TCEQ Core Data Form

TCEQ Use Only

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)

☐ New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)

☐ Renewal (Core Data Form should be submitted with the renewal form) ☒ Other Modification

2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN 602893620		RN 104729918

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	5/4/2018

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name (If an individual, print last name first: e.g.: Doe, John)	If new Customer, enter previous Customer below:
Texcom Gulf Disposal, LLC	

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (if applicable)
0800453006			

11. Type of Customer:	☒ Corporation	☐ Individual	Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other		☐ Sole Proprietorship	☐ Other:

12. Number of Employees	13. Independently Owned and Operated?
☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher	☐ Yes ☐ No

14. Customer Role (Proposed or Actual) - as it relates to the Regulated Entity listed on this form. Please check one of the following:

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:	6701 Broadway EXT 310							
	City	Oklahoma	State	OK	ZIP	73116	ZIP + 4	8213

16. Country Mailing Information (if outside USA)	17. E-Mail Address (if applicable)

18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)
( ) -		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)

23. Street Address of the Regulated Entity: (No PO Boxes)								
	City		State		ZIP		ZIP + 4	
24. County								

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:			
26. Nearest City		State	Nearest ZIP Code

27. Latitude (N) In Decimal:			28. Longitude (W) In Decimal:		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)

33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)

34. Mailing Address:								
	City		State		ZIP		ZIP + 4	
35. E-Mail Address:								

36. Telephone Number	37. Extension or Code	38. Fax Number (if applicable)
( ) -		( ) -

39. **TCEQ Programs and ID Numbers** Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

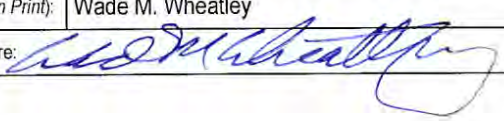
☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☒ Industrial Hazardous Waste
				39002, 87758
☐ Municipal Solid Waste	☒ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
	81209			
☐ Sludge	☒ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
	TXR15TA69			
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☒ Other: EPA ID/UIC
				TXR000076521/WDW410-413

SECTION IV: Preparer Information

40. Name: Lara Garey			41. Title: Project Manager
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 494 - 0369		( ) -	lara.garey@gdsassociates.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	GDS Associates, Inc.	Job Title:	
Name(*In Print*):	Wade M. Wheatley	Phone:	(512)494-369
Signature:		Date:	5/18/2018

ENCLOSURE D

REDLINE/STRIKEOUT VERSIONS

II.D Surface Equipment

Surface Application, Section II.D

~~Table II.A Surface Equipment~~

~~Waste Management Unit~~	~~Equipment~~	~~Function of Unit Storage/Processing~~	~~Minimum # Required~~
~~001~~	~~# Injection Well~~	~~Injection~~	~~1~~
~~002*~~	~~# Injection Well~~	~~Injection~~	~~0~~
~~003*~~	~~# Injection Well~~	~~Injection~~	~~0~~
~~004*~~	~~# Injection Well~~	~~Injection~~	~~0~~
~~005~~	~~Main Containment Area~~	~~Storage & Processing~~	~~1~~
~~006~~	~~Shaker Screen Unit #1~~	~~Processing - Filtration~~	~~1~~
~~007*~~	~~Shaker Screen Unit #2~~	~~Processing - Filtration~~	~~0~~
~~008~~	~~Solids Bin #1~~	~~Solids Waste Storage~~	~~1~~
~~009*~~	~~Solids Bin #2~~	~~Solids Waste Storage~~	~~0~~
~~010~~	~~Oil/Water Separator~~	~~Processing - Phase Separation~~	~~1~~
~~011~~	~~Filtration Unit #1~~	~~Processing - Filtration~~	~~1~~
~~012~~	~~Dewatering System~~	~~Processing - Dewatering~~	~~1~~
~~013*~~	~~Caustic Tank~~	~~Storage~~	~~1~~
~~014*~~	~~Acid Tank~~	~~Storage~~	~~1~~
~~015*~~	~~Oil Tank~~	~~Storage~~	~~1~~
~~016~~	~~Injection Tank # 1~~	~~Storage~~	~~1~~
~~017*~~	~~Injection Tank #2~~	~~Storage~~	~~0~~
~~018~~	~~Waste Storage/Mixing # 1~~	~~Storage & Processing~~	~~1~~
~~019*~~	~~Waste Storage/Mixing # 2~~	~~Storage & Processing~~	~~0~~
~~020 *~~	~~Waste Storage/Mixing # 3~~	~~Storage & Processing~~	~~0~~
~~021*~~	~~Waste Storage/Mixing # 4~~	~~Storage & Processing~~	~~0~~
~~022~~	~~Reaction/Mixing Tank # 1~~	~~Processing~~	~~1~~
~~023*~~	~~Reaction/Mixing Tank # 2~~	~~Processing~~	~~0~~
~~024~~	~~Saltwater Tank #1~~	~~Storage~~	~~1~~
~~025~~	~~Stormwater Tank #1~~	~~Storage~~	~~1~~
~~026~~	~~Freshwater Tank~~	~~Storage~~	~~1~~
~~NA~~	~~Injection Pump~~	~~Injection~~	~~1~~
~~NA~~	~~Centrifugal Processing Pumps~~	~~Flow~~	~~18~~
~~NA *~~	~~Caustic Mixing System~~	~~Mixing caustic for~~	~~1~~
~~NA~~	~~Crane~~	~~Equipment Handling~~	~~1~~
~~NA~~	~~Forklift~~	~~Equipment Handling~~	~~1~~
~~NA~~	~~Polishing Filter~~	~~Particle/Salinity Safety~~	~~1~~
	~~Units are registered but status will in 'inactive' until such time as needed~~		

Please refer to Attachment 11, Table 1.1WMU list regarding on site WMUs.

salinity tests. See Attachments 2 and 3, Pore throat analysis and Critical Salinity Analysis, respectively.

