2RF-169 -FED 128 AST FACILITY ID fVV2206936015

C147/Closure Cost/Conditions of Approval/Correspondence

[329620] Enchantment Water, LLC March 16, 2022



March 16, 2022

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

Attn: Victoria Venegas

Email: Victoria.venegas@state.nm.gov

Re: 2RF-169 - FED 128 AST FACILITY ID FVV2206936015 | O-21-23S-31E | Eddy Co., NM

Dear Ms. Venegas,

The estimated cost of closure for 2RF-169 - FED 128 AST FACILITY ID FVV2206936015, located at O-21-23S-31E, Eddy County NM, consisting of two (2) above ground storage tanks (ASTs) of 60,000 bbl capacity each is \$83,000.00.

Kind regards,

Matthew W. Grisell Contract Landman

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 Re	cycling Containment			
Type of Facility: Recycling Facility	□ Recycling Containment*			
Type of action: Permit	Registration			
☐ Modification ☐ Closure	Extension Other (explain)			
At the time C-147 is submitted to the division for a Recycling Containmen				
Be advised that approval of this request does not relieve the operator of liability should operating				
For does approval relieve the operator of its responsibility to comply with any other applicable 1.				
Operator: : Enchantment Water, LLC	OGRID #: 329620			
Address:1250 S. Capital of Texas hwy, Ste 1-270, Austin, Tx 78746				
Facility or well name (include API# if associated with a well):FED 128 A				
OCD Permit Number: 2RF-169 (For new facilities the permit	number will be assigned by the district office)			
U/L or Qtr/Qtr Containments 1 & 2O Section21Township23	S Range 31E County: Eddy			
Surface Owner: Federal State Private Tribal Trust or Indian Allotn	nent			
2. Recycling Facility:				
Location of (if applicable): Latitude 32.28179 Longitude -103.780569	1 NAD83 (Approximate)			
Proposed Use: ☐ Drilling* ☐ Completion* ☐ Production* ☐ Plugging*				
*The re-use of produced water may NOT be used until freshwater zones are cased a	and comonted			
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:	• • • • • • • • • • • • • • • • • • • •			
For multiple or additional recycling containments, attach design and loc				
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 in	nspections for previous year)			
Center of Recycling See Attachment (adjacent): (if applicable) Latitude 32.283	6555 Longitude -103.7803083 NAD83 (Approximate)			
☐ For multiple or additional recycling containments, attach design and location information of each containment:				
☐ Liner type: Thickness See Attachment: ☐ HDPE ☐ HDPE ☐ PVC ☐ Other				
Primary liner <u>SEE DESIGN DRAWINGS</u> ; Secondary liner <u>SEE DESIGN DRAWINGS</u> String-Reinforced				
Liner Seams: ⊠ Welded ☐ Factory ☐ Other _ Volume: <u>SEE DESIGN DRAW</u>	INGS bbl Dimensions: (Inside dimensions) <u>SEE DESIGN</u>			
☐ 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 <u>\$</u> See Attached Cost Estimate (work on these facilities ca	nnot commence				
until bonding amounts are approved)					
s. Fencing:					
Four foot height, four strands of barbed wire evenly spaced between one and four feet					
Alternate. Please specify					
6. <u>Signs</u> :					
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, hur	nan 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.	ed include the				
variance information on a separate page and attach it to the C-147 as part of the application.	ed, include the				
If a Variance is requested, it must be approved prior to implementation. See Volume 2					
8. Siting Criteria for Recycling Containment Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria helow as part of the applicant.	ation Potential				
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					
General siting Grand material law than 50 footballow the bettern of the Populine Containment					
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 FIGURES 1, 2a	☐ Yes ⊠ No				
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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)
Ex Certain that notice of the C 147 (only) has been sent to the surface office(s)

Operator Application Certification: I hereby certify that the information and attachments submitted with this a	application are true, accurate and complete to the best of my knowledge and belief.
Name (Print):Peter Mercure	Title:Chief Operating Officer Date:12/30/2021 Telephone:432-242-2021
OCD Representative Signature: Victoria Venegas	Approval Date: 03/17/2022
Title: Environmental Specialist	OCD Permit Number: 2RF-169
OCD Conditions X Additional OCD Conditions on Attachment	FACILITY ID[fVV2206936015]

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD

Sent: Thursday, March 17, 2022 11:16 AM **To:** Matthew Grisell; Michael Bailey

Cc: r@rthicksconsult.com; Enviro, OCD, EMNRD; peter@water.energy

Subject: 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015]. Conditions of Approval

Attachments: C-147 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015].pdf

2RF-169 - FED 128 AST FACILITY ID [fVV2206936015]. Conditions of Approval

NMOCD has reviewed the recycling containment permit application and related documents, submitted by [329620] Enchantment Water, LLC on January 5, 2022, for 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015] in Unit Letter O, Section 21, Township 23S, Range 31E, Eddy County, New Mexico.

[329620] Enchantment Water, LLC requested variances from 19.15.34 NMAC for 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015] related to 19.15.34. NMAC

The following variances have been approved.

- The variance to 19.15.34.14 NMAC Table I for the use of alternate analytical method 8015/8015M for total petroleum hydrocarbons (TPH) is approved.
- The variance to 19.15.34.14 NMAC Table I for the use of alternate analytical method EPA 300.0 or SM4500 for the analysis of chloride is approved.
- The variance to 19.15.34.12.A.(2) NMAC for the no side-slope requirement for the AST containment with vertical walls is approved.
- The variance to 19.15.34.12.A.(3) NMAC for the liners to be anchored to the top of the AST steel walls and no anchor trenches is approved.
- The variance to 19.15.34.12.A.(4) NMAC for the installation on the AST containment of a 40-mil non-reinforced LLDPE primary liner and a 30-mil non-reinforced LLDPE secondary liner with a 200-mil geogrid drainage layer is approved.

The following variance has been denied.

• The variance to 19.15.34.13.B.(2) NMAC for a 2-feet freeboard has been denied. The AST containment must operate with the 3-feet freeboard as specified by rule.

The form C-147 and related documents for the 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015] is approved with the following conditions of conditions of approval:

- The purpose of this permit is for oil and gas activities regulated under the NMAC 19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Section 70-2-12(B) NMSA 1978, which authorizes the division to regulate the disposition of water produced or used in connection with the drilling for or producing of oil and gas or both and Paragraph (21) of Section 70-2-12(B) NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas.
- [329620] Enchantment Water, LLC shall construct, operate, maintain, close, and reclaim the 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] in compliance with 19.15.34 NMAC.

- 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] is approved for five years of operation from the date of permit application. 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] permit expires on January 5, 2027. If [329620] Enchantment Water, LLC wishes to extend operations past five years, an annual permit extension request must be submitted using an OCD form C-147 through OCD Online by December 5, 2026.
- [329620] Enchantment Water, LLC cannot receive produced water in the 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] until after the original copy of the financial assurance has been accepted by NMOCD.
- Per Rule 19.15.34.15.A.(1) operators without existing financial assurance pursuant to 19.15.8 NMAC shall furnish financial assurance acceptable to the division in the amount of the recycling containment's estimated closure cost. The total closure cost estimate for 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] consisting of two (2) above ground storage tanks (ASTs) of 60,000 bbl capacity each in Unit Letter O, Section 21, Township 23S, Range 31E, Eddy County, New Mexico in the amount of \$83,000.00, satisfies the requirements of NMAC 19.15.34.15.A.(1).
- The financial assurance bond should be mailed to the Oil Conservation Division; Bonding and Compliance; 1220
 South St Frances Drive; Santa Fe, NM 87505. NMOCD will notify you when the bond has been received and approved.
- [329620] Enchantment Water, LLC shall notify NMOCD when construction of the 2RF-169 FED 128 AST FACILITY ID [fVV2206936015] commences.
- [329620] Enchantment Water, LLC shall notify NMOCD when recycling operations commence and cease at the 2RF-169 FED 128 AST FACILITY ID [fVV2206936015].
- A minimum of 3-feet freeboard must be maintained in the AST recycling containment, at all times during operations.
- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operation of the facility is considered ceased and notification of cessation of operations should be sent electronically to OCD Online. An extension to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Online.
- [329620] Enchantment Water, LLC shall submit monthly reports of recycling and reuse of produced water, drilling fluids, and liquid oil field waste on NMOCD form C-148 through OCD Online even if there is zero activity.
- [329620] Enchantment Water, LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 2RF-169 FED 128 AST FACILITY ID [fVV2206936015].

Please reference number 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015] in all future communications. Regards,

Victoria Venegas ● Environmental Specialist Environmental Bureau EMNRD - Oil Conservation Division (575) 909-0269 | <u>Victoria.Venegas@state.nm.us</u> http://www.emnrd.state.nm.us/OCD/



Venegas, Victoria, EMNRD

From: Matthew Grisell <matthew@caliberlandman.com>

Sent: Wednesday, March 9, 2022 10:03 AM

To: Venegas, Victoria, EMNRD

Cc: Randy T. Hicks PG; Michael Bailey

Subject: Re: [EXTERNAL] Enchantment Water, LLC Fed 128 AST Containment C-147

Attachments: Atlantis AST Engineered Drawings.pdf

Victoria,

I've talked to my consultant, Randy Hicks (Cc'd), and he has provided a better resolution of the drawings attached (this came from a 30x40 size piece of paper). We do not have the original drawings, only copies. Therefore, this resolution is the best we have. As for the Closure Cost Estimate, it was included in the original uploaded application (see page 7 of application).

In respect to the application, we have selected "Permit" on the application, nothing about a modification.

I have also attached a <u>full copy of the application to this email</u> that was originally uploaded to the NMOCD website in the event there was a software issue when we originally uploaded.

Finally, our receiving of this permit is of utmost importance as not having this permit in place will disallow us from recycling for upcoming projects in the near future. I appreciate all of your help with this matter and look forward to hearing from you. If you would please confirm receipt of this email and all attachments I would be most appreciative.

Take care,

Matthew W. Grisell

Managing Partner

Caliber Land Management, LLC

402 Heights Blvd. | Houston, Texas 77007 M: (832) 725-8503 | O: (713) 522-4547, ext. 105

matthew@caliberlandman.com www.caliberlandman.com



CONFIDENTIALITY / PRIVILEGE NOTICE:

This communication and any attachment(s) are confidential and/or privileged, and are for the sole use of the addressee(s). If you received this transmission in error, you are advised that any unauthorized review, use, disclosure, or distribution is strictly prohibited. In such event, please contact the sender by return email and destroy all copies of the original message and any attachment(s). Thank you.

On Mar 7, 2022, at 3:51 PM, Venegas, Victoria, EMNRD < <u>Victoria.Venegas@state.nm.us</u> > wrote:

Good afternoon Mr. Grisell.

To continue the review of this application, please submit an addendum that explicitly clarifies the following:

The total closure cost estimate for the proposed FED 128 Above Ground Storage, consisting of two ASTs in Letter O, Section 21, Township 23S, Range 31E, Eddy County, NM.

Provide the fluid capacity of each tank. Also include engineering drawings for the tanks. The drawings included in the application are completely illegible.

A necessary clarification; NMOCD didn't issue a permit for Fed 128 AST Containment #1, so we cannot approve a modification. [329620] Enchantment Water, LLC's request will be processed as an application for a new recycling facility as long as the application meets all the requirements of **NMAC 19.15.34. PRODUCED WATER, DRILLING FLUIDS, AND LIQUID OIL FIELD WASTE**.

Let me know if you have any additional questions. Thank you,

Victoria Venegas ● Environmental Specialist Environmental Bureau EMNRD - Oil Conservation Division (575) 909-0269 | Victoria.Venegas@state.nm.us http://www.emnrd.state.nm.us/OCD/ <image002.jpg>

From: Matthew Grisell <matthew@caliberlandman.com>

Sent: Friday, February 25, 2022 12:19 PM

To: Venegas, Victoria, EMNRD < Victoria. Venegas@state.nm.us>

Cc: Randy T. Hicks PG < rootnotes PG < rootnotes

Subject: Re: [EXTERNAL] Enchantment Water, LLC Fed 128 AST Containment C-147

Victoria,

Per our contractor, Randy Hicks, the Fed 128 AST currently provides initial produced water oil/water separation in advance of final treatment at the adjancent recycling faciltiy associated with the Mills Ranch Containment RF-162. Currently, this AST is not a <u>storage</u> containment but is part of treatment. It is my understanding that this difference in use caused a conclusion that leak detection and other requirements of Rule 34 did not apply. <u>Thus, there is no RF number that is specific to this AST.</u> The purpose of the December 2021 permit application was to

- 1. Demonstrate to OCD that Enchantment intends to bring the Fed 128 AST into compliance with Rule 34 in the second quarter of this year
- 2. Gain OCD approval for a rehabilitated Fed 128 AST Containment #1 after installation of a fully compliant Fed 128 Containment #2 and
- 3. Continue to recycle produced water to conserve the fresh water resource.

What Enchantment seeks is approval of the permit to allow installation of Containment #2, commencing use of #2 and then reconstruction of AST Containment #1 to meet the Rule 34 requirements to allow use in full compliance with OCD Rules. We understand that OCD may

require testing of the soil beneath the liners of AST #1 in accordance with the specifications outlined in Rule 34.

After Randy's inspection of the Fed 128 AST and witnessing no evidence of seepage, he advised us to continue produced water recycling while we prepared the December 2021 permit. Given the depth to groundwater exceeds 150 feet, the nature of the subsurface lithology and the lack of any evidence of seepage from the AST, Randy believed this approach provided the highest net benefit for the environment and fresh water.

Take care,

Matthew W. Grisell

Managing Partner

Caliber Land Management, LLC

402 Heights Blvd. | Houston, Texas 77007

M: (832) 725-8503 | O: (713) 522-4547, ext. 105

matthew@caliberlandman.com www.caliberlandman.com

<image001.png>

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On Feb 9, 2022, at 12:11 PM, Matthew Grisell <<u>matthew@caliberlandman.com</u>> wrote:

Hi Victoria,

I apologize for the delay. I am looping in our consultant, Randy Hicks, to answer your question.

Take care,

Matthew W. Grisell

Managing Partner

Caliber Land Management, LLC

402 Heights Blvd. | Houston, Texas 77007

M: (832) 725-8503 | O: (713) 522-4547, ext. 105

matthew@caliberlandman.com

www.caliberlandman.com

<Caliber.png>

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On Feb 3, 2022, at 11:15 AM, Venegas, Victoria, EMNRD Victoria.Venegas@state.nm.us wrote:

Good morning Mr. Grisell, The attached letter, included in the application for FED 128 Above-Ground Storage Tank, Application ID: 70715 states:

"In our 2021 annual compliance audit of assets, we found that an above ground storage tank (AST) located on federal lease NM-141317 does not have the requisite leak detection system installed. This AST provides for the preliminary stage in our produced water recycling process"

Could you please provide the RF number for the mentioned AST?

Thank you,

Victoria Venegas ● Environmental Specialist Environmental Bureau EMNRD - Oil Conservation Division 811S. First St. | Artesia, NM 88210 (575) 909-0269 | Victoria.Venegas@state.nm.us http://www.emnrd.state.nm.us/OCD/ <image002.jpg>

From: Venegas, Victoria, EMNRD

Sent: Wednesday, January 26, 2022 7:19 AM

To: Matthew Grisell <<u>matthew@caliberlandman.com</u>> **Cc:** Gomez, Robert <<u>rgomez@blm.gov</u>>; Michael Bailey
<<u>michael@caliberlandman.com</u>>; Randy T. Hicks PG

<r@rthicksconsult.com>

Subject: RE: [EXTERNAL] Re: Enchantment Water, LLC Fed 128 AST

Containment C-147

Good morning Mr. Grisell,

I confirm we received the email below. [329620] Enchantment Water, LLC's C-147 Registration Package for FED 128 Above-Ground Storage Tank will be reviewed shortly. Thank you,

Victoria Venegas • Environmental Specialist Environmental Bureau EMNRD - Oil Conservation Division

811S. First St. | Artesia, NM 88210 (575) 909-0269 | Victoria.Venegas@state.nm.us http://www.emnrd.state.nm.us/OCD/ <image002.jpg>

From: Matthew Grisell < <u>matthew@caliberlandman.com</u>>

Sent: Wednesday, January 26, 2022 5:51 AM

To: Venegas, Victoria, EMNRD < Victoria.Venegas@state.nm.us>

Cc: Gomez, Robert < rgomez@blm.gov">rgomez@blm.gov; Michael Bailey < michael@caliberlandman.com; Randy T. Hicks PG

<<u>r@rthicksconsult.com</u>>

Subject: [EXTERNAL] Re: Enchantment Water, LLC Fed 128 AST

Containment C-147

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Hi Victoria,

If you would be so kind to confirm receipt of this email I would be most appreciative.

Thank you and have a wonderful day. We greatly appreciate your assistance with this matter.

Take care,

Matthew W. Grisell

Managing Partner

Caliber Land Management, LLC

402 Heights Blvd. | Houston, Texas 77007 M: (832) 725-8503 | O: (713) 522-4547, ext. 105

matthew@caliberlandman.com www.caliberlandman.com

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On Jan 5, 2022, at 2:50 PM, r@rthicksconsult.com wrote:

Ms. Venegas

The purpose of this email is provide OCD with evidence that the surface landowner's representative (BLM) has received a copy of the C-147 for the above-referenced AST Containment.

Hicks Consultants affirms that:

- 1. The location meets all siting criter ia in the Rule and the locationmeet s the specified setback criteria,
- 2. We conducted a foot survey to check that all setback criteria are met,
- 3. The Operation and Maintenance Plan and Closure Plan are consistent with the Rule and previously approved by OCD.

Thank you for your attention to this submission. Caliber will upload these documents to the OCD.Online portal shortly.

Randall Hicks, PG 505-238-9515 (cell) 505-266-5004 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, NM 87104

<Volume1_C147_LEnchantmentFed128ASTFINAL.pdf><Volume2FED
128FINAL.pdf>

<FED 128 Above-Ground Storage Tank.pdf>



Enchantment Water, LLC | 1250 S. Capital of Texas Hwy., Ste 1-270 | Austin, TX 78746

Dear Ms. Venegas,

This letter is provided to you for the purposes of communicating a deficiency in construction relating to one of our company's existing recycling containment assets. New Mexico Administrative Code 19.15.34.12 (A.7) stipulates the following:

"An operator shall design and construct include a recycling containment in accordance with the following specifications.

