



Fox Engineering Solutions, Inc.

July 13, 2020

Michael Gardner
TEP Rocky Mountain, LLC
1058 County Road 215
Parachute, Colorado 81635

Re: Mautz Pit; COGCC Facility #444993 – Hydrostatic Pit Integrity Test
SE ¼ NW ¼ of Section 19, Township 2 South, Range 98 West, 6th P.M.
Rio Blanco County, Colorado

Dear Mr. Gardner,

Attached are the results of the 72-hour hydrostatic test conducted by Fox Engineering Solution (FES), July 8 through July 11, 2020, at TEP's Mautz Pit, COGCC Facility #444993. The hydrostatic test indicated no observed loss in liner system integrity. The summary results, attached, include a data and calculation sheet, survey plat with water surface area and elevation data, and an outline of the procedures employed.

The hydrotest was conducted with the water level at or near the freeboard water depth of approximately 16 ft. A weather station, consisting of a National Weather Service Class A evaporation pan and two precipitation gauges, was installed at the facility. Survey data including vertical and horizontal control points along with pit water elevations and surface areas, were established and collected by a registered land surveyor from Sexton Surveying Services, Inc.

The mass balance comparison of the pit's water surface level drop with actual precipitation and evaporation measurements during the test differed by only 0.052 inches or 1.27 mm, indicating that there was no observed loss in liner system integrity. The fluid level of the Mautz Pit dropped 0.804 inches over the 72-hour test duration. Correspondingly, evaporation and precipitation measurements provide a calculated fluid level drop in the pit of 0.752 inches.

The pit lining system consists of a primary 60 mil HDPE liner, a secondary 40 mil HDPE liner and a tertiary geosynthetic bentonite clay liner. A 200 mil geonet is located between the primary and secondary liners with a leak detection sump and monitoring system located on the southwest side of the pit. Visible portions of the liners above the water level had no visible tears, delamination or seam failures. There were a total of four areas along the northeast and southwest sides of the pit where the primary liner was floating on the water surface. These pockets were directly adjacent to the pit sidewalls. Upon examination, the liner appeared to have air or gas trapped inside the liner.

In summary, the hydrostatic tests results indicated no observed loss in liner system integrity. The presence of air or gas under the liner, possibly from normal biological digestion processes, warrants additional investigation. FES will immediately follow-up with an additional investigation.

Should you have any questions or require additional information, please let us know.

Respectfully submitted,

David Fox, P.E.
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Hydrostatic Pit Testing

Data Collection & Computation Form

Fox Engineering Solutions, Inc.



Pit Owner: TEP Rocky Mountain, LLC
Pit Name: Mautz Ranch Pit
COGCC Facility No. 444993
Pit Location: SE 1/4 NW 1/4 Section 19, T2S, R98W, 6th P.M.
 Latitude: N 39.51485° Longitude: W108.26145° (NAD83)
Liner System: 60mil HDPE Primary Liner/40 mil HDPE Secondary Liner/
 Geosynthetic Clay Tertiary Liner
Approximate Elevation: 6689 ft. msl
Test Conducted By: David Fox P.E., Fox Engineering Solutions, Inc.

Test Initiation:		Test Termination:	
Date:	7/8/2020	Date:	7/11/2020
Time:	9:00 AM	Time:	9:00 AM
Total Duration:	72 hours		

	<u>Length</u>	<u>Width</u>	<u>Area</u>	<u>Comments</u>
Tributary Pit Liner Surface Area (ft ²):	-	-	57,018 ft. ²	Surveyed by Sexton Survey
Initial Pit Water Surface Area:	-	-	44,011 ft. ²	Surveyed by Sexton Survey
Final Pit Water Surface Area:	-	-	44,011 ft. ²	Surveyed by Sexton Survey
Average Pit Surface Area:			44,011 ft. ²	
Initial Pit Fluid Level:				6686.104 ft.
Final Pit Fluid Level:				6686.037 ft
Difference				0.067 ft or
Est. Fluid Depth:	16 ft.			0.804 inches
Evaporation Pan Installed: Yes	Location: S side of pit	Measured Gross Pan Evap.:		1.044 inches
		(During Test Duration)		
		Evaporation w/ Pan Coeff. 0.72		0.752 inches
		(During Test Duration)		
Rain Gauge Installed: Yes - 2 Gauges	Location: SW side of pit	Recorded Precipitation:		0.000 inches
	Equivalent 72-Hour Precipitation Pit Inflow:			0.000 inches
Other Inflow/Outflow:	Inflow (gal) 0	Equivalent Inflow:		0.000 inches
	Outflow (gal) 0	Equivalent Outflow:		0.000 inches
Calculated Fluid Level Change in Inches:	(+ indicates fluid level increased)			-0.752 inches
(Precipitation - 72% Pan Evaporation + Inflows - Outflows)				
Measure Fluid Level Change in Inches:	(+ indicates fluid level increased)			-0.804 inches
Difference between Calculated and Measured Pit Fluid Level:				0.052 inches (1.27 mm)

Summary: No observed loss in liner integrity. The mass balance comparison of the pit water surface level dropped with actual precipitation and evaporation measurements during the 72-hour test differed by 1.27 mm.

