

September 2020

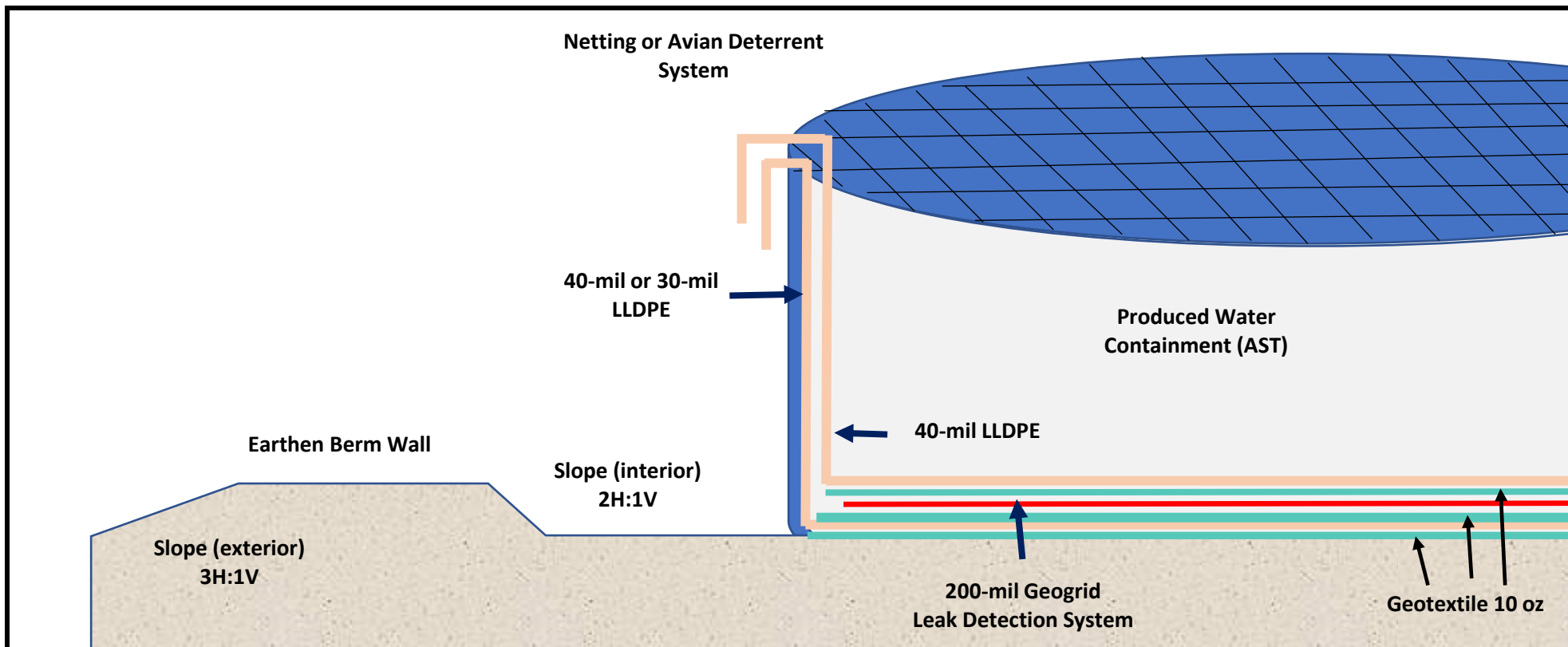
**Volume 2**  
**C-147 Registration Package for**  
**RODNEY ROBINSON AST CONTAINMENT**  
**AST DESIGN AND CONSTRUCTION PLAN**  
**VARIANCES FOR ASTs**



*View east from center of proposed containment.*

**Prepared for:**  
**Solaris Water Midstream LLC**  
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**Houston, TX 77024**