(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection."

In our 2021 annual compliance audit of assets, we found that an above ground storage tank (AST) located on federal lease NM-141317 does not have the requisite leak detection system installed. This AST provides for the preliminary stage in our produced water recycling process. Our inspection found no evidence of seepage or wet earth around this double-lined AST.

We intend to resolve this deficiency in the first quarter of 2022 and propose the following actions. We will erect a second AST on the same lease and adjacent to the existing structure. The new AST will meet all specifications of design and construction set forth in NMAC 19.15.34.1 and will assume the functional responsibilities of the existing AST. Once in service, the existing AST will be drained, and remedial work will begin to install the necessary leak detection system as required by the code. The AST will be returned to service upon completion of remedial work as a storage for recycled water.

Attached is a C-147 permit application for the existing recycling containment and the proposed new AST containment that will be the same design. Our consultant suggests that OCD approve the existing AST with a condition that we provide documentation on or before May 31, 2022 that the AST meets all design and operational mandates of Rule 34. As stated earlier, the additional AST to be installed will relieve the existing AST from produced water storage obligations and allow Enchantment to avoid a break in service for produced water recycling.

I am happy to discuss this matter with additional details and regret that this oversight in leak detection has required your attention. We are working with the contractor who constructed this structure for our company to ensure this issue does not surface again in future projects. Please contact me directly if I can be of assistance or if you have any questions.

Best Regards,

Peter Mercure Enchantment Water, LLC

December 2021

Volume 1 C-147 Registration Package for FED 128 Above-Ground Storage Tank Section 21, T23S, R31E, Eddy County C-147 Form and Closure Cost Estimate AST Operations and Closure Plan Siting Criteria Demonstration Appendix Well Logs Site Photos



View southeast showing existing AST that will be refurbished to meet Rule 34 construction requirements and, on the right of the image, the existing recycling facility for the Mills Ranch Recycling Containment. A second AST that is fully compliant with Rule 34 will be installed adjacent to the existing AST shown above.

Prepared for: Enchantment Water LLC 1250 S. Capital of Texas Hwy, Ste 1-270 Austin, Texas

Prepared by: R.T. Hicks Consultants, Ltd. 901 Rio Grande NW F-142 Albuquerque, New Mexico 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

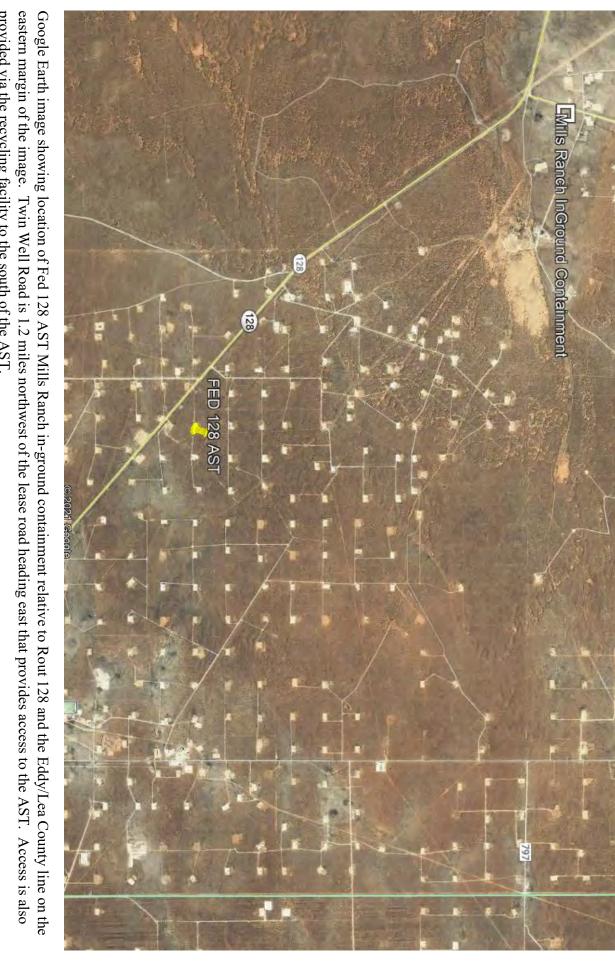
Recycling Facility and/or Recycling Containment				
Type of Facility: ☐ Recycling Facility ☐ Recycling Containment* Type of action: ☐ Permit ☐ Registration ☐ Modification ☐ Extension ☐ Closure ☐ Other (explain)				
* At the time C-147 is submitted to the division for a Recycling Containment, a copy shall 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: :Enchantment Water, LLC OGRID #:329620				
Address:1250 S. Capital of Texas hwy, Ste 1-270, Austin, Tx 78746				
Facility or well name (include API# if associated with a well):FED 128 AST (STORAGE)				
OCD Permit Number:(For new facilities the permit number will be assigned by the district office)				
U/L or Qtr/Qtr Containments 1 & 2O Section21 Township23SRange31ECounty:Eddy				
Surface Owner: ☐ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment				
2				
\(\text{Recycling Facility:} \)				
Location of (if applicable): Latitude 32.28179 Longitude -103.7805691 NAD83 (Approximate)				
Proposed Use: ⊠ Drilling* ⊠ Completion* ⊠ Production* ⊠ Plugging *				
*The re-use of produced water may NOT be used until freshwater 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.				
Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)				
Center of Recycling See Attachment (adjacent): (if applicable) Latitude 32.2836555 Longitude -103.7803083 NAD83 (Approximate)				
☐ For multiple or additional recycling containments, attach design and location information of each containment:				
☐ Liner type: Thickness See Attachment: ☐ HDPE ☐ HDPE ☐ PVC ☐ Other Driver lines SEE DESIGN DRAWINGS Secondary lines SEE DESIGN DRAWINGS ☐ Series Printer and See Design Printer and				
Primary liner <u>SEE DESIGN DRAWINGS</u> ; Secondary liner <u>SEE DESIGN DRAWINGS</u> String-Reinforced				
Liner Seams: Welded Factory Other Volume: <u>SEE DESIGN DRAWINGS</u> bbl Dimensions: (Inside dimensions) <u>SEE DESIGN</u>				
Recycling Containment Closure Completion Date:				

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 \$\section{\section}\$ See Attached Cost Estimate (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. <u>Signs:</u> ☐ 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. See Volume 2				
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 FIGURES 1, 2a	☐ 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. - Written confirmation or verification from the municipality; written approval obtained from the municipality FIGURE 3	☐ Yes ⊠ No ☐ NA			
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division FIGURE 4	☐ Yes ⊠ No			
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map FIGURE 5	☐ Yes ⊠ No			
Within a 100-year floodplain. FEMA map FIGURE 6	☐ Yes ⊠ 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 FIGURE 7	☐ 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 FIGURE 8	☐ 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. FIGURES 1 and 7	☐ Yes ⊠ No			
 NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site Within 500 feet of a wetland. FIGURE 9 US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site 	☐ Yes ⊠ No			

OCD Conditions

Additional OCD Conditions on Attachment

9.	
Recycling Facility and/or Containment Checklist:	
	ation. 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 requi	rements.
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 surfa 	aa ayynaw(a)
Certify that notice of the C-147 (only) has been sent to the surfa	ce owner(s)
10.	
On another Annalization Contiffications	
Operator Application Certification:	
I hereby certify that the information and attachments submitted with this a	application are true, accurate and complete to the best of my knowledge and belief.
Name (Bright) Between Manager	Tides Chief Occuption Officer
Name (Print):Peter Mercure	Title:Chief Operating Officer
Signature:	Date: 12/30/2021
e-mail address peter@water.energy	Telephone: 432-242-2021
OCD Representative Signature:	Approval Date:
	Approvide Dates
Title	OCD Downit Number



provided via the recycling facility to the south of the AST.

R. T. HICKS CONSULTANTS, LTD.

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

FED 128 ABOVE-GROUND STORAGE TANK

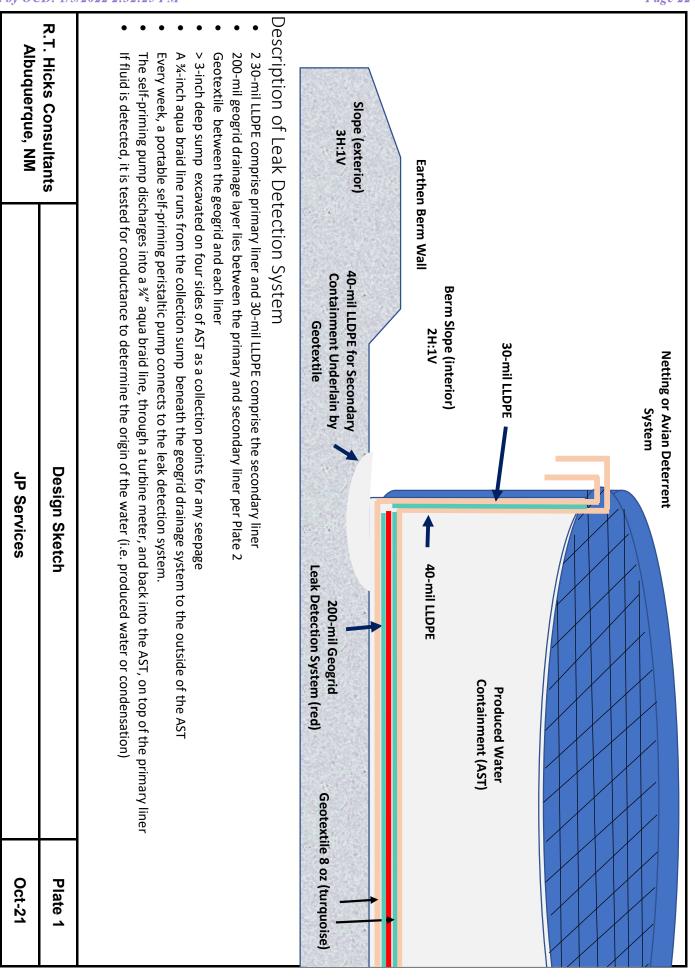
Financial Assurance Cost Estimate

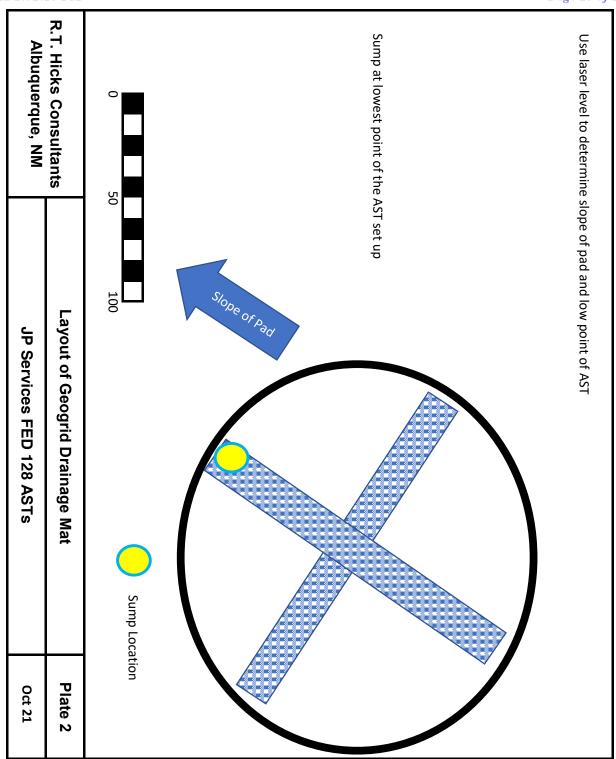
Total estimated cost for closure, reclamation, and restoration of the facility (AST, fencing, etc.) pursuant to Rule 34 is \$49,500 for AST Containment #1 and \$33,500 for AST Containment #2 based upon the work elements in the spreadsheet (below). As shown in the C-147 permit application, the AST Containments will lie on the same pad. Reclamation and restoration of pad on this Federal lease is bonded by the \$16,000 amount associated with AST #1.

Items shown with "0" units are costs recommended by BLM but are not required in a closure cost estimate for compliance with Rule 34. The estimate was generated by Enchantment with input from Hicks Consultants and is equivalent to contractor bids for other AST containments.

ITEM				UNIT	Rule 34
NO.	ITEM DESCRIPTION	UNITS	QTY	PRICE	TOTAL PRICE
	Fed 128 AST				
1	Site Containment	0	1	\$1,000.00	\$0.00
2	Removal of AST and Liner Disposal	1	1	\$30,000.00	\$30,000.00
3	Removal of Weir Tanks	0	5	\$500.00	\$0.00
4	Removal of Chemical Trailer	0	1	\$50.00	\$0.00
5	Removal of Filter Pods	0	1	\$200.00	\$0.00
	Removal of pumps, generators, light				
6	towers	0	4	\$200.00	\$0.00
8	Clean Pumps, piping and equipment	0	1	\$1,500.00	\$0.00
9	Remove Pumps, piping, and equipment	0	3	\$1,500.00	\$0.00
11	Assess soil for impacts	1	1	\$2,500.00	\$2,500.00
12	Re-grade and Reclaim Site	0	0	\$16,000.00	\$16,000.00
	Misc. disposal and removal of fencing				
13	and cattle guards	1	1	\$1,000.00	\$1,000.00
	Facility Decommission and Reclaim				
	Site Subtotal:				\$49,500.00
	Second AST				\$33,500.00

C-147





AST OPERATIONS AND CLOSURE PLANS

General Specifications

This plan provides additional protocols to cause the proposed recycling containments (AST Containments) to conform to NMOCD Rules.

The operator will maintain and operate the recycling containments and facility in accordance with the following plan to contain liquids and maintain the integrity of the liner to prevent contamination of fresh water and protect public health and the environment.

- The operator will use the treated produced water in the containments for drilling, completion (stimulation), producing or processing oil or gas or both. If other uses are planned, the operator will notify the OCD though the submission of a modified C-147.
- For all exploration and production operations that use produced water, the operator will conduct these activities in a manner consistent with hydrogen sulfide gas provisions in 19.15.11 NMAC or NORM provisions in 19.15.35 NMAC, as applicable.
- The operator will address all releases from the recycling and re-use of produced water in accordance with 19.15.29 NMAC.
- The operator will not discharge into or store any hazardous waste in the recycling containments, but they may hold fluids such was freshwater, brackish water, recycled and treated water, water generated by oil or gas processing facilities, or other waters that are gathered for well drilling or completion. The recycling facility will not be used for the disposal of produced water. The operator will maintain the containments free of miscellaneous solid waste or debris
- The operator will verify that no oil is on the surface of the contained fluid. If oil is observed, the oil shall be removed using an absorbent boom or other device and properly disposed at an approved facility. An absorbent boom or other device will be maintained on site.
- The operator will install and use a header and diverter described in the design/construction plan in

19.15.34.10 B

Recycling containments may hold produced water for use in connection with drilling, completion, producing or processing oil or gas or both.

19.15.34.8 A

(5) All operations in which produced water is used shall be conducted in a manner consistent with hydrogen sulfide gas provisions in 19.15.11 NMAC or NORM provisions in 19.15.35 NMAC, as applicable.

19.15.34.8 A

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

19.15.34.10 B

Recycling containments may hold produced water for use in connection with drilling, completion, producing or processing oil or gas or both. Such fluids may include fresh water, brackish water, recycled and treated water, fluids added to water to facilitate well drilling or completion, water produced with oil and gas, flowback from operations, water generated by an oil or gas processing facility or other waters that are gathered for well drilling or completion but may not include any hazardous waste.

19.15.34.9 G

Recycling facilities may not be used for the disposal of produced water.

19.15.34.13 B

- (1) The operator shall remove any visible layer of oil from the surface of the recycling containment (7) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
- 19.15.34.13 B
- (3) The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents

order to prevent damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes during injection or withdrawal of liquids.

- Pursuant to a variance, the operator will maintain at least 2-feet of freeboard in each AST containment.
 Under extenuating circumstances, which will be noted on the inspection log as described below, the operator may temporarily exceed the freeboard mandate.
- If the liner develops a leak or if any penetration of the liner occurs above the liquid's surface, then the operator will repair the damage or initiate replacement of the liner within 48 hours of discovery (and immediately notify BLM) or will seek a variance from the division district office within this time period.
- If visible inspection suggests that the liner developed a leak or if any penetration of the liner occurs below the liquid's surface, then the operator will remove all liquid above the damage or leak line within 48 hours of discovery. The operator will also notify the district division office within this same 48 hours (and immediately notify BLM) of the discovery and repair the damage or replace the liner.
- In the event of a leak due to a hole in the liner, the following steps will be followed:
 - 1. If the source of the fluid is uncertain, comparative field tests may need to be performed on both the water in the containment and that which may have been released (e.g. pH, conductance, and chloride).
 - 2. If the fluid is found to be coming from the containment, determine the location from which the leak is originating.
 - 3. Mark the point where the water is coming out of the tank.
 - 4. Locate the puncture or hole in the liner.
 - 5. Empty the containment to the point of damage in liner.
 - 6. Clean area of liner that needs to be repaired.

damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

19.15.34.13 B

(2) The operator shall maintain at least three feet of freeboard at each containment.

19.5.34.13 B

(4) If the containment's primary liner is compromised above the fluid's surface, the operator shall repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.

(5) If the primary liner is compromised below the fluid's surface, the operator shall remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.

- 7. Cut out piece of material (patch or tape) to overlay liner.
- 8. Either weld the patch to the injured area in the liner or apply tape over the rupture.
- 9. Make sure rupture is completely covered.
- 10. Monitor as needed.

Water should NEVER go below 12 inches at the lowest level of the tank to prevent impact from high winds.

If the tank is drained, it should be secured from wind impacts and the liner inspected and reposition (to provide sufficient slack during filling) prior to refilling, per direction of SOP.

The operator will report releases of fluid in a manner consistent with NMAC 19.15.29, as well as immediately notify BLM.

The operator will inspect and remove, as necessary, surface water run-on accumulated in the secondary containment

Monitoring, Inspections, and Reporting
Inspections are to routinely be performed, as well as when the ASTs are emptied and prior to refilling.
An "Inspection Form" meeting requirements according to NMAC 19.15.34, as well as BLM COA, is to be filled out during these routine inspections and is included at the end of this section.

