00	6.86	
Ethylbenzene*	<0.050	0.050	07/02/2018	ND	1.67	83.6	2.00	6.82	
Total Xylenes*	<0.150	0.150	07/02/2018	ND	4.92	82.1	6.00	6.91	
Total BTEX	<0.300	0.300	07/02/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 101 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	6260	16.0	07/01/2018	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29	
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51	
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND					

Surrogate: 1-Chlorooctane 92.1 % 41-142

Surrogate: 1-Chlorooctadecane 101 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/05/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 @6' (H801787-06)

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	07/03/2018	ND	1.60	79.8	2.00	6.67	
Toluene*	<0.050	0.050	07/03/2018	ND	1.65	82.4	2.00	6.86	
Ethylbenzene*	<0.050	0.050	07/03/2018	ND	1.67	83.6	2.00	6.82	
Total Xylenes*	<0.150	0.150	07/03/2018	ND	4.92	82.1	6.00	6.91	
Total BTEX	<0.300	0.300	07/03/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIE) 99.9 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3120	16.0	07/01/2018	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/03/2018	ND	181	90.5	200	4.29	
DRO >C10-C28*	<10.0	10.0	07/03/2018	ND	205	103	200	4.51	
EXT DRO >C28-C36	<10.0	10.0	07/03/2018	ND					

Surrogate: 1-Chlorooctane 95.0 % 41-142

Surrogate: 1-Chlorooctadecane 103 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
 (575) 393-2326 FAX (575) 393-2476

BILL TO

ANALYSIS REQUEST

Company Name: HRL Compliance P.O. #: _____
 Project Manager: Jennifer Knoustra Company: _____
 Address: _____ Attn: _____
 City: _____ State: _____ Zip: _____
 Phone #: 505-238-3588 Fax #: _____
 Project #: _____ Project Owner: _____
 Project Name: 3 Bear City: _____ State: _____ Zip: _____
 Project Location: Recycling Pt Phone #: _____
 Sampler Name: JR Fax #: _____

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX							DATE	TIME	ANALYSIS REQUEST
				GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:			
<u>H501787</u>	<u>Backfill</u>												<u>Chlorides</u>
	<u>1</u>												<u>TPH</u>
	<u>2</u>												<u>BTEX</u>
	<u>3</u>												
	<u>4</u>												
	<u>5</u>												
	<u>6</u>												

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analysis. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: [Signature] Date: 6/29/18 Received By: [Signature]
 Time: 1442 Received By: [Signature]
 Date: _____ Received By: _____
 Time: _____

Delivered By: (Circle One) UPS 11:30 Sample Condition: Cool Intact: Yes
 Sampler - UPS - Bus - Other: Consolid 11:30 Cool: Yes Intact: Yes
 Checked By: [Signature] (Initials) TO

REMARKS: Push Chlorides

* Cardinal cannot accept verbal change. Please fax written change to (575) 393-2476



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

July 02, 2018

JENNIFER KNOWLTON
HRL COMPLIANCE SOLUTIONS, INC.
2385 F 1/2 ROAD
GRAND JUNCTION, CO 81505

RE: 3 BEAR

Enclosed are the results of analyses for samples received by the laboratory on 06/29/18 14:42.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/ga/lab_accred_certif.html.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene
Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/02/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: BACKFILL (H801787-01)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	96.0	16.0	07/01/2018	ND	416	104	400	0.00		

Sample ID: SP2 SIDE W @4' (H801787-02)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	3960	16.0	07/01/2018	ND	416	104	400	0.00		

Sample ID: SP2 SIDE E @4' (H801787-03)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	4240	16.0	07/01/2018	ND	416	104	400	0.00		

Sample ID: SP2 SIDE N @4' (H801787-04)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	4480	16.0	07/01/2018	ND	416	104	400	0.00		

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 JENNIFER KNOWLTON
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/29/2018	Sampling Date:	06/29/2018
Reported:	07/02/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	RECYCLING PIT	Sample Received By:	Tamara Oldaker
Project Location:	NOT GIVEN		

Sample ID: SP2 SIDE S @4' (H801787-05)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	6260	16.0	07/01/2018	ND	416	104	400	0.00	

Sample ID: SP2 @6' (H801787-06)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3120	16.0	07/01/2018	ND	416	104	400	0.00	

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 27, 2018

LUPE CARRASCO
HRL COMPLIANCE SOLUTIONS, INC.
2385 F 1/2 ROAD
GRAND JUNCTION, CO 81505

RE: 3 BEAR

Enclosed are the results of analyses for samples received by the laboratory on 06/27/18 11:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/ga/lab_accred_certif.html.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene
Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 LUPE CARRASCO
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/27/2018	Sampling Date:	06/27/2018
Reported:	06/27/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 1 @ SURFACE (H801741-01)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	592	16.0	06/27/2018	ND	416	104	400	0.00		

Sample ID: SP 1 @ 1' (H801741-02)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	64.0	16.0	06/27/2018	ND	416	104	400	0.00		

Sample ID: SP 2 @ SURFACE (H801741-03)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	672	16.0	06/27/2018	ND	416	104	400	0.00		

Sample ID: SP 2 @ 1' (H801741-04)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	656	16.0	06/27/2018	ND	416	104	400	0.00		

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 LUPE CARRASCO
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/27/2018	Sampling Date:	06/27/2018
Reported:	06/27/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 3 @ SURFACE (H801741-05)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	128	16.0	06/27/2018	ND	416	104	400	0.00	