Organic and Chemical Characteristics

Proposed client waste streams may contain various organic/chemical constituents and concentrations. Each potential waste stream will be evaluated, prior to acceptance, for constituents, concentrations, and potential reactions. Evaluation may include research, testing with formation fluids/surrogates, and/or testing with formation core samples Based on the waste evaluation, TGD may process wastes using phase separation of oils/grease, chemical precipitation, or a combination of the two. Injectate oil sizes will be limited to 20 micron based on OMNI Laboratories pore throat results. See Attachment 2, Pore throat analysis, OMNI Laboratories.

Radiological Properties

TGD will not accept radioactive wastes. Radioactive evaluation of potential client waste streams will be based primarily on client provided information but TGD may also perform independent analysis of client samples if upstream processes and/or resources are suspect.

Injectate Criterion

In summary, composite, post treatment injection waste (injectate) shall meet the following criterion:

- pH of 3 to 9 inclusive;
- Specific gravity .9 to 1.3 inclusive;
- Particle/oil size < 20 micron; and
- Chloride concentration >= 15,000 ppm OR treated with clay stabilizer.

III.A.3 Excluded Wastes

Excluded wastes include those wastes specifically excluded by regulations, permit conditions, and/or those rejected during TGD's Waste Stream Evaluation process.

Prohibited Wastes

TGD will not accept any of the following wastes:

- Wastes defined as hazardous per 40 CFR 261, Subpart A thru D, including but not limited to listed hazardous wastes;
- Wastes defined as radioactive per the Texas Health Safety Code, 401.411;
- Explosive material as defined by the Department of Transportation per 49 CFR 173;
- Any waste with a flashpoint of < 140 degrees Fahrenheit as determined by a Pensky-martens Closed Cup tester using ASTM standard method D-93-79 or D-93-80;
- Wastes containing polychlorinated biphenyls (PCBs) with concentrations > 50 ppm.

Characteristically Excluded Wastes

TGD will not accept wastes whose final, post treatment, pre-injection characteristics are shown or suspected of adversely reacting with the permitted injection zone's sediments.

III.A.4 Requested Wastes

Surface Application, Section III.A
Surface Application, Section III.B
Surface Application, Section III.C

TGD requests approval to evaluate, accept (as appropriate), treat, and dispose of the following wastes:

General Categories of Requested Wastes

- Wastes generated during closure of the well and associated facilities given the wastes are compatible with permitted wastes and the reservoir:
- ~~Non-hazardous~~ Class 1 and 2 wastes defined by 30 TAC 335.05 and limited to the following I-NH class wastes:
    - Aqueous solutions containing petroleum hydrocarbons;
    - Aqueous solutions containing less than 24% alcohol, not characterized as spent solvent;
    - Aqueous solutions with a pH greater than 2 and less than 12.5;
    - Aqueous solutions that contain contaminants below the regulatory limits set forth in 40 CFR 261.24, Table I;
    - Aqueous solutions that contain halogenated organic compounds in concentrations less than 1,000 mg/l;
    - Pesticide wastes;
    - Caustic wastes;
    - Metallic wastes;
    - Organic wastes;
    - Acid wastes; and
    - Filter cake.
- Other associated wastes such as groundwater and rainfall contaminated by the above authorized wastes, spills of the above authorized wastes, and wash waters and solutions used in cleaning and servicing the waste disposal well system equipment and process equipment which are compatible with the permitted waste streams and reservoir.

Specifically Requested Waste Form Codes and Waste Codes

TGD requests authority to receive wastes in accordance with the following attachments:

5	Waste Management Information, Table III.A	*Surface Application, Section III A*
6	Wastes managed in Permitted Units, Table III.B	*Surface Application, Section III B*

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
- ~~• Neutralization;~~
    - o pH adjustment;
    - o Oil/hydrocarbon removal
    - ~~o Particle removal/Filtration;~~
    - o Specific gravity adjustment;
    - o Chemical precipitation;
    - o Salinity adjustment / Clay stabilization; and
    - o Filtration
    - ~~o Oil/Water Separation.~~
- 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;
- ~~• Injection System~~
- Waste Injection

~~All wastes are classified as Class 1, Non-Hazardous.~~ TGD will accept only wastes which are classified as Class 1 or Class 2. ~~All pumps are electric motor driven, 3" x 4" centrifugal pumps, except the Injection pumps, which are electric motor driven, positive displacement, piston pumps.~~