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



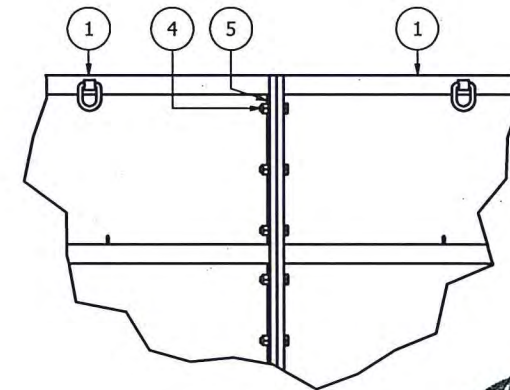
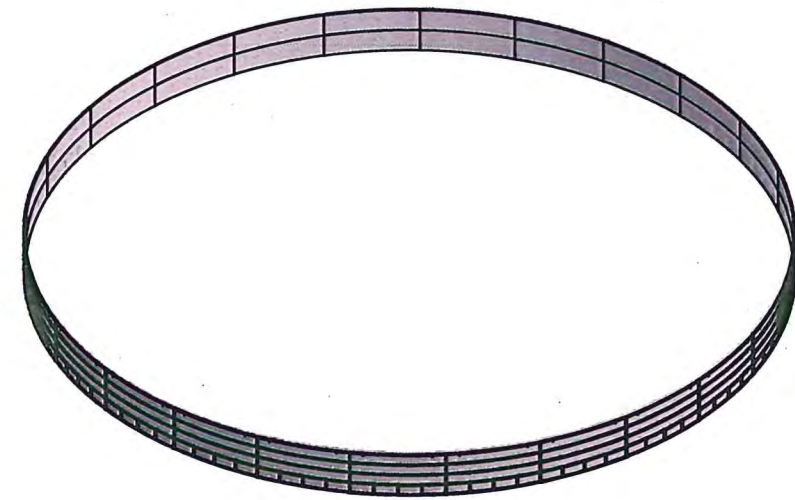
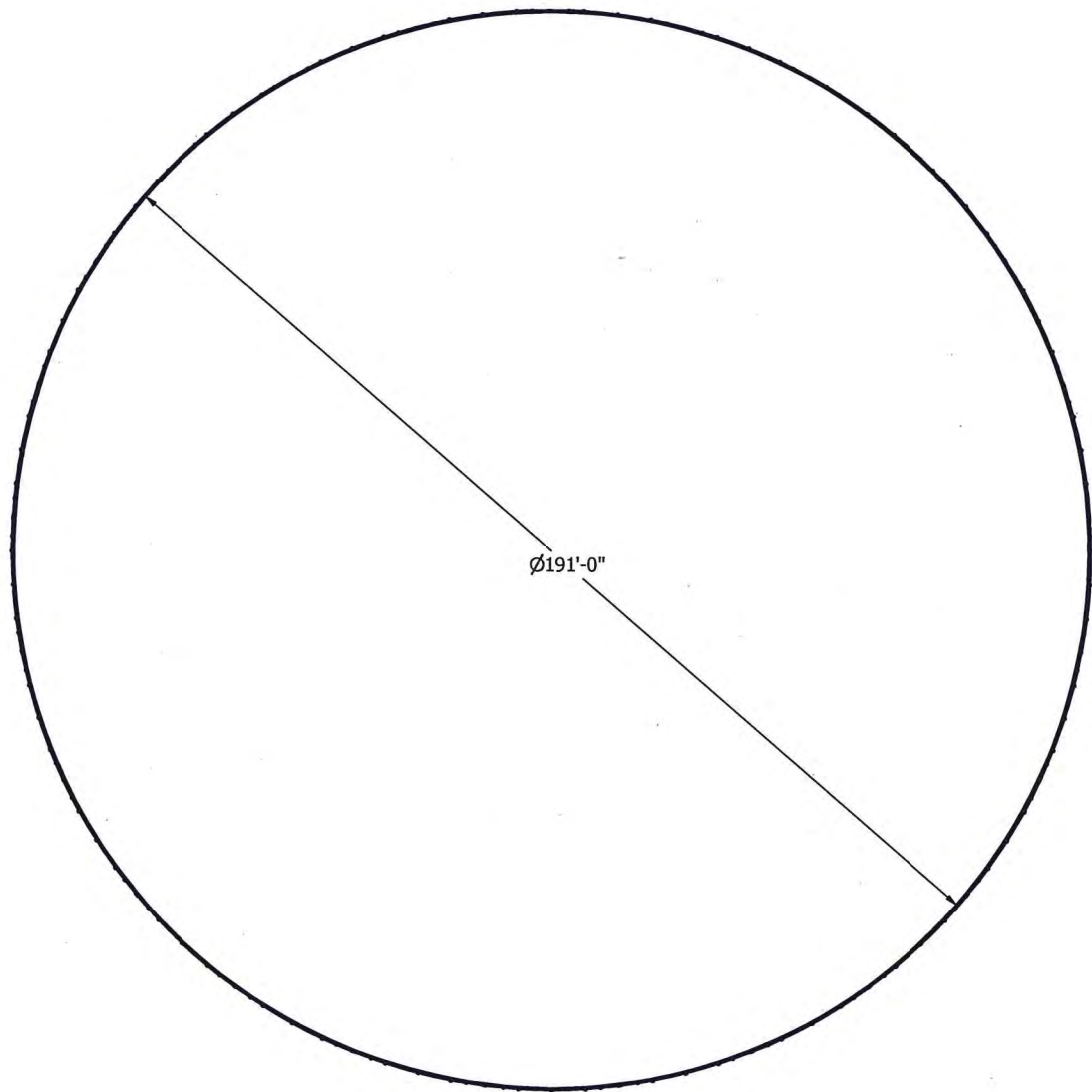
### Description of Leak Detection System