Weekly inspections consist of

- reading and recording the fluid height of staff gauges, freeboard
- recording any evidence that the AST Containment surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect any diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.

- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.
- Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery (24 hours if federally protected), report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs, then the operator will take appropriate action within 48 hours as noted above, including immediate notification of BLM.

Monthly, the operator will:

- Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
- Record sources and disposition of all recycled water.

Additional monitoring to identify hazards that may have developed, changes in site conditions, tank use and to enable early detection of structural issues such as uneven tank panel settlement, soil settlement, liner damage, insufficient liner slack, or leaks. If changes are noted, they should be communicated to the AST contractor (WWS Manager/Field Supervisor)

The operator will maintain a log of all inspections and make the log available for the appropriate Division district office's review upon request.

Cessation of Operations
If less than 20% of the total fluid capacity is utilized

19.15.34.12 E

Netting. The operator shall ensure that a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds. The operator shall on a monthly basis inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

every six months, beginning from the first withdraw, operation of the facility has ceased and the division district office will be notified. The division district may grant an extension not to exceed six months to determine the cessation of operations and the operator may request a *variance from this mandate to close for good cause and has been included in Volume 3*.

The operator will remove all fluids from the recycling facility within 60 days of cessation of operations. An extension, not to exceed 2 months, may be granted by the district division for the removal of fluids from the facility.

The breakdown of the containments follows the reverse order of the setup steps presented in the set-up manual

19.15.34.13 C

A recycling containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator must report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

19.15.34.14 A

Once the operator has ceased operations, the operator shall remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use. The division district office may grant an extension for the removal of all fluids not to exceed two months.

	Inspe	ction For	m Date:
FED 1 Weekly inspection	1 28 AST Contai		Tank ID:
Weekly Inspection	iyi idid level ili	ust be maintaine	ed > 1 100t
Fluid Level:		<u> </u>	Fank contents:
Inspection Task	Results		Remarks, Observations, and/or Remedial Actions
Visible Oil on Surface	None Ves, Observed Describe Action		
		An absorbent boo surface.	om or similar device is located on site to remove visible oil from
At least 2 ft of freeboard	☐ Yes	No, Measure Freeboard	
Evidence of surface water run-on	None Observed	Yes, Describe	
		Check for excess	sive erosion of perimeter berms.
Birds or wildlife in net or screen	None Observed	Yes, Describe	
			overy (immediately if federally protected species, report dead birds or iate agency (USFWS, NMDGF) and to NMOCD district division office.
Damage to netting or screen	None Observed	Yes, Describe	
Rupture of Liner	None Observed	Yes, Describe	
			l, repair within 48 hours. If below fluid level, remove fluid above within trict division office, and repair. Immediately notify BLM of any leak
Clips or clamps properly securing liner	Yes	No, Describe	
If low level, enough liner slack on panel wall	Yes	No, Describe	
Uneven gaps between panels	None Observed	Yes, Describe	
Signs of tank settlement	None Observed	Yes, Describe	

Fed 128 AST

Erosion of soil surrounding tank (10 ft radius)	None Observed	Yes, Describe	
Running water on the ground	None Observed	Yes, Describe	
Unusual ponding of fluid inside berm	None Observed	Yes, Describe	
	dete divis	rmined as the sourc	ictance, etc.) ponded fluid and compare to fluid in tank. If tank is ie, locate and repair rupture within 48 hours. Notify NMOCD district r. Immediately notify BLM.
Rust or corrosion on panels, stairs, or hardware	None Observed	Yes, Describe	
Damage to any hardware	None Observed	Yes, Describe	
Additional Observations or Actions:			
Inspected by:			

Closure Plan Above Ground Tank Containment (AST)

Closure Plan

After operations cease, the operator will remove all fluids and commence reclamation efforts immediately. Final reclamation to be completed within 3 months from the date the operator ceases operations from the containment for use.

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol (BLM requirements will supersede OCD rules if equal or better for protection of freshwater, human health and the environment).

The containments are expected to contain a small volume of solids, the majority of which will be windblown sand and dust with some mineral precipitates from the water.

The operator will notify the division district and BLM (phone or email) before initiating closure of the containments and/or facility.

Excavation and Removal Closure Plan – Protocols and Procedures

- 1. Residual fluids in the containments will be sent to disposal at a division-approved facility.
- 2. The operator will remove all solid contents and transfer those materials to the following division-approved facility:

Disposal Facility Name: R360 Permit Number NM 01-0006

- 3. If possible, geomembrane textiles and liners that exhibit good integrity may be recycled for use as an under liner of tank batteries or other use as approved by OCD.
- 4. Disassemble the recycling containment infrastructure according to manufacturer's recommendations
- 5. After the disassemble of the containments and removal of the contents and liners, soils beneath the tanks will be tested as follows
 - a. Collect a five-point (minimum) composite from beneath the liner to include any obviously stained or wet soils, or any other evidence of impact from the containments for laboratory analyses for the constituents listed in Table I of 19.15.34.14 NMAC.
 - b. If any concentration is higher than the parameters listed in Table I, additional delineation may be required, and closure activities will not proceed without Division

19.15.34.14 B

The operator shall close a recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.

19.15.34.14 C

The operator shall test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below.

(1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results and the operator must

Closure Plan Above Ground Tank Containment (AST)

approval.

c. If all constituents' concentrations are less than or equal to the parameters listed in Table I, then the operator will backfill the facility as necessary using non-waste containing, uncontaminated, earthen material and proceed to reclaim the surface to pre-existing conditions.

receive approval before proceeding with closure.

(2) If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator can proceed to backfill with non-waste containing, uncontaminated, earthen material

Reclamation and Re-vegetation

The operator will reclaim the surface to safe and stable pre-existing conditions that blends with the surrounding undisturbed area. "Pre-existing conditions" may include a caliche well pad that existed prior to the construction of the recycling containment and that supports active oil and gas operations.

Areas not reclaimed as described herein due to their use in production or drilling operations will be stabilized and maintained to minimize dust and erosion.

For all areas disturbed by the closure process that will not be used for production operations or future drilling:

- <u>a.</u> The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
- <u>b.</u> Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns.
- c. The disturbed area shall then be reseeded with BLM defined seed mixture within the first 3 months following closure of a recycling containment in accordance with BLM requirements.

Federal, state trust land, or tribal lands may impose alternate reclamation and re-vegetation obligations that provide equal or better protection of fresh water, human health, and the environment. Re-vegetation and reclamation plans imposed by the surface owner will be outlined in communications with the OCD.

The operator will notify the division when the site meets the surface owner's requirements or exhibits a uniform vegetative cover that reflects a life-form ratio of plus or minus fifty percent (50%) of predisturbance levels and a total percent plant cover of at least seventy

19.15.34.14 E

Once the operator has closed the recycling containment, the operator shall reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment. The operator shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

19.15.34.14 G

The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

19.15.34.14 F

Reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established

Closure Plan Above Ground Tank Containment (AST)

percent (70%) of pre-disturbance levels, excluding noxious weeds. (As surface owner, BLM will determine satisfactory completion of reclamation).

Closure Documentation

Within 60 days of closure completion, the operator will submit a closure report (Form C-147) to the District Division, with necessary attachments to document all closure activities are complete, including sampling results and details regarding backfilling and capping as necessary.

In the closure report, the operator will certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in the closure plan. that reflects a life-form ratio of plus or minus fifty percent (50%) of predisturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

19.15.34.14 D

Within 60 days of closure completion, the operator shall submit a closure report on form C-147, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

SITING CRITERIA DEMONSTRATION

Discussion Figures

SITING CRITERIA (19.15.34.11 NMAC ENCHANTMENT WATER, LLC – FED 128 AST

Distance to Groundwater

Figure 1, Figure 2, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 100 feet beneath the area of interest that will include the location of the recycling containment.

Figure 1 is a geologic/ topographic map that shows:

- 1. The FED 128 Containment area identified by the blue polygon
- 2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often mislocated in the WATERS database as older wells will plot in the center of the quarter, quarter, quarter, of the Section Township and Range. Additionally, the OSE database can include locations of proposed wells (i.e., permit applications). The permit data that show "DTW=0" as data are eliminated from Figure 1. Some wells are mis-located.
- 3. Water wells from the USGS database as large triangles color-coded to the formation from which the well draws water.
- 4. Water wells, which are not documented in the public databases but were identified by field inspection or other published reports as colored squares.
- 5. The depth-to-water from the most recent available measurement for each well is adjacent to the well symbol.

Note that C-03150 (southwest of FED 128 area) is also a DOE monitoring well SNL-8. Three Misc. wells are also OSE wells north of FED 128.

Figure 2 is an area topographic and geologic map that shows:

- 1. The FED 128 Containment area identified by the red polygon.
- 2. Water wells measured by the USGS, the year of the measurement and the calculated elevation of the groundwater surface.
- 3. Water wells measured by professionals and documented in published reports or by staff of Hicks Consultants (Misc.).
- 4. Isocontour lines displaying the elevation of the groundwater surface.

Geology

Quaternary Age eolian and piedmont deposits (Qe/Qp on Figures 1 and 2) are the dominant exposed material in the area. These deposits are a 5-100 foot covering of the underlying Permian Dewey Lake Formation (aka Quartermaster Formation) or, further east, the Triassic upper Chinle Formation.

A detailed description of the geology near the site is available in *Basic Data Report for Drillhole SNL-12 (C-2954)* and *Basic Data Report for Drill Hole H-12R (C-3749 Pod-1)*. SNL-12 (C-3150) lies about 6500 feet east of the FED 128 containment area and H-12R, is 2.3 miles northeast.

The referenced report for SNL-12 includes a description of groundwater encountered in the Dewey Lake Formation during drilling. In Section 3.1 the report states:

Groundwater was encountered in the Dewey Lake Formation at SNL-12 on June 26, 2003. As the drillhole reached ~160 ft depth using compressed air, cuttings began to cake and felt moist ... The drillhole was deepened to 175 ft, and the hole was allowed to stand To provide ample opportunity for the water level to stabilize, drilling was suspended until July 7, 2003. The water level was measured at 141.55 ft at 12:19 MDT on July 7.

Thus, Figure 1 shows a static depth to water in the Dewey Lake formation of 141.6 feet below grade.

The data for C-3749 (WIPP Well H-12 in Appendix Well Logs) describes the Santa Rosa/Chinle as 53 feet thick (19-72 feet deep). The well log reports that the underlying Permian Dewey Lake Formation is 548 feet thick. The report provides no data relating to shallow groundwater in the Dewey Lake. The DOE drilled this well to provide data from the Culebra Dolomite of the Rustler Formation.

The principal aquifer around the area of the FED 128 containments is the sandstone units of the Dewey Lake Redbeds. To the east, groundwater the overlying Chinle Formation (including the basal Santa Rosa Sandstone) is the uppermost water bearing unit that provides water to wells.

Topographically, the area around the containment area slopes to the west southwest toward drainages of Nash Draw.

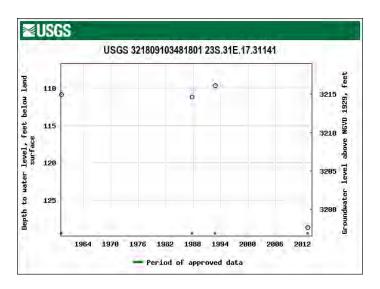
Groundwater Data

We relied upon the most recent data measured by the USGS and published data to create the water table elevation map shown in Figure 2. Water level data from the OSE database rely upon observed water levels by drillers during the completion of the water well. The OSE dataset provides some useful data in certain areas but are not used to generate groundwater elevations for these Figures, unless specifically noted in the text.

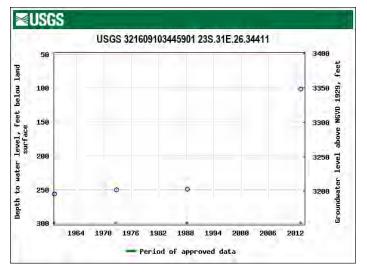
The Rustler Formation is an aquifer in much of Eddy County and can be weakly hydraulically connected to the Dewey Lake Formation, which is the uppermost water-bearing unit near the proposed containment. The overlying Chinle Formation is also connected to the Dewey Lake. The Tertiary Ogallala Formation and Quaternary alluvium have protectable groundwater east of the containments and these saturated units are not hydraulically connected to the Dewey Lake in this area. Our discussion relies on data from the wells nearest to the containment (Figure 2), which completed in the Dewey Lake, Chinle and Rustler Formations. Note that groundwater elevation in this area is flat as there is an 8-foot difference in elevation over the 16 square mile area presented.

The graphs below present USGS historic ground water elevation data for selected wells.

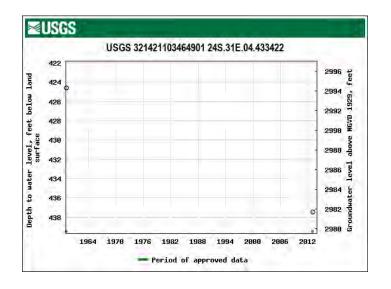
USGS-9496 is located about 2.5 miles northwest of the proposed containment and the data are presented to the right. Over the 50+ year record, ground water elevation in this Rustler Formation well has varied by about 20 feet. However, the well was pumping during the 2012 monitoring event. We conclude the groundwater elevation data are stable for the Rustler in this area and the 1959 data (Misc. 160 provides better data than the recent USGS measurement.



The database shows USGS-9579 draws water from the Dewey Lake Redbeds, which underlies the Chile/Santa Rosa aquifer. This well is three miles to the east-southeast of SNL-8 and the uppermost groundwater unit may be the Dewey Lake or the Chinle/Santa Rosa. The most recent USGS monitoring event indicates the well was pumping. Our 2021 depth to groundwater is 248.8 feet, consistent with the earlier USGS data. The groundwater elevation in this well is stable.



Well USGS 9624 is 3 miles south of the proposed containment and draws water from the Dewey Lake Redbeds according to the USGS database. Although this well was being pumped at the most recent measurement, groundwater elevation varies by only 13 feet over the period of record (1959-2013)



The data in Figure 2 and the discussion above demonstrate:

- Groundwater elevation in the Dewey Lake (aka Quartermaster) groundwater zone beneath the proposed containments is about 3197 feet ASL
- The alluvial sediments overlying the Chinle or Dewey Lake are unsaturated
- Given a surface elevation for the containments of 3366, depth to the groundwater surface is about (3366-3197=) 169 feet

Distance to Municipal Boundaries and Freshwater Fields

Figure 3 demonstrates that the area of interest is not within incorporated municipal boundaries or within defined municipal freshwater well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- The nearest freshwater well field is a City of Carlsbad Wellfield, which is 32 miles east
- The nearest municipality is the Village of Loving, which is 18 miles east of the site.

Distance to Subsurface Mines

Figure 4 and our general reconnaissance of the area demonstrate the absence of subsurface mines in the area.

- The FED 128 site is not in an area where subsurface mines exist. Subsurface workings are in the northwest corner of Figure 4.
- The site is within the Main potash district.
- The nearest surface mine mapped in the MILS database is a gravel pit approximately 3 miles to the northwest.
- The MILS database shows a "prospect" north of the proposed AST Containment. We can find no backup documentation that provides any information and there is no evidence of a feature on Google Earth

Distance to High or Critical Karst Areas

Figure 5 illustrates the FED 128 Site absence of mapped areas of high or critical karst potential.

- The FED 128 site is not located within high or critical karst potential areas.
- Our field investigation saw no evidence of karst features such as sinkholes.
- The nearest mapped high karst potential area is more than 4 miles northwest

Distance to 100-Year Floodplain

Figure 6 demonstrates the absence of 100-year flood plains with respect to the proposed location for the FED 128 site.

- The nearest 100-year flood plain is 9 miles northwest of the site.
- Our site investigation found no evidence of flood potential.

Distance to Surface Water

Figure 7 and the site visit demonstrate the that the FED 128 Site is outside of the setback distances for a continuously flowing watercourse, significant watercourse or the next lower order tributary, lakebed, sinkhole, playa lake (measured from the ordinary high-water mark) or spring.

- The nearest surface water feature is a lake/pond that is located about 2.5 miles southeast and the nearest mapped watercourse is about 2.25 miles to the southsouthwest.
- We observed no watercourses that meet the Rule 34 definition near the site.

Distance to Permanent Residences or Structures

Figure 8 demonstrates that the proposed site for the FED 128 Site is not within the setback distances of an occupied permanent residence, school, hospital, institution, church, or other structure at the time of the initial application.

• The only structures near the proposed site are well pads, pipelines and the referenced produced water recycling facility.

Distance to Non-Public Water Supply

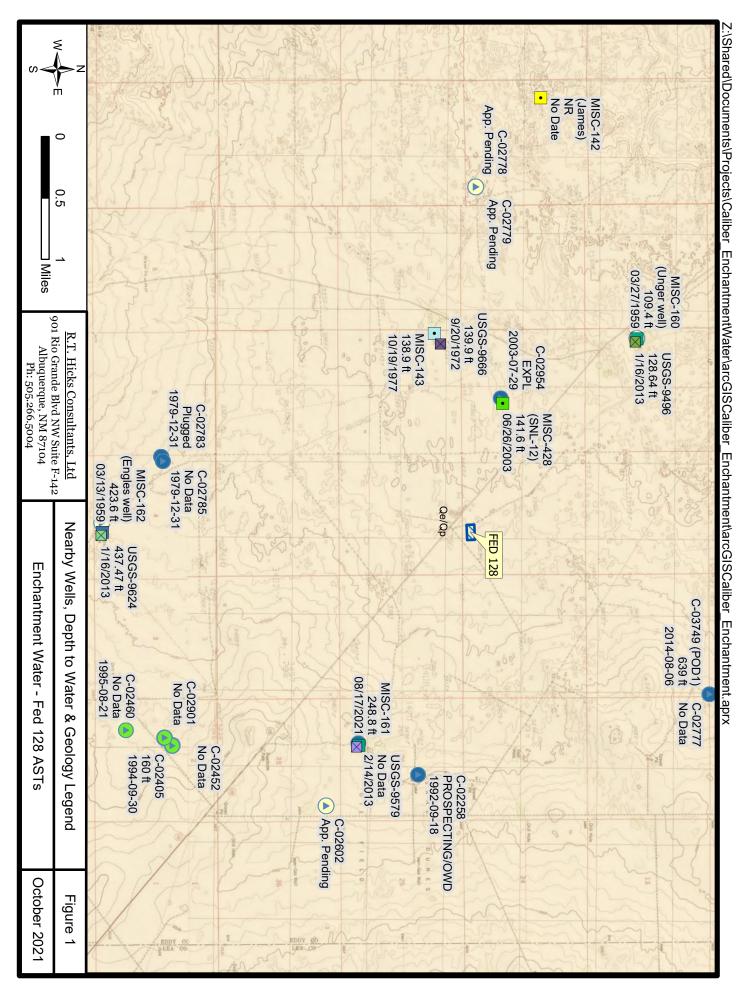
Figures 1 and 7 demonstrate the FED 128 location is not within the setback distances of a spring or freshwater well used for domestic or stock watering purposes, in existence at the time of initial application.

