INSTRUCTION PAGE FOR SECTION IV

- REMOVE EXISTING SECTION IV AND REPLACE WITH NEW SECTION IV.

IV Engineering Report

Surface Application, Section IV

IV.A Waste Management Units

Surface Application, Section IV.A

Waste Management Units (WMU) in combination support the following waste related processes and systems:

- Waste Offloading;
- Solids Separation;
- Waste Storage;
- Waste Mixing and Processing:
    - pH adjustment;
    - Oil/hydrocarbon removal;
    - Specific gravity adjustment;
    - Chemical precipitation;
    - Salinity adjustment / Clay stabilization; and
    - Filtration.
- Waste Injection

For a list of WMUs, see Attachment 11, Waste Management Unit List, Table I.I.

IV.B Process Descriptions and Flow Diagrams

Surface Application, Section IV.B

The TexCom Gulf Disposal (TGD) Facility includes the following systems:

- Waste Offloading;
- Solids Separation;
- Waste Storage;
- Mixing and Processing; and
- Waste Injection.

TGD will accept only wastes which are classified as Class 1 or Class 2.

See Attachment 23, Process Flow Diagram, PFD-001.

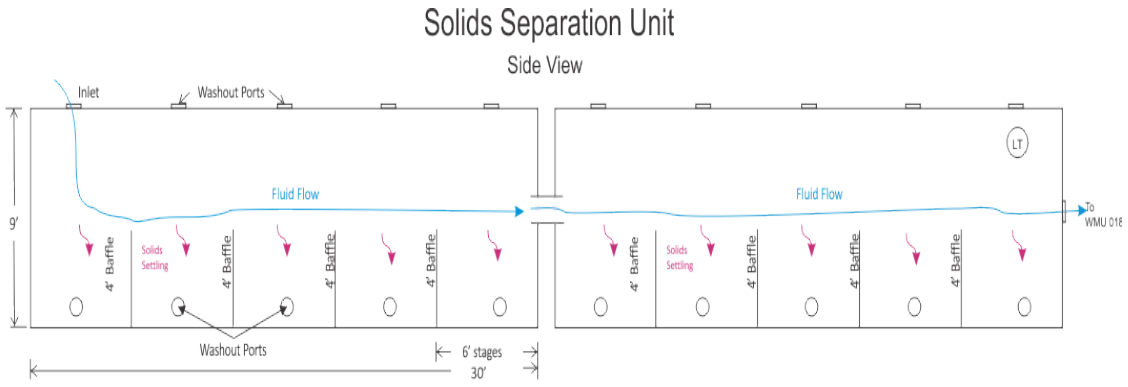
<u>Waste Offloading System</u>
Wastes are offloaded from tanker trucks carrying client wastes. Trucks drive into one (1) of three (3) unloading bays. One end of a flexible hose is attached to the tanker truck outlet and the other end of the hose is permanently attached to the suction of the unloading pump with piping leading directly to the Solid Separation Units or Waste Storage/Mixing tanks. Once the truck operator opens the truck's outlet valve, a TGD

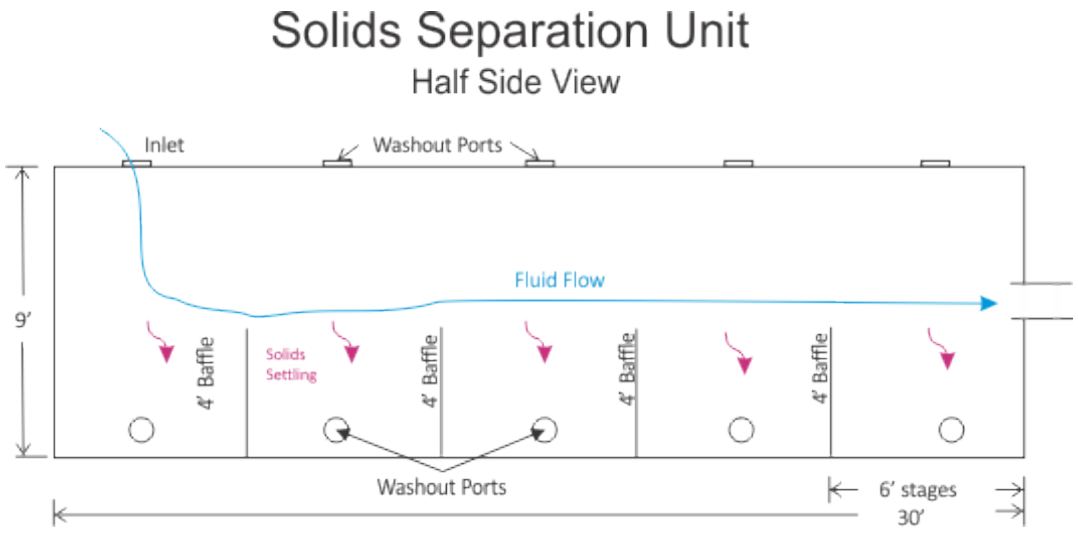
operator starts the unloading pump. Alternately, the vacuum truck operator pressurizes the tanker there by initiating flow. Wastes are pumped directly to or pressure pushed to one (1) of eight (8) Waste Storage/Mixing Tanks or to one (1) of two (2) SSU's.

See Attachment 25, Waste Offloading, Storage and Processing System Piping and Instrumentation Diagram (PID)

Solids Separation

Two (2) SSU's (WMU 027 and 028) are used to remove solids from wastewater. The SSUs receive waste fluids directly from the offload area (vacuum trucks) or from any waste storage/mixing tank when incidental or induced precipitates (solids) need removal. The SSU's utilize gravity settling of solids by directing fluids over 10 sequential baffles which provides for removal of both coarse and fine particles. After passing through each unit's 10 stages, fluids are pumped to Waste Storage/Mixing Tank #1 (WMU 018) or Tank #2 (WMU 019). The SSUs are equipped with vapor balance lines which are simultaneously connected to each of the other eight (8) Waste Storage and Mixing Tanks.





Waste Storage

Waste fluids are to be stored in any of the eight (8) Waste Storage/Mixing Tanks. See section IV.D.3 for tank and storage details.

Waste Mixing and Processing

Waste mixing and/or processing will be performed as described in Section III of this document. If client wastewater particulates are above the formation pore throat size, TGD will process the wastewater using the SSU's, as described above, and/or the Filtration Unit.

Oil/hydrocarbon removal is accomplished via oil-water gravity separation in Waste Storage/Mixing Tank #1 or #2 (WMU 018; WMU 019). Fluids enter the tank via a down comer whose outlet is in the lower portion of the tank. As the fluid enters, oil and water begin to separate based on their density differences. Oil rises to the upper levels and 'overflow' to TGD's oil tank (WMU 015). Remaining fluid in WMU 018 and 019 continues to be processed which may include pH and/or specific gravity adjustment, chemical precipitation, salinity adjustment/clay stabilization prior to being transferred to the injection system. Product from WMU 015 is either managed on-site or sent off-site for recycling or authorized disposal.

pH and/or specific gravity adjustments may be needed to meet injection criteria. Adjustments are made, as necessary, by mixing of client waste streams that are not incompatible with each other or with storm water. Mixing for pH and or specific gravity adjustment may be performed in any of TGD's eight (8) Waste Storage/Mixing Tanks. Once mixing has met its pH or specific gravity objective, the wastewater is considered injectate and transferred to one of two (2) Injection Tanks.

Client wastewaters may require processing to ensure precipitates do not form downhole. Chemical precipitation is conducted in any of TGD's eight (8) Waste Storage/Mixing Tanks by the addition of a flocking agent and thorough mixing/recirculation within the respective tank. Once adequate mixing and residence time is achieved, the precipitate laden wastewater is pumped to the Solids Separation or Filtration Unit for solids removal. Solids are characterized for off-site disposal.