- 200-mil geogrid drainage layer lies between the primary and secondary liner
- Geotextile between the geogrid and the liners
- 2- to 3-inch deep sump excavated within the compacted caliche pad as a collection point for any seepage
- A ¾-inch aqua braid line runs from the collection sump between the liners and beneath the geogrid drainage system to the outside of the AST
- The leak detection pipe is fastened to the exterior of the AST and terminates at ground level.
- 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 (e.e. produced water or condensation)

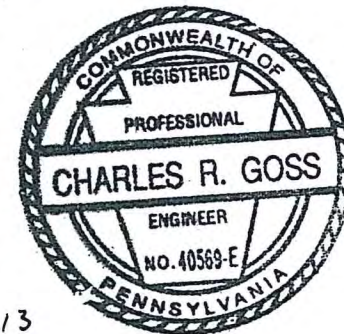
R.T. Hicks Consultants Albuquerque, NM	Design Sketch	Plate 1
	Solaris Water Midstream - F cXbYmF cVJbgcb AST Containment	GYdh20

# AST DESIGN DRAWINGS, LINER SPECIFICATIONS AND SET UP SOP





DETAIL A  
SCALE 1 / 25



CRG  
18 Dec 2013



Reviewer's Notes:

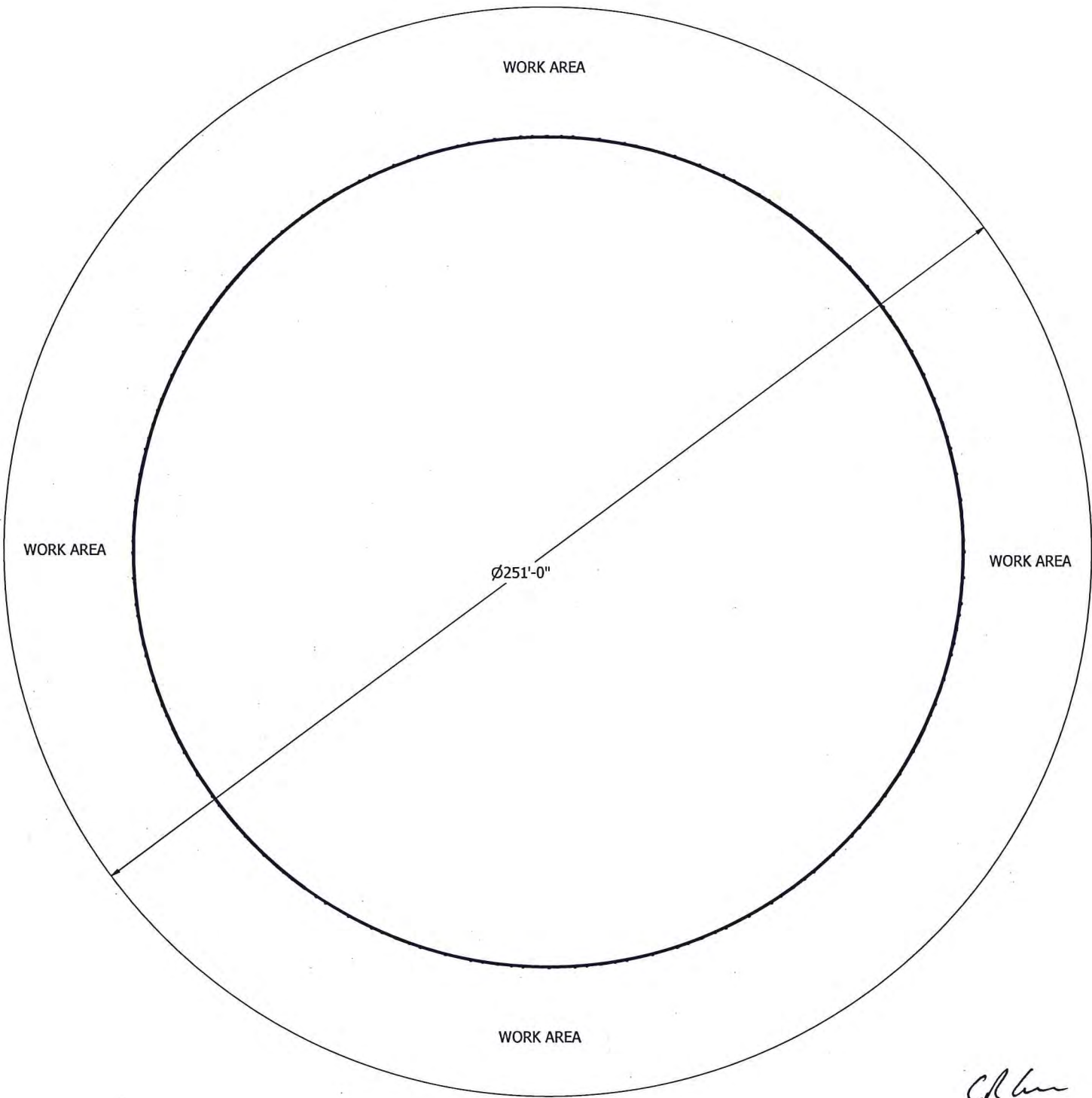
1. This drawing set replaces set previously sealed on 27 MAR 2013
2. Empty corral cannot withstand high winds.