Sample ID: SP 3 @ 1' (H801741-06)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	96.0	16.0	06/27/2018	ND	416	104	400	0.00	

Sample ID: SP 4 @ SURFACE (H801741-07)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	576	16.0	06/27/2018	ND	416	104	400	0.00	

Sample ID: SP 4 @ 1' (H801741-08)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	144	16.0	06/27/2018	ND	416	104	400	0.00	

Sample ID: SP 5 @ SURFACE (H801741-09)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	288	16.0	06/27/2018	ND	416	104	400	0.00	

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 LUPE CARRASCO
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/27/2018	Sampling Date:	06/27/2018
Reported:	06/27/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 5 @ 1' (H801741-10)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	06/27/2018	ND	416	104	400	0.00	

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

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Celey D. Keene, Lab Director/Quality Manager



101 East Marland, Hobbs, NM 88240
 (575) 393-2326 FAX (575) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Handwritten signature

BILL TO

ANALYSIS REQUEST

Company Name: HRL Compliance Solutions Inc
 Project Manager: Lupe Carrasco
 Address: 2385 Elk Road
 City: Grand Junction State: CO Zip: 81505
 Phone #: (970) 243-3271 Fax #:
 Project #: Project Owner:
 Project Name: 3 Bear
 Project Location:
 Sampler Name:
 P.O. #: Company: HRL
 Attn: Brenda Restanger
 Address: 2385 Elk Road
 City: Grand Junction
 State: CO Zip: 81505
 Phone #: (970) 243-3271 Fax #:

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX							DATE	TIME	ANALYSIS REQUEST
				GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:			
H801741	SP1 Surface	G	1	X	X	X	X	X	X	X	X	Chlorides	
	SP1 @ 1'			X	X	X	X	X	X	X	X		
	SP2 Surface		1	X	X	X	X	X	X	X	X		
	SP2 @ 1'			X	X	X	X	X	X	X	X		
	SP3 Surface		1	X	X	X	X	X	X	X	X		
	SP3 @ 1'			X	X	X	X	X	X	X	X		
	SP4 Surface		1	X	X	X	X	X	X	X	X		
	SP4 @ 1'			X	X	X	X	X	X	X	X		
	SP5 Surface		1	X	X	X	X	X	X	X	X		
	SP5 @ 1'			X	X	X	X	X	X	X	X		

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Relinquished By: [Signature] Date: 2/2/23 Received By: [Signature] Date: 2/2/23
 Time: 11:05am Received By: [Signature]

Delivered By: (Circle One) UPS 2749c / 27350c
 Sampler - UPS - Bus - Other: 2749c / 27350c
 Sample Condition: Cool Intact
 CHECKED BY: [Signature]

Phone Result: Yes No Add'l Phone #:
 Fax Result: Yes No Add'l Fax #:
 REMARKS: email to jkwashten@hrlcomp.com
lcarrasco@hrlcomp.com
575-725-0787



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 27, 2018

LUPE CARRASCO
HRL COMPLIANCE SOLUTIONS, INC.
2385 F 1/2 ROAD
GRAND JUNCTION, CO 81505

RE: 3 BEAR

Enclosed are the results of analyses for samples received by the laboratory on 06/27/18 11:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/ga/lab_accred_certif.html.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive, flowing style.

Celey D. Keene
Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

HRL COMPLIANCE SOLUTIONS, INC.
 LUPE CARRASCO
 2385 F 1/2 ROAD
 GRAND JUNCTION CO, 81505
 Fax To:

Received:	06/27/2018	Sampling Date:	06/27/2018
Reported:	06/27/2018	Sampling Type:	Soil
Project Name:	3 BEAR	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SP 1 @ 3' (H801740-01)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	112	16.0	06/27/2018	ND	416	104	400	0.00		

Sample ID: SP 2 @ 3' (H801740-02)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	864	16.0	06/27/2018	ND	416	104	400	0.00		

Sample ID: SP 4 @ 3' (H801740-03)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	256	16.0	06/27/2018	ND	416	104	400	0.00		

Cardinal Laboratories

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

RUSH

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

BILL TO

ANALYSIS REQUEST

Company Name: *HRL*

Project Manager: *Lupe Carrasco*

Address:

City: State: Zip:

Phone #: *575-725-0787* Fax #:

Project #: Project Owner:

Project Name: *3 Bear*

Project Location:

Sampler Name:

FOR LAB USE ONLY

Lab I.D. Sample I.D.

H90D1740

1 SP1 @ 3'
2 SP2 @ 3'
3 SP4 @ 3'

(G)RAB OR (C)OMP.
CONTAINERS
GROUNDWATER
WASTEWATER
MATRIX
SOIL
OIL
SLUDGE
OTHER:
ACID/BASE:
ICE / COOL
OTHER:

PRESERV

SAMPLING

DATE TIME

6/27/18
6/27/18
6/27/18

Chlorides

PLEASE NOTE: Liability and Damages: Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits, incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated releases or otherwise.