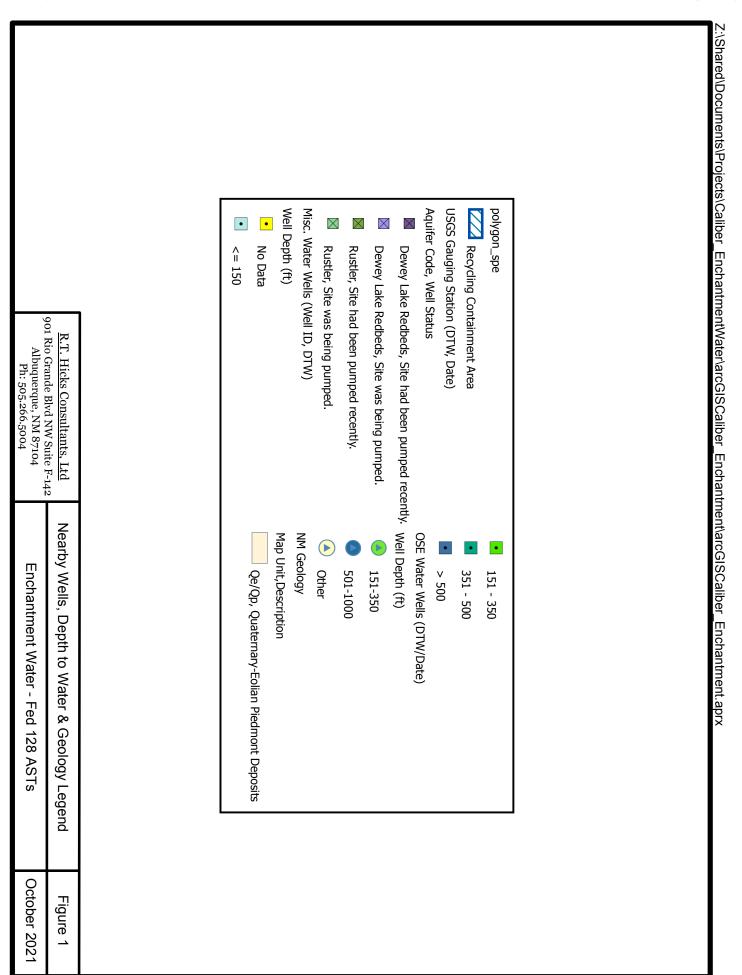
- Figure 1 shows the location of all area water wells.
- The nearest well is USGS-9666/Misc.143, about 1.5 miles southeast. This is an active stock watering well.
- No domestic water wells are located within 1,000 feet of the recycling area.
- No springs are in the area.

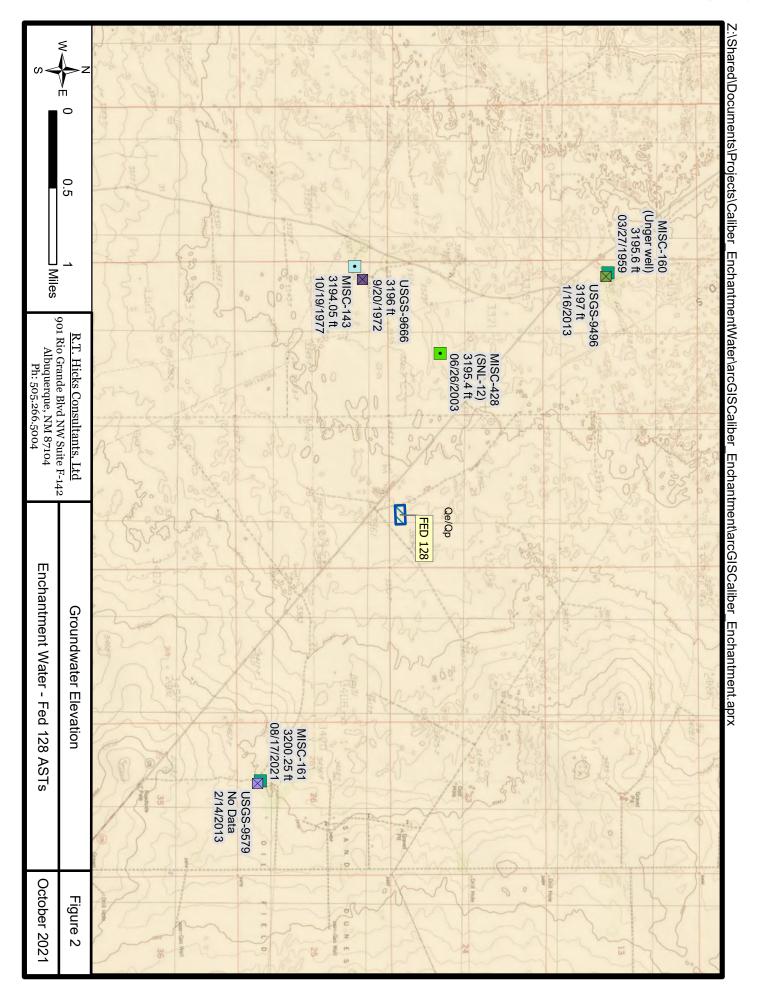
Distance to Wetlands

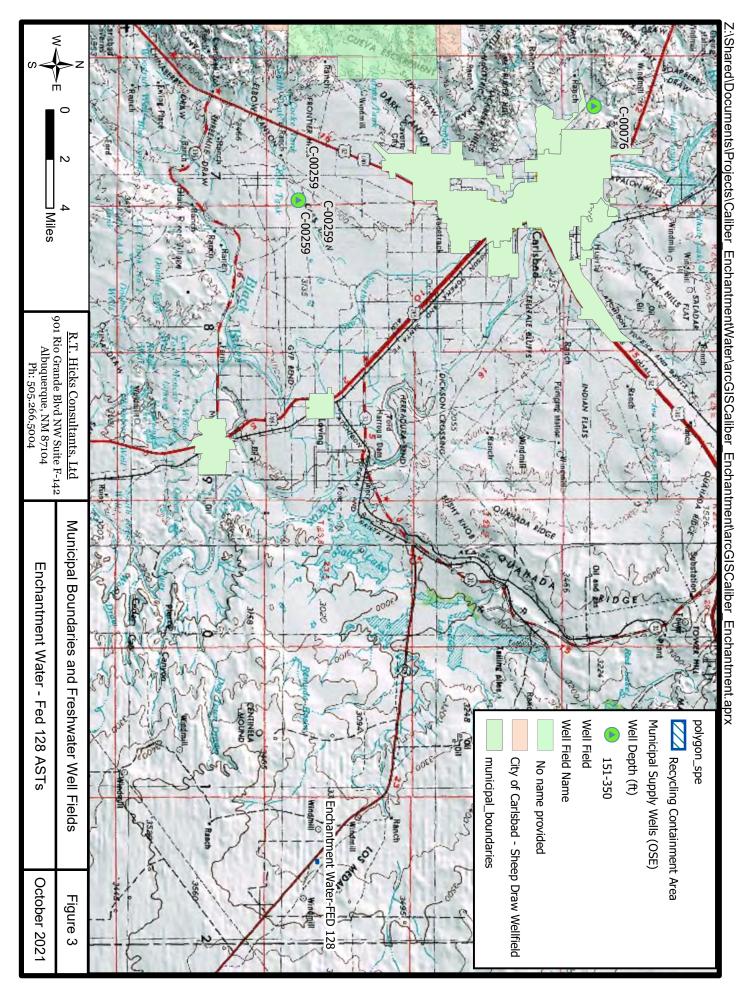
Figure 9 demonstrates that the proposed location of the FED 128 site is not within the 300-foot setback distance of a wetland.

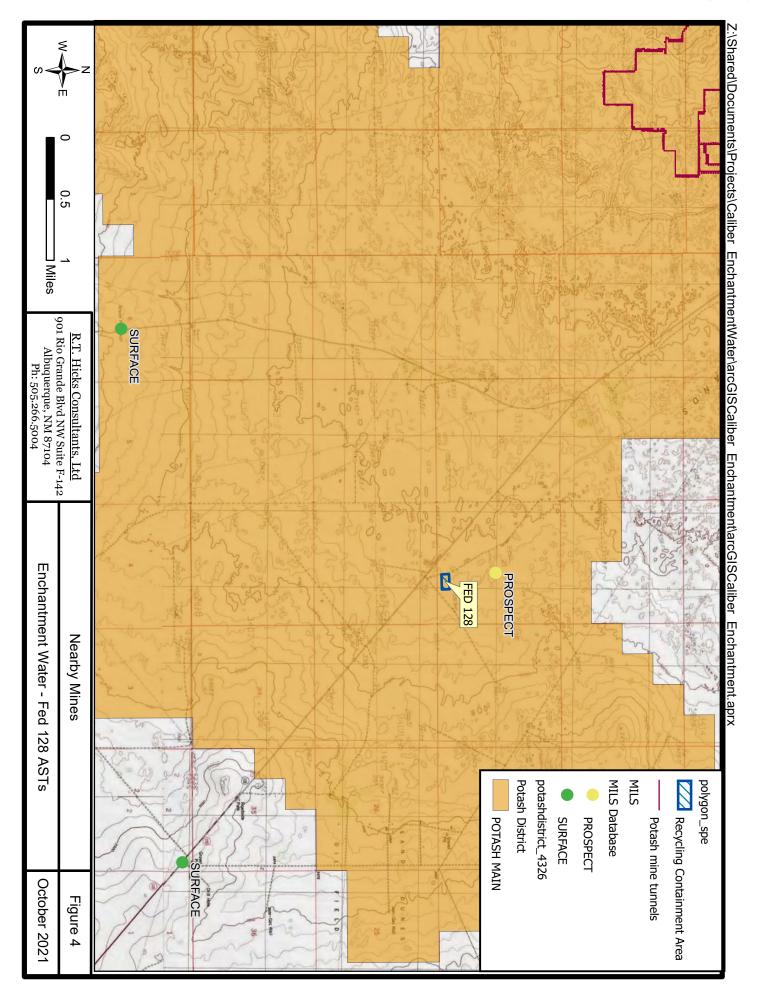
• The nearest mapped wetland is a freshwater pond that is about 3 miles east of the site.