ITEM	QTY	PART NUMBER	DESCRIPTION	REV
6	120	4X4X4 LUMBER	4" x 4" x 48" Lumber (NOT SHOWN)	-
5	850	WASH-200-1-1/4	1-1/4" ASTM F436 Galvanized Structural Washer	-
4	425	NUT-200-1-1/4-7	1-1/4"-7 ASTM A563 Gr DH Galvanized Hex Nut	-
7	425	BOLT-1-1/4-4333	1-1/4"-7 x 5" ASTM A490 Structural Bolt	-
3	25	ETC-106	.063" X 8" X 168" RUBBER SHEET (NOT SHOWN)	-
2	5	MWC-SA-008A	60,000 BBL Corral Shipping Support	-
1	25	MWC-SA-002a	60,000 BBL CORRAL WALL SECTION	-

THIS DRAWING IS PROPERTY OF JWF INDUSTRIES IT MAY NOT BE COPIED OR DISTRIBUTED IN WHOLE OR PART. WITHOUT PRIOR PERMISSION OF JWF INDUSTRIES.		INTERPRET DIMENSIONS AND TOLERANCES LAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (MM)		DRAWN BY mspecial		ETC Environmental Tank & Container JOHNSTOWN, PA 855-382-8265 www.etc-tank.com					
		FRACTIONAL ± 1/4 (6.4) XXX ± .25 (6.4) X.XXX ± .125 (3.2) X.XXX ± .060 (1.5) ANGULAR ± 1°		DATE 7/12/2012		TITLE					
		NEXT ASSY USED ON		CHECKED BY dbodenshatz		DATE 11/23/2012					
		APPLICATION		APPROVED mspecial		DATE 11/23/2012					
THIRD ANGLE PROJECTION		MATERIAL		DATE		SIZE		PRT. NO.		REV	
THICKNESS		NA		WEIGHT		N/A		SCALE		DWG. NO.	
DO NOT SCALE		N/A		SCALE		DO NOT SCALE		DWG. NO.		MWC-A-002a	
LOCATION		C:\Vault\ETCVault\Corrals\MWC-A-002a.lam		SCALE		DO NOT SCALE		DWG. NO.		MWC-A-002a	
SHEET 1 OF 2											

NOTES:

1. MINIMUM OF 30 FEET OF WORK AREA AROUND CORRAL
2. OVER ALL SITE MUST BE LEVEL TO +/- .50 INCH
3. RING AREA WHERE CORRAL PANELS WILL BE SETUP MUST BE LEVEL TO +/- .25 INCH
4. SOIL COMPACTION MUST MEET ASTM D-698A, 90% OR GREATER
5. BUILD A 12" X 12" SAND INSIDE CORNER RELIEF BEFORE INSTALLING LINER
6. MUST USE 1"-1/4"-7 X 4" GRADE A490 STRUCTURAL BOLTS
7. PANELS MUST HAVE ALL CONNECTING BOLTS TIGHTENED AND LINER FULLY SECURED BEFORE ADDING WATER
8. ALLOW FOR 6 INCHES OF FREEBOARD FROM TOP OF CORRAL