Relinquished By:

Date: *6/27/18*
Time: *11:05*

Received By:

Yolli Munson

Relinquished By:

Date:

Time:

Delivered By: (Circle One)

Sampler - UPS - Bus - Other: *27.40 / 27.350*

Sample Condition
Cool Yes No
Intact Yes No

CHECKED BY: (Initials)

Phone Result: Yes No Add'l Phone #:
Fax Result: Yes No Add'l Fax #:

REMARKS:

*email: jkuallton@hrlcomp.com
lcarrasco@hrlcomp.com
bprestangen@hrlcomp.com*



P.O. Box 1708 • Artesia, NM 88211
www.hrlcomp.com

July 24, 2018

Re: 1RF-24 Libby Recycling Containment

Mr. Brad Billings
EMNRD/OCD
Santa Fe, New Mexico

Mr. Bradford,

On behalf of 3Bear Energy, HRL Compliance Solutions is providing this summary of actions and results at the Recycling Containment.

Empty tanks were stored on the east side of the containment. During a windstorm the tanks were blown into the containment and the t-posts attached to the tanks ripped the liner. OCD provided the following guidance via email on June 14, 2018:

- NMOCD advised 3Bear to collect discrete samples from each of the identified areas where the liner(s) have been torn. Soil samples will be collected by an environmental professional and sent to an accredited laboratory.
- Samples will be taken from the surface and at least 1 ft. bgs for verification. Soil samples will be tested for BTEX, TPH extended (GRO, DRO, and MRO), and chlorides via these respective EPA methods 8260 or 8021, 8015, and 300. Permissible levels are 10 mg/kg Benzene, 50 mg/kg BTEX, 5000 mg/kg TPH, and 600 mg/kg chlorides.
- Windblown soil currently in the containment must be removed to complete inspection of the liner for any additional defects affecting liner integrity.
- Please contact Mr. Bradford Billings to obtain more specific instructions on the use of a tracer dye for leak detection after repairs are completed.
- 3Bear will inform NMOCD of subsequent site visit opportunities and will provide photo documentation of the repair process.

3Bear Energy retained HRL to obtain the samples from 5 identified locations where the liner(s) were torn. The Sample Location Map is shown with the five locations identified relative to the southeast corner of the containment for reference. Samples were analyzed for chlorides via Method 4500 on 6/27/2018. The sampling results are presented below:

INNOVATIVE SOLUTIONS DELIVERED



	SP1	SP2	SP3	SP4	SP5
Surface	592	672	128	576	288
1' bgs	64	656	96	144	32
2' bgs	133	864	--	256	--

Based on these results, additional excavation at SP2 was necessary.

On 6/29/2018, a small track hoe was used to excavate the contaminated material in a 10-foot radius centered around SP2. Samples were taken along the side wall and bottom of the excavation. Samples were analyzed for chlorides via Method 4500 on 6/29/2018.

	W Side	E Side	N Side	S Side	Bottom
4' bgs	3690	4240	4480	6260	
6' bgs					3120

On June 29, 2018, on behalf of 3Bear Energy, HRL communicated the results of this sampling with OCD and asked to for an alternate closure standard via email. This was approved on July 2, 2018. 3Bear commenced with repairs to the liner and pressure tested all repairs on the liner. A “spark test” was also conducted on the liner per ASTM D7240. The spark test was completed satisfactorily on July 14, 2018 and the pit was put back into service. OCD was informed of this via email on 7/19/2018. It will take several weeks for the facility to be fully operational. During this phase, the leak detection system will be monitored.

Liquid Leak Detection

The liquid leak detection (LLD) drain will be an open three-dimensional HDPE synthetic drainage net. The liquid leak detection drain will be supported by the secondary flexible membrane liner. The entire liner, including the leak detection drainage net, will be graded to drain to a leak detection drain sump that is filled with graded fine gravel supported by the secondary flexible membrane liner.

A leak detection drainage net is located in the gravel-filled sump and in the adjacent surface runoff between the primary flexible membrane liner and the secondary flexible membrane liner. The liquid leak detection header and associated gravel-filled trench will be graded to an associated leak detection sump. A geotextile cushion or additional geocomposite will be placed over the top of the gravel filling the gravel-filled leak detection trench to reduce the potential for damage to the overlying primary flexible membrane liner. A leachate collection underdrain lateral will be installed beneath the geonet drainage layer and will extend from the east end of the containment pond to the leachate detection sump. This will increase the total capacity of



the leak detection drainage system to convey the necessary leachate flow along the primary flow path at the center of the pond to the sump.

Liquid levels in the leak detection drain sump are monitored via an electronic system that is monitored in the control room. Alarms are set for any measurable liquid and any alarm will result in an immediate investigation.

3Bear Energy and HRL consider this project closed. If you have any additional questions regarding this project, please feel free to contact me via email at jknowlton@hrlcomp.com.

Sincerely,

A handwritten signature in blue ink that reads "Jennifer Knowlton". The signature is fluid and cursive.

Jennifer Knowlton
Regional Manager – Permian

Cc: Gerald Wyche
Scott Spicher



N

Frontier Development, Inc. 4896 FM 2314

DATE OF REPORT	SAT 06 JUL 2018
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LOCATION OF TEST	3BE Libby G
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TEST STANDARD	Air pressure
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#	Date	Panel #
1	06 JUL 2018	P1 - P2



Frontier Development, Inc. 4896 FM

DATE OF REPORT	SAT 06
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LOCATION OF TEST	3BE Li
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TEST STANDARD	Air pre
---------------	---------

Prima

Permit Modification Request



February 1, 2023

Ms. Victoria Venegas
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

Re: Request for Permit Modification to Add 3rd Layer of Synthetic Liner at an Approved C-147 Recycle Facility in Lea County New Mexico

Ms. Venegas,

3Bear Field Services, LLC (OGRID #372603) is requesting a permit modification to add a third layer of HDPE liner at the Libby Recycling Facility (1RF-024). The existing Primary Liner will be kept in place as a sacrificial liner layer to provide protection to the secondary layer during installation of the 3rd layer of synthetic liner.

