

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

April 20, 2018

Mr. Jim Griswold
OCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, NM 87505
VIA EMAIL

RE: Closure Report for Jawbone State Cuttings Pit, Permit #2-13-0034

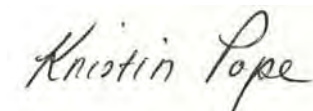
Dear Mr. Griswold,

On behalf of Murchison Oil and Gas, R.T. Hicks Consultants submits this closure report for the above-referenced temporary pit in accordance with the approved C-144 closure plan and conditions of approval. This report includes the following information listed in Part 21 of the C-144 form:

Requirements	Location in this Submission
Proof of Closure Notice (to surface owner and Division)	Attachment 1
Proof of Deed Notice (on-site closure on private land only)	Not applicable; State Land (no deed)
Plot Plan, C-105 form (for on-site closures and temporary pits)	Attachment 2
Confirmation Sampling Analytical Results	Not applicable
Waste Material Sampling Analytical Results (required for on-site closure)	Attachment 3
Disposal Facility Name and Permit Number	Not applicable; on-site closure
Soil Backfilling and Cover Installation	Attachment 4
Re-vegetation Application Rates and Seeding Technique	Attachment 5
Site Reclamation (photo documentation)	To follow
Updated C-144 form	Attachment 6

R.T. Hicks Consultants will notify NMOCD and provide photo-documentation when re-vegetation obligations described in subsection H of 19.15.17.13 NMAC are met. In accordance with the engineered Post Closure Erosion Control Plan, Murchison will inspect the surface for erosion concerns and an annual report will be submitted to OCD.

Sincerely,
R.T. Hicks Consultants



Kristin Pope
Project Geologist

Copy: OCD District 2 (M. Bratcher), Murchison Oil and Gas, NM State Land Office

ATTACHMENT 1

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

October 19, 2017

NMOCD District 2
1625 French Drive
Artesia, New Mexico 88210
VIA EMAIL

RE: Jawbone St. Com Cuttings Pit, In-place Burial Notice
Pit Permit #2-13-0034
Unit M, Section 20, T24S, R33E, Eddy County

Dear Mr. Jim Griswold:

On behalf of Murchison Oil and Gas, Inc., R. T. Hicks Consultants provides this notice to NMOCD with a copy to the State Land Office (email return receipt in lieu of US Mail) that closure operations at the above-referenced pit is scheduled to begin no earlier than **Wednesday, October 25, 2017**. The closure process should require about two weeks, depending on weather conditions.

The "In-place Burial" closure plan for the pit was approved by NMOCD on September 21, 2017 with the C-144 temporary pit application (resubmitted 7/25/2017). The drying pad, which was constructed using the siting, design, and construction mandates in the Pit Rule, began accepting cuttings in late February 2017 from the Jawbone St Com #1H well. This rig was released on March 1 and then cuttings from the subsequent wells (#3, #4) were deposited into the drying pad. The drying pad, which was converted to a pit with the approval of the permit in September, is located at the Jawbone #3H/#4H location.

As a result of discussions with OCD and a meeting on site, the cuttings were sampled on May 10, 2017. A 5-point composite was collected using a backhoe with protected teeth and an auger tube.



As shown in the table below, laboratory analysis of the cuttings sample meets in-place closure target concentrations found in Table II of 19.15.17.13 NMAC without mixing with 3 parts soil/earth. A robust centrifuge and closed loop system were used at each of these wells to

ensure that the cuttings were reasonably dry when deposited into the drying pad and fluids were removed as necessary from the sump in the pad. No mixing is required for stabilization.

Jawbone State Com	Sample Date	Chloride 80,000	Benzene 10	BTEX 50	GRO+ DRO 1000	TPH 8015D 2500
Jawbone Cuttings Pit (5-pt composite)	5/10/2017	32400	0.375	5.91	ND	11.8

TPH 8015D = GRO+DRO+extDRO

ND = Not detected at the laboratory's reporting limit

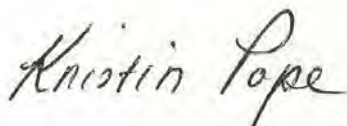
All values are mg/kg

Closure activities are scheduled to begin on October 25 depending on machinery availability. The cuttings will be mixed with CKD or fly ash, as requested by NMOCD, and redistributed in the pit so that they are located at least 4 feet below surrounding grade. The closure process will follow the submitted plan and approval conditions, including the engineered, post-closure erosion control plan.

Thank you for your consideration of this notice of in-place closure. I will follow-up this notice to you with a phone call on Monday, October 23, 2017 as required by the Pit Rule.

Sincerely,

R.T. Hicks Consultants



Kristin Pope

Copy: Murchison Oil and Gas
Mike Bratcher, Crystal Weaver, Brad Billings (NMOCD)
Ed Martin, Amber Groves (SLO) via email

From: [Martin, Ed](#)
To: [Kristin Pope](#)
Subject: Read: IN-PLACE CLOSURE NOTICE: Murchison - Jawbone St Com
Date: Thursday, October 19, 2017 2:08:47 PM

Your message

To: Martin, Ed
Subject: IN-PLACE CLOSURE NOTICE: Murchison - Jawbone St Com
Sent: Thursday, October 19, 2017 2:07:05 PM (UTC-07:00) Mountain Time (US & Canada)
was read on Thursday, October 19, 2017 2:08:33 PM (UTC-07:00) Mountain Time (US & Canada).

This email has been scanned by the Symantec Email Security.cloud service.
For more information please visit <http://www.symanteccloud.com>

ATTACHMENT 2

Submit To Appropriate District Office Two Copies District I 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88210 District III 1000 Rio Brazos Rd., Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505		State of New Mexico Energy, Minerals and Natural Resources Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505			Form C-105 Revised August 1, 2011					
WELL COMPLETION OR RECOMPLETION REPORT AND LOG										
4. Reason for filing: <input type="checkbox"/> COMPLETION REPORT (Fill in boxes #1 through #31 for State and Fee wells only) <input checked="" type="checkbox"/> C-144 CLOSURE ATTACHMENT (Fill in boxes #1 through #9, #15 Date Rig Released and #32 and/or #33; attach this and the plat to the C-144 closure report in accordance with 19.15.17.13.K NMAC)								5. Lease Name or Unit Agreement Name Jawbone State		
7. Type of Completion: <input checked="" type="checkbox"/> NEW WELL <input type="checkbox"/> WORKOVER <input type="checkbox"/> DEEPENING <input type="checkbox"/> PLUGBACK <input type="checkbox"/> DIFFERENT RESERVOIR <input type="checkbox"/> OTHER								6. Well Number: #3H (cuttings from 1H, 3H, and 4H deposited)		
8. Name of Operator MURCHISON OIL & GAS, INC.						9. OGRID 15363				
10. Address of Operator						11. Pool name or Wildcat				
12. Location	Unit Ltr	Section	Township	Range	Lot	Feet from the	N/S Line	Feet from the	E/W Line	County
Surface:										
BH:										
13. Date Spudded	14. Date T.D. Reached	15. Date Rig Released 3/1/2017 (#1H)			16. Date Completed (Ready to Produce)			17. Elevations (DF and RKB, RT, GR, etc.)		
18. Total Measured Depth of Well		19. Plug Back Measured Depth			20. Was Directional Survey Made?			21. Type Electric and Other Logs Run		
22. Producing Interval(s), of this completion - Top, Bottom, Name										
23. CASING RECORD (Report all strings set in well)										
CASING SIZE		WEIGHT LB./FT.		DEPTH SET		HOLE SIZE		CEMENTING RECORD		AMOUNT PULLED
24. LINER RECORD						25. TUBING RECORD				
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET			
26. Perforation record (interval, size, and number)						27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.				
						DEPTH INTERVAL		AMOUNT AND KIND MATERIAL USED		
28. PRODUCTION										
Date First Production		Production Method (<i>Flowing, gas lift, pumping - Size and type pump</i>)					Well Status (<i>Prod. or Shut-in</i>)			
Date of Test	Hours Tested	Choke Size	Prod'n For Test Period	Oil - Bbl	Gas - MCF	Water - Bbl.	Gas - Oil Ratio			
Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API - (<i>Corr.</i>)				
29. Disposition of Gas (<i>Sold, used for fuel, vented, etc.</i>)								30. Test Witnessed By		
31. List Attachments										
32. If a temporary pit was used at the well, attach a plat with the location of the temporary pit. PLATE I ATTACHED										
33. If an on-site burial was used at the well, report the exact location of the on-site burial:										
Latitude 32.166205° Longitude -104.265211° NAD 1927 1983										
I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief										
Signature <i>Kristin Pope</i>			Printed Name KRISTIN POPE		Title AGENT FOR MURCHISON			Date 4/20/2018		
E-mail Address kristin@rthicksconsult.com										

ATTACHMENT 3

Waste Material Sampling Analytical Results

On May 10, 2017, a 5-point composite sample was collected from the contents of the temporary pit using a backhoe bucket with protected teeth and a sampling tube. The sample was submitted to Cardinal Laboratories of Hobbs for BTEX (8021B), GRO+DRO (8015M), TPH (8015M), and Chloride (SM4500) analyses.