In order to ensure that injectate does not swell the clay constituents in the formation, TGD will (1) ensure that the injectate meets a minimum chloride concentration via the addition of a substitute such as potassium chloride (KCl) to raise salinity or (2) will introduce a chemical additive specifically designed to stabilize clays in the presence of freshwater. Chemical injection of the substitute or clay stabilizer will occur immediately downstream of the SSU's, if required.

See Attachment 23, Process Flow Diagram

Waste Injection

Once processed wastes meet permit and formation criterion, they are transferred to one (1) of two (2) Injection Tanks (WMU 016; WMU 017) for downhole injection. One multi stage centrifugal pump, or equivalent, is operational and one is on standby.

See Attachment 26, Injection System PID.

IV.C Secondary Containment

Surface Application, Section IV.F

Secondary containment includes two (2) connected areas: (1) the Main Containment Area (MCA) and (2) the Waste Unloading and Solids Area (WUSA). The MCA contains waste water storage, processing, and injection equipment. The WUSA encompasses the offloading of wastes via tanker trucks and the solids roll-off containers. The WUSA drains in to the MCA.

IV.C.1 Dimensions

Surface Application, Section IV.F.1
Surface Application, Section IV.F

The MCA has a surface area 118’ (feet) x 70’ with perimeter containment walls 3’ high by 8” (inches) wide. The WUSA has an area of 63’ x 60.735’ with perimeter retaining walls or ridges 2’ high by 8” wide and freely drains into the MCA.

See Attachment 27, Containment, Tank and Processing Area Layout.

IV.C.2 Engineering Description

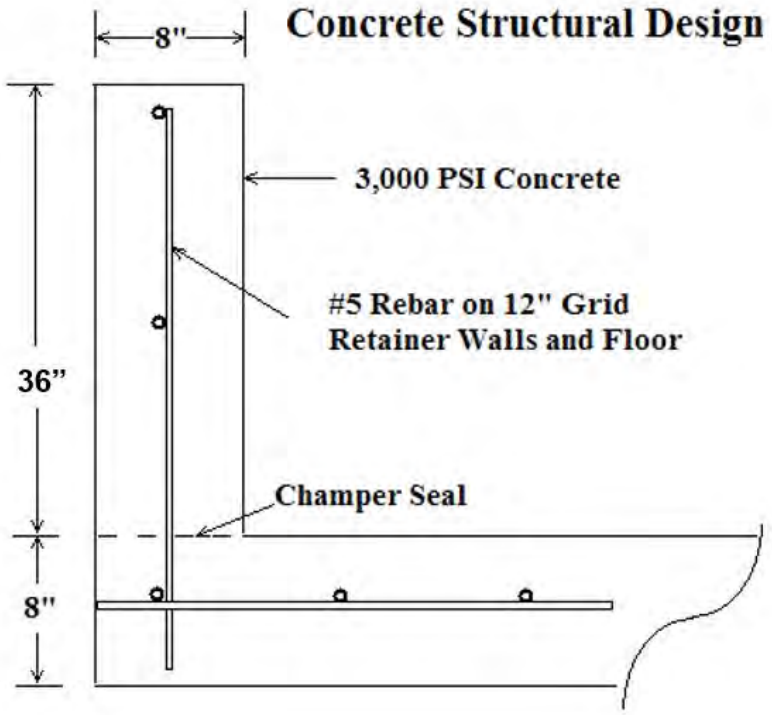
Surface Application, Section IV.F.1
Surface Application, Section IV.F.2

Design and Construction Material

The MCA is designed to: Structurally support tank and processing systems; prevent migration of wastes or accumulated liquid out of the system; prevent run off to soils, groundwater, or surface water; provide for collection of stormwater and inadvertent leaks/spills; accommodate stresses associated with climatic conditions, daily operations, and installation; completely surround waste storage and processing equipment; provide for safe movement of personnel; and accommodate the 100-year, 24-hour storm event.

The MCA will be constructed of reinforced concrete and will be compatible with incoming wastes. The foundation will provide support, resistance to pressure gradients from above and below, and will prevent failure due to settlement, compression, or uplift. The MCA will be constructed of 3,000-psi cement with #5 rebar spaced at 12” intervals throughout the retaining walls and floor. The retaining wall is 3’ high and 8” thick. All joints will

include chemical resistant water stops. Interior surfaces will be provided with an impermeable interior coating or sealant to prevent migration of waste into the concrete.



The WUSA is designed to accommodate persistent vehicle traffic, support tanker truck and roll-off box weight, collect and redirect accumulated stormwater and leaks/spills into the MCA.

Run On and Run Off Prevention

In the MCA, run on is prevented through sound structural design and installation of a 3' retaining wall along the perimeter. Chemically resistant water stops in all joints will also prevent run on. Run off is also prevented through sound structural design and installation, a 3' retaining wall along the perimeter, and chemically resistant water stops in all joints. Stormwater and leaks/spills, are recovered using a sump, trough and pump system (collection system) that transfers recovered fluids to either the SSU's or any of the eight (8) Waste Storage/Mixing Tanks. The MCA pad (floor) is sloped to direct stormwater and leak/spill fluids to the collection troughs and sumps.

In the WUSA, run on and run off is prevented through sound design, a retaining wall on the east end, and retaining ridges 'speed bumps' slope and ridge design on the north and south ends. Stormwater and leaks/spills are directed to the MCA's collection system via a central collection trough. The WUSA pad (floor) is sloped to direct stormwater and leak/spill fluids to the central collection trough that channels in to the MCA.

Secondary containment capacity will be sufficient to accommodate a 100-year, 24-hour storm event as explained in IV.C.3.

See Attachment 27, Containment, Tank, and Processing Area Layout.

IV.C.3 Specifications and Design Criterion

Surface Application, Section IV.F.1
Surface Application, Section IV.F.2

Quantitative design criteria include:

- Secondary containment volumes accommodate a 100-year / 24-hour storm event plus the capacity of the largest tank; and
- Waste water storage must be sufficient to accommodate injection and pumping limits and waste receipt and processing rates.

Secondary Containment Volume Criteria

To verify the secondary containment volume criteria is met, the following sequential analysis is performed:

Secondary Containment Volume Calculations	
Steps	**Calculation**
Table IV.A	*Calculate fluid gross storage volume of MCA*
Table IV.B	*Calculate volume displaced by equipment and tanks*
Table IV.C	*Calculate storm event volume for MCA and WUSA*
Table IV.D	*Calculate total fluid storage capacity*
Table IV.E	*Capacity Evaluation*

Table IV.A
Fluid Gross Storage (Containment) Volume

Facility Area ID	Width (ft)	Length (ft)	Height (ft)	Volume	
				ft^3	gal
Main Containment Area (MCA) Volume	70	118	3	24,780	185,367
Waste Unloading and Storage Area (WUSA) Volume [1]	60.735	53	2	0	0
			Total:	**24,780**	**185,367**

Note [1] - WUSA drains to MCA and is assumed not to add to containment capacity.