If this modification is granted, neither the Operation and Maintenance plan of the facility nor the closure plan will change.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

A handwritten signature in black ink that reads "Tyler Williams".

Tyler Williams, P.E.
President and Principal Engineer

Variance Requests



February 1, 2022

Ms. Victoria Venegas
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

RE: Rule 34 Variance Request –Produced Water Recycling Containment Liner

Ms. Venegas

3Bear Field Services, LLC (3Bear) is requesting a variance to Rule 34 Part 12(A)(4) requiring the liner system for produced water containments to be double lined. 3Bear is requesting approval to add a 3rd layer of liner to the existing liner system. 3Bear intends to add a 2nd drainage layer on top of the current primary layer and a new primary layer. The existing primary layer will be kept in place as a sacrificial layer to protect the existing secondary layer.

The new proposed liner layer will add additional environmental protections to the existing system by adding a 3rd independent barrier between the produced water stored in the containment and the surrounding environment.

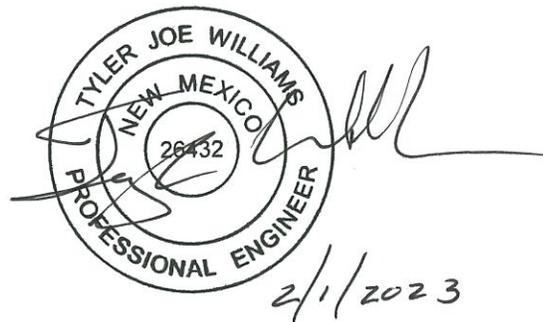
The proposed new liner system cross-section, bottom to top, is as follows: 60-mil HDPE, double sided goecomposite, 60-mil HDPE sacrificial layer, 200-mil goenet (new), 60-mil primary liner (new). This will replace the cross-section required by the current rule and submitted with the original permit application.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

Tyler Williams, P.E.
President and Principal Engineer





February 1, 2023

Ms. Victoria Venegas
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

RE: Rule 34 Variance Request –Produced Water Recycling Containment Liner

Ms. Venegas

3Bear Field Services, LLC (3Bear) is requesting a variance to Rule 34 Part 12(A)(4) requiring secondary liners to be 30-mil string reinforced LLDPE. 3Bear is requesting approval to use 60-mil HDPE in place of the specified material. Based on our experience, we feel that the requested material will allow us to provide greater environmental protection in our impoundments.

Due to the construction of the 30-mil reinforced LLDPE material, nondestructive QA/QC testing cannot be performed. The proposed 60-mil HDPE will be seamed in a manner that will allow nondestructive pressure testing of the seams to ensure proper sealing.

The proposed HDPE is appropriate material for the proposed use in the impoundment and is compatible with the material that will be stored. This material will provide equal or better environmental protection as the specified 30-mil reinforced LLDPE.

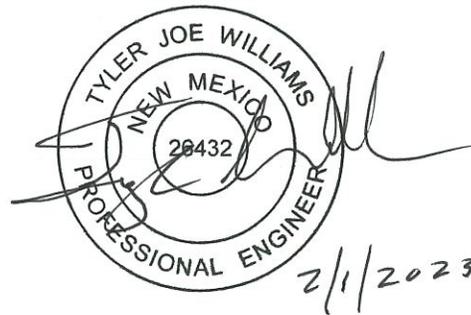
The proposed new liner system cross-section is as follows: 60-mil HDPE, double sided geocomposite, 60-mil HDPE, 200-mil geonet, 60-mil HDPE This will replace the cross-section required by the current rule and submitted with the original permit application. It should also be noted that this variance has been granted on past sites.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

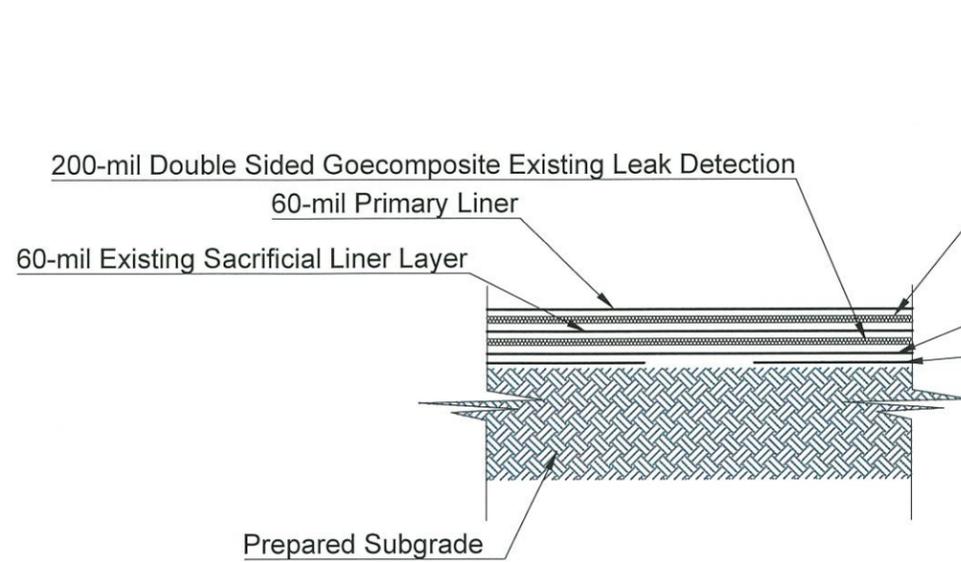
Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.