Sampling cuttings 5/10/2017

As shown in the table below, laboratory analyses of the cuttings sample “demonstrate that, after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than the parameters listed in Table II of 19.15.17.13 NMAC.” All concentrations of the Table II closure limits were met *without* mixing the cuttings with any other material.

Jawbone State Com	Sample Date	Chloride 80,000	Benzene 10	BTEX 50	GRO+ DRO 1000	TPH 8015D 2500
Jawbone Cuttings Pit (5-pt composite)	5/10/2017	32400	0.375	5.91	ND	11.8

TPH 8015D = GRO+DRO+extDRO

ND = Not detected at the laboratory's reporting limit

All values are mg/kg

May 18, 2017

KRISTIN POPE

R T HICKS CONSULTANTS

901 RIO GRANDE BLVD SUITE F-142

ALBUQUERQUE, NM 87104

RE: JAWBONE CUTTINGS PIT

Enclosed are the results of analyses for samples received by the laboratory on 05/11/17 11:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. 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/qa/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,



Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

R T HICKS CONSULTANTS
KRISTIN POPE
901 RIO GRANDE BLVD SUITE F-142
ALBUQUERQUE NM, 87104
Fax To: NONE

Received:	05/11/2017	Sampling Date:	05/10/2017
Reported:	05/18/2017	Sampling Type:	Soil
Project Name:	JAWBONE CUTTINGS PIT	Sampling Condition:	Cool & Intact
Project Number:	MURCHISON	Sample Received By:	Tamara Oldaker
Project Location:	EDDY CO NM		

Sample ID: CUTTINGS 5-PT COMP (H701261-01)

BTX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	0.375	0.050	05/16/2017	ND	1.90	94.9	2.00	1.60	
Toluene*	1.67	0.050	05/16/2017	ND	1.87	93.3	2.00	1.48	
Ethylbenzene*	0.623	0.050	05/16/2017	ND	1.94	97.2	2.00	1.76	
Total Xylenes*	3.24	0.150	05/16/2017	ND	5.52	92.0	6.00	1.89	
Total BTX	5.91	0.300	05/16/2017	ND					

Surrogate: 4-Bromofluorobenzene (PID) 108 % 72-148

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32400	16.0	05/12/2017	ND	464	116	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	05/12/2017	ND	204	102	200	8.42	
DRO >C10-C28	<10.0	10.0	05/12/2017	ND	225	113	200	15.7	
EXT DRO >C28-C36	11.8	10.0	05/12/2017	ND					

Surrogate: 1-Chlorooctane 103 % 28.3-164

Surrogate: 1-Chlorooctadecane 112 % 34.7-157

Cardinal Laboratories

*=Accredited Analyte

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 client for 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 thirty (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 the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

QR-04	The RPD for the BS/BSD was outside of historical limits.
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

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 client for 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 thirty (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 the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Celey D. Keene, Lab Director/Quality Manager



(575) 393-2326 FAX (575) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: <i>R.T. Hicks Consultants</i> Project Manager: <i>Kristin Pope</i> Address: City: <i>Albuquerque</i> State: <i>NM</i> Zip: Phone #: Fax #: Project #: Project Name: <i>Trabone Cuttings Pit</i> Project Location: <i>Eddy Co.</i> Sampler Name: <i>K. Pope</i>				P.O. #: Company: <i>R.T. Hicks</i> Attn: <i>R. Hicks</i> Address: City: <i>Albuquerque</i> State: <i>NM</i> Zip: <i>87108</i> Phone #: <i>505-266-5004</i> Fax #:							
FOR LAB USE ONLY Lab I.D. <i>#701266</i>		Sample I.D. 		(G)RAB OR (C)OMP. # CONTAINERS GROUNDWATER WASTEWATER SOIL OIL SLUDGE OTHER :		MATRIX 		PRESERV 		SAMPLING 	
DATE TIME		DATE TIME		DATE TIME		DATE TIME		DATE TIME		DATE TIME	
Relinquished By: <i>Kristin Pope</i> Date: <i>5-11-17</i> Time: <i>1:45</i>		Received By: <i>Shawna</i> Date: <i>5-11-17</i> Time: <i>1:45</i>		Relinquished By: Date: Time:		Received By: Date: Time:		Relinquished By: Date: Time:		Received By: Date: Time:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition <input checked="" type="checkbox"/> Cool <input type="checkbox"/> Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		CHECKED BY: <i>(Initials)</i>		Phone Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Phone #: Fax Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Fax #:		REMARKS: 		REMARKS: 	
Lab I.D. 		Sample I.D. 		(G)RAB OR (C)OMP. 		# CONTAINERS 		GROUNDWATER 		WASTEWATER 	
DATE TIME		DATE TIME		DATE TIME		DATE TIME		DATE TIME		DATE TIME	
Relinquished By: Date: Time:		Received By: Date: Time:		Relinquished By: Date: Time:		Received By: Date: Time:		Relinquished By: Date: Time:		Received By: Date: Time:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition <input checked="" type="checkbox"/> Cool <input type="checkbox"/> Intact <input type="checkbox"/> Yes <input type="checkbox"/> No		CHECKED BY: <i>(Initials)</i>		Phone Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Phone #: Fax Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Fax #:		REMARKS: 		REMARKS: 	

From: [Oberding, Tomas, EMNRD](#)
To: [Kristin Pope](#)
Cc: [ccottrell@jdmii.com](#); [Chace Walls](#); [gboans@jdmii.com](#); [Randy Hicks](#); [Griswold, Jim, EMNRD](#)
Subject: RE: VARIANCE REQUEST: Murchison - Jackson Unit #17H
Date: Thursday, December 18, 2014 8:16:05 AM

Aloha Ms. Pope et al,

Thank you for sending in this variance request.

After discussions, OCD approves the substitution of 8015 B, C, or D for 418.1. Hydrocarbons between C6 and C36 must be included in the results.

As 8015M appears to cover GRO+DRO+MRO- this too is an appropriate alternate methodology.

Thank you for continuing to work with the OCD.

Please let me know if you have any questions.

-Doc

Tomáš 'Doc' Oberding, PhD
Senior Environmental Specialist
New Mexico Oil Conservation Division, District 1
Energy, Minerals and Natural Resources Department
(575) 393-6161 ext 111
E-Mail: tomas.oberding@state.nm.us

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.

If you have any questions or concerns, and for notification, please contact me.

From: Kristin Pope [<mailto:kristin@rthicksconsult.com>]
Sent: Tuesday, December 16, 2014 7:51 AM
To: Oberding, Tomas, EMNRD
Cc: [ccottrell@jdmii.com](#); [Chace Walls](#); [gboans@jdmii.com](#); [Randy Hicks](#); [Griswold, Jim, EMNRD](#)
Subject: VARIANCE REQUEST: Murchison - Jackson Unit #17H

Dr. Oberding:

Please find the attached variance request we discussed over the phone last week. During our phone call, I was mistaken on the closure deadline for this site; the closure deadline for this is January 14, 2015. Per our discussion, note that I've copied Jim Griswold on this submission.

Please let me know if we can assist NMOCD's review in any way. Thank you.

Kristin Pope
R.T. Hicks Consultants

ATTACHMENT 4

SOIL BACKFILLING & COVER INSTALLATION

In accordance with the requirements listed in paragraph D of 19.15.17.13 NMAC and the conditions of approval, the operator employed the following steps for in-place burial of the waste material from the temporary pit:

1. Before approval as a temporary pit, the location was used as a drying pad for cuttings from the Jawbone wells 1H, 3H, and 4H. Siting criteria, construction, and operations of the drying pad complied with the temporary pit specifications submitted in the C-144 application and with the Pit Rule. The rig was released from the Jawbone #1H on March 1, 2017 and the drying pad then accepted cuttings from the #3H and #4H as they were drilled. Although a fluid removal system was in place, it was not used as the cuttings were dry upon deposition.
2. After an on-site discussion with NMOCD, a composite sample of the cuttings was recovered on May 10, 2017. The sample was analyzed for Chloride, TPH, GRO+DRO, Benzene, and BTEX at Cardinal Laboratories in Hobbs. As noted in the subsequent closure notice and Attachment 3 of this report, the cuttings meet the concentration limits of the parameters listed in Table II of the Pit Rule.
3. After the cuttings analyses were submitted to NMOCD, approval (with conditions) of the C-144 temporary pit application was granted by the Bureau Chief on September 21, 2017. A closure notice was submitted to the Bureau Chief, the District, and to the State Land Office (via email) on October 19, 2017. Verbal notice in the form of a phone call to NMOCD was placed on October 23.
4. On October 25, 2017, closure activities commenced with the mixing of the cuttings and redistribution across the pit to match the natural slope of the surrounding surface. As suggested by NMOCD, fly ash and water were mixed into the cuttings to hinder post-closure erosion. The liner material above the cuttings was then folded upon the cuttings on the edges of the pit. Hicks Consultants confirmed that the cuttings were located at least 4 feet below final grade.
5. Following inspection, having achieved all applicable requirements associated with in-place burial, a geomembrane liner was installed to completely cover the stabilized cuttings on December 13, 2017. The pit contents and liner were shaped to shed infiltrating water.