See Attachment 23, Process Flow Diagram, PFD-001

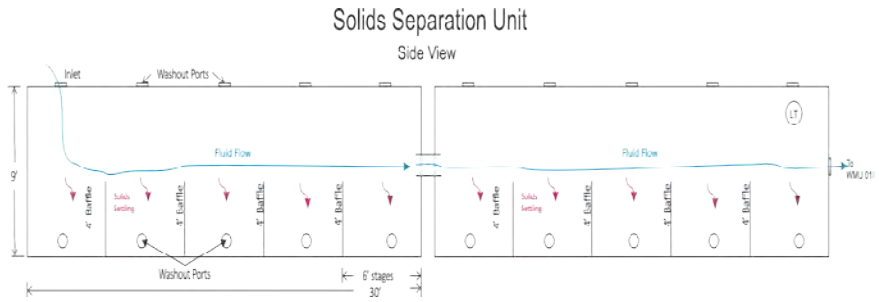
Waste Offloading System

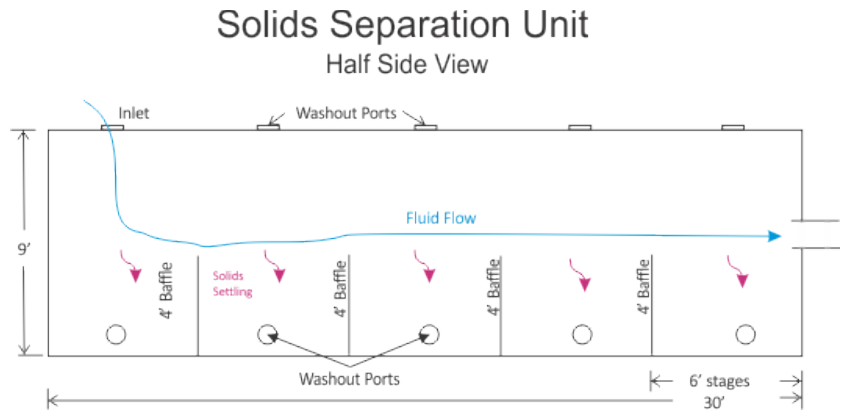
Wastes are offloaded from tanker trucks carrying client wastes. ~~Tanker trucks back into the one (1) of four (4) unloading bays.~~ Trucks drive into one (1) of three (3) unloading bays. One end of a flexible hose is attached to the tanker truck outlet and the other end of the hose is permanently attached to the suction of the unloading pump with piping leading directly to the SSU's 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 ~~four (4)~~ eight ~~(8)~~ Waste Storage/Mixing Tanks or to one (1) of ~~two~~ two (2) ~~shaker screen Solids Separation Units~~SSU's. ~~The shaker screen SSUs are designed for coarse particle removal the removal of both coarse and fine particle sizes. The inlet to the unit enters an enclosed upper unit that contains baffles and a screen mesh. The screen mesh is part of a vibrating, angled unit that 'shakes' screened solids into one (1) of two (2) 20 yd^3 solids bin containers. When full, the solids bins containers are trucked to the local solid waste landfill for offsite disposal. Various screen meshes can be used in the upper unit to optimize coarse particle filtration. Once passed through the screen, wastewaters fall into a tank below that provides suction to the shaker pumps. Shaker pumps transfer the screened wastewater to one (1) of four (4) waste storage/mixing tanks or to the Injection Tanks for downhole injection.~~

See Attachment 25, Waste Offloading, Storage and Processing –System Piping and Instrumentation Diagram (PID)~~PID, PID-Off-001~~

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 Storage, Mixing, and Processing~~
Waste Mixing and Processing
~~Waste storage, mixing, and processing includes: four (4) eight (8) Waste Storage/Mixing Tanks; two (2) Reaction Tanks; one (1) Filtration Unit; one (1) Oil/Water Separator; one (1) each liquid acid and caustic storage tanks; two (2) Shaker Screen Units; one (1) Waste Oil Tank; and one (1) Dewatering Unit.~~

Waste mixing and/or processing will be performed ~~based on the final TCEQ permit conditions and TGD's waste acceptance program results~~as described in Section III of this document. ~~See Section III of this document.~~
If client wastewater particulates are above the formation pore throat size, TGD will ~~filter remove solids~~ process the wastewater ~~through the Shaker Screen Unit~~ using the SSU's, as described above, and/or the Filtration Unit. ~~Shaker screen operation is described in~~

~~the paragraph above named Waste Offloading System. Particulate sizes output from the Shaker Screen Unit vary with screen mesh but, for example, a 100-mesh screen results in an approximate 140 micron particle size. If additional particulate size reduction is required, TGD will process wastewater through the Filtration Unit. Wastewater is pumped from the waste storage/mixing tank to the self-contained, self-cleaning filter unit. Wastewater enters into the center of a filter cylinder and flows outward. Filtered water is directed back the a Waste Storage tank, a Reaction Tank, or an Injection Tank, based on what, if any, additional waste processing is required. When the particle loading on the Filtration Unit reaches a design point, inlet and outlet valves are automatically shut and the filter is backwashed. The backwash is a sludge waste and is directed to the Dewatering Unit. At this time, TGD has not selected a specific design for the Dewatering Unit but the equivalent of a filter press or belt press will be used. The Dewatering Unit liquid output is directed to a Waste Storage tank, a Reaction Tank, or an Injection Tank, based on what, if any, additional waste processing is required. The Dewatering Unit solid output is directed to one (1) of two (2) solids bins that are ultimately shipped offsite for disposal at a local solid waste landfill.~~

~~If client wastewaters possess nuisance oils, grease or have oil/grease particles above the formation pore throat diameter, TGD will pump the wastewater to the Oil/Water Separator. The Oil/Water Separator performs phase separation and directs output oils to the Waste Oil Tank and wastewaters to a Waste Storage/Mixing Tank. When full, Waste Oils are trucked offsite to an authorized waste oil recycling or disposal facility. Oil and hydrocarbon removal~~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.