Tyler Williams, P.E.
President and Principal Engineer

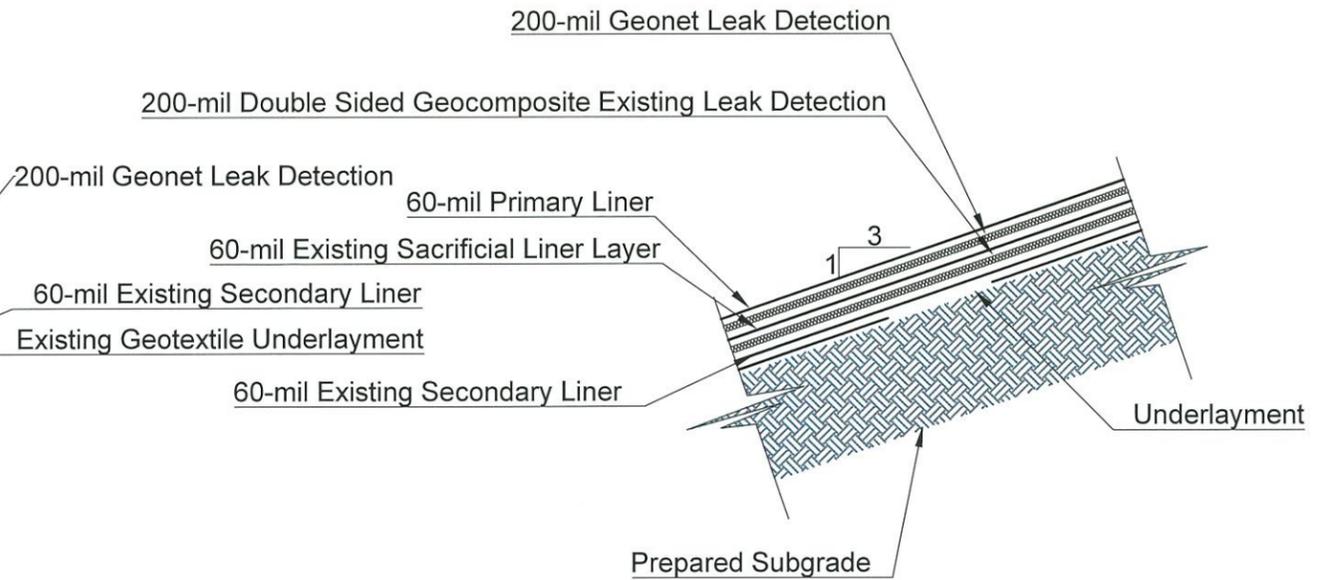


Liner Installation Details



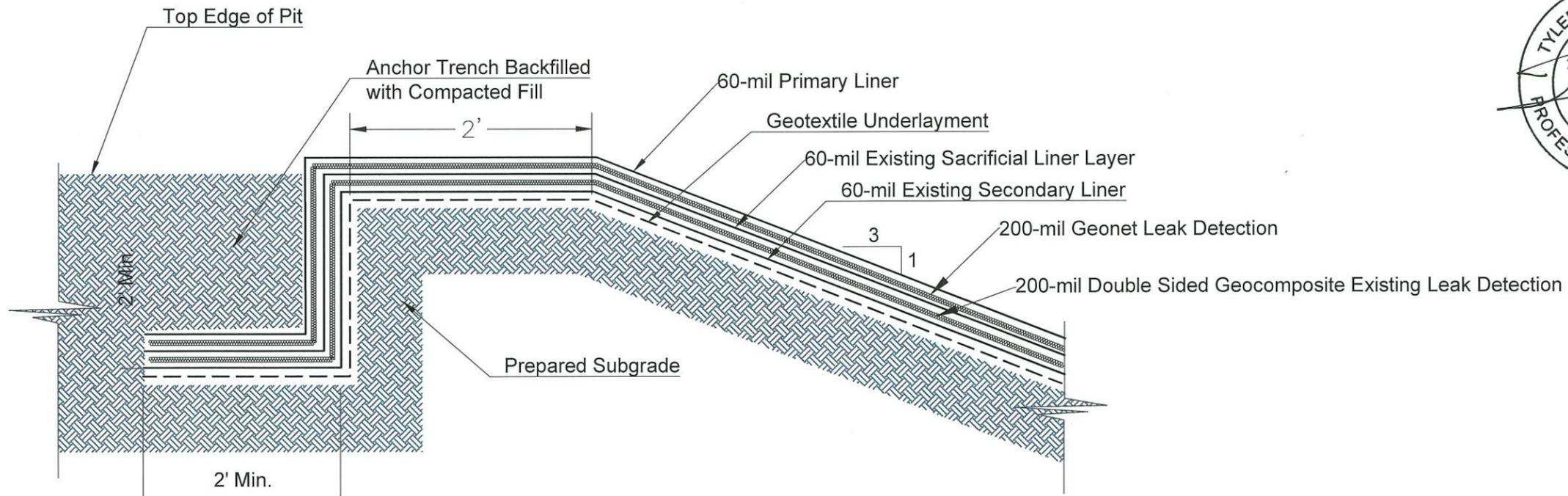
LINER SYSTEM FLOOR DETAIL

Not to Scale



LINER SYSTEM SIDE SLOPE DETAIL

Not to Scale



ANCHOR TRENCH DETAIL

Not to Scale

TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER
2/1/2023



ENVIROTECH ENGINEERING
2500 North Elvorth Street
Enid, Oklahoma
509.234.8780
envirotechconsulting.com
License #26432 - Expiration Date: 12-31-2024