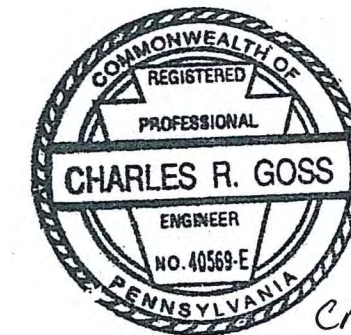


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18 Dec 2013


THIS DRAWING IS PROPERTY OF JWF INDUSTRIES IT MAY NOT BE COPIED OR DISTRIBUTED IN WHOLE OR PART. WITHOUT PRIOR PERMISSION OF JWF INDUSTRIES.			INTERPRET DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (MM)  FRACTIONAL ± 1/4(6.4) XXX ± .25(6.4) XXXX ± .125(3.2) XXXXX ± .060(1.5) ANGULAR ± 1°  125	DRAWN BY mspeciale	ETC Environmental Tank & Container JOHNSTOWN, PA 855-382-8265 www.etc-tank.com					
				DATE 7/12/2012	TITLE					
				CHECKED BY dbodenshatz	60,000 BBL MOBILE WATER CORRAL, BOLT-UP DESIGN					
				DATE 11/23/2012	SIZE C	PRT. NO. MWC-A-002a	REV -			
				APPROVED mspeciale	DATE 11/23/2012	SCALE DO NOT SCALE	DWG. NO. MWC-A-002a	SHEET 2 OF 2		
	NEXT ASSY.	USED ON	APPLICATION	MATERIAL	THICKNESS	WEIGHT	LOCATION	C:\Vault\ETC\Vault\Corrals\MWC-A-002a.lam		
			THIRD ANGLE PROJECTION		NA	N/A				



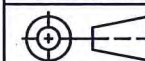
1. BLAST TO A 1 1/2 - 2 mil PROFILE
2. PAINT WITH CARBOLINE 8845, 3 - 5 mils THICK

A perspective view of a long, narrow, dark-colored metal tray or container. It features multiple compartments separated by vertical dividers. A handle is visible on the left side, and the tray is shown from an angled perspective.