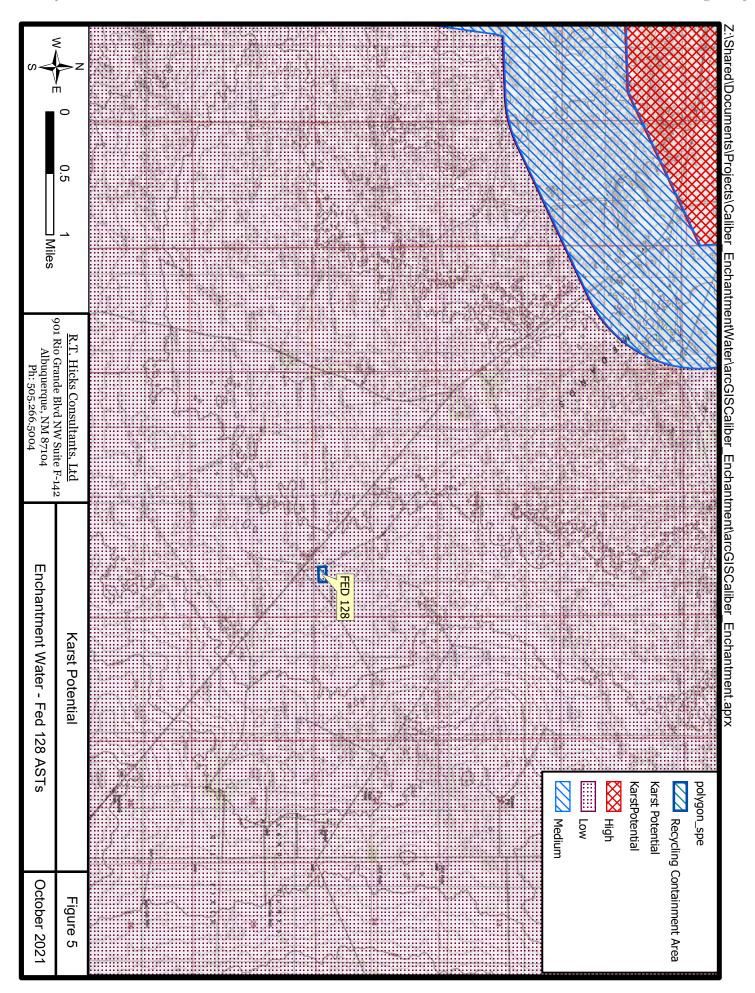


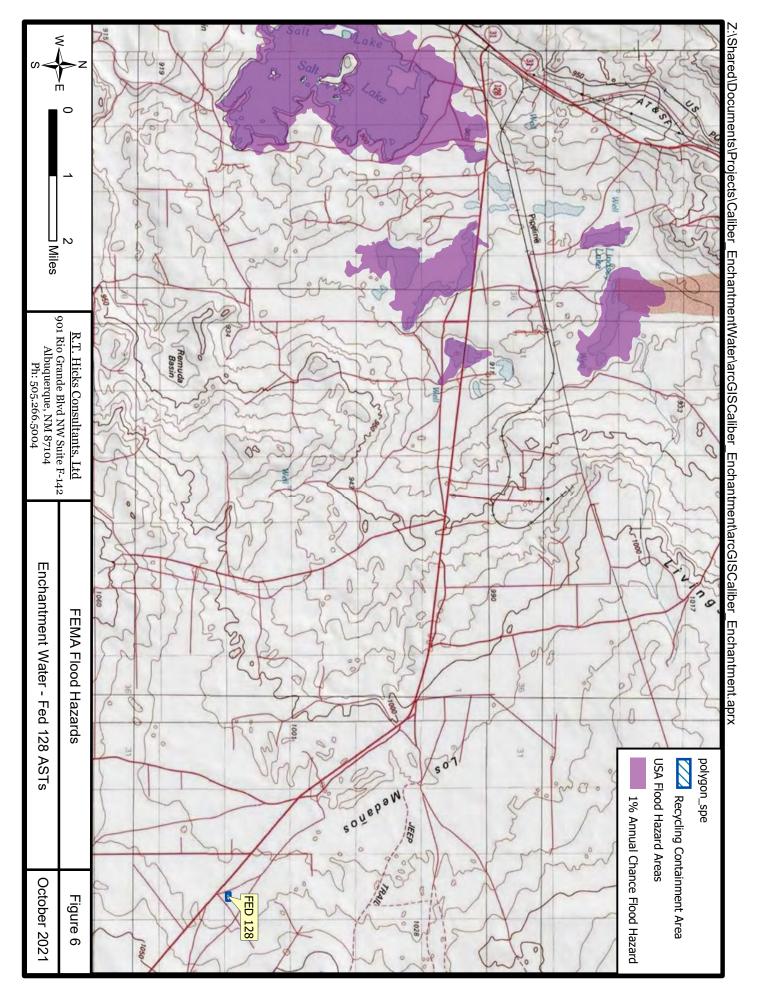


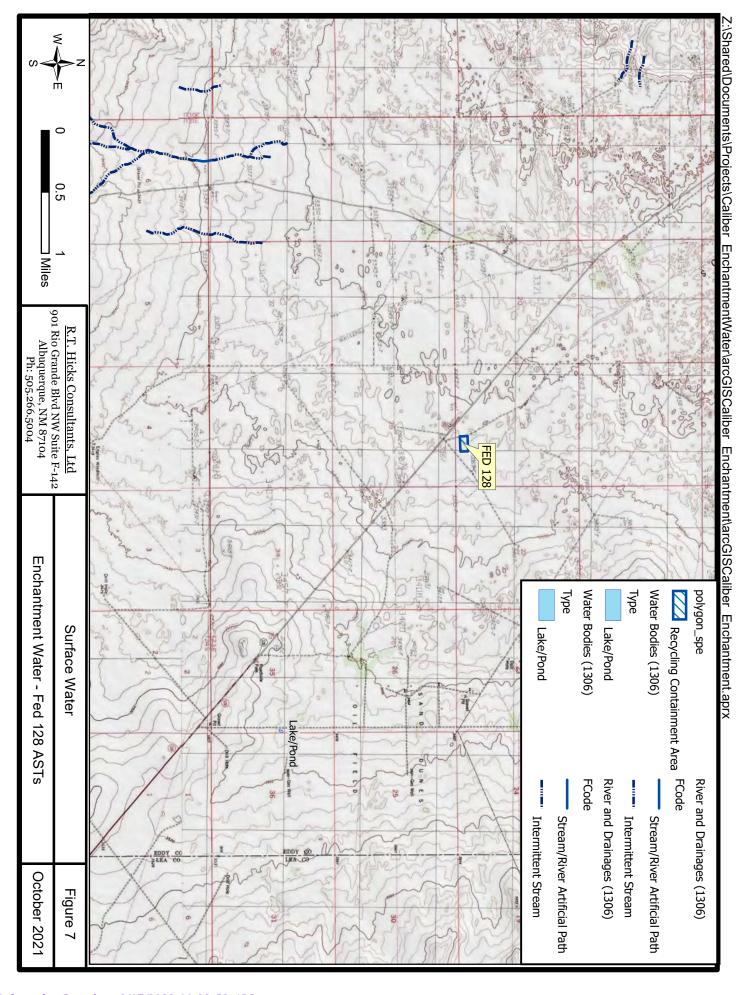


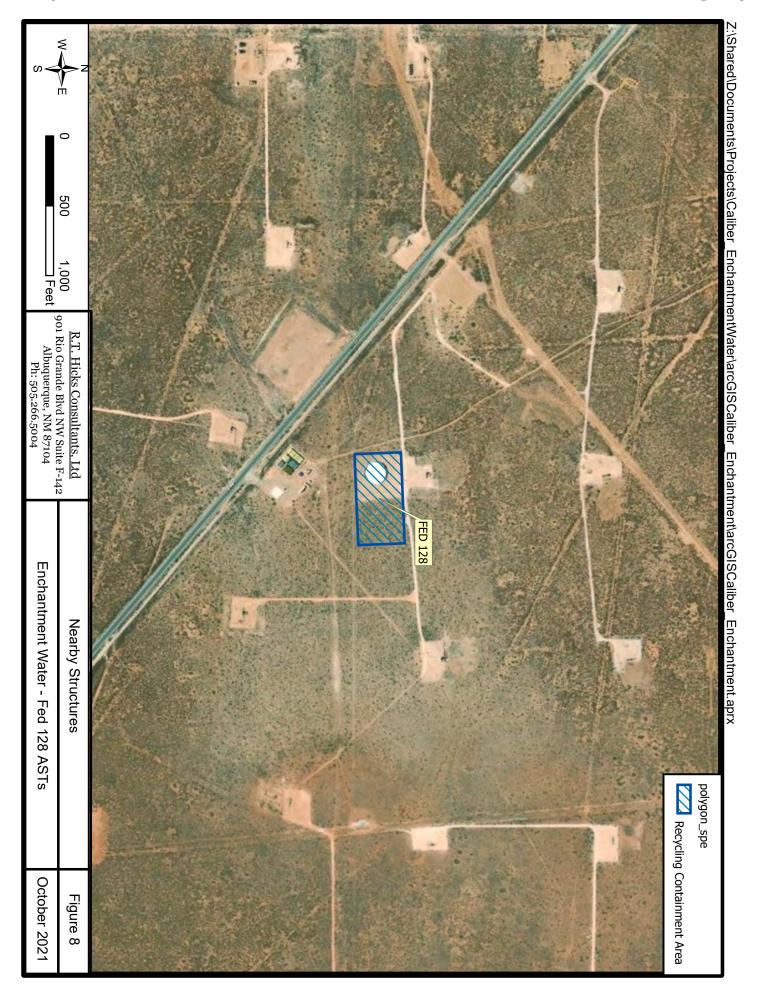


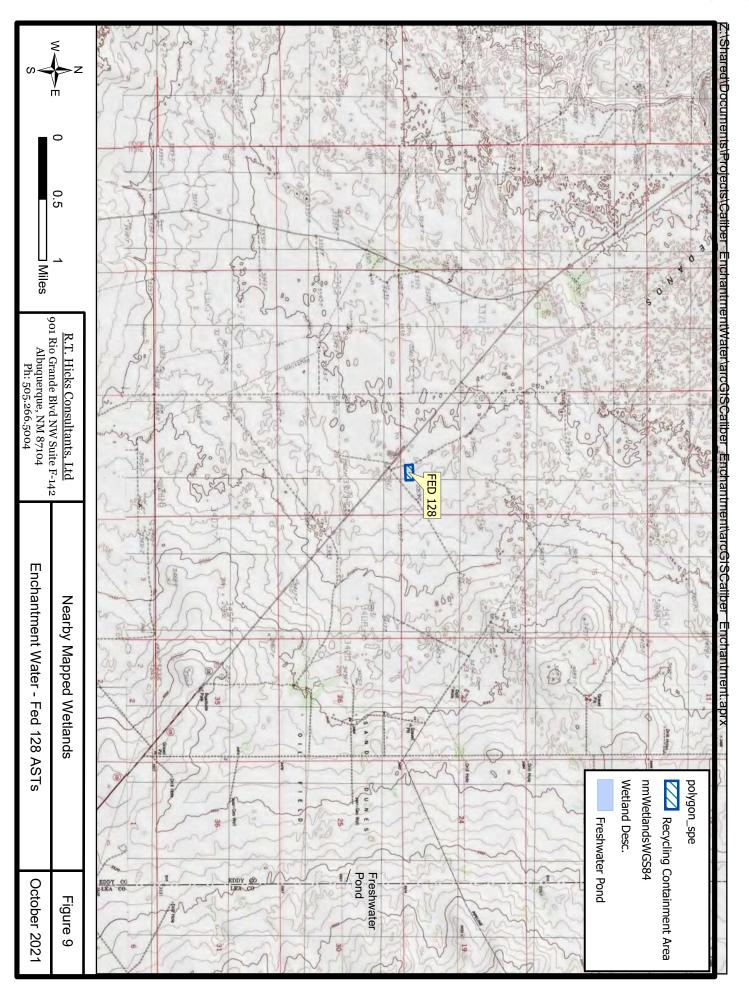












APPENDIX WELL LOGS

Basic Data Report for Drillhole SNL-12 (C-2954) DOE/WIPP 03-3295

		Tabl Geology at Dr		
	System/ Period/Epoch	Formation or unit	Member Informal units	Depth below surface (ft)
oic	Holocene	surface dune sand and Berino soil		0 - 10 ft
Cenozoic	Pleistocene	Mescalero caliche		10 - 18 ft
	Miocene-Pleistocene	Gatuña		18 ft - 36 ft
oic		Santa Rosa ²		eroded
Mesozoic	Triassic	Dewey Lake ³		36 ft - 372 ft
Paleozoic	Permian	Rustler	Forty-niner A-5 M-4/H-4 A-4 Magenta Dolomite Tamarisk A-3 M-3/H-3 A-2 Culebra Dolomite Los Medaños ⁴ M-2/H-2 A-1 M-1/H-1	372 ft - 432 ft 372 ft - 403 ft 403 ft - 418 ft 418 ft - 432 ft 432 ft - 460 ft 460 ft - 547 ft 460 ft - 524 ft 524 ft - 536 ft 536 ft - 547 ft 547 ft - 587 ft 587 ft - 692 ft 587 ft - 600 ft 600 ft - 608 ft 608 ft - 692 ft
		Salado	?Marker Bed 100 Marker Bed 101 Marker Bed 102 Marker Bed 103	692 - total depth (905 ft) ? - 785? ft 822 ft - 825 ft 845 ft - 850 ft? 879 ft - 894 ft

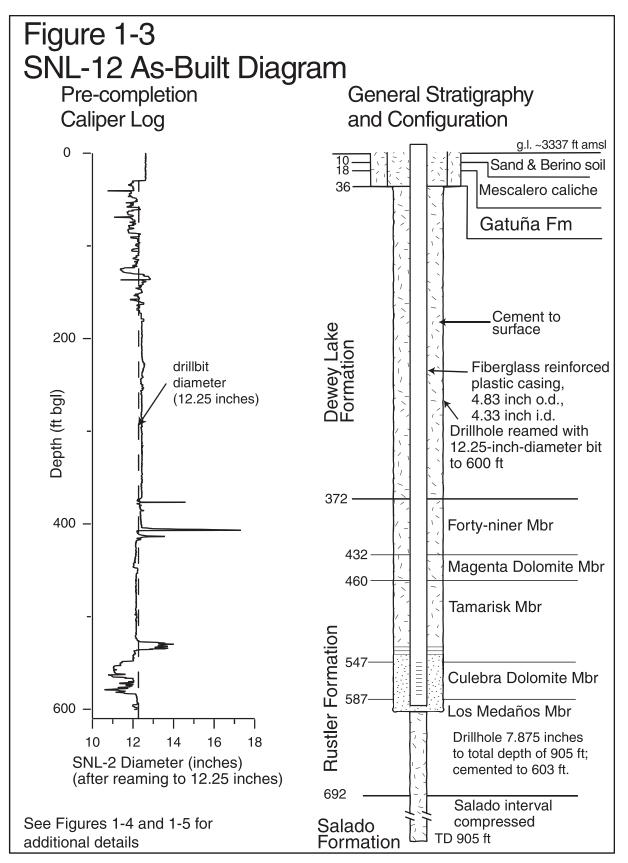
¹Depths are based on measurements by geophysical logging supplemented by drilling data. Geological logs based on field descriptions (Appendix C) and markings on cores (Appendix G) vary modestly because of incomplete recovery and lesser precision using cuttings.

²The Santa Rosa Formation, part of the Dockum Group or undifferentiated Triassic, is completely eroded at SNL-12.

³The Dewey Lake Formation has been considered part of the Permian System in the past. Recent work (Renne and others, 1996, 2001) indicates that lithologically equivalent rocks in Texas are mostly Lower Triassic, with some Upper Permian at the base.

⁴The Los Medaños Member was named by Powers and Holt (1999) to replace the informal unit "unnamed lower member" of the Rustler Formation.

Basic Data Report for Drillhole SNL-12 (C-2954) DOE/WIPP 03-3295



	Well Cut	tings Log		Page <u>1</u> of <u>5</u>
Hole ID: <u>H-12R, C-3749</u>	Locatio	on: NE 1/4, NE	1/4, NE 1/4, Section	on 15, T23S, R31E
Drill Date: 7-12-14 to 7-2 Drill Co: Stewart Broth Drilling Comp	ners Hole Diameter:	10.5 Inch 55 Feet bgl	Drill Make/Mode Barrel Specs: Drill Fluid: Core Preserve: _	NA NA
Logged by: Brett Sea	Date: 6/8/1	5	Scale:	NA
	Northing	Easting		Elevation
Survey Coordinate (Ft):				
	unit contacts are derived from geo comes from cuttings. S sample dep		to correlate with	units
Sample Number Depth (Ft bgl) Formation Member Informal		Description		Lithology
C-S1 Surficial Deposits C-S3 Mescalero Gatuña C-S4 Gatuña	Mostly unconsolidated dune sands, with 5 YR 5/8 (yellowish red), well sorted round Caliche, 5 YR 8/3 (Pale pink), poorly sorte Sandstone, 2.5 YR 5/4 (Reddish brown), poorlains caliche from the above Mescaler exposed to HCl, low porosity. Sandstone, 2.5 YR 5/6 (red) moderately of when exposed to HCL Sandstone, 2.5 YR 5/6 (red), cuttings pown poorly sorted, calcareous cement, efferver Sandstone, 2.5 YR 4/6 (red), coarse to fine effervescent with HCL, moderately sorted.	ded grains with high po d, highly effervescent woorly sorted grains, classo, manganese oxide states, manganese oxide states, manganese oxide states, fine grained, subsection when exposed to grained, poorly consolid, low porosity	rosity then exposed to HCL, I t supported with a cal aining present, efferves ted, calcic cement, effer rounded and subangu HCL idated, calcareous cem	nigh porosity cic matrix, scent when rvescent
80	manganese oxide flakes present Sandstone, 2.5 YR 5/4 (reddish brown), cal low porosity, poorly consolidated, iron oxi Sandstone, same as above		rained, subangular to s	ubrounded,
C-7 100	Sandstone, same as above, poor to mode	rate consolidation, redu	uction spots are visible.	
C-9 RE	Sandstone same as above, reduction mai Sandstone, 2.5 YR 6/6 (light red), slightly o spots, minute amounts of fiberous gypsu	calcic cement, fine grain		
	Sandstone, 2.5 YR 5/3 (reddish brown), slig reduction material, minimal amounts of fi		e grained, low porosity,	, minimal

					Well Cuttings Log Page	_2_of_5_
Hol	e ID: _		-12	R	Location: <u>Section 15, T235</u>	, R31E
Sample Number	Depth (Ft bgl)	Formation	Member	Informal Unit	Description	Lithology
C-11	170 180 190				Sandstone, 2.5 YR 5/4 (reddish brown), slightly calcic cement, fine grained, low porosity, minimal amounts of fiberous gypsum	
C-12 C-13	210 220 230				Sanstone, 2.5 YR 4/6 (red) fine grained, low porosity, sub-angular and sub-rounded moderately sorted grains, slightly calcic cement, poor to moderate consolidated, reduction spots visible. No gypsum present. Sandstone, 2.5 YR 5/6 (red), fine grained and moderately sorted, poor to moderate consolidation, low porosity, reduction spots, slightly calcic. No gypsum present.	
C-14	240 250				Sandstone, 2.5 YR 5/6 (red), fine grained, moderately sorted, sub-angular and sub-rounded grains, poor to moderate consolidation, low porosity, reduction spots. Sample is slightly calcic. Fiberous gypsum is present in layers of sandstone.	
C-15	260 270	Dewey Lake			Sandstone, 2.5 YR 5/4 (reddish brown), fine grained, well sorted with low porosity, poor to moderate consolidation. Sample is slightly calcic and contains minute amounts of gypsum and has reduction spots.	
C-16	290 300 310	ð			Sandstone, 2.5 YR 5/4 (reddish brown), fine grained, moderately sorted, low porosity, moderate consolidation, slightly calic, reduction spots. No gypsum present	
C-18	320				Sandstone, 2.5 YR 5/4 (reddish brown) fine grained, moderately sorted and consolidated, sub-angular and sub-rounded grains with low porosity. Reduction material and spots present. Minor in amounts of gypsum present.	
C-19	340 350 360 370				Sandstone, 2.5 YR 5/4 (reddish brown) fine grained, moderately sorted and consolidated, sub-angular and sub-rounded grains with low porosity. Reduction spots present. Minor in amounts of gypsum present.	
C-21	380				Same as C-19, slighlty calcic.	

					Well Cuttings Log Page	_3_of_5_
Hol	e ID: _		-12	R	Location: Section 15, T235	, R31E
Sample Number	Depth (Ft bgl)	Formation	Member	Informal Unit	Description	Lithology
C-22	400 410				Increase in the amount of reduction material and spots.	
C-23					Increase in reduction spots	
C-24	440 450				Sandstone, 2.5 YR 4/4 (reddish brown), low porosity, medium to high consolidation, reduction spots present, sub-angular to sub-rounded, minor amounts of gypsum. Non calcic cement.	
C-25	460 470				Sandstone, 2.5 YR 4/6 (red), low porosity, medium to high consolidaiton, moderately sorted, reduction material and spots, gypsum present. Non calcic cement.	
C-26	480	4.			Decrease in reduction material and poorly sorted.	
C-27 C-28	490 500 510	Dewey Lake			Sandstone, 2.5 YR 6/4 (light reddish brown), low porosity, medium to high consolidation, reduction spots, non calcic cement. Sandstone, 10 YR 8/1 (white), low porosity, low to high consolidation, no reduction spots, non calcic cement, minimal gypsum present. Poorly sorted. Sandstone, 2.5 YR 5/4 (reddish brown), low porosity, medium to high consolidation, reduction spots and material, non calcic cement, poorly sorted, minimal gypsum.	
C-29	520 530				No reduction material and poorly sorted. Gypsum present.	
C-30	540 550				Same as above	
C-31	560				Sandstone, 2.5 YR 4/4 (reddish brown), well sorted, poor to medium consolidation, sub-anglular to sub-rounded, low porosity, reduction spots, non calcic cement, gypsum present.	
C-32	570				No Change.	
C-33	590				Sandstone, 2.5 YR 5/4 (reddish brown), low porosity, moderately sorted, low consolidation, sub-angular to sub-rounded, reduction material and spots, non calcic cement, gypsum present.	
C-34	600				No reduction material	

					Well Cuttings Log Page	4_ of _5_
Hol	e ID: _	Н	-12	2	Location: Section 15, T239	5, R31E
Sample Number	Depth (Ft bgl)	Formation	Member	Informal Unit	Description	Lithology
C-35 C-36	620				Sandstone, 2.5 YR 5/4 (reddish brown), low porosity, moderate sorting, poor consolidation, sub- angular to sub-rounded, non calcic cement, gypsum. Anhydrite, 7.5 YR 6/1 (gray), low porosity, fine crystalline structure, minimal gypsum present. Fall down Dewey Lake sandston present with reduction spots.	
C-37	640		er	A-5	Anhydrite, 7.5 YR 6/1 (gray), fine crystalline structure with low porosity. Minimal Dewey Lake falldown.	
C-39	650		Forty-Niner	M-4		
C-40 C-41 C-42	670			A-4	Anhydrite, 7.5 YR 6/1 (gray), fine crystalline structure with low porosity. Same as above. No change.	
C-43 C-44	680		Magenta		Dolomite, 10 YR 6/1 (gray), microcrystalline, minor amounts of anhydrite present. Dolomite, 10 YR 7/1 (light gray), microcrystalline, minor amounts of gypsum present.	
C-45 C-46 C-47 C-48 C-49 C-50 C-51 C-52 C-53 C-54 C-55 C-56	700 710 720 730 740 750 760 770 780	Rustler	Tamarisk	A-3 M-3	Anhydrite, 7.5 YR 6/1 (gray) fine crystalline structure with low porosity and gypsum present. Dolomite fall down present. Anhydrite, 7.5 YR 6/1 (gray), fine crystalline structure with low porosity. Same as above. No Change. No Change. Anhydrite, 10 YR 7/1 (light gray) fine crystalline structure with low porosity. Anhydrite, GLEY 1 7/N (light greenish gray), fine crystalline structure with low porosity. Mudstone, 5 Y 6/1 (gray), very fine grained, low porosity, some samples with specs of pyrite Anhydrite fall down present. Anhydrite, GLEY 1 6/N (gray), fine crystallin structure with low porosity, moderately sorted, poor to moderate consolidation. Halite present. Salt, 2.5 YR 6/1 (reddish gray), well sorted, some anhydrite fall down present. Salt, 5 YR 4/2 (dark reddish gray) to clear, well sorted. Anhydrite, 10 YR 5/2 (grayish brown), poor to moderate consolidation, moderately sorted, some halite present.	
C-57 C-58	810 820 830		Culebra		Anhydrite, 10 YR 5/1 (gray), well sorted, low porosity, fine crystalline structure. Anhydrite, 10 YR 5/1 (gray), moderately sorted, fine crystalline structure with low porosity. Small amount of dolomite present. Dolomite, 10 YR 7/1 (light gray), poor to medium consolidation, microcrystalline.	