Closure Letter Attachment 4
Murchison – Jawbone State Cuttings Pit
Permit #2-13-0034

6. Once the geomembrane cover was in place, approximately 4 feet or more of non-waste containing, uncontaminated, earthen material and the reserved topsoil were replaced to their relative positions in accordance with Subsection (3) of Paragraph H of 19.15.17.13 NMAC and the engineered post-closure erosion control plan submitted with the C-144 application. The soil cover consists of at least four feet of compacted, non-waste containing, earthen material. The uppermost topsoil is equal to the background thickness at least one foot. The surface was contoured to blend with the surrounding topography and to prevent erosion and the ponding of water over the on-site closure. A field test of this material yielded 24 mg/kg chloride.
7. Completion of erosion control measures was delayed due a lack of local availability of the prescribed erosion control blanket in the submitted plan. On January 3, 2018, Pettigrew & Associates approved the use of another product from another manufacturer. After surface sculpting and run-on diversions were complete in accordance with the engineered plan, the erosion control blanket was installed on March 9, 2018.

Mixing fly ash into cuttings
11/29/2017



Paint filter test of mixed cuttings
12/13/2017

Closure Letter Attachment 4
Murchison – Jawbone State Cuttings Pit
Permit #2-13-0034



Installing liner over cuttings and backfilling
12/13/2017



Erosion control blanket over backfilled surface
3/9/2018



Backhoe installing drainage
diversion channels in background



ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

Project: Murchison Oil & Gas, Inc.
Jawbone State COM 3H
Proposed Temporary Solids Pit
Section 2, T25S, R26E
Eddy County, New Mexico

Date: January 3, 2018

Subject: Material Substitution Post-Closure Erosion Control Plan_REV2

Jan 3, 2018

To: R.T. Hicks Consultants

Jawbone State Com 2H

From: Pettigrew & Associates, PA

SUMMARY OF CHANGES

This letter shall serve as an amendment to the technical memorandum dated July 21, 2017

- The substitution of Landlok erosion control blanket for the Curlex I blanket by Excelsior is approved with the following conditions:
 1. The proposed substitution does not affect dimensions shown on the drawings.
 2. No changes to the engineering design, or detailing are required by the proposed substitution.
 3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.
 4. The selected material should be installed in accordance with manufactures recommendations.



ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965

Project: Murchison Oil & Gas, Inc.
Jawbone State COM 3H
Proposed Temporary Solids Pit
Section 2, T25S, R26E
Eddy County, New Mexico

Date: July 21, 2017

Subject: Post-Closure Erosion Control Plan_REV2

This Post-Closure Erosion Control Plan will serve as a supplement to the Closure Plan prepared by R.T. Hicks Consultants.

Site Description and Location

The project site is located in Section 2, T25S, R26E, in Eddy County, NM. The approximate pit dimensions are 160' x 150' and the approximate depth is 10'.



Figure 1 - Site Location (Madron Surveying Inc., No. 4939A 12-9-16)

Recommendations

Restoration of Drainage


According to aerial images, two natural drainage features cross the site. The drainage pattern to the east of the pit shall be returned to the original condition. The drainage pattern through the center of the pit shall be redirected around the west side of the closure and reconvene with the southern portions of the channel as depicted in Figure 2 below.



Figure 2 - Drainage Features

As-Built Survey and Erosion Control Methods

An as-built survey was conducted by Pettigrew & Associates, P.A. (*As-Built Survey Jawbone Site 6/16/17, Appendix A*) following the deposition of cuttings into the pit during its use as a drying pad. Utilizing the survey and aerial images, estimations for cuttings volume, approximate pit profile and the approximate original surface profile were prepared (See cross sections in Appendix A). It was determined there will be sufficient coverage (> 4 feet) over the cuttings after the surface profile is restored.



Restore the surface profile by placing and compacting natural material over the cuttings until the surface of the backfill is 12 inches below the proposed surface profile. Backfilling of the uppermost 12 inches of the soil cover should be accomplished by placing moisture conditioned fill, free of rocks and deleterious material, in 8" loose lifts and compacting until final grade has been reached. Once completed, the southern slope of the reclaimed site shall be the slope shown on profiles A-F (Appendix A), which should approximate the original grade shown on profiles A-F on the as-built survey. The site shall then be covered with Landlok® Erosion Control Blankets from Propex (Appendix B). These blankets should be installed in accordance with manufacturer recommendations as outlined in Appendix B. The blanket shall then be reseeded in accordance with the New Mexico Department of Transportation Zone 5 Seed List for the Southern Desertic Basins, Plains, and Mountains. A list of acceptable seeding is shown in Appendix C. Upon completion, R.T. Hicks Consultants will inspect the completed surface.

In an effort to maintain erosion control, during the first post-closure year, Murchison Oil and Gas, Inc. should visually inspect the reclaimed surface on a quarterly basis and after each significant rain event. During the second and subsequent years, inspections shall take place on a bi-annual basis. If any significant erosion is observed, Murchison shall evaluate a need for a remedy. A report of findings should be provided to the New Mexico Oil Conservation Division (OCD) on an annual basis.

Should any questions or concerns arise with regard to the recommendations provided herein, do not hesitate to contact our office.

Regards,



A handwritten signature in blue ink, appearing to read "CLAUDIUS", located below the professional seal.