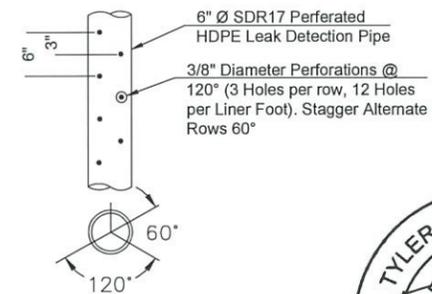
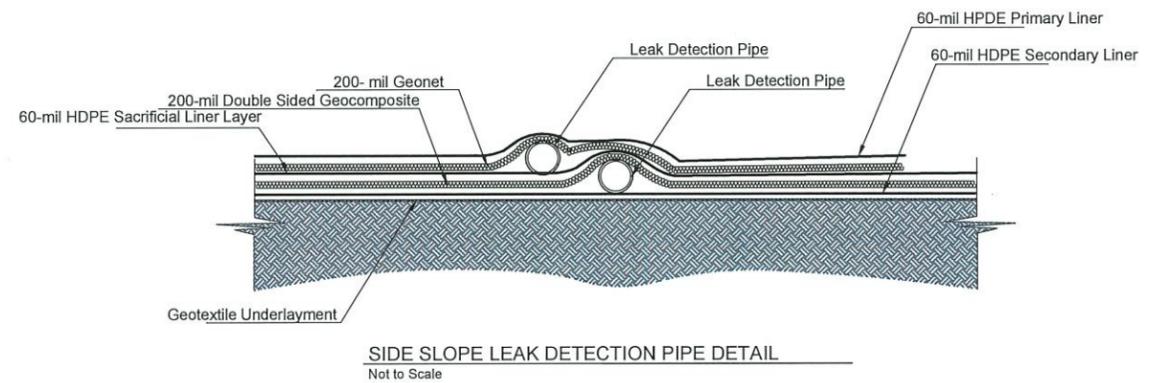
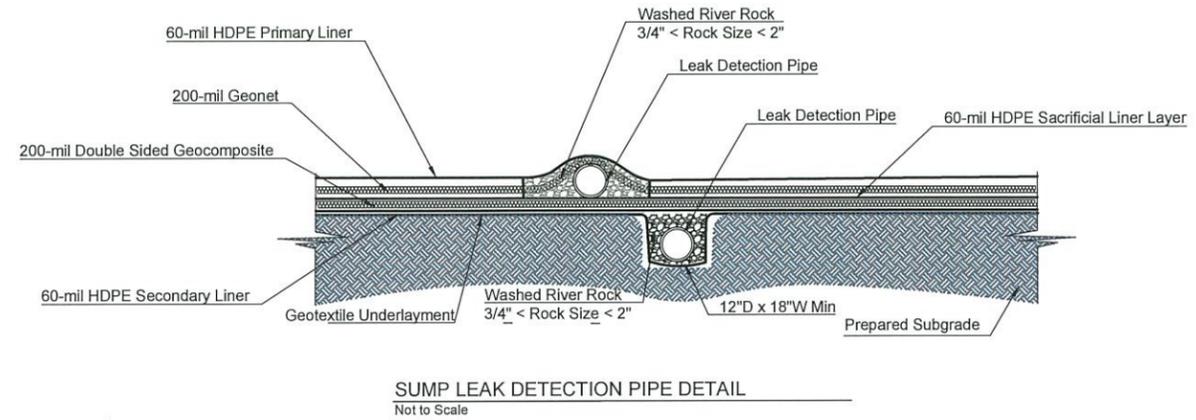
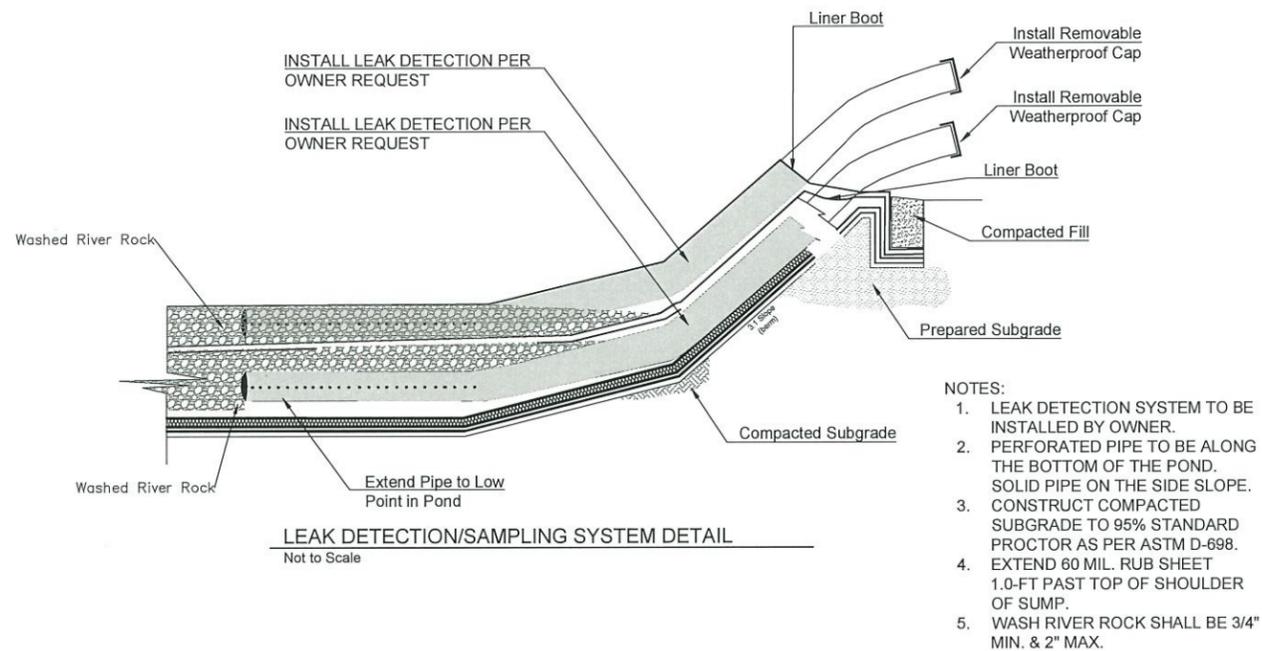
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NO.	DATE	DESCRIPTION