					Well Cuttings Log Page	<u>5</u> of <u>5</u>
Hol	le ID: _	Н	-12	R	Location: Section 15, T23S	, R31E
Sample Number	Depth (Ft bgl)	Formation	Member	Informal Unit	Description	Lithology
C-60 C-61 C-62 C-63 C-64	840 850 860 870 880	Rustler	Los Medaños Culebra		Dolomite, 10 YR 7/2 (light gray), vuggy texture, microcrystalline matrix, and minor amounts of gypsum present. Dolomite, 10 YR 5/1 (gray), microcrystalline matrix. Dolomite, 10 YR 7/2 (light gray), vuggy texture, microcrystalline matrix. Minor amount of anhydrite fall down. Dolomite, 10 YR 5/1 (gray), microcrystalline matrix, well sorted. Gypsum present in minor amounts. Anhydrite, 5 YR 6/2 (pinkish gray), fine crystalline structure, minor amounts of dolomite and gypsum. — End of Geophysical Log — Salt, 5 YR 5/3 (reddish brown), moderately sorted. Minor amounts of anhydrite and dolomite from fall down.	

Revised June-1973

STATE ENGINEER OFFICE

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Section 6. LO	G OF	HOLE
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The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, exception 5, shall be answered as completely drilled, repaired or deepened. When this is seed as a plugging record, only Section 1(a) section 5 need be completed.

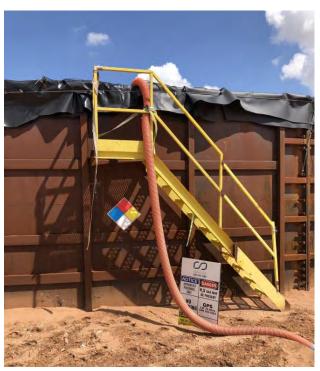
SITE PHOTOGRAPHS



SP1 – View southwest showing the existing FED 128 AST that Enchantment Water LLC will upgrade to meet the standards of Rule 34 and the adjacent recycling facility (right). At present, the AST receives produced water in advance of treatment for recycling.



SP2- View northwest from RT 128 showing entrance to the recycling facility that serves the Mills Ranch in-ground Containment. The existing FED 128 containment is in the center of the image, below the powerlines. The avian protection netting makes the AST appear to have a cone-shaped top.



SP-3 As shown in this image, the AST is double-lined. There is no leak detection system.



SP-4 We inspected the circumference of the AST and found no evidence of seepage



SP5 -View southwest showing the nature of the vegetation and soil of the area. Note the exposed caliche that suggests a horizon underlies the area as is common.



SP6 – Well USGS-9579/Misc. 161 where we were able to measure a depth to groundwater in abandoned casing near the well (32 16 12.85, -103 45 2.11).



SP-7 Well C-2954/Misc. 428 is SNL-8, a WIPP monitoring well. Data for this well presented in this submission documents the fact that alluvial water is not present. (32 17 14.66, -103 47 53.53)

December 2021

Volume 2 C-147 Registration Package for FED 128 Above-Ground Storage Tank Section 21, T23S, R31E, Eddy County

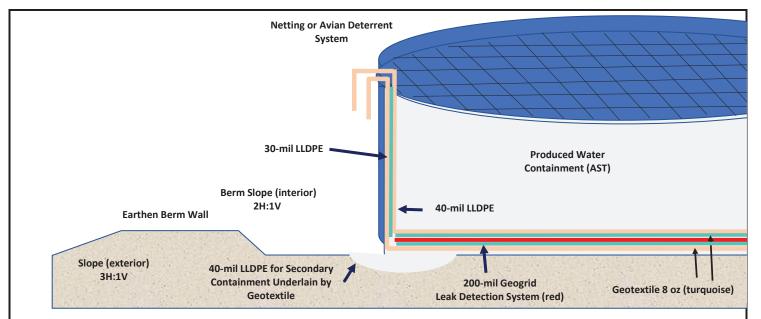
Engineering Drawings and Liner Specifications
Design/Construction Plan
Select Energy Services Manual
Variances for AST Storage Containments
Applicability of Engineering Variances to Variety of Site Conditions in Permian Basin



View southeast showing existing AST that will be refurbished to meet Rule 34 construction requirements and, on the right of the image, the existing recycling facility for the Mills Ranch Recycling Containment. A second AST that is fully compliant with Rule 34 will be installed adjacent to the existing AST shown above.

Prepared for: Enchantment Water LLC 1250 S. Capital of Texas Hwy, Ste 1-270 Austin, Texas

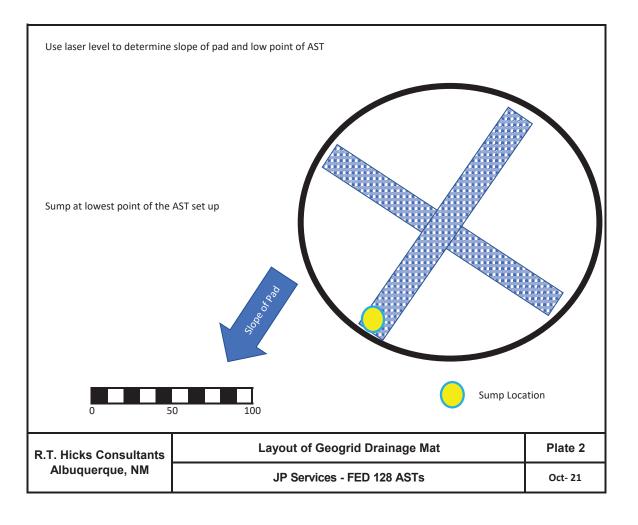
Prepared by: R.T. Hicks Consultants, Ltd. 901 Rio Grande NW F-142 Albuquerque, New Mexico



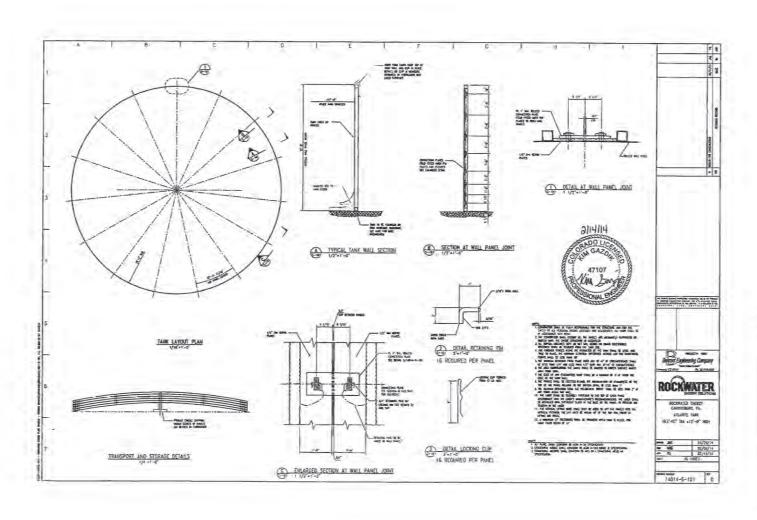
Description of Leak Detection System

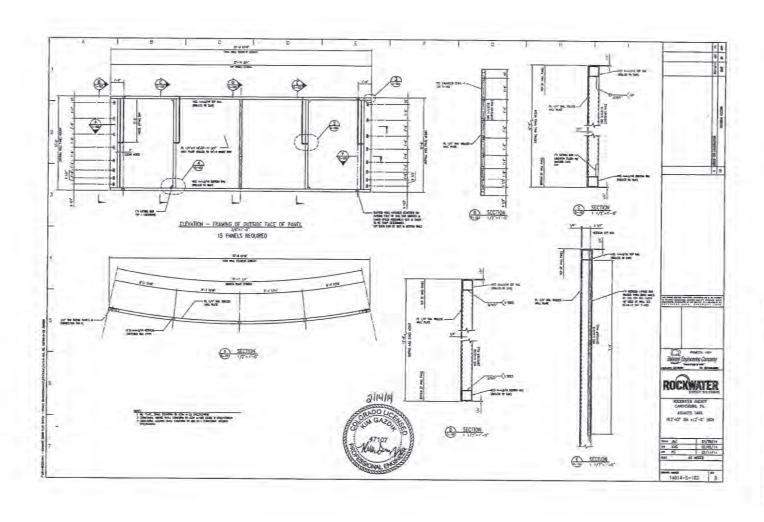
- $\bullet \hspace{0.5cm} \textbf{2 30-mil LLDPE comprise primary liner and 30-mil LLDPE comprise the secondary liner} \\$
- 200-mil geogrid drainage layer lies between the primary and secondary liner per Plate 2
- Geotextile between the geogrid and each liner
- > 3-inch deep sump excavated on four sides of AST as a collection points for any seepage
- A %-inch aqua braid line runs from the collection sump beneath the geogrid drainage system to the outside of the AST
- Every week, a portable self-priming peristaltic pump connects to the leak detection system.
- The self-priming pump discharges into a ¾" aqua braid line, through a turbine meter, and back into the AST, on top of the primary liner
- If fluid is detected, it is tested for conductance to determine the origin of the water (i.e. produced water or condensation)

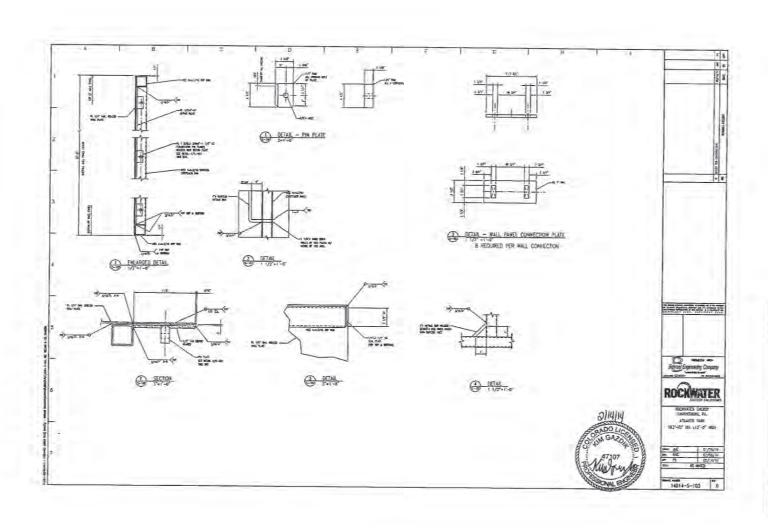
R.T. Hicks Consultants Albuquerque, NM	Design Sketch	Plate 1
	JP Services	Oct-21



RECYCLING CONTAINMENT DESIGN DRAWINGS







AST SETUP SOP

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INSTALLATION INSTRUCTIONS FOR LARGE SECTIONAL WATER STORAGE TANKS

This tank installation procedure is specifically for the Atlantis Tank (15 segment), Large Water Storage Tank. This design consists of tank segments that measure 38.75 feet long and 12 feet high and feature a bolt together design.

- The area where the water storage tank will be placed must be prepared and brought to a state
 of level that is +/- 12 inches around the circumference of the tank walls.
- 2. Grade and compact tank site with granular soils. Ensure that the grade is level where the tank(s) will be placed. Ensure that there are no sharp edges or rocks within the prepared area. Add 1-2 inches of fine sand cover on top of the compacted granular soils. Immediately prior to the delivery of the tanks, install one layer of #8 to #12 felt geotextile on the tank installation area and secure with sandbags.
- 3. Now establish the exact center of the tank area.
- 4. Mark with spray paint the circumference of the tank to be erected as follows:

<u>Tank</u>	Diameter	
Atlantis Tank (2.40 MM Gallons)	182.10 Ft.	

- Ensure that the tank have at least 15 feet between adjacent tank walls and/or location edge. This space is required for tank assembly.
- Immediately prior to delivery of the tank, ensure the following equipment is available:
 - a. One all-terrain 10k or 12k forklift.
 - b. One all-terrain, rubber-tired man lift controllable from its platform.
 - c. Two 16 footstep ladders
 - d. Lifting straps
 - e. Various sizes of mallets and sledgehammers
 - f. Minimum 100 sandbags to assist in windy conditions
- 7. On the day of tank delivery, ensure 4-5 installation personnel and one forklift operator are available to provide labor to install the tank(s) and subject to the client's experience with tank and liner installation. All personnel should be provided with high visibility vests.
- 8. Unload the following equipment from the tank delivery trucks (per tank):
 - 15 tank sections (38.75 feet long X 12 feet high, approximately 6465 lbs, or 2930 kg, per segment).
 - b. 12 outside and 7 inside installation supports. These supports re required to support the tank segments during installation, 2 outside supports and 1 inside support per segment.
 - c. 1 inch diameter bolts and studs, approximately 15 sets per tank segment.
 - d. Approximately 10 liner clips per segment purchased, each with a retainer bolt.
 - e. One 40 mil tank liner, rolled up, suitable for the tank size purchased.

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f. One diameter floating insulation cover (if ordered).

TANK INSTALLATION:

General:

- Conduct safety meeting before each day's work to describe the day's activities and discuss
 potential hazards. Document meeting, and concerns and risk mitigation activities.
- 10. Ensure work permits are issued by the Site Operator as required.

Event Sequence:

- Before starting assembly, the client should determine where the candy cane fluid nozzles are to be located.
- 12. CAREFULLY spot the liner in the center of the tank position as marked.
- CAREFULLY unfold the liner until the entire floor has been exposed and matches up with the perimeter line drawn with spray paint.
- CAREFULLY roll the liner back toward its center to provide minimum 15 feet of work space between the floor perimeter and the liner material.
- 15. Erect each tank section by carefully lifting each section at the designated lifting locations and aligning each end of each section with the line previously made on the bedding material.

NOTE: At least the first 90 degrees of tank sections should be braced on both sides until all 90 degrees are fully bolted together.

- 16. Adjust the position of each tank section until the bolt holes align on both panels, place the spacer washers on each side of the two tank sections to be bolted together and insert bolts into one side of a set of two sections and then place nut on other end of bolt and hand tighten.
- Complete erection of all tank sections and then perform final tightening of bolts to a torque rating of 250-foot pounds.

18. Liner Installation:

- a. Lower 2 people into the assembled tank with the man lift and one of the step ladders.
- b. CAREFULLY unroll the tank liner to the inside edge of the assembled tank. Use 2 of the adjacent liner eyes and ropes with clips and feed the ropes to the man lift. Have one person leave the inside of the tank.
- c. Initially from the forklift or the knuckle boom, and later from the man lift, pull the liner wall up and fold the surplus liner over the top of the tank channel. Install the liner clips over the liner and onto the top tank channel spaced approximately 4 feet apart. The liner clips shall be installed with the 1-2 inch retainer bolt on the outside of the tank wall. As each clip is put in place, install the retainer bolt on the outside of the tank wall (the clips are designed to be a friction fit for the liner wall and, if properly installed, wont damage the liner). GENTLY adjust the liner bottom to the tank wall to eliminate extra tension from the liner wall on the clips. Continue around the perimeter of the tank

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until the liner is fully installed. **NOTE:** Should a liner clip accidently be dropped inside the tank, this must be immediately examined and reported. The likelihood of damage to the liner is high should this occur, so repair may be required.

- 19. Identify the position where the "candy cane" fluid nozzles will be placed. Inside the tank where the nozzle will be located, place geotextile to protect the liner from any accidental impact from the nozzle assembly.
- Using the forklift CAREFULLY install the "candy cane" nozzle over the lip of the tank and secure into place.
- 21. CAREFULLY inspect the entire tank liner floor and walls for blemishes. The tank liner is sometimes specifically designed with an outside white layer covering the inside black material, which allows for more obvious appearance of any damage to the upper white layer. Repair and test any blemishes, documenting all repairs for future references.
- 22. Reference Appendix A for the installation of the "X" patterned geo grid.

Insulated Cover Installation:

- 23. CAREFULLY place the insulation cover bundles inside the tank. Unwrap the cover casings and select the edge casings that have slots and place these casings at the "candy cane" nozzles.
- 24. Assemble the insulation cover as per the insulation map, taking care to ensure that the cover lays over the 8-inch flexible hoses. Install the ballast tubes along the perimeter of the cover andevenly spaced elsewhere to ensure the cover will remain in place during windy conditions.
- 25. CAREFULLY inspect the entire insulation cover and the tank liner walls for blemishes. Repair and test any blemishes, documenting all repairs for future reference.
- 26. The tank is now ready to be filed with fluid and be turned over to tank operations. During the filling process, observe the insulation cover to ensure that the cover does not bind on the nozzles or tank walls.

Please Note: DISMANTING OF THE STORAGE TANK FOR TRANSPORT AND USE ANOTHER SITE SHOULD BE ACCOMPLISHED IN THE REVERSE MANNER OF THE PRECEDING STEPS. DO NOT FORGET TO USE THE SEGMENT SHIPPING SUPPORT THAT WAS SUPPLIED WITH THE ORIGINAL TANK AS IT WILL HELP PROTECT THE INTEGRITY OF THE SECTIONS.