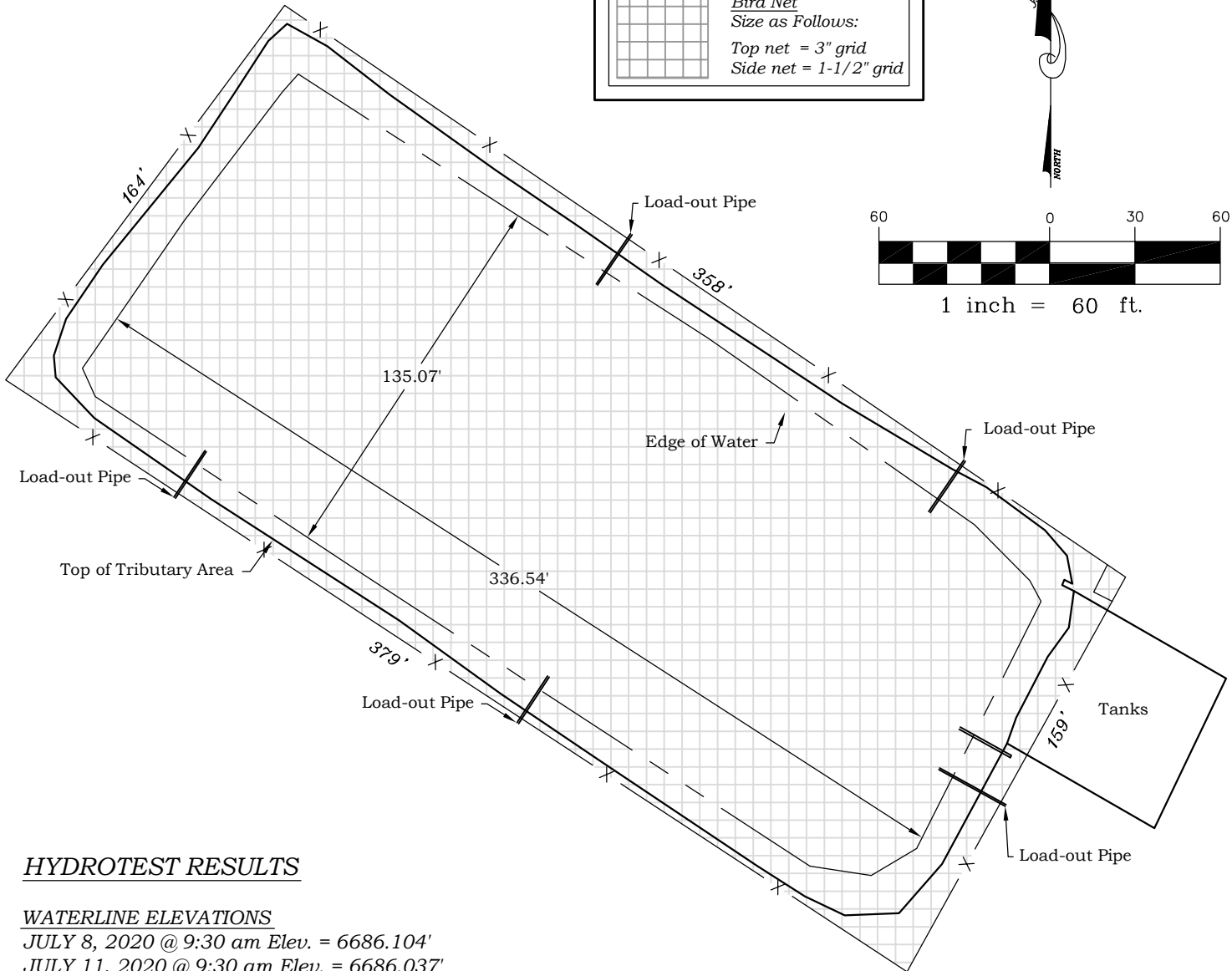
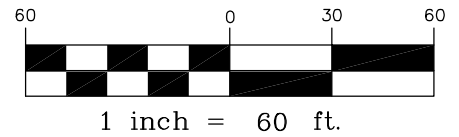
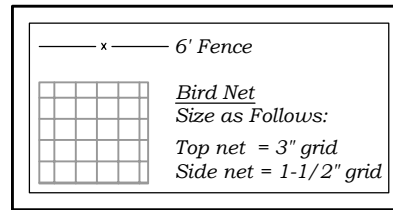
Weather: Mostly sunny and dry. Temperatures 60° - 90°.

Liner and Pit Condition: Produced water fluid level at approximate 16 ft depth. There were no liner tears or delaminations visible above the water line. The primary liner had four areas where air pockets had formed. Liner vents were inspected. Leak detection sump water levels measured at the initiation and termination of hydrotest. Both measurements were 10' - 7" as measured from the top of the leak detection observation pipe to the water level in the sump.