Claudius Sanchez Czyzewska, PE NM No. 22897

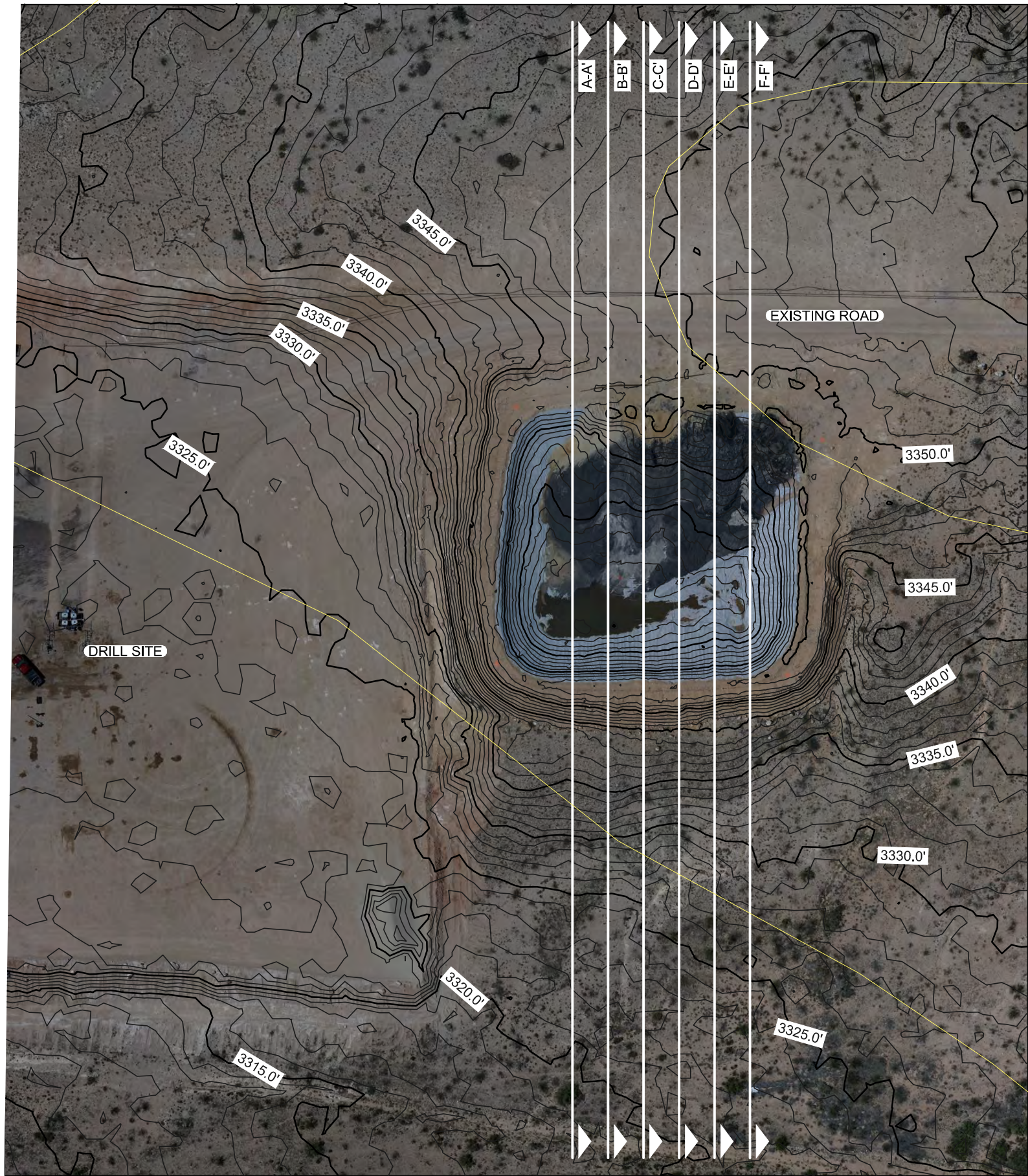
07/21/2017



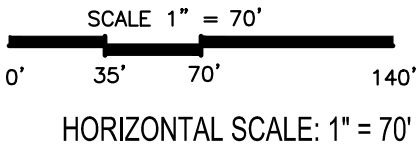
Appendix A

As-Built Survey Jawbone Site 6/16/17





AREA	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'
ESTIMATED AREA AVAILABLE 4 FEET BELOW APPROXIMATE ORIGINAL GROUND (FT²) PER CROSS SECTION	309	403	611	596	669	485
ESTIMATED AREA OF CUTTINGS (FT²) PER CROSS SECTION	231	307	402	337	368	357
LENGTH	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'
ESTIMATED LENGTH (FT) PER CROSS SECTION	20	20	20	20	20	25
VOLUMES	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'
ESTIMATED VOLUME OF CUTTINGS (FT³) PER CROSS SECTION	4611	6148	8037	6750	7360	8936
TOTAL ESTIMATED VOLUME OF CUTTINGS (YD³) USING THE CROSS SECTION METHOD	1550					
TOTAL ESTIMATED VOLUME OF CUTTINGS (YD³) USING CIVIL 3D SOFTWARE	1410					



06/16/2017

[Signature]

PROJECT ENGINEER:
Claudius Sanchez Czyzewska ,PE

REVISIONS		
No.	DATE	DESCRIPTION

SITE PLAN

AS-BUILT SURVEY
JAWBONE SITE

MURCHISON OIL AND GAS INC.
EDDY COUNTY, NEW MEXICO

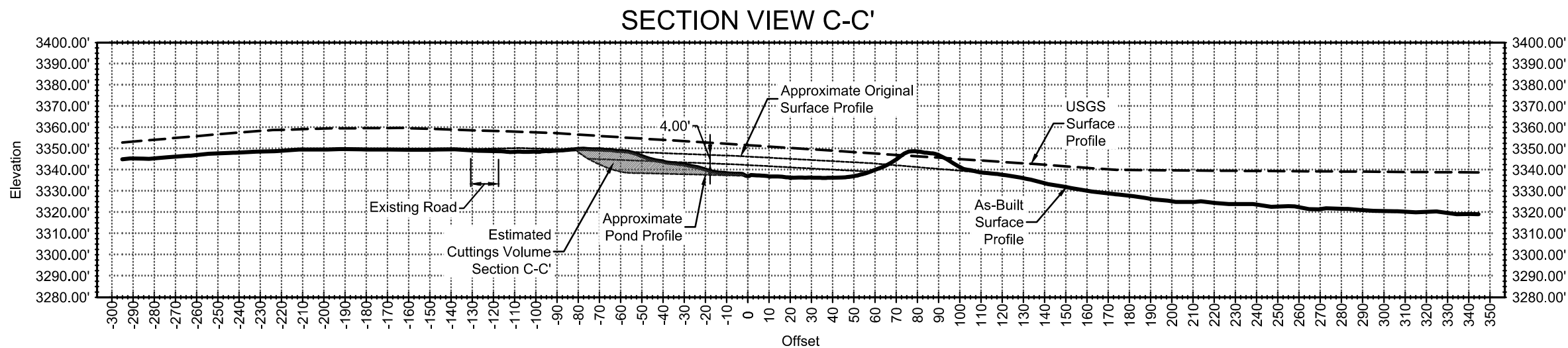
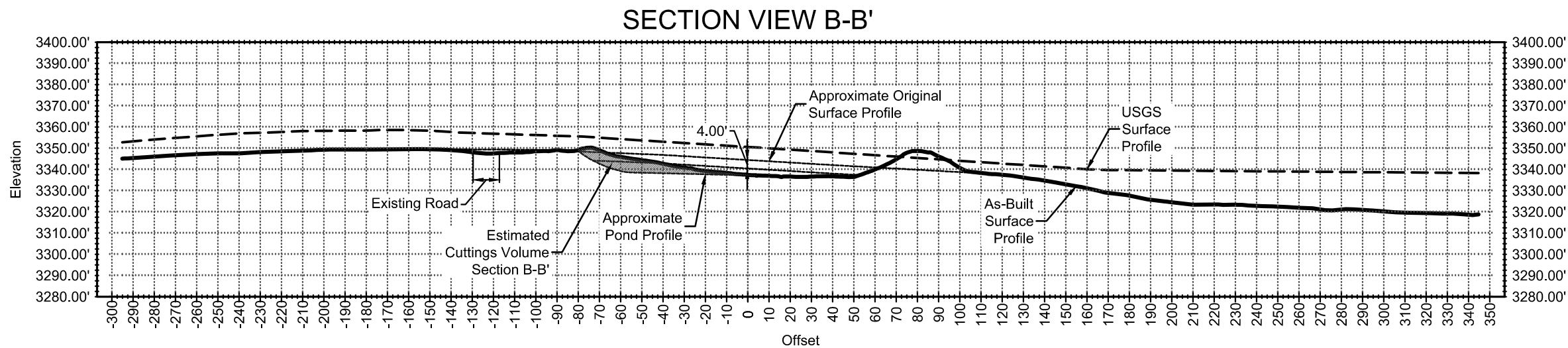
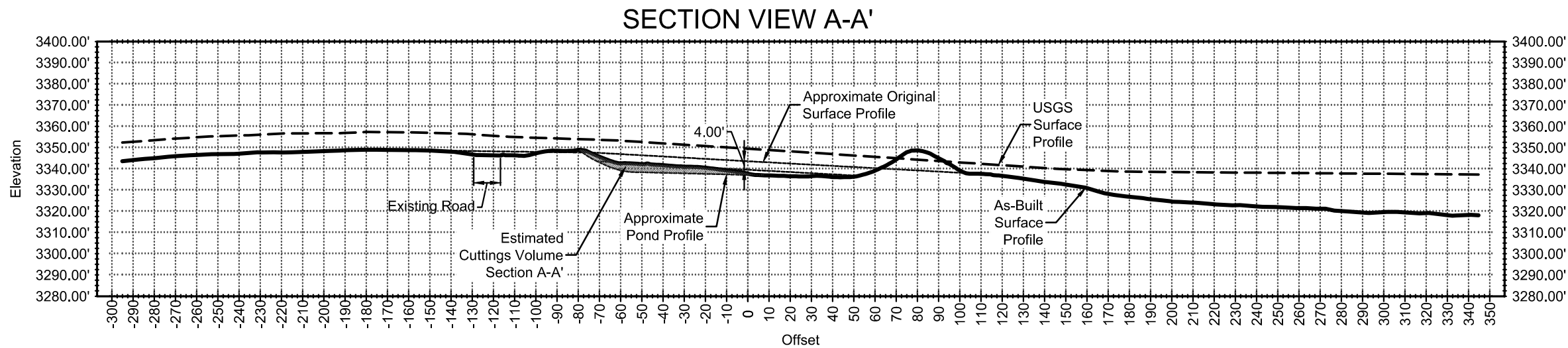


PETTIGREW
& ASSOCIATES PA

ENGINEERING | SURVEYING | TESTING
DEFINING QUALITY SINCE 1965
100 E. Navajo Drive Suite 100 Hobbs New Mexico
88240
T 575 393 9827 F 575 393 1543
Pettigrew.us

PROJECT NUMBER:
2017.1019

SHEET
C-100



HORIZONTAL SCALE: 1" = 60'
 VERTICAL SCALE: 1" = 60'