SEGMENT INSTALLATION PROCESS FOR ATLANTIS TANK (15SEGMENTS, 182 FT DIAMETER)

As reviewed in the Installation Manual, it is recommended that the circumference of the tank wall be spray painted on the geo-textile base before installation of the panel proceeds. This marking is an approximate reference for the tank, however, to efficiently install the panels and ensure that the last panel fits properly, we highly recommend that the installer use tape measures and the following procedure of measuring tank chords after every panel is installed. For the Atlantis tanks (15 segments, each with a curved length of 38 ft. 9 inches), the following is therecommended procedure:

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- Select one of the two tank segments that will be used to support the "candy cane" fluid
 nozzle and determine where on the perimeter of the tank this is to be located. Using canvas
 straps and lifting bar, lift and place this tank segment in the position desired for the nozzle
 orientation. Install the support jigs (2 external, 1 internal) on this segment while the
 segment is being held by the forklift.
- 2. Select the 2nd tank segment that will not be used to support the "candy cane" fluid nozzle and install lifting straps and spreader bar. Lift and place the 2nd tank segment adjacent to the first tank segment. Install the support jigs (2 external, 1 internal). Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 2nd tank segment initially with reference to spray circumference marking and finally by measuring the distance from the ends of the 1st and 2nd segments, using the inside edge of the tank wall.
- 3. Select the 3rd tank segment that will not be used to support the "candy cane" fluid nozzle and install lifting straps and spreader bar. Lift and place this 3rd tank segment adjacent to the 2nd tank segment. Install the support jigs (2 external, 1 internal). Adjust until the top and bottom bolts can be made up. Check the position of this 3rd tank segment initially with reference to the spray circumference marking and finally by measuring the distance from the ends of the 1st and 3rd segments, using the inside edge of the tank wall.
- 4. Select the 4th tank segment that will be used to support the "candy cane" fluid nozzle (if this is the plan for the tank) and install lifting straps and spreader bar. Lift and place this 4th tank segment adjacent to the 3rd tank segment. Install the support jigs (2 external, 1 Internal). Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 4th tank segment initially with reference to spray circumference marking and finally by measuring the distance from the ends of the 1st and 4th segments, using the inside edge of the tank wall.
- 5. Select the 5th tank segment and install lifting straps and spreader bar. Lift and place this 5th tank segment adjacent to the 4th tanks segment. Install the support jigs (2 external, 1 internal) adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 5th tank segment initially with reference to spray circumference marking and finally by measuring the distance from the ends of the 1st and 5th segments, using the inside edge of the tank wall.
- 6. Select the 6th tanks segment and install lifting straps and spreader bar. Lift and place this 6th tank segment adjacent to the 5th segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 6th tank segment initially with reference to the spray circumference marking

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and finally, be measuring the distance from the ends of the 1st and 6th segments using theinside edge of the tank wall. Select the 7th tanks segment and install lifting straps and spreader bar. Lift and place this 7thtank segment adjacent to the 6th segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 7th tank segment initially with reference to the spray circumference markingand finally be measuring the distance from the ends of the 1st and 7th segments using the inside edge of the tank wall

- 7. Select the 8th tanks segment and install lifting straps and spreader bar. Lift and place this 8thtank segment adjacent to the 7th segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 8th tank segment initially with reference to the spray circumference markingand finally be measuring the distance from the ends of the 1st and 8th segments using the inside edge of the tank wall.
- 8. Select the 9th tanks segment and install lifting straps and spreader bar. Lift and place this 9th tank segment adjacent to the 8th segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 9th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 6th segments using the inside edge of the tank wall.
- 9. Select the 10th tanks segment and install lifting straps and spreader bar. Lift and place this 10th tank segment adjacent to the 9th segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 10th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 10th segments using the inside edge of the tank wall.
- 10. Select the 11th tanks segment and install lifting straps and spreader bar. Lift and place this 11th tank segment adjacent to the 10th tank segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 11th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 11th segments using the inside edge of the tank wall.
- 11. Select the 12th tanks segment and install lifting straps and spreader bar. Lift and place this 11th tank segment adjacent to the 11th tank segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 12th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 12th segments using the inside edge of the tank wall.
- 12. Select the 13th tanks segment and install lifting straps and spreader bar. Lift and place this 13th tank segment adjacent to the 12th tank segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can be made up. Check the position of this 11th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 11^{3h} segments using the inside edge of the tank wall.
- 13. Select the 14th tanks segment and install lifting straps and spreader bar. Lift and place this 14th tank segment adjacent to the 13th tank segment. Adjust until the top and bottom bolts

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- can be made up between the segments and adjust until all bolts can be made up. Check the position of this 14th tank segment initially with reference to the spray circumference marking and finally be measuring the distance from the ends of the 1st and 14th segments using the inside edge of the tank wall.
- 14. Select the 15th tanks segment and install lifting straps and spreader bar. Lift and place this 12th tank segment adjacent to the 14th tank segment. Adjust until the top and bottom bolts can be made up between the segments and adjust until all bolts can aligned.

DESIGN CONSTRUCTION PLAN

General

Examination of the engineering drawings and the SOP for set-up (Engineering Drawings, Liner Specifications, Set Up) plus the history of solid performance of these AST Containments demonstrates that the AST Containment is designed and will be assembled to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. As the AST Containments are generally less than 190 feet in diameter, wave action is not a meaningful consideration.

These AST Containments are constructed of 12-foot high steel panels, are netted (netting no larger than 1.5 inch per square per BLM COA) and employ the Mega Blaster Pro avian deterrent system to prevent ingress of migratory birds. AST Containments will be enclosed by a 4-strand barbed wire fence or better. Thus, complies with the Rule to fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair.

The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in conspicuous places surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following infom1ation: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers.

Site Preparation

Foundation for AST Containment

Preparation of the soils on site is required to form a dependable base for the AST Containment in accordance with NMAC 19.15.34 and the SOP and is the responsibility of the operating company. If the location of the AST Containment is on an existing pad, the operator has_stripped and stockpiled the topsoil for use as the final cover or fill at the time of closure. If the pad is new construction, the operator will strip and stockpile the soil for reclamation upon cessation of site activities.

19.15.34.12 A

(1) The operator shall design and construct a recycling containment to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall.

19.15.34.12 D

(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

19.15.34.12 C

Signs. The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers.

19.15.34.12 B

Stockpiling of topsoil. Prior to constructing containment, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure.

The foundation soils must be roller compacted Compaction characteristics must meet or exceed 95% of Standard Proctor Density in accordance with ASTM D 698 or modified Proctor Test (ASTM Standard D1557).

Examination of the SOP shows that the AST Containment contractor will conform to the following mandates of the Rule:

- the AST Containment will have a properly constructed compacted earth foundation and interior slopes (vertical steel) consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.
- Geotextile will be placed under the liner where needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.
- If the AST containment is within a levee, the inside grade is no steeper than two horizontal feet to one vertical foot (2H: 1V) and the outside grade no steeper than three horizontal feet to one vertical foot (3H: IV). The vertical steel walls of the AST Containment are the subject of *a variance included in Volume 3* of this submission. OCD.

The Operator will ensure that at a point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage and external discharge or suction lines shall not penetrate the liner.

Liner and Leak Detection Materials

The liner and geotextile specifications show that all primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be an equivalent liner [to that stated in Rule 34] and are pursuant to a requested variance. The liner system is presented in an earlier section of this submission.

All secondary liners shall be an equivalent liner [to that stated in Rule 34] approved by OCD pursuant to a

19.15.34.12 A

(2) A recycling containment shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity. The operator shall construct the containment in a levee with an inside grade no steeper than two horizontal feet to one vertical foot (2H:1V). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

19.15.34.12 A

(6) At a point of discharge into or suction from the recycling containment, the operator shall insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the

19.15.34.12 A

(4) All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a

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variance. The liner system is presented in an earlier section of this submission.

Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

Variance request for liner system (two 40 mil LLDPE for primary and secondary liners) included in Volume 3.

The AST Containment will have a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet to facilitate drainage.

Install Secondary Liner, Leak Detection System and Secondary Containment

All AST containments holding produced water will have a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The rule states that the edges of all secondary liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep. The lack of an anchor trench with an AST Containment *is pursuant to a requested variance.*

The AST Containment Contractor will cause the recycling containment will have a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection (see attached drawing).

The presence of the secondary containment levee or pre-fabricated secondary containment meets the OCD Rule mandate that a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion to prevent run-on of surface water.

AST Containment Setup

As with the secondary liner, AST Containment contractor will minimize liner seams and orient them up and down, as much as possible, not across, a slope.

hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

19.15.34.12 A

(3) Each recycling containment shall incorporate, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

19.15.34.12 A

(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection.

19.15.34.12 A

(8) The operator of a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion to prevent run-on of surface water.

Factory welded seams shall be used where possible. AST Containment contractor will employ field seams in geosynthetic material that are thermally seamed. Prior to field seaming, AST Containment contractor shall overlap liners four to six inches and minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the AST Containment bottom. Qualified personnel shall perform field welding and testing.

Fluid Injection/Withdrawal Flow Diverter
The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

19.15.34.12

(5) The operator of a recycling containment shall minimize liner seams and orient them up and down, not across, a slope of the levee. Factory welded seams shall be used where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches. The operator shall minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

19.15.34.13 B

(3) The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

March 2020

Variances and/or Equivalency Demonstrations for Above Ground Steel Tank Modular Recycling Storage Containments (AST) Primary and Secondary Liners Liner for Above Ground Steel Tank Modular Recycling Storage Containments

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR 40 MIL NON-REINFORCED LLDPE GEOMEMBRANE AS AN ALTERNATIVE PRIMARY AND 30 MIL NON-REINFORCED AS ALTERNATIVE SECONDARY LINER FOR MODULAR STEEL AST CONTAINMENT

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of 19.15.34.12

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT **(4)** All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. *All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.*

The applicant proposes one layer of 40-mil LLDPE non-reinforced as a primary liner and a secondary liner comprised of one layer of 30-mil LLDPE non-reinforced material

Rule 34 did not consider Above Ground Steel Storage Tanks that employ liners as a primary and secondary containment method.

This material is more readily available than the prescribed liners in the Rule and provides superior flexibility and conformity characteristics. Due to the vertical steel walls, 60-mil HDPE, 45 or 30-mil LLDPE string reinforced liners and 30-mil PCV liners are not sufficiently flexible for use in these modular containments.

All liners will have a hydraulic conductivity no greater than 1 x 10 -9 cm/sec and meet or exceed EPA SW-846 method 9090A.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The following technical documents provide supportive data to demonstrate that this liner system (with integrated leak detection system) provides equal or better protection of fresh water, public health and the environment by providing the requisite containment and protection. Attached is a technical comparison of the proposed material is compared to what is advised through Rule 34. A second memorandum provides clarification that the engineering requirements for site preparation, which ensures functionality of the liner system, is crosscutting to varied locations/sites within the Permian Basin. Liner specifications are also included in submission.

Consulting Engineers

Technical Memorandum: 40-mil LLDPE as Alternative Primary with 30-mil LLDPE as Alternative Secondary Liner System for Modular Steel AST Recycling Containment
NMAC 19.15.34.12 A (4)

In consideration of the liner application for modular AST impoundments, size and depth of the AST, design details for modular tanks as well as estimated length of at least five years of service time, it is my professional opinion that a 40 mil LLDPE (non-reinforced) and a 30 mil LLDPE (non-reinforced) geomembrane system will provide the requisite barrier against produced water loss as an alternative primary and secondary liner system. The two proposed liners, 40 mil LLDPE as Primary liner and 30 mil LLDPE Secondary liner, will function equal to or better than 45 mil String Reinforced LLDPE, 30 mil PVC, or 60 mil HDPE liners as a primary liner and 30 mil LLDPE string reinforced as a secondary liner system. Additionally, this two-layer system with integrated leak detection system, will provide requisite protection for the environment that is equal to or better than the above primary and secondary liner systems referenced in OCD rule 34. The following are discussion points that will exhibit the attributes of a 40 mil/30 mil LLDPE lining system:

The nature and formulation of LLDPE resin is very similar to HDPE. The major difference is that LLDPE is lower density, lower crystallinity (more flexible and less chemical resistant). However, LLDPE will resist aging and degradation and remain intact for many years in exposed conditions. The LLDPE resin is virtually the same for non-reinforced 30 or 40 mil LLDPE and string reinforced 30 or 45 mil LLDPE geomembranes and both will provide requisite containment and be equally protective for this application, enduring UV and chemical degradation in the produced water environment.

Flexibility Requirements. Non-reinforced LLDPE geomembranes are less stiff and far more flexible than string reinforced geomembranes as well as 60 mil HDPE and in this regard are preferred for installations in vertical wall tanks such as this proposed installation. LLDPE provides a very flexible sheet that enables it to be fabricated into large panels, folded for shipping and installed on vertical walls transitioned to flat bottom. Non-reinforced LLDPE sheet will conform better than a string reinforced LLDPE to the tank dimensions under hydrostatic loading and will exhibit less wrinkling and creasing during and after installation.

<u>Thermal Fusion Seaming Requirements</u>. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Both dual wedge and single wedge thermal fusion welding is commonly used on LLDPE and QC testing by air channel (ASTM D 5820) or High Pressure Air Lance (ASTM D 4437) is fully acceptable and recognized as industry standards. In this regard, either non-reinforced LLDPE or string-reinforced LLDPE will be acceptable as far as QC and thermal fusion seaming methods are concerned.

Consulting Engineers

Potential for Leakage through the Primary and Secondary Liners. Leakage through geomembrane liners is directly a function of the height of liquid head above any hole or imperfection. The geonet drainage media between the primary and secondary LLDPE geomembranes at the base of the AST in this application provides immediate drainage to a low point or outside the Modular AST Impoundment and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the Secondary LLDPE liner.

Leakage through any Primary geomembrane is driven by size of hole and depth and will be detected by the increase of water in the drainage system and the volume being pumped out of the secondary containment. In this regard and for this variance, the Primary consists of 40 mil LLDPE geomembrane which will perform equal to or better than a single layer of string reinforced LLDPE for potential leakage. Thus, if a leak occurs through the top layer, it will be effectively contained by the second layer of 30 mil LLDPE geomembrane. If required, location of holes in the Primary can be found by Electrical Leak Location Survey (ELLS) using a towed electrode (ASTM D 7007). Holes found can then be repaired and thus water seepage into the leakage collection and drainage system will be kept to a minimum. Dependent on OCR requirements for Action Leakage Rate (ALR), the leakage volumes may only be monitored. For example, a typical ALR is < 20 gpad whereas a rapid and large leak (RLL) may be > 100 gpad. Most states specify maximum ALR values for waste and process water impoundments usually in the range of 100 to 500 gpad. However, New Mexico does not specify an ALR for waste or process water impoundments (GRI Paper No. 15).

LLDPE (and string reinforced LLDPE) can be prefabricated into large panels and thus both types offer the following for Containment:

- Prefabrication in factory-controlled conditions into very large panels (up to 30,000 sf) results in ease of installation, less thermal fusion field seams and less on site QC and CQA. (It should be noted that HDPE cannot be prefabricated into panels and requires considerably more on-site welding and QC).
- Large prefabricated panels will provide better control of thermal fusion welding in a factory environment that will improve the liner system integrity for the long term. Ease of installation of large prefabricated custom size panels results in a greater reduction of installation time and associated installation and QC costs
- The Non-reinforced LLDPE geomembrane provides superior lay flat characteristics and conformability which allows for more intimate contact with the underlying soil, geonet, or geotextile and tank walls as well as overlying materials thus providing better flow characteristics for drainage of water. String reinforced LLDPE exhibits more wrinkling and when overlaid or in contact with a geonet drain, wrinkles tend to form pockets and dams affecting drainage of any leakage water to the exterior of the Modular AST Impoundment.

Consulting Engineers

Both types of LLDPE geomembrane are easily repaired using the same thermal
fusion bonding method without the need for special surface granding preparation
for extrusion welding as is typically used in repair of HDPE geomembranes.
However, string reinforced LLDPE requires that all cut edges with exposed scrim
must be encapsulated with extrusion bead. No encapsulation is required on nonreinforced LLDPE.

In summary, it is my professional opinion that the liner system of 40 mil non-reinforced LLDPE geomembrone as Primary liner and 30 mil non-reinforced LLDPE Secondary liner, with integrated leak detection system, will provide protection that is equal to or better than 45 mil string reinforced LLDPE, 30 mil PVC, 60 mil HDPE (primary liner) and 35 mil LLDPEr (secondary liner) and meets requirements as defined by the rule as an alternative liner system (resistance to UV and chemical exposure and required hydraulic conductivity). Additionally, this liner system will provide a superior initiallation in the AST environment and function better than liners referenced in the OCD rule and will provide the requisite protection of fresh water, public health and the environment for at least 5 years in the produced water recycling environment.

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@misn.com

Sincerely Yours...

RX Feeler

Ronald K. Frobel, MSCE, PE

References:

NMAC 19,15,34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Popers 2018

ASTM Standards 2018

Attachments:

R. K. Frobel C.V.

32156 Castle Court / Suite 211 / Evergreen, CO 80439 Ph 303-679-0285 Fx 303-679-8955 geosynthetics@msn.com Slope and Anchor Variance Request for Above Ground Steel Tank Modular Recycling Storage Containments

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR SLOPE AND ANCHOR FOR MODULAR STEEL AST CONTAINMENT

Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of NMAC 19.15.34.12.

NMAC 19.15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT:

- A. An operator shall design and construct a recycling containment in accordance with the following specifications.
- (2) A recycling containment shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity. The operator shall construct the containment in a levee with an inside grade no steeper than two horizontal feet to one vertical foot (2H:1V). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
- (3) Each recycling containment shall incorporate, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The edges of all liners shall be anchored in the bottom of a compacted earthfilled trench. The anchor trench shall be at least 18 inches deep.

The applicant requests a variance to prescribed slope and anchor in the setting of above ground modular steel containments.

With respect to storage of produced water for use in lieu of fresh water, Rule 34 is written for earthen, lined pits, not free-standing modular impoundments that employ liners as their primary fluid containment system. A modular impoundment consists of a professionally designed steel tank ring with vertical walls. There is no slope to consider as the segmental steel sections are set vertical.

There is no anchor trench as envisioned by the Rule, liners are anchored to the top of the steel walls with clips, no anchor trench is required.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The following technical memorandum provides supportive data to demonstrate equal or better protection of fresh water, public health and the environment by providing the requisite containment and protection.

Consulting Engineers

Technical Memorandum: Slope and Anchor Trench Variance for Above Ground Steel Modular Containments NMAC 19.15.34.12 A (2), (3)

Side Slope

The design of soil side slope (inclination) is a geotechnical engineering design consideration. Liquid impoundments such as fresh water or process water containments are usually built within an excavation or with raised earthen embankments. For a liquid impoundment with an exposed liner system, the slope soils and construction dictate slope inclination and very detailed slope stability analysis may be required to determine if slope failure within the embankment will occur once loaded with impounded water. Slope failure may also occur during construction or when the impoundment is empty. A maximum slope is usually specified and is dependent on soil type and cohesive strength, saturated or unsaturated conditions, etc. Detailed analysis for slope stability can be found in "Designing with Geosynthetics" by R.M Koerner as well as many geotechnical books.