~~Mixing of client wastewaters is performed to (1) adjust pH and/or specific gravity to within permit range or (2) to increase salinity concentrations so that injectate does not swell formation clays. Waste mixing is performed in either of the four (4) Waste Storage/Mixing Tanks or the two (2) Reaction Tanks. Adjustment of pH may be performed using stormwater, saltwater, compatible client wastes, or smaller volumes of liquid acid or caustic. Adjustment of specific gravity will be performed using stormwater, saltwater, or compatible client wastes. Each of the above (6) six tanks is equipped with its own transfer/re-circulation pump to facilitate mixing and transfer. pH and/or specific gravity adjustments~~ 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 ~~chemical concentration~~ 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 ~~either of the four (4) Waste Storage/Mixing Tanks or the two (2) Reaction Tanks~~ any of TGD's eight (8) Waste Storage/Mixing Tanks by the addition of a precipitate 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 ~~and processing commences as described regarding particle removal for~~ for solids removal. Solids are characterized for off-site disposal.
~~Waste Storage and Reaction Tanks # 1 are made of steel and Waste Storage and Mixing Tanks 2, 3, and 4 and Reaction Tank # 2 are made of fiberglass. Waste and Reaction Tanks numbered 1 will be used for waste streams that are potentially incompatible with fiberglass construction materials. Waste and Reaction Tanks numbered 2, 3, and 4 will be used for all wastes that are not incompatible with fiberglass materials. Steel and PVC piping will be used for steel and fiberglass tanks, respectively.~~

~~See Attachment 24, Waste Storage and Processing Area PID, PID-WSP-001~~

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. ~~TGD will add a sufficient volume of saltwater to raise the injectate to levels above the OMNI laboratory critical salinity test results for clay reaction with freshwater (15,000 ppm). See Attachment 3, Critical Salinity Analysis. Mixing chloride concentrations are 62,000 ppm. See Attachment 4, Formation Fluids Laboratory Analysis, ACE Technologies.~~ 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~~Injection System~~
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 ~~positive displacement injection~~ multi stage centrifugal pump, or equivalent, is operational and one is on standby.

See Attachment 26, Injection System PID~~, PID-Inj-001~~

IV.C ~~Container Storage Areas /~~ Secondary Containment

Surface Application, Section IV.F

~~The Main Containment Area is the primary container storage area and secondary containment, containing all liquid storage tanks and processing equipment. For purposes of the engineering report, TGD will address the Waste Unloading & Solids Area as a secondary containment also.~~

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 Main Containment Area (MCA) is 118' x 70' x 8" with perimeter walls 2' high by 8" wide. The Waste Unloading and Solids Area are contiguous. The Waste Unloading area portion is 80' x 30' x 8". The solids area portion is 60' x 23' x 8".~~

The MCA has a surface area 118' x 70' with perimeter containment walls 3' high by 8" 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 Map, PAL 001~~
See Attachment 27, ~~31, Secondary Containment and Equipment Layout~~General ~~Arrangement~~Containment, Tank and Processing Area ~~, SCELPAL 001, Rev. 1, April 2018. 1/10/201~~Layout~~8~~

IV.C.2 Engineering Description

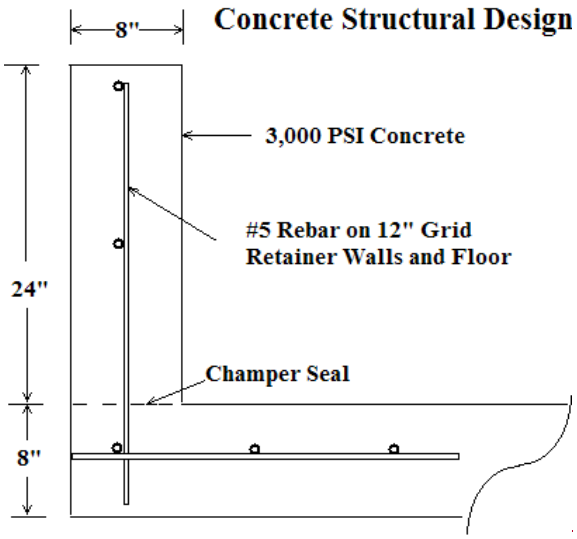
Surface Application, Section IV.F.1
Surface Application, Section IV.F.2

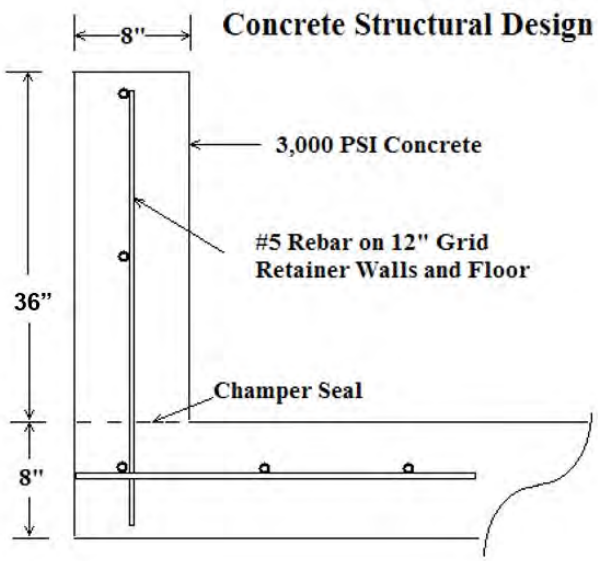
Design and~~&~~ Construction Material

The ~~Main Containment Area (~~MCA~~)~~ is~~will be~~ 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