CLAUDIUS SANCHEZ CZYZEWSKA
 NEW MEXICO
 22897
 PROFESSIONAL ENGINEER

06/16/2017

PROJECT ENGINEER:
 Claudius Sanchez Czyzewska, PE

REVISIONS		
No.	DATE	DESCRIPTION

SECTION VIEWS

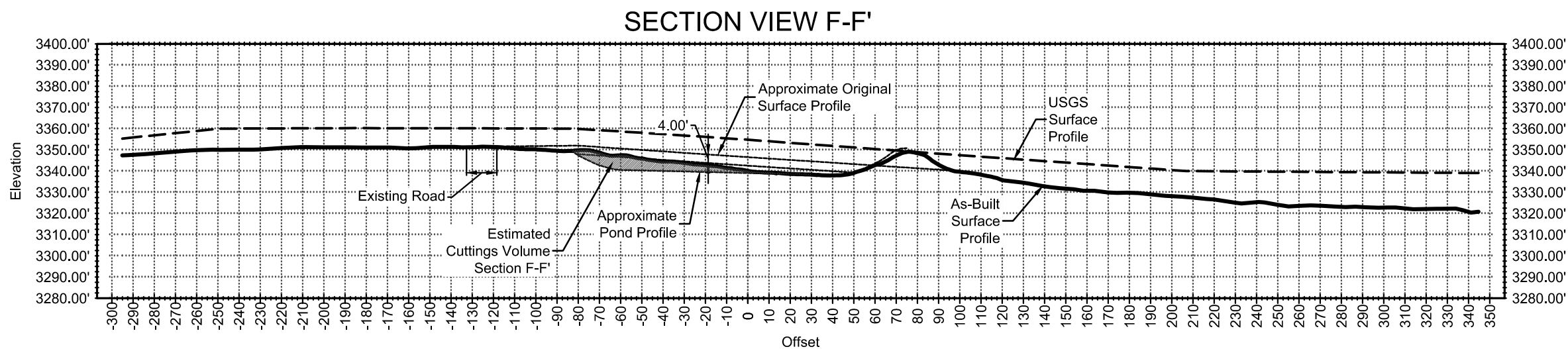
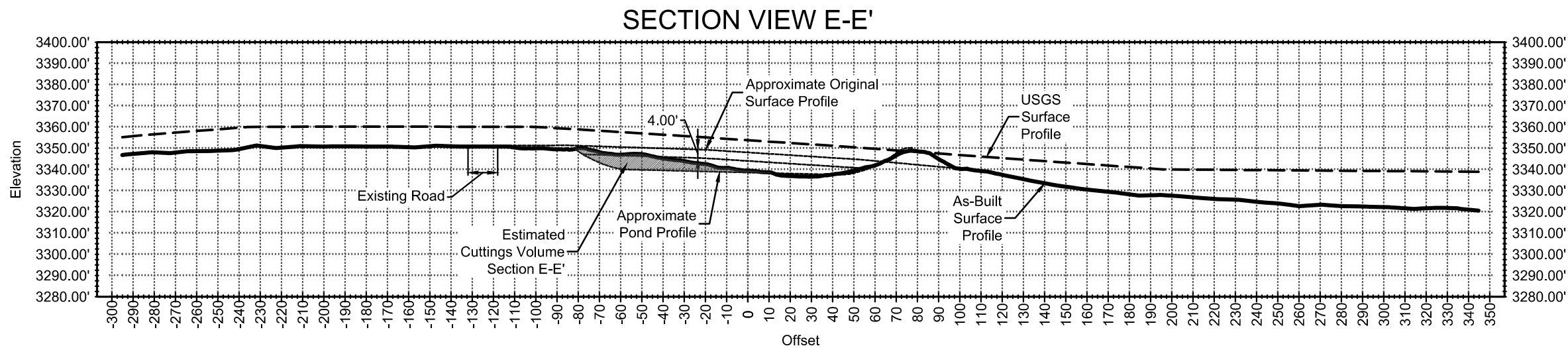
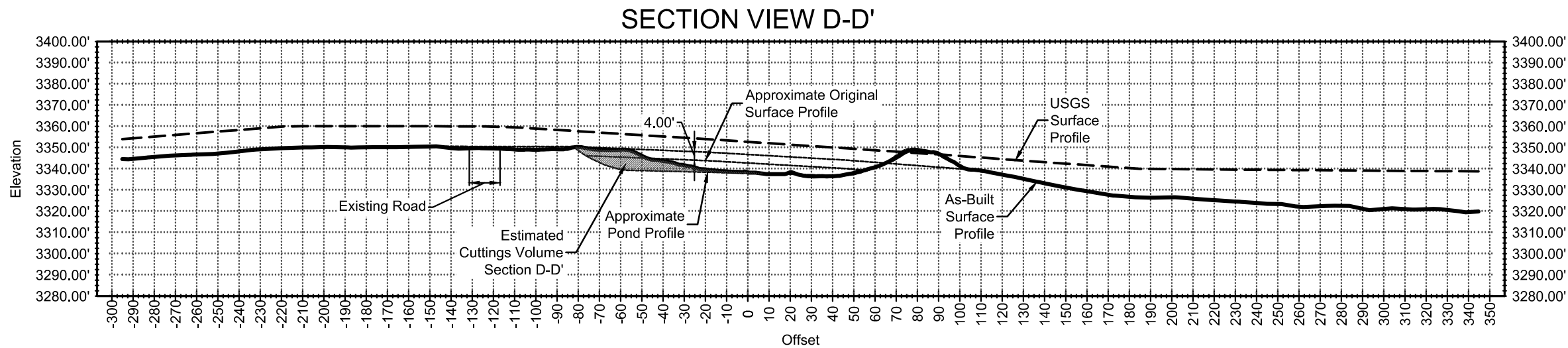
AS-BUILT SURVEY JAWBONE SITE

MURCHISON OIL AND GAS INC.
 EDDY COUNTY, NEW MEXICO

**PETTIGREW
& ASSOCIATES PA**
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 Pettigrew.us

PROJECT NUMBER:
2017.1019

SHEET
C-101



HORIZONTAL SCALE: 1" = 60'
 VERTICAL SCALE: 1" = 60'

CLAUDIUS SANCHEZ CZYZEWSKA
 NEW MEXICO
 22897
 PROFESSIONAL ENGINEER

06/16/2017

PROJECT ENGINEER:
 Claudius Sanchez Czyzewska, PE

REVISIONS		
No.	DATE	DESCRIPTION

SECTION VIEWS

AS-BUILT SURVEY JAWBONE SITE

MURCHISON OIL AND GAS INC.
 EDDY COUNTY, NEW MEXICO

**PETTIGREW
& ASSOCIATES PA**

ENGINEERING | SURVEYING | TESTING
 DEFINING QUALITY SINCE 1965

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PROJECT NUMBER:
2017.1019

SHEET
C-102



Appendix B

Landlok® Erosion Control Blankets from Propex



INSTALLATION GUIDELINES

FOR LANDLOK® ECBs

BEFORE YOU BEGIN

Thank you for purchasing high quality Landlok® Erosion Control Blankets (ECBs) from Propex. We're committed to offering the best erosion control blankets in the industry.

It is important to follow these installation guidelines for a successful project. (Note: Construction shall be performed in accordance with the specific project bid documents, construction drawings and specifications.)

SITE PREPARATION

- ▶ Grade and compact area of ECB installation as directed and approved by Engineer. Subgrade shall be uniform and smooth. Remove all rocks, clods, vegetation or other objects so the installed blanket will have direct contact with soil surface.
- ▶ Prepare seedbed by loosening the top 2-3 in (50-75 mm) minimum of soil.
- ▶ Incorporate amendments such as lime and fertilizer and/or wet the soil, if needed.
- ▶ Do not mulch areas where blanket is to be placed.

SEEDING

- ▶ Apply seed to soil surface before installing blanket. Disturbed areas shall be reseeded.
- ▶ Consult project plans and/or specifications for seed types and application rates.

INSTALLATION ON SOIL SLOPES

- ▶ Excavate a 12 x 6 in (300 x 150 mm) minimum longitudinal anchor trench 2-3 ft (600-900 mm) over crest of slope (see Figure 1).
- ▶ Install top end of blanket into trench and secure to bottom of trench using ground anchoring devices spaced every 12 in (300 mm) minimum. Backfill and compact soil into trench.
- ▶ Unroll blanket down slope. Landlok® S1 should have net on top. Landlok CS2 should have black net on top.

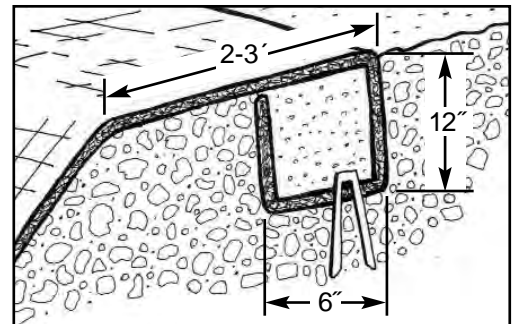


FIGURE 1 Longitudinal anchor trench at top of slope

- ▶ Overlaps of adjacent rolls shall be 3 in (75 mm) minimum and anchor every 18 in (450 mm) minimum along the overlap. Secure using ground anchoring devices at the appropriate frequency and pattern shown below. Overlaps are shingled away from prevailing winds (see Figure 2).
- ▶ Unroll blanket in a manner to maintain direct contact with soil. Do not pull blanket taut. Secure blanket to ground surface using anchoring devices.
- ▶ Excavate a 12 x 6 in (300 x 150 mm) minimum anchor trench at toe of slope (see Figure 3).
- ▶ Install bottom end of blanket into trench and secure to bottom of trench using ground anchoring devices spaced every 12 in (300 mm) minimum. Backfill and compact soil in trench (see Figure 3).
- ▶ Irrigate as necessary to establish/maintain vegetation. Do not over-irrigate.