A modular impoundment, on the other hand, consists of a professionally designed steel tank ring with vertical walls. *There is no slope to consider as the segmental steel sections are set vertical.* Design of steel tanks, in regard to hydrostatic loading, wind loading, seismic loads, etc. are thoroughly referenced with detailed procedures in the design code - American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage". *There are no requirements for maximum slope inclination other than perhaps 90 degrees or vertical wall.*

Anchor Trench

All earthen impoundments with a geomembrane lining system require some form of top of slope anchor, the most common of which is an excavated and backfilled anchor trench usually set back at least 3 ft from the top of slope. Again, there are detailed procedures for anchor trench design in "Designing with Geosynthetics" by R.M Koerner.

A Modular Impoundment requires mechanical anchoring of the geomembrane at the top of the vertical steel wall using standard liner clips that prevent the geomembrane or geomembrane layers from slipping down the side wall. These are detailed in the Tank Installation Manual. There are no requirements for an "anchor trench" as this is not an in-ground impoundment.

In summary, based on the design and specifications of a modular steel impoundment, there is no requirement for a maximum interior slope angle of 2H:1V due to the fact that this impoundment is a steel tank with vertical walls. Additionally, there is no requirement for an anchor trench as the geomembrane is attached to the top of the Modular Impoundment vertical walls with large steel clips. This provides the requisite protection of fresh water, public health and the environment for many years.

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Consulting Engineers

If you have any questions on the above technical memorandum or require further information, give me a call at 303-679-0285 or email geosynthetics@msn.com

Sincerely Yours.

ZX Frobel

Ronald K. Frobel, MSCE, PE



References:

NMAC 19.15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage"

Koemer, R.M., 2005 "Designing With Geosynthetics" Prentice Hall Publishers

Attachments:

R. K. Frobel C.V.

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR FREEBOARD FOR MODULAR STEEL AST CONTAINMENT

Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of NMAC 19.15.34.13

19.15.34.13 OPERATIONAL REQUIREMENTS FOR RECYCLING CONTAINMENTS:

- **B.** The operator shall maintain and operate a recycling containment in accordance with the following requirements.
- (2) The operator shall maintain at least three feet of freeboard at each containment.

The applicant requests variance to allow for a freeboard of 2 feet as opposed to the prescribed 3 feet in the setting of an above ground steel tank modular system.

Rule 34 did not take into consideration above ground steel tank modular containment systems. With respect to lined earthen impoundments that may hold 25-acre feet of produced water, a 3-foot freeboard stipulation makes sense. For example, wave action and other factors could focus stress on the upper portion of the levee or the liner system in these large impoundments. The smaller diameter steel tank (modular impoundment) does not share the same characteristics as these large earthen pits.

We believe 3-feet of freeboard is not necessary – especially during active hydraulic stimulation of wells when maximum storage volume provides the highest value. Moreover, meeting the 3-foot freeboard requirement at all times significantly reduces the storage capacity of a single modular impoundment – negatively impacting the economics of using produced water in lieu of fresh water for E&P activities.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The attached technical memorandum by Ron Frobel, PE, describes how the proposed 2-foot freeboard limit in the permit application for the modular impoundment provides the same protection afforded by the 3-foot freeboard mandate for a large earthen pit. The attached equations and supporting email from Mr. Jason Henderson, PE, shows that a 2-foot freeboard limit on the steel impoundment meets the manufacturer's design criteria.

Consulting Engineers

Freehoard Requirements for Above Ground Steel Tank Modular Recycling Storage Containments NMAC 19.15.34.13 B (2)

Liquid impoundments such as fresh water or process water containments are usually built within an excavation or with raised earthen embankments. For a liquid impoundment with an exposed liner system, the slope soils and construction dictate slope inclination and very detailed slope stability analysis may be required to determine if slope faiture within the embankment will occur once loaded with impounded water. Freeboard or the vertical height between the maximum water surface elevation and the top of slope is important for earthen impoundments. Specified freeboard requirements take into consideration high precipitation events and provent wave run-up on slopes that result in over-topping and potential saturation of embankments. This is particularly important on large earthen impoundments. Detailed design considerations including freeboard requirements for fined earthen impoundments can be found in "Designing with Geosynthetics" by R.M. Koemer as well as other publications on reservoir design.

A modular impoundment, on the other hand, consists of a professionally designed steel tank ring with vertical walls. There is no slope to consider as the segmental steel sections are set vertical. Design of steel tanks as regards hydrostatic loading, wind loading, seismic loads, etc. are thoroughly referenced with detailed procedures in the design code. American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage". There are requirements for operational treeboard to prevent over-topping but due to the relatively small surface area and fetch of cylindrical tanks, wave heights are much less than large earthen impoundments. Thus, freeboard is usually within the range of 0.5 to 2 ft. I have reviewed the Tank Design Calculation Summary and regarding the structural stability of the tank walls, a freeboard of 0.5 ft was assumed. Thus, the variance request of 2.0 ft for a Modular Impoundment is well within the Tank Design requirements.

Insummary, it is my professional opinion that the design freehourd of 2.0 ft will provide requisite storage volume and prevent overtopping due to wind and wave action, potential setume events and high previguation.

If you have my questions on the above technical memorandum or require further information, give me a call at 303-679-0285 or email geosynthetics/acmsn.com

Sincerely Yours.

RX Probel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.13 OPERATIONAL REQUIREMENTS FOR RECYCLING CONTAINMENTS

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Consulting Engineers

American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage"

Koerner, R.M., 2005 "Designing With Geosynthetics" Prentice Hall Publishers

Attachments:

R. K. Frobel C.V.

The modular impoundment is designed for use with fluids that are 8.34 pounds/gallon (62.4 pounds per cubic foot) or lighter. Exceeding this specification for fluid weight at full tank capacity (12') could lead to failure at the connection plate(s).

Assuming a freeboard of 0.5 ft (minimum modular impoundment freeboard requirement) the Hyrdo Pressure (p) of water is 718 pounds per square foot (psf), where

$$p = Design Density X Height$$

$$= 62.4 PCF * 11.5 ft$$
 $(design density = 8.34 \frac{lb}{L} X 7.48 \frac{ft^3}{L})$

The density of the conditioned produced water is 9.3 pounds/gallon. Assuming a freeboard of 3-ft (19.15.17.12.F(3) NMAC), the Hyrdo Pressure (p) of conditioned produced water is 626 psf, where

$$p = Design Density X Height$$

= 69.64 PCF *9 ft
(design density = 9.3 $\frac{lb}{}$ X 7.48 $\frac{ft^3}{}$)

Using conditioned produced water with the Pit Rule freeboard requirements of 3-feet results in a Hydro Pressure 92 psf less than the engineered design.

The operator asks the District Division to allow for a 2-foot freeboard, which yields a Hydro Pressure (p) of 696.4 psf, where

$$p = Design Density X Height$$

$$= 69.64 PCF*10 ft$$
 $(design density = 9.3 \frac{lb}{} X 7.48 \frac{ft_3}{})$
 $gal gal$

January 2020

Applicability of Variances for Modular AST Containments in the Permian Basin of New Mexico

Consulting Engineers

Technical Memorandum: Applicability of Variances for Modular AST Containments in the Permian Basin of New Mexico NMAC 19.15.34.12 A (2)

I have reviewed the most recent historical variances for AST Containments in the document titled "Variances for C-147 Registration Packages Permian Basin of New Mexico" (January 2020) and examined the applicable design drawings and permits for the following modular AST containments located in the Permian Basin of New Mexico.

- C-147 Registration Package for Myox Above Ground Storage Tank Section 32, T25S, R28E, Eddy County (January 20, 2020)
- C-147 Registration Package for Fez Recycling Containment and Recycling Facility Area (100+ acres) Section 8, T25-S, R35-E, Lea County, Volume 2 – Above-Ground Storage Tank Containments
- Hackberry 16 Recycling Containments and Recycling Facility Section 16, T19S, R31E, Eddy County

Locations of the modular containments range from west of the Pecos River to slightly west of Jal, NM. All locations exhibit different surface and subsurface geology, different topography and are of various sizes and volumes. However, in regard to structural integrity of the base soils that support the AST and in particular the geomembrane containment system, the specification requirements are the same. The foundation soils must be roller compacted smooth and free of loose aggregate over ½ inch. Compaction characteristics must meet or exceed 95% of Standard Proctor Density in accordance with ASTM D 698. This specification requirement is specific and causes the general or earthworks contractor to meet this standard regardless of the site-specific geology or topography. Provided that the design drawings and associated specifications call out the minimum requirements for subsoils compaction (i.e., 95% Standard Proctor Density – ASTM D 698), the design engineer or owners representative will carry out soils testing on the foundation materials to provide certainty to the AST containment owner that the earthworks contractor has met these obligations.

Thus, provided that the contractor meets the minimum specified requirements for foundation soils preparation and density, the location, geology or depth to groundwater will make no difference in regard to geomembrane liner equivalency as demonstrated by the AST variances presented in this volume and are considered valid for meeting NMOCD Rule 34 requirements for all locations within the Permian Basin of New Mexico.

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@msn.com

Consulting Engineers

Sincerely Yours,

ZX France

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15,34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

ASTM Standards 2019



RONALD K. FROBEL, MSCE, P.E.

CIVIL ENGINEERING GEOSYNTHETICS EXPERT WITNESS FORENSICS

FIRM: R. K. FROBEL & ASSOCIATES

Consulting Civil / Geosynthetics Engineers

TITLE: Principal and Owner

PROFESSIONAL

AFFILIATIONS: American Society for Testing and Materials (ASTM) -

Founding member of Committee D 35 on Geosynthetics Chairman ASTM D35 Subcommittee on Geomembranes 1985-2000

Chairman ASTM D35 Subcommittee on Geomembranes 1985-2000

ASTM Award of Merit Recipient/ASTM Fellow - 1992 ASTM D18 Soil and Rock - Special Service Award - 2000

Transportation Research Board (TRB) of The National Academies

Appointed Member A2K07 Geosynthetics 2000 - 2003 National Society of Professional Engineers (NSPE) - Member

American Society of Civil Engineers (ASCE) - Member

Colored Society of Civil Engineers (ASCE) - Weille

Colorado Section - ASCE - Member

International Society of Soil Mechanics and Foundation Engineers

(ISSMFE) - Member

International Geosynthetics Society (IGS) - Member

North American Geosynthetics Society (NAGS) - Member

International Standards Organization (ISO) - Member TC 221

Team Leader - USA Delegation Geosynthetics 1985 - 2001 European Committee for Standardization (CEN) - USA Observer EPA Advisory Committee on Geosynthetics (Past Member) Association of State Dam Safety Officials (ASDSO) – Member U. S. Committee on Irrigation and Drainage (USCID) - Member Technical Advisory Committee - Geosynthetics Magazine Editorial Board - Geotextiles and Geomembranes Journal Fabricated Geomembrane Institute (FGI) – Board of Directors Co-Chairman International Conference on Geomembranes Co-Chairman ASTM Symposium on Impermeable Barriers

U.S. Naval Reserve Officer (Inactive)

Registered Professional Engineer – Civil (Colorado) Mine Safety Health Administration (MSHA) Certified

ACADEMIC

BACKGROUND: University of Arizona: M.S. - Civil Engineering - 1975

University of Arizona: B. S. - Civil Engineering – 1969

Wentworth Institute of Technology: A.S. Architecture – 1966

RONALD K. FROBEL, MSCE, P.E.

Page 2

PROFESSIONAL

EXPERIENCE:

- R. K. Frobel & Associates Consulting Engineers
 Evergreen, Colorado, Principal and Owner, 1988 Present
- Chemie Linz AG and Polyfelt Ges.m.b.H., Linz, Austria U. S. Technical Manager Geosynthetics, 1985 1988
- U.S. Bureau of Reclamation, Engineering and Research Center Denver, Colorado, Technical Specialist in Construction Materials Research and Application, 1978 - 1985
- Water Resources Research Center (WRRC), University of Arizona Tucson, AZ, Associate Research Engineer, 1975 - 1978
- Engineering Experiment Station, University of Arizona Tucson, AZ, Research Assistant, 1974 - 1975

United States Navy, Commissioned Naval Officer, 1970 - 1973

REPRESENTATIVE EXPERIENCE:

R.K. Frobel & Associates: Civil engineering firm specializing in the fields of geotechnical, geo-environmental and geosynthetics. Expertise is provided to full service civil/geotechnical engineering firms, federal agencies, municipalities or owners on a direct contract, joint venture or sub-consultant basis. Responsibilities are primarily devoted to specialized technical assistance in design and application for foreign and domestic projects such as the following:

Forensics investigations into geotechnical and geosynthetics failures; providing expert report and testimony on failure analysis; providing design and peer review on landfill lining and cover system design, mine waste reclamation, water treatment facilities, hydro-technical canal, dam, reservoir and mining projects, floating reservoir covers; oil and gas waste containment; design of manufacturers technical literature and manuals; development and presentation of technical seminars; new product development and testing; MQA/CQA program design and implementation.

<u>Polyfelt Ges.m.b.H., Linz, Austria and Denver Colorado</u>: As U.S. technical manager, primary responsibilities included technical development for the Polyfelt line of geosynthetics for the U.S. civil engineering market as well as worldwide applications.

RONALD K. FROBEL, MSCE, P.E.

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<u>U.S.</u> Bureau of Reclamation, Denver, Colorado: As technical specialist, responsibilities included directing laboratory research, design and development investigations into geosynthetics and construction materials for use on large western water projects such as dams, canals, power plants and other civil structures. Included were material research, selection and testing, specification writing, large scale pilot test programs, MQA/CQA program design and supervision of site installations. Prime author or contributor to several USBR technical publications incorporating geosynthetics.

<u>University of Arizona, Tucson, Arizona</u>: As research engineer at the Water Resources Research Center, responsibilities included research, design and development of engineering materials and methods for use in construction of major water projects including potable water reservoirs, canals and distribution systems. Prime author or contributor to several WRRC technical publications.

Northeast Utilities, Hartford, Connecticut: As field engineer for construction at Northeast Utilities, responsibilities included liason for many construction projects including additions to power plants, construction of substations, erection of fuel oil pipelines and fuel oil storage tanks. Responsibilities also included detailed review, inspection and reporting on numerous construction projects.

U.S. Navy: Commissioned Naval Officer – Nuclear Program

PUBLICATIONS: Over 85 published articles, papers and books.

CONTACT DETAILS:

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Additional Variance For Recycling Storage CONTAINMENTS (Inground and AST)

• Alternative Testing Methods

Request for OCD Approval of Alternative Test Methods to Analyze Concentrations of TPH and Chloride

The prescriptive mandates of the Rule that are the subject of this request are the following subsections of NMAC 19.15.17.13 [emphasis added], 19.15.34.14 and 19.15.29. 12 D

19.15.17.13 CLOSURE AND SITE RECLAMATION REQUIREMENTS:

D.(5) The operator shall collect, at a minimum, a five point composite of the contents of the temporary pit or drying pad/tank associated with a closed-loop system to 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.

The referenced Table II, which is reproduced in part below, notes the Method with asterisk signifying: "*Or other test methods approved by the division".

	Closure Criteria fo	able II or Burial Trenches and ace in Temporary Pits	
Depth below bottom of pit to groundwater less than 10.000 mg/I TDS	Constituent	Method*	Limit**
	Chloride	EPA Method 300.0	20,000 mg/kg
25-50 feet	ТРН	EPA SW-846 Method 418.1	100 mg/kg

19.15.34.14 CLOSURE AND SITE RECLAMATION REQUIREMENTS FOR RECYCLING CONTAINMENTS:

- **C.** The operator shall test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below.
- (1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results and the operator must receive approval before proceeding with closure.

The referenced Table I, which is reproduced in part below, notes the Method with asterisk signifying: "*Or other test methods approved by the division".

Table I Closure Criteria for Recycling Containments			
Depth below bottom of containment to groundwater less than 10,000 mg/I TDS	Constituent	Method*	Limit**
51 feet - 100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg

After sampling solids of more than 50 drilling pits in the Permian Basin, we have observed and reported to OCD on numerous occasions significant problems with non-petroleum drilling additives (e.g. starch) interfering with the laboratory method 418.1. It is not surprising that in many instances we found no correlation between the laboratory results using 418.1 and the results using Method 8015.

We request approval of Method 8015 (GRO + DRO + MRO) for Method 418.1.

19.15.29.12 D. CLOSURE REQUIREMENTS. The responsible party must take the following action for any major or minor release containing liquids.

(1) The responsible party must test the remediated areas for contamination with representative five-point composite samples from the walls and base, and individual grab samples from any wet or discolored areas. The samples must be analyzed for the constituents listed in Table I of 19.15.29.12 NMAC or constituents from other applicable remediation standards.

The referenced Table I, is reproduced in part below.

		Table I Soils Impacted by a Release	
Minimum depth below any point within the horizontal boundary of the release to ground water less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤50 feet	Chloride***	EPA 300.0 or SM4500 Cl B	600 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg

We request approval of EPA 300.0 or SM4500 for the analysis of chloride.

Demonstration that OCD Approval Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The purpose of TPH analyses in the Pit Rule is to measure total petroleum hydrocarbons not all non-polar compounds, such as starch or cellulose that can interfere with Method 418.1. While Method 418.1 may provide some useful data for transportation of crude oil or condensate spills to disposal, the addition of non-polar organic materials in drilling fluids, especially for horizontal wells, renders Method 418.1 highly problematic to determine compliance with the Rule. Using Method 8015 for TPH (GRO+DRO+MRO) provides a better measurement of what we believe the Commission intended operators to measure.

In hearings before the Oil Conservation Commission technical arguments were presented regarding the use of SM4500 in lieu of EPA 300.00 for chloride analysis for Rule 29. The Division and the Commission agreed that these two methods provide equal or better protection of fresh water, public health and the environment.

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

CONDITIONS

Action 70715

CONDITIONS

Operator:	OGRID:
Enchantment Water, LLC	329620
P.O Box 60	Action Number:
Jal, TX 88252	70715
	Action Type:
	[C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	NMOCD has reviewed and approved the recycling containment permit application and related documents, submitted by [329620] Enchantment Water, LLC on January 5, 2022, for 2RF-169 - FED 128 AST FACILITY ID [fVV2206936015] in Unit Letter O, Section 21, Township 23S, Range 31E, Eddy County, New Mexico.	3/17/2022