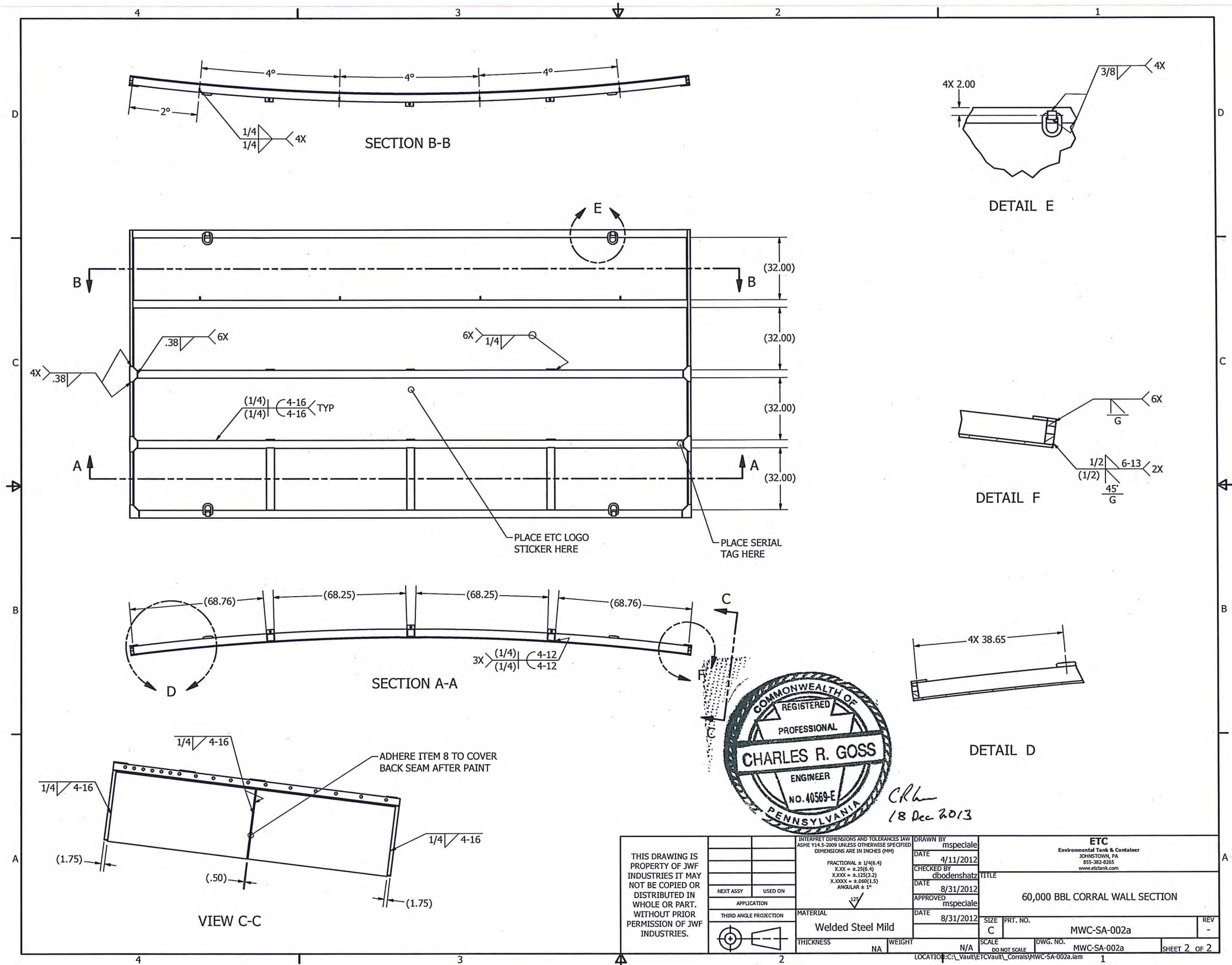
CAH  
18 Dec 2013

				PARTS LIST			
		INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (MM)		DRAWN BY mspeciale		ETC Environmental Tank & Container JOHNSTOWN, PA 855-382-8265 www.etc tank.com	
		FRACTIONAL $\pm 1/4(6.4)$ X.XX $\pm .25(6.4)$ X.XXX $\pm .125(3.2)$ X.XXXX $\pm .060(1.5)$ ANGULAR $\pm 1^\circ$		DATE 4/11/2012		TITLE  60,000 BBL CORRAL WALL SECTION	
				CHECKED BY dbodenshatz			
NEXT ASSY		USED ON		DATE 8/31/2012			
APPLICATION				APPROVED mspeciale			
THIRD ANGLE PROJECTION		MATERIAL  Welded Steel Mild		DATE 8/31/2012		SIZE C	
		THICKNESS NA		WEIGHT N/A		PRT. NO. MWC-SA-002a	
2				SCALE DO NOT SCALE		DWG. NO. MWC-SA-002a	
				LOCATION: C:\Vault\ETC Vault\Corrals\MWC-SA-002a.iam		SHEET 1 OF 2	

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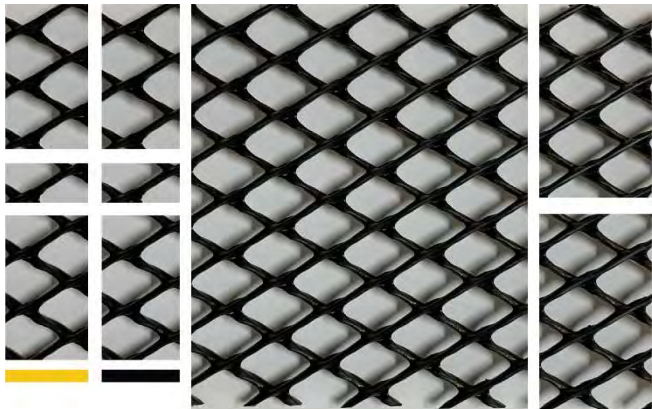


SKAPS TRANSNET™ geonet consists of SKAPS Geonet made from HDPE resin.