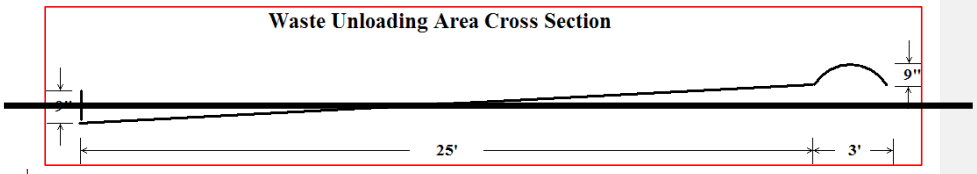
stormwater and inadvertent leaks/spills; accommodate stresses associated with climatic conditions, daily operations, and installation; completely surround waste storage and processing equipment; provide for safe movement of personnel; and accommodate the 100-year, 24-hour storm event.

The MCA will be constructed of reinforced concrete and will be compatible with incoming wastes. The foundation will provide support ~~as a secondary containment system~~, 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 ~~2'~~ 3' high and 8" thick. ~~The pad is constructed with 3% incline to the south and west to direct stormwater and spills toward the stormwater sump and pump. The base will be level within + or – 1/8 inch in any 30' of circumference.~~ 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 ~~Waste Unloading and Solids Area (~~WUSA~~)~~ is designed to accommodate persistent vehicle traffic, support tanker truck and roll-off box~~solids bin~~ weight, ~~and~~ collect and redirect accumulated stormwater and leaks/spills into the MCA. ~~The Waste Unloading and Solids Area will be constructed of asphalt and have a 2' x 8" retaining wall along the northern and southern edges. The WUSA includes a 3' x 9" 'speed bump' near the entry edge to help retain stormwater. The unloading area foundation will be sloped to the rear to direct stormwater and spills toward a stormwater sump and pump. The sump pump will direct accumulated fluids to the Stormwater Tank. Sump pump capacity will as explained in IV.C.3 below.~~



Commented [KA1]: See Attachment 27 for Waste Unloading Area Cross Section.

Run On and~~&~~ Run Off Prevention

In the MCA, rRun on is prevented through sound structural design and installation and 2' of a 3' retaining walls 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 2' 3' retaining wall along the perimeter, and chemically resistant water stops in all joints. In addition, the foundation will be sloped toward the southwest corner of the containment where a 3' x 3' sump and centrifugal sump pump is installed to recover accumulated stormwater and leaks/spills. 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, retaining walls a retaining wall on the east end, and a retaining ridges 'speed bumps' slope and ridge design on the north and south ends. The sump and sump pump will also accommodate a 100 year, 24 hour storm event by pumping rainwater to the Stormwater Tank. 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 below. Sump accumulations will be pumped to the stormwater tank.

See Section VI.B, Run On & Run Off Management for additional discussion.
See Attachment 27, Containment, Tank, and Processing Area Layout Map, PAL-001

IV.C.3 Specifications and Design Criterion

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

See Attachment 27, Containment, Tank, and Processing Area Map, PAL-001
See Attachment 31, Secondary Containment and Equipment Layout, SCEL 001, 1/10/2018
See Attachment 27, General Arrangement, PAL 001, Rev. 1, April 2018.

Numerical design considerations for the Container Storage Area / Secondary Containment include:

- Capacity to retain accumulated liquids;
- Sump pump capacity to accommodate 100 year, 24 hour storm event;
- Stormwater storage volume for 100 year, 24 hour storm event;

- ~~Wastewater storage capacity to accommodate waste receipt and processing rates; and~~
- ~~Structural design strength to support wastewater storage.~~

Quantitative design criteria include:

- Secondary containment volumes accommodate a 100-year / 24-hour storm event plus the ~~larger of (1) the highest volume tank or (2) 10% of the containment's total fluid storage~~capacity of the largest tank; and
- Waste water storage must be sufficient to accommodate injection and pumping limits and waste receipt and processing rates.~~;~~

~~Containing Accumulated Liquids~~ 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] - MCA drains to WUSA and is assumed not to add to containment capacity.

~~The Main Containment Area is designed to retain the simultaneous accumulation of the largest tank rupture and a 100 year, 24-hour storm event (in both the MCA and WUSA) plus the larger of (1) the highest volume tank or (2) 10% of the containment's total fluid storage. The largest tank volume is selected because the Injection Tanks are 30,000 gallons where as 10% of the total Tankage is only 18.017 gallons. The 100 Year, 24-hour storm event rainfall is 12" (See From Technical Paper No. 40, Rainfall Frequency of the U.S., U.S. Department of Commerce Weather Bureau). Available containment is the~~

~~difference between the inner MCA's area under rainfall minus the MCA's and consumed area from processing equipment and tankage. Based on calculations detailed in Table IV.A, Main Containment Area Capacity Calculations, the MCA has 48,860 gallons of available capacity for containment.~~