GROUND ANCHORING DEVICES

- ▶ U-shaped wire staples or metal geotextile pins can be used to anchor blanket to the ground surface. Wire staples should be a minimum thickness of 8 gauge (4.3 mm). Metal pins should be at least 0.20 in (5 mm) diameter steel with a 1 1/2 in (38 mm) steel washer at the head of the pin. Wire staples and metal pins should be driven flush to the soil surface. All anchors should be between 6-18 in (150-450 mm) long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils. Heavier metal stakes may be required in rocky soils.

ANCHOR PATTERN GUIDE

- ▶ The shaded areas in the diagram provide anchor suggestions based on slope gradient and/or anticipated flow conditions. When the correct number of anchors has been evaluated, refer to the three illustrations below to establish anchor pattern. Increased anchoring may be required depending upon site conditions.

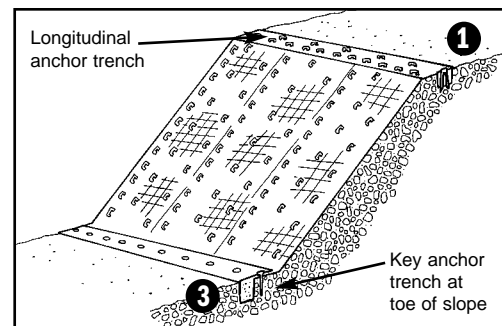
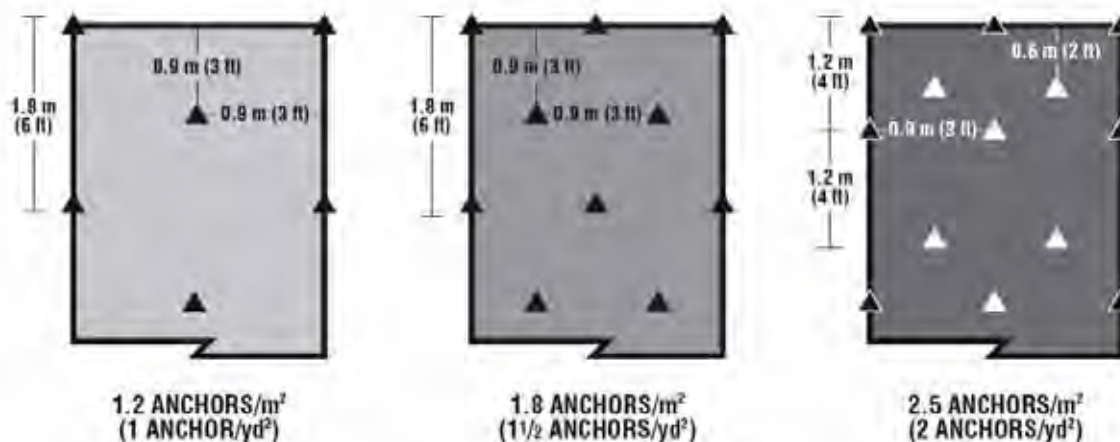


FIGURE 2 Erosion Control Blanket on slope

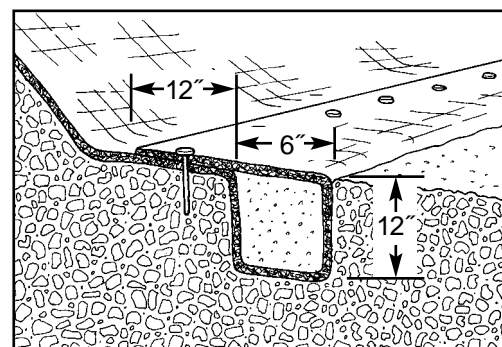


FIGURE 3 Key anchor trench at toe of slope (mat)



PROPEX | THE ADVANTAGE CREATORS.™
GEOSYNTHETICS

Propex Inc.
6025 Lee Highway, Suite 425
PO Box 22788
Chattanooga, TN 37422

PH: 423 899 0444
PH: 800 621 1273
FAX: 423 899 7619
www.geotextile.com

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Appendix C

New Mexico Department of Transportation

2017 Zone 5 Seed List: Southern Desertic Basins, Plains, and Mountains



2017 Zone 5 Seed List: Southern Desertic Basins, Plains, and Mountains

Common Name	Botanical Name	Lbs of PLS*/Acre
Annual quick-cover grasses		
Oats	<i>Avena sativa</i>	0.50
Sterile triticale	<i>Triticum aestivum X Secale cereale</i> 'Quickguard'	0.50
Cool-season grasses		
Bottlebrush squirreltail	<i>Elymus elymoides</i>	1.75
New Mexico feathergrass	<i>Hesperostipa neomexicana</i>	1.00
Western wheatgrass	<i>Agropyron smithii</i>	1.75
Warm-season grasses		
Alkali sacaton	<i>Sporobolus airoides</i>	0.20
Black grama	<i>Bouteloua eriopoda</i>	0.20
Little bluestem	<i>Schizachyrium scoparium</i>	0.50
Needle grama	<i>Bouteloua aristidoides</i>	0.30
Sand dropseed	<i>Sporobolus cryptandrus</i>	0.08
Sideoats grama	<i>Bouteloua curtipendula</i> var. <i>Vaughn</i> **	0.75
Wildflowers		
Blanket flower	<i>Gaillardia pulchella</i>	0.30
Desert marigold	<i>Baileya multiradiata</i>	0.10
Desert zinnia	<i>Zinnia acerosa</i>	0.20
Hairy golden aster	<i>Heterotheca villosa</i>	0.20
Lewis flax	<i>Linum lewisii</i>	0.20
Prairie aster	<i>Machaeranthera tanacetifolia</i>	0.20
Wild four o'clock	<i>Mirabilis multiflora</i>	0.30
White prairie clover	<i>Dalea candida</i>	0.30
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	0.30

Woody Shrubs

Four-wing saltbush	<i>Atriplex canescens</i>	0.40
Sand sage	<i>Artemisia filifolia</i>	0.05
Winterfat	<i>Krascheninnikovia lanata</i>	0.20

***PURE LIVE SEED/ACRE TOTAL**

10.58

**** Local, wild-sourced genotypes preferred. Provide specified registered variety only if wild-sourced seed is unavailable.**

Should any questions or concerns arise with regard to the recommendations provided herein,
do not hesitate to contact our office.

Regards,



David A. Roybal, PE NM No. 23576

01/03/2018

ATTACHMENT 5

RE-VEGETATION PROCEDURES

Surface drainage patterns were restored/diverted as prescribed in the engineered Post Closure Erosion Control Plan.

1. Storm Construction will seed the topsoil of the on-site burial area using a seed drill pulled by a tractor that prepares the seedbed in the same pass using discs. The seed furrows were oriented perpendicular to the slope of the surface to minimize topsoil erosion.
2. Approximately 27 pounds of a seed mixture consisting of species from the *New Mexico Department of Transportation Zone 5 Seed List for the Southern Desertic Basins, Plains, and Mountains* was applied to approximately 1 acre of disturbance in accordance with the supplier's instructions and the Post Closure Erosion Control Plan. Species are listed below in the photograph of the tag of the seed sack and are appropriate for the soil type and conditions at this site.