PROPERTY	TEST METHOD	UNIT	VALUE	QUALIFIER
Thickness	ASTM D 5199	mil	200	MAV <sup>(3)</sup>
Carbon Black	ASTM D 4218	%	2.0	MAV
Tensile Strength	ASTM D 7179	lb/in	45	MAV
Melt Flow	ASTM D 1238 <sup>(2)</sup>	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm <sup>3</sup>	0.94	MAV
Transmissivity <sup>(1)</sup>	ASTM D 4716	gal/min/ft (m <sup>2</sup> /sec)	9.67 (2.0 x 10 <sup>-3</sup> )	MAV

**Notes:**

- (1) Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.1 and a confining pressure of 10,000 psf between steel plates after 15 minutes. Values may vary with individual labs.
- (2) Condition 190/2.16
- (3) Minimum average value



*This information is provided for reference purposes only and is not intended as a warranty or guarantee.  
SKAPS assumes no liability in connection with the use of this information.*



PROPERTY	TEST METHOD	FREQUENCY <sup>(1)</sup>	UNIT Imperial	
<b>SPECIFICATIONS</b>				
Thickness (min. avg.)	ASTM D5199	Every roll	mils	40.0
Thickness (min.)	ASTM D5199	Every roll	mils	36.0
Melt Index - 190/2.16 (max.)	ASTM D1238	1/Batch	g/10 min	1.0
Sheet Density (8)	ASTM D792	Every 10 rolls	g/cc	≤ 0.939
Carbon Black Content	ASTM D4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D5596	Every 10 rolls	Category	Cat. 1 & Cat. 2
OIT - standard (avg.)	ASTM D3895	1/Batch	min	100
Tensile Properties (min. avg) (2)	ASTM D6693	Every 2 rolls		
Strength at Break			ppi	168
Elongation at Break			%	800
2% Modulus (max.)	ASTM D5323	Per formulation	ppi	2400
Tear Resistance (min. avg.)	ASTM D1004	Every 5 rolls	lbf	22
Puncture Resistance (min. avg.)	ASTM D4833	Every 5 rolls	lbf	62
Dimensional Stability	ASTM D1204	Certified	%	± 2
Multi-Axial Tensile (min.)	ASTM D5617	Per formulation	%	30
Oven Aging - % retained after 90 days	ASTM D5721	Per formulation (5)		
STD OIT (min. avg.)	ASTM D3895		%	35
HP OIT (min. avg.)	ASTM D5885		%	60
UV Resistance - % retained after 1600 hr	ASTM D7238	Per formulation (5)		
HP-OIT (min. avg.)	ASTM D5885		%	35
Low Temperature Brittleness	ASTM D746	Certified	°F	- 106
<b>SUPPLY SPECIFICATIONS</b> (Roll dimensions may vary ±1%)				
Color (one side) (4)		-		White


## NOTES

1. Testing frequency based on standard roll dimension and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.
4. Smooth edge may not have the same consistent shade of color as the membrane itself. The colored layer may cause the carbon black content results to be higher than 3%.
5. Certified by core (black) formulation on geomembrane roll or molded plaque.
8. Correlation table is available for ASTM D792 vs ASTM D1505. Both methods give the same results.

\* All values are nominal test results, except when specified as minimum or maximum.

\* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.

	Mustang Extreme Environmental Services, LLC		Pg. 1 of 5
	MEES-003	Rev: 01	

Policy Template

## APPROVALS

*All approvals are maintained and controlled By **OPERATIONS MANAGEMENT***


*Please refer to the **SOP MANUAL** for the current controlled revision and approval records.*

## REVISION HISTORY

<i>AUTHOR</i>	<i>REVISED SECTION/PARAGRAPH</i>	<i>REV</i>	<i>RELEASED</i>
<b><u>Jeff Anderson</u></b>	<b><u>INITIAL RELEASE</u></b>	02	


*Draft and Archived/Obsolete revisions are not to be used.*



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	MEES-003	Rev: 01	

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## 1. PURPOSE

*This procedure is being implemented to standardize the process for installing Epic 360 Tanks and to ensure the quality from a standardized plan.*

## 2. SCOPE

*This procedure applies to the installations of 10,000bbl, 22,000bbl, 40,000bbl, and 60,000bbl Epic Tanks*

## 3. DEFINITIONS

- Epic 360 Tank – Above ground tank used for water containment. Permanent or temporary structure used in industrial processes where large volumes of water are needed.
- Secondary Containment – Usually a “steel wall” type of containment that surrounds the perimeter of the Epic tank and serves as safeguard if leaks were to occur.