Table IV.A Main Containment Area Capacity Calculations

	Capacity (gallons)	Qty	Width or Diameter (ft)	Length (ft)	Height (ft)	Area (ft^2)	Volume (ft^3)
Main Containment Area - Volume Available			118	70	2	8,260	16,520
100 year 24 hr Storm Height	12		118	70	1.00	8,260	8,260
Storm Concurrent Containment Available			118	70	1.00	8,260	8,260
Equipment - Volume Consumed							
Injection Tanks	30,000	2	14			308	NA
Reaction/Mixing Tanks	22,000	2	12			226	NA
Storage/Mixing Tanks	22,000	4	12			452	NA
Stormwater Tank	30,000	1	14			154	NA
Saltwater Tank	30,000	1	14			154	NA
Freshwater Tank	9,000	1	10			79	NA
Caustic Tank	9,000	1	10			79	NA
Acid Tank	9,000	1	10			79	NA
Waste Oil Tank	9,000	1	10			79	NA
Shaker Screen	2,154	1	6	6	8	28	288
Filtration Unit	1,915	1	8	8	4	50	256
Dewater Unit	4,308	1	6	16	6	28	576
Oil/Water Separator	1,795	1	4	10	6	13	240
Square Footage Consumed by Equipment						1,728	
Square Footage Remaining for Rupture						6,532	
Volume Available for Rupture (ft^3)						6,532	
Volume Available for Rupture (gals)						**48,860**	
Volume Criterion							
Tankage Total (gals)	180,173						
10% of Total Tankage (gals)	18,017						
Highest Volume Tank (gals)	**30,000**						
Volume Available for Rupture (gals) > Highest Volume Tank (gals)							

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]	ft³	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	
					ft³	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	
	ft³	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).

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

Main Containment Area Containment Volume

~~The Main Containment Area is designed to retain the simultaneous accumulation of the largest tank rupture and a 100-year, 24-hour storm event. The largest tank volume is selected because the injection tanks are 30,000 gallons where as 10% of the total Tankage is only 18.017 gallons. 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 consumed area from processing equipment and tankage. Based on calculations detailed in Table IV.A, Main Containment Area Capacity Calculations, the MCA has 48,860 gallons of available capacity for containment.~~

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 ~~Waste Unloading and Solids Area~~WUSA is designed to drain storm water and leaks/spills to the ~~Main Containment Area~~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.D Wastewater Storage Capacity~~

	#	Size (bbls)	Gallons Each	Gallons Total
Injection Tanks	2	714	30,000	60,000
Waste Storage/Mixing	3	524	22,000	66,000
Waste Storage/Mixing	1	524	22,000	22,000
Reaction Tank	1	524	22,000	22,000
Reaction Tank	1	524	22,000	22,000
Saltwater	1	714	30,000	30,000
Storm water	1	714	30,000	30,000
Acid Tank	1	214	9,000	9,000
Caustic Tank	1	214	9,000	9,000
Oil Tank	1	214	9,000	9,000
Freshwater Tank	1	214	9,000	9,000
			90%	172,800
			100%	192,000

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 wastewater tank storage capacity is 192,000 7,539 bbls or 316,632 gallons including that provided by Injection Tanks, Waste Storage/Mixing Tanks, and Reaction Tanks Solids Separation Units. Table no longer applicable – see revised table below~~

~~172,800 gallons 6,785 bbls or 285K gallons Table no longer applicable – see revised table below~~

Total ~~wastewater~~ facility storage~~tank storage~~ capacity is ~~192,000~~ 287,840 gallons~~ns (6,617 bbls). including that provided by Injection Tanks, Waste Storage/Mixing Tanks, and Reaction Tanks. Assuming a usable operation limit at 90% of that capacity, TGD's total wastewater storage capacity equals 172,800 gallons.~~

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

Table IV.G~~E~~ 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**

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**

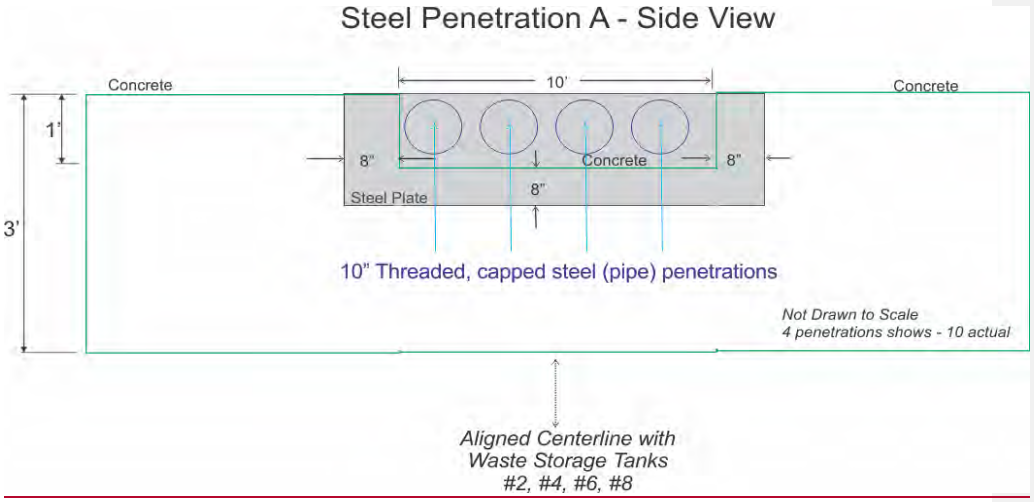
Based on 16 hours of waste receipt per day, 31 days per month, initially empty tanks, and a 350 gpm injection rate, TGD would require a total wastewater storage capacity of 168,00 gallons. This criterion is met.