Table IV.B

MCA Tank/Equipment Displacement

Tank/Unit	Capacity (gal)	Width (ft) or Tank Diameter (ft)	Equipment Height (ft) [1, 2]	Equipment Length (ft)	Pad Diameter (ft)	Pad Height (ft)	Volume Displaced			
							Equipment ft^3	Pad ft^3	Total ft^3	Total gal
Injection Tanks # 1 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Injection Tanks # 2 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 1 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 2 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 3 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 4 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 5 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 6 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 7 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Storage/Mixing # 8 (API 12F) [5]	21,000	12	2.3333	-	13	0.6667	264	88	352	2,636
Waste Oil Tank (API 12F) [6]	16,800	12	2.3333	-	13	0.6667	264	88	352	2,636
Solids Separation Unit (SSU) # 1	30,520	8	2.5	60	Note [3]	Note [3]	1,200	Note [3]	1,200	8,977
Solids Separation Unit (SSU) # 2	30,520	8	2.5	60	Note [3]	Note [3]	1,200	Note [3]	1,200	8,977
Filtration Unit [4]	317	3.5	2	3.5	Note [3]	Note [3]	25	Note [3]	25	183
								Total:	**6,301**	**47,132**

Note [1] - Height = Displacement height to top of containment wall

Note [2] - Height of MCA containment wall = 3'

Note [3] - Hollow supports of 1/2' height = no pad displacement

Note [4] - Each Filtration Unit (WMU) has 2 cannisters, Not actually 2 WMUs

Note [5] - Capacity up to 21,000 gallons

Note [6] - Capacity up to 16,800 gallons

Table IV.C
Storm Event Volumes

Facility Area ID	Width (ft)	Length (ft)	Volume		
			Height (ft) [1]	ft^3	gal
Main Containment Area (WMU)	70	118	1	8,260	61,789
Waste Unloading and Solids Area (WUSA)	60.735	53	1	3,219	24,079
			Total:	**11,479**	**85,868**

Note [1] - 100-year, 24-hour rainfall amount for area = 12 inches

Table IV.D
Total Storage Capacity (Tanks and Equipment)

Tank/Unit	Capacity (gal)	Width (ft) or Diameter (ft)	Length (ft)	Height (ft)	Unit Volume	
					ft^3	gal
Injection Tanks # 1 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Injection Tanks # 2 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 1 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 2 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 3 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 4 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 5 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 6 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 7 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Storage/Mixing # 8 (API 12F) [1]	21,000	12	-	-	2,807	21,000
Waste Oil Tank (API 12F) [2]	16,800	12	-	-	1,179	8,820
Solids Separation Unit (SSU) # 1	30,520	8	60	8.5	4,080	30,520
Solids Separation Unit (SSU) # 2	30,520	8	60	8.5	4,080	30,520
Filtration Unit	317	3.5	3.5	2	25	317
				Total:	**37,437**	**280,177**

Note [1] - Capacity up to 21,000 gallons
Note [2] - Capacity up to 16,800 gallons

Table IV.E
Secondary Containment Capacity Evaluation

Item	Volume	
	ft^3	gal
Gross Storage Volume	24,780	185,367
Storm Event Volume	-11,479	-85,868
Volume Displaced by Tanks/Equipment	-6,301	-47,132
Largest Volume Tank [1]	-4,080	-30,520
Net Excess Storage Capacity	**2,920**	**21,846**

Is Secondary Containment sufficient for 100-year, 24-hour storm?	***Yes***
Is Secondary Containment sufficient for largest volume tank rupture?	***Yes***
Is Secondary Containment sufficient for 100-year, 24-hour storm plus capacity of the largest tank?	***Yes***

AVAILABLE CONTAINMENT VOLUME (185,367 gallons) > REQUIED CONTAINMENT VOLUME (163,520 gallons)

Note [1]: Largest volume tank = 30,520 gallons (WMU 027 or 028).

Main Containment Area Containment Volume

The Main Containment Area is designed to retain the simultaneous accumulation of a 100-year, 24-hour storm event (in both the MCA and WUSA) plus the capacity of the largest tank. The 100-year, 24-hour storm event rainfall is 12" (*See Technical Paper No. 40, Rainfall Frequency of the U.S., U.S. Department of Commerce Weather Bureau*). Available containment is the difference between the MCA and WUSA area under rainfall minus the MCA's consumed area from processing equipment and tankage.

Waste Unloading and Solids Area Containment Volume

The WUSA is designed to drain storm water and leaks/spills to the MCA.

Wastewater Storage Capacity

Wastewater storage capacity must be sufficient to accommodate the difference in the requested monthly allowable receipt volume (15,624,000 gallons) and the requested per minute injection limit (350 gpm). Assuming 31 days per month, TGD would be authorized to receive 504,000 gallons per day. If TGD receives waste 16 hours per day, the hourly receipt volume would equal 26,033 gallons. Because the 350 gpm equates to 21,000 gallons per hour going downhole, TGD's wastewater storage capacity must be sufficient to accommodate the hourly increase in wastewater stored on-site.

TGD tank capacities are as follows:

Table IV.F Wastewater Storage Capacity

Unit	# Units	Capacity (Gallons)	Total Volume (Gallons)
Injection Tanks	2	21,000	42,000
Waste Storage/Mixing Tanks	8	21,000	168,000
Solids Separation Units	2	30,520	61,040
Waste Oil Tank	1	16,800	16,800
		Wastewater Volume:	**287,840**
		90% of Wastewater Volume:	**259,056**

Total facility storage capacity is 287,840 gallons.

The hourly accumulation of wastewater is calculated using the following table.

Table IV.G Wastewater Accumulation Rates

Time	Received Gallons	Downhole @ 350 gpm (Gallons/hr)	Leftover (Gallons)
6:00 AM	31,500	21,000	10,500
7:00 AM	31,500	21,000	21,000
8:00 AM	31,500	21,000	31,500
9:00 AM	31,500	21,000	42,000
10:00 AM	31,500	21,000	52,500
11:00 AM	31,500	21,000	63,000
12:00 PM	31,500	21,000	73,500
1:00 PM	31,500	21,000	84,000
2:00 PM	31,500	21,000	94,500
3:00 PM	31,500	21,000	105,000
4:00 PM	31,500	21,000	115,500
5:00 PM	31,500	21,000	126,000
6:00 PM	31,500	21,000	136,500
7:00 PM	31,500	21,000	147,000
8:00 PM	31,500	21,000	157,500
9:00 PM	31,500	21,000	**168,000**

Based on 16 hours of waste receipt per day, 31 days per month, initially empty tanks, and a 350 gpm injection rate, TGD would require a total wastewater storage capacity of 168,00 gallons. This criterion is met.