## 4. RESPONSIBILITIES

- SOP process owner – On-Site Epic Supervisor designated by management
- On-site Epic Supervisor – Ensure that SOP is strictly followed as the source for correct assembly and installation of Epic Tanks and their secondary containments.
- Crew Leader – Follow direction given by the On-Site Supervisor and managing their crew in a safe and productive manner
- Crew – Labor portion of the assembly/installation process
- Safety Coordinator – Ensuring that safety standards are being followed by the On-Site Supervisor, Crew Leader, and Crew. This is attained through audits and evaluation.
- Quality Director – Performs a post-completion inspection and ensures that the tank was built to customer specifications.
- Regulatory/Document Coordinator – Compile and file appropriate inspections and quality control documentation.

## 5. POLICY

Procedure for installing Epic 360 Tanks.


### 5.1 Prepare Surface Area

- Assure ground surface is within 1” of level grade. This is checked by the On-Site Epic Supervisor.
- If level, find the center of tank location and mark ground with paint. Determine radius of tank and mark ground for footprint of the tank.
- Obtain textile and appropriate liner, as determined by customer or internal specifications.

### 5.2 Ground Cover Installation

- Determine whether the tank requires a secondary containment to achieve 110% containment, spill containment, or tank only installation.



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- Apply textile to the entire footprint of the tank, including secondary tank if applicable. Re-mark the painted footprint on top of the textile to serve as a guide for the wall panel placement.
- Apply liner material over the textile extending it 15 feet past the edge of the tank footprint.
- Fold the liner back toward the center of the tank footprint allowing sufficient space to place the wall panels.

### 5.3 Tank Wall Assembly


- Panels weight 8,600 lbs. each. A 10,000--11,000 lb Telehandler or greater must be used when handling and installing these panels. Use **Extreme Caution** when performing this process.
- Wall Assembly cannot take place if winds exceed 15 mph.
- Hold a safety meeting to determine who the signal person will be. The designated signal person will be the **ONLY** person to give direction to the Telehandler operator. However, anyone can give the **STOP** signal.
- Using rate and certified lift chains, attach two (2) hooks to the top of the wall panel.
- Attach tag lines to the bottom of the wall panel to assist in guiding the panel during installation.
- Equipment operator will place the wall panel in its designated location. While still supported by chains and the telehandler, install six (6) braces on the wall panel – three (3) braces on the inside of the wall and three (3) on the outside of the wall. Once the braces are installed, the lift chains can be removed.
- Install second wall panel following the same process. Once the second wall panel is in place, bolt the panels together. Be sure to leave the braces in place until at least half of the panels are installed.
- Repeat this process until the entire circumference is complete.

### 5.4 Tank Liner Installation

- The On-Site Supervisor and Safety Coordinator will determine if entry into the tank would be considered “confined space entry”. If designated as such, a confined space permit will be obtained and only those designated personnel will be permitted to enter.
- Liner install cannot take place if winds are over 10-15 mph.
- Attach pull line to the edge of the liner and pull line over top of the wall panels.
- Secure liner to the top of the wall panels using the (3) clamps per panel. While clamping, inspect the liner to ensure it is not in a “stressed” condition and be sure to leave enough slack so that the liner can conform to the walls once the tank is filled with water.
- Trim any excess liner material from the outer edge of the tank wall

### 5.5 Final Installation

- The tank is now ready for the necessary access ladders and discharge hoses to be installed.
- Remove all excess material from the property and dispose of appropriately.

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### 5.6 Final Inspection

- The Quality Director will inspect the completed build to ensure that it was built to the customer specifications.

## 6. APPLICABLE REFERENCES

- Epic Tank Supervisor



**DESIGN/CONSTRUCTION PLAN**  
**O&M PLAN**  
**CLOSURE PLAN**

# Design and Construction Plan Above Ground Tank (AST) Containments

## General

Examination of the engineering drawings and the SOP for set-up (Appendix 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 and are netted or 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. 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 information: 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 the SOP. 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.

## Design and Construction Plan Above Ground Tank (AST) Containments

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.

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 contractor constructs the containment in 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: 1V). The vertical steel walls of the AST Containment are the *subject of a requested variance*.

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] approved by OCD pursuant to a 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 liner.

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

## Design and Construction Plan Above Ground Tank (AST) Containments

*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.

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 also the subject of 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.

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. Factory welded seams shall be used where possible. AST Containment contractor will employ field seams in

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  $1 \times 10^{-5}$  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.

19.15.34.12 A

(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



## Design and Construction Plan Above Ground Tank (AST) Containments

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.

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.