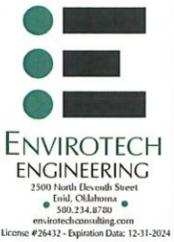


Liner Installation Details
Libby Recycle Facility
Delek Logistics

DATE:	January 2023
SCALE:	Not to Scale
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022315-00
SHEET NO.	1 of 2



TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER
2/1/2023



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NO.	DATE	DESCRIPTION



Sump Details
Libby Recycle Facility
Delek Logistics

DATE:	January 2023
SCALE:	Not to Scale
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022315-00
SHEET NO.	2 of 2

Letter Showing Intent to Remove Aerators



February 1, 2023

Ms. Victoria Venegas
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

Re: Removal of Aerators from the Libby Recycle Containment (1RF-024)

Ms. Venegas,

In order to receive a permit extension for the Libby Recycle Containment, 3Bear Field Services, LLC (OGRID #372603) has agreed to remove the aerators from the containment.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

A handwritten signature in black ink that reads "Tyler Williams".

Tyler Williams, P.E.
President and Principal Engineer

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Friday, February 10, 2023 2:04 PM
To: Harry Lewis; Mitchell Ratke; Tyler Williams
Cc: Barr, Leigh, EMNRD
Subject: 1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611]

1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611].

1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611].

Good afternoon Mr. Lewis,

NMOD has reviewed [372603] 3BEAR FIELD SERVICES, LLC permit modification and variance request Application ID 182066 received on February 2, 2023, to address the primary liner integrity issue at the 1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611] in Unit Letter I, Section 20, Township 26S, Range 34E, Lea County, New Mexico. [372603] 3BEAR FIELD SERVICES, LLC requested variances from 19.15.34 NMAC for 1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611].

The following variances have been approved:

- [372603] 3BEAR FIELD SERVICES, LLC requested a variance to Rule 34 Part 12(A)(4) requiring the liner system for produced water containments to be double lined. [372603] 3BEAR FIELD SERVICES, LLC requested approval to add a third layer of liner to the existing liner system. [372603] 3BEAR FIELD SERVICES, LLC intends to add a second drainage layer on top of the current primary layer and a new primary layer. The existing primary layer will be kept in place as a sacrificial layer to protect the existing secondary layer. The proposed new liner system cross-section is as follows: 60-mil HDPE, double sided goecomposite, 60-mil HDPE sacrificial layer, 20-mil goenet (new), 60-mil HDPE primary liner (new). This will replace the cross-section required by the current rule and submitted with the original permit application. Liner installation details, and engineering drawings can be found on pages 73-74 of this application. This variance request is approved.
- [372603] 3BEAR FIELD SERVICES, LLC requested approval to use a 60-mil HDPE as the secondary liner. The proposed new liner system cross-section is as follows: 60-mil HDPE, double sided goecomposite, 60-mil HDPE sacrificial layer, 20-mil goenet (new), 60-mil HDPE primary liner (new). This will replace the cross-section required by the current rule and submitted with the original permit application. This variance request is approved.

The form C-147 and related documents for 1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611] is approved with the following conditions of approval:

- The operator cannot use the containment until after OCD approves the bond. The financial assurance should be mailed to Oil Conservation Division; Bonding and Compliance; 1220 South St Frances Drive; Santa Fe, NM 87505.
- OCD requested the removal of the aerators as part of the containment repair project. The operator agreed to this request. The application includes a written statement that the operator agrees to this request.
- If the operator wishes to use the aerators in the future, the facility will need to submit a 19.15.36 NMAC application for a Surface Waste Management Facility and get approval prior to utilizing the aerators.
- The facility will no longer be permitted to conduct hydrocarbon recovery. This is considered a "Treating plant" under NMAC 19.15.2.7.T.(7). The treating plant definition means "a plant constructed for wholly or partially or being used wholly or partially for reclaiming, treating, processing or in any manner making tank bottoms or other waste oil marketable". If the operator wants to do this after the permit expiration date of December 04, 2022, the facility will need to submit a 19.15.36 NMAC application and cease the hydrocarbon recovery until a permit is issued.