Comments: Sexton Survey utilized a Trimble Total Station for required area and elevation measurements. TEP Rocky Mountain staff indicated that no fluids were transferred from or to the pit during the duration of the test. Evaporation pan placed within the fenced and netted area of the pit site.

HYDRO-TEST EXHIBIT

LEGEND



HYDROTEST RESULTS

WATERLINE ELEVATIONS

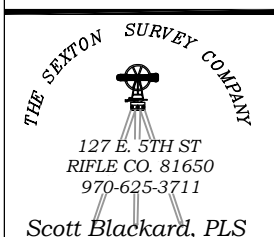
JULY 8, 2020 @ 9:30 am Elev. = 6686.104'

JULY 11, 2020 @ 9:30 am Elev. = 6686.037'

AREAS

PIT AREA (INCLUDING TANK AREA) = 57,018 SQ. FT.
WATER SURFACE AREA = 44,011 SQ. FT.

TRIBUTARY AREA = 13,007 SQ. FT.



SE1/4NW1/4 of Section 19
T. 2 S., R. 98 W. of the 6th P.M.
COSP NAD 83 CENTRAL ZONE
LAT: 39.51485°
LONG: -108.261450°

JOB. NO: 13039

NAME: MAUTZ

DATE: 7/11/20



Hydro-test Exhibit Prepared for:

TEP Rocky Mountain

Mautz Ranch Produced Water Pit

Hydrostatic Pit Test

Pit Liner Integrity Observation Procedures For Earthen Pits

Version 9.0 10/01/2018 ©



Fox Engineering Solutions.

The observation methodology utilizes a mass balance approach by accurately measuring and monitoring the pit's water surface level and comparing level changes with precipitation, evaporation and other inflow and outflow measurements and estimates. The observation period is generally 72 hours. These procedures are specific to existing or active earthen pits holding oil and gas related fluids including, but not limited to, produced water. The pit shall have a fluid level as high as practical or warranted, without encroaching into the freeboard, and shall be monitored for a minimum of 72 hours, if practical. Visible portions of the liner, including the anchor trench and seams, shall be inspected for defects. The observation period shall be scheduled and coordinated with personnel to ensure that oil and gas activities do not interfere. Procedures may be subject to changes as dictated by field and climatic factors. All involved personnel, while onsite, shall comply with their respective EH&S requirements.

- If practical, a sign shall be placed in a conspicuous location stating "Liner Integrity Observation in Progress, Pit Closed to All Water Transport Activities". Contact information shall also be placed on the sign. Locked gates at the pit facility are recommended.
- Semi-permanent datum elevation point(s) shall be established at the pit location. The pit fluid level; fluid surface area; the lined surface area tributary to the pit, and evaporation pan water levels shall be measured and recorded at the beginning of the observation period. The pit fluid level and evaporation pan water levels shall be measured again at the end of the period. A survey grade total station shall be utilized for accuracy to capture this information. The date and time of measurements shall be documented.
- A minimum of one 4" diameter NWS rain gauge with funnel inlet shall be installed at the pit site. Precipitation shall be recorded for the duration of the liner integrity observation period.
- Pan evaporation shall be measured following the procedures established by the National Weather Service – NOAA in the document entitled "National Weather Service - Observing Handbook No. 2, dated July 1989. A Class A evaporation pan shall be placed at the site, or as near as practical, with evaporation measured per established procedures. During ice-over periods at the pit, evaporation is assumed negligible and evaporation measurements will not be taken.
- All inflows and outflows, such as truck and piped transfers, shall cease. Surveillance monitoring may be warranted to prevent inadvertent fluid transport. If the cessation of inflows and outflows is not practical, all pit inflows and outflows shall be accurately metered and documented.
- If no precipitation has occurred, compare the change in the pit fluid level with the recorded pan evaporation. Pan coefficients shall be applied as per NOAA Technical Report NWS 33, USGS Water Supply Paper 2437 and Texas Water Development Board Report 77. During ice-over periods, compare the pit levels taken at the start and end.
- If precipitation has occurred, precipitation falling onto tributary portions of the liner, outside of the fluid surface area, may be added as an inflow to the pit and converted into inches of depth over the fluid surface area. During ice-over and snow conditions, precipitation inflow from tributary portions of the liner may be estimated from snow depth and corresponding water equivalent comparisons at the start and termination of the observation period. Other factors may also be utilized.
- The calculated change in pit level is:
$$\Delta L = P + I - O - E \text{ (all measurements converted to inches)}$$

Where: ΔL = Change in pit fluid level P = Precipitation Inflow E = Evaporation
 I = Measured Inflows O = Measured Outflows
- The measured change in the pit fluid level shall be compared to the calculated change utilizing precipitation and evaporation data collected. The procedures and results will be reviewed and analyzed for discrepancies. The observation period may be extended if the results indicate integrity issues with the lining system.