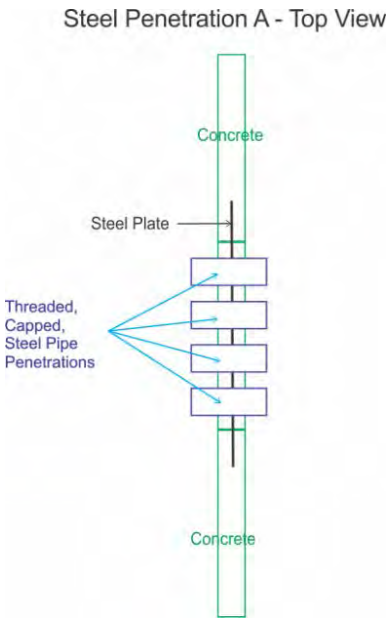
MCA Structural Design Strength

See section IV.C.2~~1~~, 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 Ssection B, is the same design as section A but is aligned centerline with the odd numbered waste storage tanks. Steel Penetration C, is only 1' wide, vice 10', 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




Steel Penetration A - Top View
Concrete
Steel Plate
Threaded,
Capped,
Steel Pipe
Penetrations
Concrete

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 ~~effect~~ 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 ~~use~~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;
- ~~Weekly inspections will be conducted of all tank externals for labels, shell discoloration, uneven settling, supports, foundation as early indications of failure~~
- ~~Monthly inspections of all listed non-metallic parts will be inspected for Corrosion, wear, leaks, failure, etc as early indications of failure. TGD will maintain a comprehensive list of non-metallic components specifically for corrosion/degradation monitoring;~~
- ~~Annually, or when open, pump internals will be inspected for corrosion, impeller, seat wear, pitting, etc;~~
- ~~Annually, or when open, tank internals, including support structures, will be inspected for deterioration depressions, loss of fiber, wear, cracking, pitting, etc.~~
- ~~Monthly inspections of all listed non-metallic parts will be inspected for Corrosion, wear, leaks, failure, etc as early indications of failure. TGD will maintain a comprehensive list of non-metallic components specifically for corrosion/degradation monitoring;~~
- Annually, or when open, pump internals will be inspected for corrosion, impeller, seat wear, pitting, etc.~~;~~
- ~~Annually, or when open, tank internals, including support structures, will be inspected for deterioration depressions, loss of fiber, wear, cracking, pitting, etc.~~
- ~~Tanks, flowlines, and equipment supports will be properly grounded.~~

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~~s~~ wastes that ~~is~~are ~~not corrosive to steel as defined by RCRA~~compatible with the facilities materials of construction and other wastes managed~~.~~. ~~As such, in addition to the permit requirement of injectate meeting a pH range of 3 to 9, TGD will strive to target a more protective pH range of 4.5 to 7.~~
~~As such, in addition to the permit requirement of injectate meeting a pH range of 3 to 9, TGD will strive to target a more protective pH range of 4.5 to 7.~~

~~Texcom Gulf Disposal will use construction materials compatible with the various waste streams authorized for receipt and disposal. Waste Storage and Reaction Tanks # 1 are made of steel and Waste Storage and Mixing Tanks 2, 3, and 4 and Reaction Tank # 2 are made of fiberglass. Waste and Reaction Tanks numbered 1 will be used for waste streams that are potentially incompatible with fiberglass construction materials. Waste and Reaction Tanks numbered 2, 3, and 4 will be used for all wastes that are not incompatible with fiberglass materials. Steel and PVC piping will be used for steel and fiberglass tanks, respectively.~~

Table IV.HF 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
~~See Attachment 25, Waste Offloading System PID, PID-Off-001~~

Dimensions, Capacities, and Material

Table IV.~~I~~G Waste Offloading System

Unit #	Waste Management Unit	Dimensions	Material	Capacity
~~006~~	~~Shaker Screen Unit #1~~	~~6' x 6' x 8'~~	~~Steel~~	~~500 gpm~~
~~007~~	~~Shaker Screen Unit #2~~	~~6' x 6' x 8'~~	~~Steel~~	~~500 gpm~~
~~NA~~	~~Piping with Unloading Station #1~~	~~4"~~	~~Steel~~	~~NA~~
~~NA~~	~~All other piping~~	~~4"~~	~~PVC~~	~~NA~~
~~NA~~	~~3 x 4 pumps (40 hp motors)~~	~~3" x 4"~~	~~Steel~~	~~1000 gpm max~~
027	Solids Separation Unit #1	8' x ~~30'~~ 60' x 9' x 9'~~8.5'~~	Steel [1]	500 gpm; ~~769~~ 30,520 g~~726 bbls~~
028	Solids Separation Unit #2	8' x ~~30'~~ 60' x 9'~~x 9'~~8.5'	Steel [1]	500 gpm; ~~769~~ 30,520 g~~726 bbls~~
NA	Piping	Various	Steel [1]	Various
NA	Pumps	Various	Steel [1]	Various

~~As discussed in Section IV.D.1, TGD will use various construction material(s) to accommodate differing waste stream characteristics. Both steel and PVC will be used in the Waste Offloading System. Unloading station #1 pipe, valves, and pipe out from Shaker Screen Unit #1 (which leads to Waste Storage/Mixing Tank #1) will be steel and used for offloading waste streams incompatible with fiberglass, PVC, and/or epoxy materials. All other piping and valves will be PVC.~~ 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, ~~four (4)~~ three (3) offloading stations are used. Each of the ~~Shaker Screen Units Solids Separation Units~~SSU's are~~is~~ designed to accommodate the full capacity required for permit allowances received over a 16-~~-~~hour period (504,000~~K~~ gallons per day = ~~26,033 26,033~~31,500 gallons / hour for 16 hours and ~~433 433~~ 525 gpm).