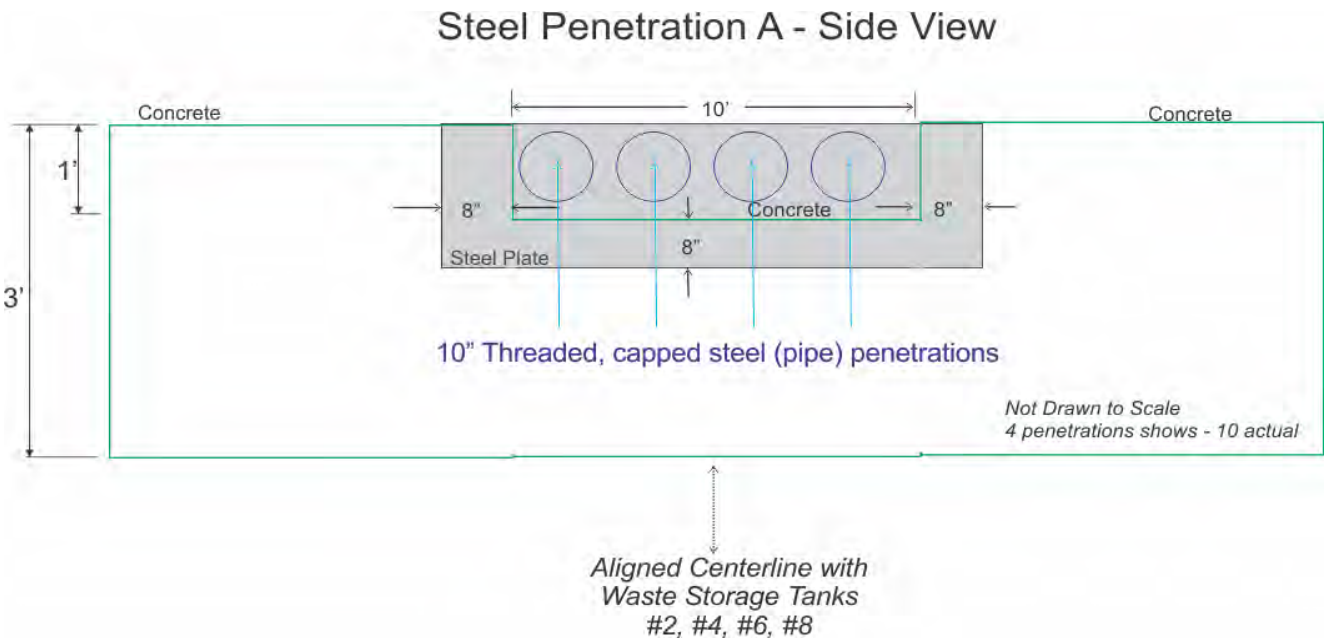
MCA Structural Design Strength

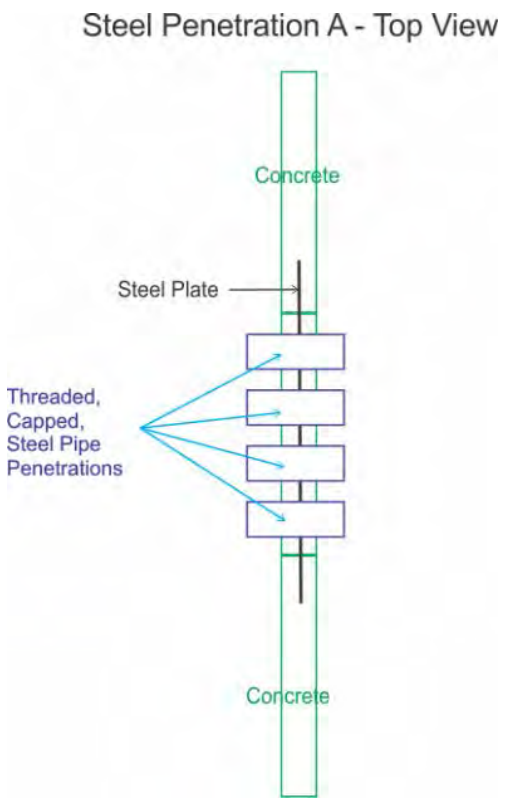
See section IV.C.2, Engineering Description.

IV.C.4 MCA Steel Penetrations

The MCA includes three (3) steel penetrations (A, B, and C) along the north wall (Attachment 27). Sections will be aligned with (centered on) each row of the waste storage/mixing tanks and with the collection trough between the waste storage and mixing tanks. Each section will include a steel plate which replaces a portion of the concrete wall and is set in to the concrete wall 8". In the steel plate, 10" threaded and capped steel pipes are steel welded into the steel plate. Steel Penetration A, as shown below, will align with the even numbered waste storage tanks. Steel Penetration Section B, is the same design as section A but is aligned centerline with the odd numbered waste storage tanks. Steel Penetration C, is 1' wide and includes only one (1) 10" threaded, capped, steel pipe penetration. Penetration C is aligned with the collection trough

located between the two (2) rows of waste storage and mixing tanks. All joints will include chemical resistant water stops





IV.D Tank Systems

Surface Application, Section IV.G

IV.D.1 Materials of Construction and Corrosion/Degradation

Surface Application, Section IV.G.1
Surface Application, Section IV.G.3

Corrosion / Degradation

TGD recognizes corrosion and degradation of system components as a key issue when selecting construction material. General corrosion is the uniform or near uniform thinning of metal. Local corrosion, such as pitting and crevice corrosion, can lead to equipment failure from leaks, mechanical failure from local thinning or from crack formation and propagation. Galvanic corrosion may also arise when dissimilar metals are in contact. Non-metallic degradation may occur through physiochemical processes and manifest through blistering, crazing, swelling, softening, and delaminating.

Factors Affecting Corrosion/Degradation

A variety of factors will affect the corrosiveness and degradation of wastewater processing systems. These include the characteristics of the alloy, the presence of aggressive species, the pH, the temperature, velocity or turbulence of the flowing streams, equipment grounding, and the presence of synergistically corroding/degrading chemicals.

Corrosion/Degradation and Wastewater

The EPA has recently conducted an inventory of Class I waste wells in the United States. The data collected have provided a data base for determining the composition of the most generally injected waste fluids. Table IV.F lists the most commonly injected fluids, as well as a description of the type of corrosion that can be caused by those fluids (Environmental Protection Agency, 1987, Technical Assistance Document: Corrosion, Its Detection and Control in Injection Wells: EPA 570/9-87-002, Washington, D.C.).

Selection of Construction Material

Based on the range of wastewater waste types (waste form codes, waste codes) requested for permit approval, experience, fire hazard, and corrosion potential, TGD will use carbon steel or other combatable materials for tanks and piping. As recommended by manufacturers, TGD will paint external surfaces of steel components.

Corrosion / Degradation Monitoring

TGD will adopt the following corrosion/degradation monitoring methods:

- Daily inspections will be conducted when facility is in operation of all processing equipment and tanks for leaks, deposits, cracks, bulges, and discoloration as early indications of failure;
- All piping will be inspected daily when the facility is in operation for illegible labels, supports loose, leaks, and deposits as early indications of failure; and

- Annually, or when open, pump internals will be inspected for corrosion, impeller, seat wear, pitting, etc.

See Attachment 13, Table I.B, Inspection Schedule.

Operational & Design Controls for Corrosion/Degradation Protection

TGD recognizes that pH conditions are a significant factor in corrosion and degradation processes and therefore TGD will only accept wastes that are compatible with the facilities materials of construction and other wastes managed.

Table IV.H Class I Injection Chemicals and Corrosion Effects

Injected Chemical	Effect On Corrosion
Acids Pickle Liquor (HCl, H_2SO_4, $FeCl_3$, $Fe_2(SO_4)_3$) $FeCl_3$ (Ferric Chloride) HCl (Hydrochloric Acid) H_2SO_4 (Sulfuric Acid) HF (Hydrofluoric Acid) Nonspecified Acids	Strong oxidizers, enhance chemical corrosion.
Bases and Caustics Nonspecified Alkalines Nonspecified Caustics NaOH (Sodium Hydroxide) NH_3 (Ammonia)	Enhance chemical and electrochemical corrosion
Organic Compounds Phenols Isopropyl Alcohol Formates Carbon Tetrachloride Organic Cyanides Nonspecified Herbicides Nonspecified Pesticides	May cause decay of plastic and rubber well casing and tubing
Nonspecified Organic Wastes	May cause lack of oxygen allowing for growth of anaerobes
Dissolved Species NaCl (Sodium Chloride)	Electrolyte, enhances electrochemical corrosion.
Sulfates	Can react to form minor amounts of acid, nutrient for bacterial growth.
Nitrates	Can react to form minor amounts of acid, nutrient for bacterial growth.
Carbonates	Can raise TDS increasing electrolyte content, enhance electrochemical corrosion.
Sulfides	Can react to form minor amounts of acid, nutrient for bacterial growth.
Nonspecified Salts	Can raise TDS increasing electrolyte content, enhance electrochemical corrosion.
Phosphates	Can react to form minor amounts of acid, nutrient for bacterial growth.
Calcium Magnesium Iron Fluorine Sodium Chlorine	Can raise TDS increasing electrolyte content, enhance electrochemical corrosion.

IV.D.2 Waste Offloading System

Surface Application, Section IV.G.3

See Attachment 25, Waste Offloading, Storage and Processing System PID.

Dimensions, Capacities, and Material

Table IV.I Waste Offloading System

Unit #	Waste Management Unit	Dimensions	Material	Capacity
027	Solids Separation Unit #1	8’ x 60’ x 9’	Steel [1]	500 gpm; 30,520 g
028	Solids Separation Unit #2	8’ x 60’ x 9’	Steel [1]	500 gpm; 30,520 g
NA	Piping	Various	Steel [1]	Various
NA	Pumps	Various	Steel [1]	Various

Note [1] Piping and equipment will be constructed of carbon steel or other compatible material.