- To extend the registration/permit past the December 04, 2022, a registration/permit extension request must be submitted to OCD. Extension requests are reviewed on a case-by-case basis and evaluated on their merits. Extensions are considered for a maximum length of one year. The annual extension request must be submitted to OCD through [OCD Online](#) on a Form C-147 (long form) and should include a formal extension request letter, a summary of the prior registration/permit period inspection reports and the copies of the detailed inspection records for the prior permit period (2017/2022).

Please let me know if you have any additional questions.

Regards,

Victoria Venegas • Environmental Specialist

Environmental Bureau

EMNRD - Oil Conservation Division

(575) 909-0269 | Victoria.Venegas@emnrn.nm.gov

<https://www.emnrn.nm.gov/oed/>



District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., 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
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: Recycling Facility Recycling Containment*
Type of action: Permit Registration
 Modification Extension
 Closure Other (explain) _____

* At the time C-147 is submitted to the division for a Recycling Containment, a copy shall be provided to the surface owner.

Be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: 3Bear Field Services, LLC (For multiple operators attach page with information) OGRID #: 372603
Address: 7102 Commerce Way, Brentwood, TX 37027
Facility or well name (include API# if associated with a well): Libby Berry Fee SWD #1
OCD Permit Number: (1RF-024) (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr SW/4 Section 26 Township 20 South Range 34 East County: Lea
Surface Owner: Federal State Private Tribal Trust or Indian Allotment

2.
 Recycling Facility:
Location of recycling facility (if applicable): Latitude 32.543858° Longitude -103.525344° NAD83
Proposed Use: Drilling* Completion* Production* Plugging *
**The re-use of produced water may NOT be used until fresh water zones are cased and cemented*
 Other, *requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.*
 Fluid Storage
 Above ground tanks Recycling containment Activity permitted under 19.15.17 NMAC explain type _____
 Activity permitted under 19.15.36 NMAC explain type: _____ Other explain _____
 For multiple or additional recycling containments, attach design and location information of each containment
 Closure Report (required within 60 days of closure completion): Recycling Facility Closure Completion Date: _____

3.
 Recycling Containment:
 Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.544383° Longitude -103.526851° NAD83
 For multiple or additional recycling containments, attach design and location information of each containment
 Lined Liner type: Thickness 60/60/60 mil LLDPE HDPE PVC Other _____
 String-Reinforced
Liner Seams: Welded Factory Other Field Welded Seams Volume: 279,558 bbl Dimensions: L 810' x W 810' x D 13'
 Recycling Containment Closure Completion Date: _____

4.

Bonding:

Covered under bonding pursuant to 19.15.8 NMAC per 19.15.34.15(A)(2) NMAC (These containments are limited to only the wells owned or operated by the owners of the containment.)

Bonding in accordance with 19.15.34.15(A)(1). Amount of bond \$ 2,192,173 (work on these facilities cannot commence until bonding amounts are approved)

Attach closure cost estimate and documentation on how the closure cost was calculated.

5.

Fencing:

Four foot height, four strands of barbed wire evenly spaced between one and four feet

Alternate. Please specify 6' game fence with 4" mesh

6.

Signs:

12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

Signed in compliance with 19.15.16.8 NMAC

7.

Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation.

8.

Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting	
Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. FEMA map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

9.

Recycling Facility and/or Containment Checklist:

Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- Design Plan - based upon the appropriate requirements.
- Operating and Maintenance Plan - based upon the appropriate requirements.
- Closure Plan - based upon the appropriate requirements.
- Site Specific Groundwater Data -
- Siting Criteria Compliance Demonstrations -
- Certify that notice of the C-147 (only) has been sent to the surface owner(s)

10.

Operator Application Certification:

I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Harry Lewis Title: Sr. Director, EHS
 Signature: [Handwritten Signature] Date: February 2, 2023
 e-mail address: harry.lewis@dclchlogistics.com Telephone: 469.704.7379

11.

OCD Representative Signature: Victoria Venegas Approval Date: 02/10/2023

Title: Environmental Specialist OCD Permit Number: 1RF-24

- OCD Conditions
- Additional OCD Conditions on Attachment

District I
 1625 N. French Dr., Hobbs, NM 88240
 Phone:(575) 393-6161 Fax:(575) 393-0720
District II
 811 S. First St., Artesia, NM 88210
 Phone:(575) 748-1283 Fax:(575) 748-9720
District III
 1000 Rio Brazos Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
 1220 S. St Francis Dr., Santa Fe, NM 87505
 Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 182066

CONDITIONS

Operator: 3BEAR FIELD SERVICES, LLC 7102 Commerce Way Brentwood, TN 37027	OGRID: 372603
	Action Number: 182066
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
venegas	NMOD has reviewed and approved [372603] 3BEAR FIELD SERVICES, LLC permit modification and variance request Application ID 182066, received on February 2, 2023, to address the primary liner integrity issue at the 1RF-24 - Libby Berry Fee SWD #1 FACILITY ID [fOY1801835611] in Unit Letter I, Section 20, Township 26S, Range 34E, Lea County, New Mexico.	2/10/2023