Curtis and Curtis, Inc.
4830 North Prince
Curtis, NM 88101
Phone: (505) 762-4759
www.curtisseed.com

Storm Construction, LLC
1 Acre NMDOT Zone 5 Mix
1 - 1 Acre Bag @ 13.55 Bush Pounds

Lot#: 35-14851

Item	Origin	Pct%	Grain	Do. Wt.	Total	Test	Total P.L.B.
					Grain	Rate	Pounds
Orzo	Colorado	4.11%	90.00%	0.50%	37.00%	31%	0.30
Mondra							
Quick Green	Washington	3.77%	98.00%	0.20%	36.00%	30%	0.20
Starle Hybrid							
Spurlock	Washington	13.78%	79.00%	0.50%	94.00%	100%	0.70
Bentleybrook, Not Stated							
Western Wheatgrass	Washington	25.77%	74.00%	5.00%	79.00%	111%	0.70
Arriba							
ARKS Sorghum	New Mexico	4.51%	88.00%	0.20%	38.00%	60%	0.20
Not Stated							
Black Gram	New Mexico	1.73%	52.00%	0.40%	86.00%	101%	0.20
Nogal							
Little Bluestem	Texas	4.11%	90.00%	0.00%	90.00%	94%	0.20
Chamisso							
Neelie Gram	Arizona	2.31%	14.00%	0.20%	56.00%(TZ)	121%	0.20
Not Stated							
Blue-Tripod	Colorado	0.66%	14.00%	0.00%	90.00%	110%	0.20
Not Stated							
Sidecut Gram	Texas	1.11%	77.00%	0.80%	77.00%	111%	0.20
Vanguard							
Crane's Pigeon	North Dakota	3.17%	70.00%	0.00%	70.00%	95%	0.20
Not Stated							
Blue-Pan	Washington	1.70%	87.00%	0.00%	87.00%	95%	0.20
Apples							
Alfalfa	Washington	1.70%	87.00%	0.00%	87.00%	95%	0.20
Orchardgrass							
Not Stated	Oregon	1.56%	93.00%	2.00%	95.00%	95%	0.20
Fora O'Clock							
Not Stated	Oregon	2.42%	82.00%	0.20%	82.00%	100%	0.20
Grasslands Arizona							
Not Stated	Oregon	2.54%	93.00%	1.00%	95.00%	95%	0.20
Desert Grape Mahoe							
Not Stated	Idaho	2.54%	95.00%	0.00%	95.00%(TZ)	100%	0.20
Four-Wing Saltgrass	New Mexico	4.06%	67.00%	2.30%	73.00%	95%	0.20
Not Stated							
Red Topgrass	Idaho	0.50%	70.00%	0.00%	70.00%(TZ)	101%	0.20
Not Stated							
Four-Wing Saltgrass	New Mexico	2.09%	67.00%	0.10%	73.00%	95%	0.20
Not Stated							
Other Crop		0.57%					
Other Seed		0.37%					
Sum Total		12.47%					

Total Bush Pounds: 13.55

There Are 1 Bag For This Mix
This Bag Weighs 13.55 Bush Pounds
Use This Bag For 1 Acre

3. A steel plate marking the site as an in-place pit closure has been fabricated for this location and placed on the surface at the center of the former pit location in accordance

with Subsection (3) of Paragraph F of 19.15.17.13 NMAC.

4. The seeded area will be monitored for growth and the operator will repeat seeding until a successful vegetative cover is achieved as outlined in Subsection (5) of Paragraph H of 19.15.17.13 NMAC.
5. If conditions are not favorable for the establishment of vegetation, such as periods of drought, the operator may request that the division allow a delay in additional seeding until soil moisture conditions become favorable. The operator will notify the division and provide photo-documentation when it successful re-vegetation is achieved.
6. As stated in the Post Closure Erosion Control Plan, Murchison will visually inspect the surface of the former pit each quarter and after significant rainfall for erosion. After the first year, inspection frequency will decrease to twice a year. If significant erosion is observed, Murchison will evaluate the need for a remedy. An annual report of findings will be reported to NMOCD.

ATTACHMENT 6

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

Received 7/25/2017
State of New Mexico NMOCD Dist 2
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-144
Revised June 6, 2013

For temporary pits, below-grade tanks, and multi-well fluid management pits, submit to the appropriate NMOCD District Office.
For permanent pits submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

Pit, Below-Grade Tank, or
Proposed Alternative Method Permit or Closure Plan Application

Type of action: ☐ Below grade tank registration
☒ Permit of a pit or proposed alternative method
☒ Closure of a pit, below-grade tank, or proposed alternative method
☐ Modification to an existing permit/or registration
☐ Closure plan only submitted for an existing permitted or non-permitted pit, below-grade tank, or proposed alternative method

Instructions: Please submit one application (Form C-144) per individual pit, below-grade tank or alternative request

Please 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: Murchison Oil & Gas, Inc. OGRID #: 15363
Address: 7250 Dallas Parkway, Suite 1400, Plano, TX 75024
Facility or well name: Jawbone State temporary pit
API Number: 30-015-43985 OCD Permit Number: 2-13-0034
U/L or Qtr/Qtr C Section 2 Township 25S Range 26E County: Eddy
Center of Proposed Design: Latitude 32.165971° Longitude -104.265214° NAD: ☐ 1927 ☒ 1983
Surface Owner: ☐ Federal ☒ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Pit:** Subsection F, G or J of 19.15.17.11 NMAC
Temporary: ☒ Drilling ☐ Workover
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A ☐ Multi-Well Fluid Management Low Chloride Drilling Fluid ☐ yes ☒ no
☒ Lined ☐ Unlined Liner type: Thickness 20 mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
☒ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 20,698 bbl Dimensions: L 120 x W 170 x D 7-12 ft

3.
☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: _____ bbl Type of fluid: _____
Tank Construction material: _____
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other _____
Liner type: Thickness _____ mil ☐ HDPE ☐ PVC ☐ Other _____

4.
☐ **Alternative Method:**
Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

5.
Fencing: Subsection D of 19.15.17.11 NMAC (*Applies to permanent pits, temporary pits, and below-grade tanks*)
☐ Chain link, six feet in height, two strands of barbed wire at top (*Required if located within 1000 feet of a permanent residence, school, hospital, institution or church*)
☒ Four foot height, four strands of barbed wire evenly spaced between one and four feet
☐ Alternate. Please specify _____

6.

Netting: Subsection E of 19.15.17.11 NMAC (*Applies to permanent pits and permanent open top tanks*)

- ☐ Screen ☐ Netting ☐ Other _____
- ☐ Monthly inspections (If netting or screening is not physically feasible)

7.

Signs: Subsection C of 19.15.17.11 NMAC

- ☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
- ☒ Signed in compliance with 19.15.16.8 NMAC

8.

Variations and Exceptions:

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

Please check a box if one or more of the following is requested, if not leave blank:

- ☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval.
- ☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

9.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Siting criteria does not apply to drying pads or above-grade tanks.

General siting

Ground water is less than 25 feet below the bottom of a low chloride temporary pit or below-grade tank.

- ☐ NM Office of the State Engineer - iWATERS database search; ☐ USGS; ☐ Data obtained from nearby wells

☐ Yes ☐ No
☒ NA

Ground water is less than 50 feet below the bottom of a Temporary pit, permanent pit, or Multi-Well Fluid Management pit.

NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells **See Figures 1 & 2**

☐ Yes ☒ No
☐ 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. **(Does not apply to below grade tanks) See Figure 5**

- Written confirmation or verification from the municipality; Written approval obtained from the municipality

☐ Yes ☒ No

Within the area overlying a subsurface mine. **(Does not apply to below grade tanks) See Figure 7**

- Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division

☐ Yes ☒ No

Within an unstable area. **(Does not apply to below grade tanks) See Figure 8**

- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map

☐ Yes ☒ No

Within a 100-year floodplain. **(Does not apply to below grade tanks) See Figure 9**

- FEMA map

☐ Yes ☒ No

Below Grade Tanks

Within 100 feet of a continuously flowing watercourse, significant watercourse, lake bed, sinkhole, wetland or playa lake (measured from the ordinary high-water mark).

- Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within 200 horizontal feet of a spring or a fresh water well used for public or livestock consumption;.

- NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Temporary Pit using Low Chloride Drilling Fluid (maximum chloride content 15,000 mg/liter)

Within 100 feet of a continuously flowing watercourse, or any other significant watercourse or within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). (Applies to low chloride temporary pits.)

- Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within 300 feet from a occupied 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

☐ Yes ☐ No

Within 200 horizontal feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 300feet of any other fresh water well or spring, in existence at the time of the initial application.

NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Within 100 feet of a wetland.

- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

Temporary Pit Non-low chloride drilling fluid

Within 300 feet of a continuously flowing watercourse, or any other significant watercourse, or within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). **See Figure 3**

- Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☒ No

Within 300 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. **See Figure 4**

☐ Yes ☒ No

Within 500 horizontal feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or 1000 feet of any other fresh water well or spring, in the existence at the time of the initial application;

- NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site

See Figures 1 & 2

☐ Yes ☒ No

Within 300 feet of a wetland. **See Figure 6**

- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☒ No

Permanent Pit or Multi-Well Fluid Management Pit

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

☐ Yes ☐ 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

☐ Yes ☐ 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

☐ Yes ☐ No

Within 500 feet of a wetland.

- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☐ No

10.

Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC

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

- ☐ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☒ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____ or Permit Number: _____

11.