Offloading capacity is based on the desire to offload trucks time-effectively. As such, three (3) offloading stations are used. Each of the SSU’s are designed to accommodate the full capacity required for permit allowances received over a 16-hour period (504,000 gallons per day = 31,500 gallons / hour for 16 hours and 525 gpm).

Corrosion Protection

See Section IV.D.1, Materials Construction and Corrosion/Degradation.

Overfill and Spill Prevention Controls

TGD personnel oversee or perform waste offloading. Offloading is continually manned which will provide visual and manual spill control. Spills are mitigated through ongoing daily inspections of components for indications of wear and leaks. The WUSA has a retaining wall and is sloped toward a central trough which drains to the MCA.

Managing Incompatible Wastes

Incompatible wastes will not be processed through the same SSU’s or Waste Storage/Mixing tanks.

IV.D.3 Waste Storage and Mixing Tanks, & Pumps and Piping

Surface Application, Section IV.G.1
Surface Application, Section IV.G.3

See Attachment 25, Waste Offloading, Storage and Processing System PID.

Dimensions, Capacities, and Material

Table IV.J Waste Storage/Mixing Tanks, Pumps and Piping

Unit #	Waste Management Unit	Specification (diameter)	Material [1]	Capacity (gallons)
018	Waste Storage/Mixing # 1	API 12-F 12’	Steel [1]	up to 21,000 g
019	Waste Storage/Mixing # 2	API 12-F 12’	Steel [1]	up to 21,000 g
020	Waste Storage/Mixing # 3	API 12-F 12’	Steel [1]	up to 21,000 g
021	Waste Storage/Mixing # 4	API 12-F 12’	Steel [1]	up to 21,000 g
015	Oil Tank	API 12-F 12’	Steel [1]	up to 16,800 g
029	Waste Storage/Mixing # 5	API 12-F 12’	Steel [1]	up to 21,000 g
030	Waste Storage/Mixing # 6	API 12-F 12’	Steel [1]	up to 21,000 g
031	Waste Storage/Mixing # 7	API 12-F 12’	Steel [1]	up to 21,000 g
032	Waste Storage/Mixing # 8	API 12-F 12’	Steel [1]	up to 21,000 g
NA	Piping	Various	Steel [1]	Various
NA	Pumps	Various	Steel [1]	Various

Note: [1] Tank material identified is typical however, it may be substituted with functionally equivalent materials. TGD will only use tank material that conforms to all applicable regulations and code requirements. Piping and equipment will be constructed of carbon steel or other compatible material.

Corrosion Protection

See Section IV.D.1, Materials of Construction and Corrosion/Degradation and the below section, Construction Materials, Corrosion, and Incompatible Materials.

Overfill and Spill Prevention Controls

Overfill and spill prevention controls are visual and manual and electronic. A high level visual and audible alarm will be installed on all Waste Storage/Mixing Tanks. Level indicators are also attached to tanks. If operators observe levels above anticipated or if

an audible and/or visual or electronic alarm is observed, all operations will cease. At that time, pumps will be stopped, valves shut, and systems placed in a safe, standby condition. Spill prevention will be aided through ongoing daily and weekly inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

Managing Incompatible Wastes

Temporary jumpers may be installed, when incompatible wastes are being received, to cross-connect equipment preventing incompatible waste from interacting.

Construction Materials, Corrosion, and Incompatible Materials

TGD will use construction materials compatible with the various waste streams authorized for receipt and disposal. Since no RCRA corrosive material can be accepted, all tanks and piping will be constructed of steel or other materials which allows for facility grounding.

IV.D.4 Injection Tanks & Pumps and Piping

Surface Application, Section IV.G.1
Surface Application, Section IV.G.3

See Attachment 26, Injection System PID.

Dimensions, Capacities, and Material

Table IV.K Injection Tanks & Pumps and Piping

Unit #	Waste Management Unit/Equipment	Specification (diameter)	Material	Capacity
016	Injection Tank # 1	API 12-F 12’	Steel [1]	up to 21,000 g
017	Injection Tank #2	API 12-F 12’	Steel [1]	up to 21,000 g
NA	Centrifugal Pumps or equivalent	NA	Steel [1]	500 gpm
NA	Piping to Injection Pump	4”	Steel [1]	NA
NA	Piping from Injection Pump	4”	Steel [1]	NA

Note [1] Piping and equipment will be constructed of carbon steel or other compatible material.

Corrosion Protection

See Section IV.D.1, Materials of Construction and Corrosion/Degradation.

Overfill and Spill Prevention Controls

Overfill and spill prevention controls are visual, manual and electronic. A high level visual and audible alarm will be installed on both Injection Tanks. Level indicators are also attached to tanks. If operators observe levels above anticipated or if an audible and/or visual alarm is observed, all operations will cease. At that time, pumps will be stopped, valves shut, and systems placed in a safe, standby condition. Spill prevention will be aided through ongoing daily and weekly inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

IV.D.5 Ancillary Equipment & Pumps and Piping

Surface Application, Section IV.G.1
Surface Application, Section IV.G.3

See Attachment 25, Waste Offloading, Storage and Processing System PID.

Dimensions, Capacities, and Material

Table IV.L Ancillary Equipment & Pumps and Piping

Unit #	Waste Management Unit/Equipment	Dimensions	Material	Capacity
011	Filtration Unit #1	2 pots 3' x 3'	Steel or other compatible material	250 gpm
NA	Piping	Various	Steel or other compatible material	NA
NA	Pumps	Various	Steel or other compatible material	NA

Corrosion Protection

See Section IV.D.1, Materials of Construction and Corrosion/Degradation.

Overfill and Spill Prevention Controls

Overfill and spill prevention controls are visual and manual for the roll-off boxes. When operators observe one roll-off box is at capacity, they will direct solids to the other roll-off box. Overfill controls are not applicable to the other equipment as they are closed systems. If operators observe leaks or other indications of abnormalities, use of that equipment will cease. Spill prevention will be aided through ongoing daily and weekly inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

ENCLOSURE C

REPLACEMENT PAGES FOR ATTACHMENTS OF PERMIT APPLICATION

INSTRUCTION PAGE

- REMOVE EXISTING ATTACHMENTS 6, 11, 12A, 12B, 13, 18, 19, 20, 23, 24, 25, 26, 27 AND 28 AND REPLACE WITH NEW ATTACHMENTS 6, 11, 12A, 12B, 13, 18, 19, 20, 23, 24, 25, 26, 27 AND 28.

PAGE NUMBERS LOCATED AT THE BOTTOM OF EACH ATTACHMENT REPLACEMENT PAGE CORRESPONDS TO THE PAGE NUMBERS FOUND AT THE BOTTOM OF THE CURRENT APPROVED PERMIT APPLICATION ATTACHMENTS.

ATTACHMENT 6, Table III.B. - Wastes Managed in Permitted Units

TexCom Gulf Disposal, LLC
Surface Facility Permit No. 87758
Conroe, Texas

No.	Waste Description	Physical Form	TCEQ Waste Form Code	Storage of Waste		Processing of Waste		Disposal of Waste		Annual Quantity Generated and/or Received [1]
				Received From off-site	Generated On-site	Received From off-site	Generated On-site	Received From off-site	Generated On-site	
1010	Aqueous waste with low solvents	Inorganic Liquids	101	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1020	Aqueous waste with low other toxic organics	Inorganic Liquids	102	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1030	Spend acid with metals	Inorganic Liquids	103	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1040	Spend acid without metals	Inorganic Liquids	104	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1050	Acid aqueous waste	Inorganic Liquids	105	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1090	Spend caustic	Inorganic Liquids	109	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1100	Caustic aqueous waste	Inorganic Liquids	110	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1110	Aqueous waste with reactive sulfides	Inorganic Liquids	111	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1130	Other aqueous waste with high dissolved solids	Inorganic Liquids	113	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1140	Other aqueous waste with low dissolved solids	Inorganic Liquids	114	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1150	Scrubber waste	Inorganic Liquids	115	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1190	Other Inorganic liquids	Inorganic Liquids	119	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
1990	Brine solution that could also bear the form code 113	Inorganic Liquids	199	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2040	Halogenated /non-halogenated solvent mixture	Organic Liquids	204	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2050	Oil water emulsion or mixture	Organic Liquids	205	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2070	Concentrated aqueous solution of other organics	Organic Liquids	207	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2110	Paint thinner or petroleum distillates	Organic Liquids	211	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2190	Other organic liquids	Organic Liquids	219	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
2960	Ethylene glycol based antifreeze	Organic Liquids	296	Yes	None	Yes	None	Yes	None	Up to 183,960,000 g
3190	Other waste inorganic solids (onsite)	Inorganic Solids	319	None	Yes	None	Yes	None	Yes	Up to 176 cu yards
2060	Waste Oil (onsite)	Organic Liquids	206	None	Yes	None	Yes	None	Yes	Up to 21,200 g

Notes: [1] Annual volume is cumulative based on Class I UIC Permit, VII(E) issued June 03, 2011.
g = gallons; cu yard = cubic yards.

ATTACHMENT 11 - Table I.I - Waste Management Unit List

TexCom Gulf Disposal, LLC
Surface Facility Permit No. 87758

Waste Management Unit	TCEQ N.O.R. Unit #	Function(s) of Unit (storage/processing)	Design Capacity [1]
001	#1 Injection Well	Injection	350 gpm
002	#2 Injection Well	Injection	350 gpm
003	#3 Injection Well	Injection	350 gpm
004	#4 Injection Well	Injection	350 gpm
011	Filtration Unit #1	Processing - Filtration	250 gpm; 317 g
015	Oil Tank	Storage	16,800 g [2]
016	Injection Tank # 1	Storage	21,000 g [3]
017	Injection Tank # 2	Storage	21,000 g [3]
018	Waste Storage/Mixing Tank # 1	Storage & Processing	21,000 g [3]
019	Waste Storage/Mixing Tank # 2	Storage & Processing	21,000 g [3]
020	Waste Storage/Mixing Tank # 3	Storage & Processing	21,000 g [3]
021	Waste Storage/Mixing Tank # 4	Storage & Processing	21,000 g [3]
027	Solids Separation Unit #1	Solids separation	500gpm; 30,520 g
028	Solids Separation Unit #2	Solids separation	500gpm; 30,520 g
029	Waste Storage/Mixing Tank # 5	Storage & Processing	21,000 g [3]
030	Waste Storage/Mixing Tank # 6	Storage & Processing	21,000 g [3]
031	Waste Storage/Mixing Tank # 7	Storage & Processing	21,000 g [3]
032	Waste Storage/Mixing Tank # 8	Storage & Processing	21,000 g [3]

Note [1] g = gallons, gpm = gallons/minute
Note [2] up to 16,800 gallons
Note [3] up to 21,000 gallons

Legend

- TexCom Permit Boundary
- TexCom Processing Area
- MCAD Parcel Line
- *1* Landowner Identification Number
- **R** Residential
- **C** Commercial

N

0 200 400 800

Feet

1:4,800

Notes

1. Land Parcel Source - Montgomery Central Appraisal District (MCAD) Open GIS Dataset Tax Parcel Point View Shapefile; 3-8-2018 < https://datamoco.opendata.arcgis.com/datasets/4efb7eb1bad84029b11d45ec5cce7a27_0 >.
2. Landowner identification numbers coorespond to the landowners list provided as Attachment 12B.
3. The City of Conroe does not regulate land use, nor do they have a formal zoning ordinance as indicated in a Letter of No Zoning, effective April 4, 2017. Therefore, land use designations are based on owner name in MCAD. This letter of no zoning can be found under the following web link for reference. < http://www.cityofconroe.org/home/showdocument?id=14269 >.
4. Processing Area footprint shown is approximate.

GDS Associates, Inc.
Engineers and Consultants
919 Congress Avenue, Suite 1110
Austin, Texas 78701
Texas Registered Engineering Firm F-4089
gdsassociates.com

DRAWN BY:	KRA
APPROVED BY:	LLG
DATE:	5-4-2018
SCALE:	SEE SCALE BAR

REVISION NUMBER:	DATE OF REVISION:	BY:	DESCRIPTION:
#1	7-15-2015	CJI	Added street name (Class I ED)
#2	5-4-2018	GDS	Land parcels and landowners updated (Class 2 Modification).
#3	NA	NA	NA

16185 Creighton Rd
Conroe, TX 77302

ATTACHMENT 12A
APPLICATION MAP ADJACENT SURFACE OWNERS
TEXCOM GULF DISPOSAL, LLC
CONROE, TEXAS

— FOR PERMITTING PURPOSES ONLY —

PROJECT NUMBER:	SHEET NUMBER:	ATTACHMENT NUMBER:
44260-001	1 OF 1	12A

T:\WMW Team Folder\GIS Project Files\44260\001\Landowners Map\TexCom_ATT 12A_Adj Landowners Map_20180430.mxd

ADJACENT SURFACE OWNERS LIST
ATTACHMENT 12B
TEXCOM GULF DISPOSAL, LLC
CONROE, TX

Landowner ID No.	Landowner Name	Landowner Mailing Address
1	TEXCOM GULF DISPOSAL LLC	6701 BROADWAY EXT, SUITE 310, OKLAHOMA CITY, OK 73116-8213
2	SALA REAL ESTATE LLC	12262 FM 3083 RD, CONROE, TX 77301-6106
3	WARD, RICHARD M & SHARON L	16015 CREIGHTON RD, CONROE, TX 77302-6023
4	FRANKS, EUELL FRANCIS	58 LAKE WINDSOR CIR, CONROE, TX 77384-4481
5	T&W WATER SERVICE CO	PO BOX 2927, CONROE, TX 77305-2927
6	HOAGLAND, EDGAR W SR & SHIRLEY ANN	12290 FM 3083 RD, CONROE, TX 77301-6106
7	PENA, RAY JR & BETTY M	92 DAWNS EDGE DR, MONTGOMERY, TX 77356-9023
8	DIAMOND SHAMROCK #592	PO BOX 691489, SAN ANTONIO, TX 78269-1490
9	ALBITER, ALFREDO	15054 CREIGHTON RD, CONROE, TX 77302-6010
10	FILLMAN, DONALD F	11211 CROWN PARK DR, HOUSTON, TX 77067-4008
11	SHEPARD, JERRY FRANK	16164 CREIGHTON RD, CONROE, TX 77302-6024
12	NOLAN, JIM D & MICHELLE	16120 CREIGHTON RD, CONROE, TX 77302-6024
13	LANGSTON, JAMES A, JR	16080 CREIGHTON RD, CONROE, TX 77302-6022
14	SALA REAL ESTATE LLC	12262 FM 3083 RD, CONROE, TX 77301-6106
15	UNKNOWN OWNER	UNKNOWN OWNER

Notes

1. Land Ownership Identification Source - Montgomery Central Appraisal District (MCAD); 3-8-2018. <https://datamoco.opendata.arcgis.com/datasets/4efb7eb1bad84029b11d45ec5cce7a27_0>.
2. Landowner ID Numbers coorespond to the Adjacent Landowners Map provided as Attachment 12A.