Multi-Well Fluid Management Pit Checklist: Subsection B of 19.15.17.9 NMAC

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

- ☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ A List of wells with approved application for permit to drill associated with the pit.
- ☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC
- ☐ Hydrogeologic Data - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____ or Permit Number: _____

12.
Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC

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

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H₂S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

13.
Proposed Closure: 19.15.17.13 NMAC

Instructions: Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

- Type: ☒ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Multi-well Fluid Management Pit
☐ Alternative
- Proposed Closure Method: ☐ Waste Excavation and Removal
☐ Waste Removal (Closed-loop systems only)
☒ On-site Closure Method (Only for temporary pits and closed-loop systems)
☒ In-place Burial ☐ On-site Trench Burial
☐ Alternative Closure Method

14.
Waste Excavation and Removal Closure Plan Checklist: (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.13 NMAC
- ☐ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings)
- ☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

15.
Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC

Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria require justifications and/or demonstrations of equivalency. Please refer to 19.15.17.10 NMAC for guidance.

- | | |
|---|--|
| Ground water is less than 25 feet below the bottom of the buried waste.
- 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 |
| Ground water is between 25-50 feet below the bottom of the buried waste
- 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 |
| Ground water is more than 100 feet below the bottom of the buried waste.
- 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 100 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, 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 300 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 300 horizontal feet of a private, domestic fresh water well or spring used for domestic or stock watering purposes, in existence at the time of initial application.
- NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Written confirmation or verification from the municipality; Written approval obtained from the municipality | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Within 300 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 |
| 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

☐ Yes ☒ No

Within the area overlying a subsurface mine.

- Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division

☐ Yes ☒ No

Within an unstable area.

- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map

☐ Yes ☒ No

Within a 100-year floodplain.

- FEMA map

☐ Yes ☒ No

16.

On-Site Closure Plan Checklist: (19.15.17.13 NMAC) *Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.*

- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection E of 19.15.17.13 NMAC
- ☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of Subsection K of 19.15.17.11 NMAC
- ☒ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☒ Waste Material Sampling Plan - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)
- ☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

17.

Operator Application Certification:

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

Name (Print): Greg Boans Title: Production Superintendent

Signature:  Date: February 8, 2017

e-mail address: gboans@jdmii.com Telephone: (575) 361-4962

18.

OCD Approval: ☐ Permit Application (including closure plan) ☐ Closure Plan (only) ☒ OCD Conditions (see attachment)

OCD Representative Signature: Jim Griswold Approval Date: 9/21/2017

Title: OCD Environmental Bureau Chief OCD Permit Number: 2-13-0034

19.

Closure Report (required within 60 days of closure completion): 19.15.17.13 NMAC

Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☒ Closure Completion Date: March 9, 2018

20.

Closure Method:

- ☐ Waste Excavation and Removal ☒ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
- ☐ If different from approved plan, please explain.

21.

Closure Report Attachment Checklist: *Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.*

- ☒ Proof of Closure Notice (surface owner and division)
- ☐ Proof of Deed Notice (required for on-site closure for private land only) n/a (State Land)
- ☒ Plot Plan (for on-site closures and temporary pits)
- ☐ Confirmation Sampling Analytical Results (if applicable) n/a (on-site burial)
- ☒ Waste Material Sampling Analytical Results (required for on-site closure)
- ☐ Disposal Facility Name and Permit Number n/a (on-site burial)
- ☒ Soil Backfilling and Cover Installation
- ☒ Re-vegetation Application Rates and Seeding Technique
- ☐ Site Reclamation (Photo Documentation) to follow

On-site Closure Location: Latitude 32.166205 Longitude -104.265211 NAD: ☐ 1927 ☒ 1983

Operator Closure Certification:

I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): Kristin Pope Title: Project Geologist, Agent for Murchison

Signature:  Date: April 20, 2018

e-mail address: kristin@rthicksconsult.com Telephone: 575-302-6755

From: Griswold, Jim, EMNRD
Sent: Thursday, September 21, 2017 8:56 AM
To: 'Greg Boans' (gboans@jdmii.com); kristin@rthicksconsult.com
Cc: Billings, Bradford, EMNRD; Bratcher, Mike, EMNRD; Weaver, Crystal, EMNRD; Martin, Ed
Subject: Jawbone State Com

Greg and Kristen,

The Oil Conservation Division (OCD) has reviewed RT Hicks Consultants, Ltd.'s submission dated July 25th, 2017 filed on behalf of Murchison Oil and Gas, Inc. regarding the combined burial of drill cuttings from the Jawbone State Com wells 1H, 3H, and 4H. Based upon the information at hand and after review of the definitions within our regulations (19.15.17.7 R. NMAC), the structure in question can be defined as a temporary pit used for multiple wells. 19.15.17.8 NMAC states "A person shall not construct or use a pit except in accordance with a division-issued permit." Such is not the case as the pit was constructed and used while the division had not issued a permit. Furthermore, a temporary pit "...must be closed within six months from the date the operator released the drilling or workover rig from the first [emphasis added] well using the pit." It appears the earliest rig release occurred on March 1st, 2017 from the Jawbone State Com 1H. This time period can be extended, but for no more than three months.

Nonetheless, the application indicates Murchison wishes to close the pit in-place and thereby dispose of drill cuttings from the three wells. The siting requirements for a temporary pit are contained within 19.15.17.10 A. NMAC exclude siting "within an unstable area, unless a variance is granted upon a demonstration that the operator has incorporated engineering measures into the design to ensure that the temporary pit's integrity is not compromised,..." In addition, the siting requirements for an in-place closure are contained in 19.15.17.10 C. NMAC which also excludes siting within an unstable area "unless the operator demonstrates that it has incorporated engineering measures into the design to ensure that the onsite closure method will prevent contamination of fresh water and protect public health and the environment,..." The OCD considers locations potentially unstable when they are mapped as having a high karst potential by the Bureau of Land Management. The location is within an area of high karst potential and as such a variance is requested by Murchison. The NM Registered Professional Engineer retained by Murchison states that karst features are common in the region and while he did not observe any such features within the test hole to a depth of twelve feet below surface, it did not mean voids in the subsurface did not exist. He recommended during further excavation for the pit that the strata be inspected for voids, fractures, or other solution features. If such items were observed, the engineer was to be contacted for evaluation. He did not recommend any major changes to the construction design. The narrative in the application the Professional Engineer has reviewed the liner foundation and closure plans. The OCD approves the variance request.

The closure application is otherwise approved with the following conditions:

1. Drill cuttings from only the Jawbone State Com wells 1H, 3H, and 4H can be disposed of in this temporary pit.
2. The OCD assumes the existing liner is at least 20-mil in thickness, is string reinforced, made of LLDPE, impervious to petroleum and salt, resistant to ultraviolet light, and in serviceable condition.
3. Prior to closure, free liquids must be removed to a reasonable extent.
4. The contents of the pit may need to be stabilized before burial such that they can support the final cover. This can be done with uncompacted soil, cement kiln dust, or fly ash. The mixing ratio cannot exceed three to one. The mixture must pass a paint filter test.
5. The mixture must be properly sampled and analyzed to verify the concentrations of adsorbed chloride, benzene, toluene, ethylbenzene, total xylenes, gasoline range organics, diesel range organics, and total petroleum hydrocarbons are not higher than specified in Table II of 19.15.17.13 NMAC for depths to groundwater between

51 and 100 feet. Despite comments in the narrative of the application that this sampling had been completed and the waste met the Table II standards, documentation to verify this claim have not been provided.

6. Based upon a review of the “as built” survey provided of the pit and its contents, it appears the waste material needs to be redistributed such that once closed none will be situated less than four feet beneath the final grade. As part of Murchison’s closure report (see Condition 13 below) verification of the waste distribution and overburden thickness must be provided.
7. The outer edges of the liner must be folded over the waste material.
8. An LLDPE string-reinforced geomembrane with a minimum 20-mil thickness must be installed atop the waste and folded edges.
9. The area must then be covered with a minimum thickness of four feet of uncontaminated soils with an adsorbed chloride concentration of less than 600 milligrams per kilogram including a minimum of one foot of soil at the top which is suitable for re-establishing vegetation. The covering soils must also re-establish the site’s historic surface profile including restoration of the natural drainage.
10. Murchison must implement the closure plan described in the application. Murchison must appropriately revegetate the area and ensure the soil cover does not unreasonably erode. This will entail post-closure monitoring and reporting for several years thereafter.
11. An appropriate marker must be placed in the center of the burial area.
12. Murchison must notify the OCD and State Land Office at least 72 hours before closure begins.
13. No later than 60 days after closure is completed, a closure report with all necessary documentation must be submitted to the OCD.

These conditions do not supersede any obligations imposed by the surface owner provided those obligations provide equal or better protection of fresh water, human health, and the environment. I am confident Murchison agrees seeking OCD’s approval prior to construction or implementation of many projects is most efficient, especially when interpretation of regulations are concerned. If you have any questions, please don’t hesitate to call. Thanks.

Jim Griswold

Environmental Bureau Chief

Oil Conservation Division

1220 South St. Francis Drive

Santa Fe, New Mexico 87505

505.476.3465

email: jim.griswold@state.nm.us