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Attachment 13, Table II.B - Inspection Schedule

TexCom Gulf Disposal, LLC
Surface Facility Permit No. 87758

Facility Unit(s)	Basic Elements	Possible Errors, Malfunctioning or Deterioration	Frequency of Inspection[1]			
			Daily	Weekly	Monthly	Annually
Injection Wells #1 - #4	Wellhead	Cracks, Leaks, Broken Parts, Deposits	X			
	Gauges	Leaks, Operating, Consistency	X			
	Flowlines	Leaks, Cracks, Kinks, Scuffs				X
	Downhole	Integrity, Corrosion				X
	Non-Metallic components	Corrosion, wear, leaks, failure			X	
	Annulus Monitoring System	Breakdown, leaks	X			
Filtration Unit	Flowlines	Illegible labels, Support loose, Leaks, Deposits	X			
Waste Management Units	Above Ground Portion of Tanks	Leaks, deposits, cracks, bulges and discoloration as early indications of failure	X			
	All Piping/Flowlines	Illegible labels, loose supports, leaks and deposits as early indications of failure	X			
	Hi Level Alarm	Fails				Test
	Tank Internal-Supports, base	Deterioration, depressions, loss of fiber, wear, pitting, cracks, bulges, cracking, uneven				X
	Pump Internals	Corrosion or releases of waste and Leaks				X
	Construction material and the area immediately surrounding the externally accessible portion of the tank system, including secondary containment	Detect erosion or signs of releases for waste (e.g. wet spots, dead vegetation)	X			

Facility Unit(s)	Basic Elements	Possible Errors, Malfunctioning or Deterioration	Frequency of Inspection[1]			
			Daily	Weekly	Monthly	Annually
Ancillary Equipment outside of secondary containment	Construction material and the area immediately surround the externally accessible portion of the tank system	Corrosion or releases of waste and Leaks, Detect erosion or signs of releases for waste (e.g. wet spots, dead vegetation)	X			
	Emergency Equipment	Fails to operate, Water pressure, Power failure			X	
Storage	Containers/Roll-Off Boxes	Leaks, deterioration and corrosion of containers, Illegible labels, loose supports, overflow, disleveling, accumulated fluids, leaks, deposits		X		
Facility	Roads	Ruts, pits, Bulges, Stains, Standing water			X	
	Sumps, Sump Pumps, Sump Flowlines	Levels, cover integrity, secure deposits, supports loos, integrity/leaks		X		
	Berms	Cracks, Bulges, Deformations, Discoloration		X		
	Fence	Openings, Tears			X	
	Drainage	Poor Flow, Clogged drains, evidence of spills, run on/runoff accumulation			X	
	Signs	Illegible, removed			X	

Note: 1. Inspection schedule reflects 40 CFR 264 relating to tanks and containers inspections and only when facility is in operation.

2. Inspection schedule reflects language identified in the February 17, 2011 signed Order (TCEQ Docket No. 2007-0362-IHW).

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TABLE VII.A - UNIT CLOSURE

Unit & Equipment	Possible Method of Decontamination	Possible Methods of Disposal
Filtration Unit #1	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Filter & Housing	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Oil Tank & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Injection Tank # 1 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Injection Tank #2 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #1 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #2 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #3 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #4 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Solids Separation Unit #1	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Solids Separation Unit #2	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #5 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #6 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #7 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer
Waste Storage/Mixing Tank #8 & Pump	System Flushing, HydroWashing, Manual	Solid Waste Landfill, Injection Well Disposal, Solvent Recying, Processing, Return to Manufacturer

TABLE VII.C(1) - UNIT CLOSURE
Containment Area(s)

Cost Item	*Notes*	Main Containment Area	Waste Unloading and Solids Area
Waste Disposal			
Structural-Solid Material			
Floor Square Footage (ft^2)	*23,24*	8,260	3,219
Berm Square Footage (ft^2)	*23,24*	251	165
Total Square Footage (ft^2)		8,511	3,384
Floor Depth (ft)		0.67	0.67
Berm Depth (ft)		3.67	2.67
Structural Material Volume (yd^3)		1,366	418
Structural Material Disposal Rate ($/$yd^3$)		$25.00	$25.00
Structural Material Disposal Cost		$34,148.24	$10,444.50
Stormwater Disposal Cost			
Floor Square Footage (ft^2)		8,260	3,219
Avg of 2 Max Month Rainfall (11.62")(ft)	*25*	1.000	1.000
Stormwater Volume (gal)		61,785	24,078
Solids Disposal Rate ($/$yd^3$)		$0.10	$0.10
Solids/Sediment Disposal Cost		$6,178.48	$2,407.78
Waste Disposal Total		$40,326.72	$12,852.28
Waste Trucking			
Stormwater Trucking			
Tanker volume per Load (gals)	*6*	5250	5250
# Truck Loads		12	5
Trucking Rate / hr		$65.00	$65.00
Trucking Time	*7, 8*	4	4
Wastewater Trucking Costs		$3,059.82	$1,192.42
Structural Material Trucking			
Solids Trucking Rate (per load)	*5*	$175.00	$175.00
# Loads		11	3
Trucking Cost		$1,925.00	$525.00
Waste Trucking Total		$4,984.82	$1,717.42
Dismantling & Loadout			
Dismantling, Cleaning, & Loadout			
Trackhoe with Operator Rate (per day)		$400.00	$400.00
# Days		6	2
Dismantling & Loadout Total		$2,400.00	$800.00

TABLE VII.C(1) - UNIT CLOSURE
Containment Area(s)

Cost Item	*Notes*	Main Containment Area	Waste Unloading and Solids Area
Miscellaneous	*16, 17*		
Project Manager	*18*	$14,700.00	
PE Closure Certification & Report	*19*	$5,000.00	
Site Leveling/Restoration	*20*	$600.00	
WasteWater Lab Anaysis	*22*	$8,000.00	
Miscellaneous Total		$28,300.00	
Containment Area(s) Subtotal		$47,711.54	$15,369.70
Containment Area(s) (10%)		$4,771.15	$1,536.97
Containment Area(s) Total		$52,482.69	$16,906.67

TABLE VII.C(2) - Unit Closure
Tank Systems

Cost Item		Injection Tank 1 or 2	Waste Storage/ Mixing 1, 2, 3, 4, 5, 6, 7 or 8	Solids Separation Unit 1 or 2	Waste Oil Tank
	Notes	*A*	*A*	*A*	*4, 21, 22*
Waste Disposal					
Permitted Volume (gal)	*1*	21,000	21,000	30,520	16,800
Washwater Volume		2,100	2,100	3,052	1,680
Total Unit Disposal Volume (gal)		23,100	23,100	33,572	18,480
Wastewater Rate		$0.10	$0.10	$0.10	$0.10
WasteWater Disposal Cost		$2,310.00	$2,310.00	$3,357.20	$1,848.00
Solids/Sedment Disposal Volume (yd^3)	*11*	10.4	10.4	15.1	NA
Solids Disposal Rate ($/$yd^3$)		$25.00	$25.00	$25.00	NA
Solids/Sediment Disposal Cost		$259.95	$259.95	$377.80	$0.00
Waste Disposal Total		$2,569.95	$2,569.95	$3,735.00	$1,848.00
Waste Trucking					
Wastewater Trucking					
Tanker volume per Load (gals)	*6*	5250	5250	5250	
# Truck Loads		5.00	5.00	7.00	
Trucking Rate / hr		$65.00	$65.00	$65.00	
Trucking Time	*7, 8*	4	4	4	
Wastewater Trucking Costs		$1,300.00	$1,300.00	$1,820.00	NOTE 1
Solids/Sediment Trucking					
Solids Trucking Rate (per load)	*12*	$175.00	$175.00	$175.00	
# Loads		1	1	1	
Solid/Sediment Trucking Cost		$175.00	$175.00	$175.00	
Waste Trucking Total		$1,475.00	$1,475.00	$1,995.00	Note 21

TABLE VII.C(2) - Unit Closure
Tank Systems

Cost Item		Injection Tank 1 or 2	Waste Storage/ Mixing 1, 2, 3, 4, 5, 6, 7 or 8	Solids Separation Unit 1 or 2	Waste Oil Tank
Dismantling, Cleaning & Disposal					
Dismantling, Cleaning, & Loadout					
Flushing, Dismantling, Loading (hrs)	*9, 13*	20	24	20	12
Crew Rate (per hr)	*10*	$60.00	$60.00	$60.00	$60.00
Dismantling, Cleaning, & Loadout Total		$1,200.00	$1,440.00	$1,200.00	$720.00
Equipment Rental					
Pumps, Tools, etc. (per hour)		$40.00	$40.00	$40.00	$40.00
Crane (per hour)	*15*	$50.00	$50.00	$50.00	$50.00
Backhoe (per hour)	*15*	$27.50	$27.50	$27.50	$27.50
Pressure Washer (per hour)	*15*	$6.25	$6.25	$6.25	$6.25
Equipment Rental		$2,475.00	$2,970.00	$2,475.00	$1,485.00
Tankage Disposal	*14*	$0.00	$0.00	$0.00	$0.00
Pipe Disposal					
Volume (yd^3)		80	120	80	40
Pipe Disposal Rate ($/$yd^3$)		$25.00	$25.00	$25.00	$25.00
Pipe Disposal Cost		$2,000.00	$3,000.00	$3,000.00	$1,000.00
Pipe Disposal Trucking					
Solids Trucking Rate (per load)	*12*	$175.00	$175.00	$175.00	$175.00
# Loads		4	6	6	2
Pipe Trucking Cost		$700.00	$1,050.00	$1,050.00	$350.00
Dismantling, Cleaning & Disposal Total		$6,375.00	$8,460.00	$8,460.00	$3,555.00

TABLE VII.C(2) - Unit Closure
Tank Systems

Cost Item		Injection Tank 1 or 2	Waste Storage/ Mixing 1, 2, 3, 4, 5, 6, 7 or 8	Solids Separation Unit 1 or 2	Waste Oil Tank
Tankage Subtotal		$10,419.95	$12,504.95	$14,190.00	$5,403.00
Tankage Contingency (10%)		$1,042.00	$1,250.50	$1,419.00	$540.30
Tankage Total		$11,461.95	$13,755.45	$15,609.00	$5,943.30

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TABLE VII.C(3) - UNIT CLOSURE
Ancilliary Equipment

Cost Item		Filtration Unit 1
	Notes	
Waste Disposal		
Washwater Volume (gal)	*1*	1,000
Wastewater Rate		$0.10
WasteWater Disposal Cost		$100.00
Solids/Sedment Disposal Volume (yd^3)	*11*	0.5
Solids Disposal Rate ($/$yd^3$)		$25.00
Solids/Sediment Disposal Cost		$12.50
Waste Disposal Total		$112.50
Waste Trucking		
Wastewater Trucking		
Tanker Volume per Load (gals)	*6*	5250
# Truck Loads		4
Trucking Rate / hr		$65.00
Trucking Time	*7, 8*	4
Wastewater Trucking Costs		$1,040.00
Solids/Sediment Trucking		
Solids Trucking Rate (per load)	*12*	$175.00
# Loads		1
Solid/Sediment Trucking Cost		$175.00
Waste Trucking Total		$1,215.00
Dismantling, Cleaning & Disposal		
Dismantling, Cleaning, & Loadout		
Flushing, Dismantling, Loading (hrs)	*9, 13*	6
Crew Rate (per hr)	*10*	$60.00
Dismantling, Cleaning, & Loadout Total		$360.00
Equipment Rental		
Pumps, Tools, etc. (per hour)		$40.00
Crane (per hour)	*15*	$50.00
Forklift (per hour)	*15*	$27.50
Pressure Washer (per hour)	*15*	$6.25
Equipment Rental		$742.50
Tankage Disposal	*14*	$0.00
Pipe Disposal		
Volume (yd^3)		20
Pipe Disposal Rate ($/$yd^3$)		$25.00
Pipe Disposal Cost		$500.00
Pipe Disposal Trucking		
Solids Trucking Rate (per load)	*12*	$175.00
# Loads		1
Pipe Trucking Cost		$175.00
Dismantling, Cleaning & Disposal Total		$1,777.50

TABLE VII.C(3) - UNIT CLOSURE
Ancilliary Equipment

Cost Item		Filtration Unit 1
Ancilliary Equipment Subtotal		$3,105.00
Contingency (10%)		$310.50
Ancilliary Equipment Total		$3,415.50

TABLE VII.C(4) - Closure Cost Estimate
Assumptions Notes

Cost Estimate Notes:					
A; Costs for similar units. Subtotalled separately on Table VII.D.					
1: Tanks permitted at 90% of Total Capacity.					
2: Freshwater used for Tank and Equipment Flushing. All freshwater Consumed.					
3: Stormwater used for Tank and Equipment Flushing. Flushing not required.					
3a: Reported volume is minus that used for flushing other tanks + FW volume.					
4: Waste Oil to recovery. Flush volume only for disposal.					
5: Product returned to manufacturer at Texcom cost. Flush volumes only.					
6: 5,250 gallons					
7: 43 miles one way to Environmental Processing Systems (EPS) in Liberty County.					
8: Truck time inludes loading, transport, unloading, and return.					
9: Includes flushing, cleaning, pipe dismantling, pipe loadout, WMU loadout.					
10: Supervisor @ $18/hr and 3 hands @ $14/hr					
11: Solids at 5% of permitted capacity. 7.48 gallons/Ft^3. 27 Ft^3/Yd^3					
12: 20 yd^3 Rolloff box supplied.					
13: Cleaning performed manually and with pressure washer.					
14: Equipment given to local vendors at cost for vendor removal of equipment.					
15: Crane at $2000/40 hour week. Backhoe/Florklift @ $1100/40 hour week. Pressure Washer @ $250/40 hr week.					
16: Miscellaneous costs apply to entire site closure.					
17: Project estimated at 40 days total.					
18: Project Manager @ $350/day. 42 days apportioned to 26 Waste Management Units (WMUs).					
19: $5000 apportioned to 26 WMUs.					
20: 2 days with Dozer @ $300/day.					
21: Washwater trucking combined (3 x 810g) for Acity, Caustic, and Waste Oil Tanks.					
22: It is assumed 20 laboratory samples @ $400 each will be needed for various purposes.					
23: Main Containment: 118' x 70'. Berm 3' high and 8" thick.					
24: Unloading Area: 60.735' x 63'. Berm 2' high and 8" thick.					
25: Average of May and June for Houston from http://web2.airmail.net/danb1/txweathe.htm.					
26: Unbermed ashphalt along north and east of Main Containment Area.					
27: Waste Oil to recovery. Flush volume only for disposal.					

TABLE VII.D - PERMITTED UNIT CLOSURE COST SUMMARY

Existing Unit Closure Cost Estimate		
Waste Management Unit		**Cost**
NA	None	NA
Proposed Unit Closure Cost Estimate		
Waste Management Unit		**2018 Revised Cost**
001	#1 Injection Well	
002	#2 Injection Well	
003	#3 Injection Well	
004	#4 Injection Well	
	Base Cost: Project Manager, Sampling, Lab Analysis, Site Restoration, PE Certification	$28,300.00
011	Filtration Unit #1	$3,415.50
015	Oil Tank	$5,943.30
016	Injection Tank # 1	$11,461.95
017	Injection Tank #2	$11,461.95
018	Waste Storage/Mixing # 1	$13,755.45
019	Waste Storage/Mixing # 2	$13,755.45
020	Waste Storage/Mixing # 3	$13,755.45
021	Waste Storage/Mixing # 4	$13,755.45
027	Solids Separation Unit #1	$15,609.00
028	Solids Separation Unit #2	$15,609.00
029	Waste Storage/Mixing #5	$13,755.45
030	Waste Storage/Mixing #6	$13,755.45
031	Waste Storage/Mixing #7	$13,755.45
032	Waste Storage/Mixing #8	$13,755.45
	Main Containment Area	$52,482.69
	Waste Unloading Area	$16,906.67
	Total Closure Cost Estimate	**$271,233.63**

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