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

Overfill and Spill Prevention Controls
~~Only~~ TGD personnel ~~perform~~ perform ~~control the permissive to allow~~oversee or perform waste offloading. Offloading is continually manned which will provide visual and manual spill control. ~~Overfill is not possible.~~ Spills are mitigated through ongoing daily~~, weekly, monthly and annual~~ inspections of components for indications of wear and leaks. ~~-~~The ~~Waste Unloading and Storage Areas~~ WUSA ~~have~~ has ~~a retaining walls~~a retaining wall ~~and a containment berm~~ and ~~are~~ is sloped toward a ~~sump~~ central trough which drains to the ~~Main Containment Area.~~ MCA ~~and associated sump pump for removal of spilled fluids.~~

Managing Incompatible Wastes
~~In order to fully isolate incompatible waste streams, Offloading Station # 1 and Shaker Screen Unit #1, and all associated piping, will be completely separate from other offloading stations and Shaker Screen Unit. Temporary jumpers may be installed, when incompatible wastes are not being received, to cross-connect equipment for redundancy.~~
Incompatible wastes will not be processed through the same ~~Solids Separation Units~~SSU's or Waste Storage/Mixing tanks.

IV.D.3 Waste Storage~~,~~ and Mixing ~~and Reaction~~ 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
~~See Attachment 24, Waste Storage and Processing Area PID, PID-WSP-001~~

Dimensions, Capacities, and Material

Table IV.J~~H~~ Waste Storage~~/,~~ Mixing ~~and Reaction~~ Tanks, ~~-~~ & Pumps and Piping

Unit #	Waste Management Unit[1]	~~Dimensions~~ ~~Dimensions~~Design~~S~~	Material [21]~~*~~	Capacity (gallons)
018	Waste Storage/Mixing # 1	~~12' x 27' 4 "~~ ~~15' 6" x 16'API 12 F~~	Steel [21]	up to 21,000 ~~g22,000 g~~
019	Waste Storage/Mixing # 2	~~12' x 27' 4 "~~ ~~15' 6" x 16'API 12 F~~	Steel ~~[21]Fiberglass~~	up to 21,000 ~~g22,000 g~~

020	Waste Storage/Mixing # 3	~~12' x 27' 4 "~~ API 12-F Modified	Steel [2]*Fiberglass	up to 21,000 g~~22,000 g~~
021	Waste Storage/Mixing # 4	~~12' x 27' 4 "~~ API 12-F Modified	Steel [2]*Fiberglass	up to 21,000 g~~22,000 g~~
~~022~~	~~Reaction/Mixing Tank # 1~~	~~12' x 27' 4 "~~	~~Steel~~	~~22,000 g~~
~~023~~	~~Reaction/Mixing Tank # 2~~	~~12' x 27' 4 "~~	~~Fiberglass~~	~~22,000 g~~
~~013~~	~~Caustic Tank~~	~~10' x 16' 6"~~	~~Fiberglass~~	~~9,000 g~~
~~014~~	~~Acid Tank~~	~~10' x 16' 6"~~	~~Fiberglass~~	~~9,000 g~~
015	Oil Tank	API 12-F 120' ~~x 16' 6"~~	Steel [2]*Fiberglass	up to 16,800 g~~9,000 g 8,820~~
~~NA~~	~~Piping with Mixing and Reaction Tanks #1~~	~~4"~~	~~Steel~~	~~NA~~
~~NA~~	~~All other piping~~	~~4"~~	~~PVC~~	~~NA~~
~~NA~~	~~3 x 4 pumps (40 hp motors)~~	~~3" x 4"~~	~~Steel~~	~~1000 gpm max~~
~~NA~~	~~2 x 3 pumps (25 hp motors)~~	~~2" x 3"~~	~~Steel~~	~~400 gpm~~
029	Waste Storage/Mixing # 5	~~15' 6" x 16'~~ API 12-F Modified 12'D	Steel [2]*Steel	up to 21,000 g
030	Waste Storage/Mixing # 6	~~15' 6" x 16'~~ API 12-F Modified 12''D	Steel [2]*Steel	up to 21,000 g
031	Waste Storage/Mixing # 7	~~15' 6" x 24'~~ API 12-F Modified 12' D 15.5' D	Steel [2]*Steel	up to 21,000 g~~21,000 g 5KL~~
032	Waste Storage/Mixing # 8	~~15' 6" x 24'~~ API 12-F Modified	Steel [2]*Steel	up to 21,000 g ~~21,000 g~~
NA	Piping	Various	Steel [2]*Steel	Various
NA	Pumps	Various	Steel [2]*Steel	Various

Note

[1] The SSUs are equipped with vapor balance lines which are simultaneously connected to each of the other eight (8) Waste Storage and Mixing Tanks.

[2]*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.

~~As discussed in Section IV.D.1, TGD will use various construction material(s) to accommodate differing waste stream characteristics. Both steel and PVC will be used in the Waste Storage/Mixing/Reaction System. Pipes and valves associated with Waste Storage/Mixing Tank #1 and Reaction Tank #1 will be steel and used for storing and processing waste streams incompatible with fiberglass, PVC, and/or epoxy materials. All other piping and valves will be PVC.~~

~~Storage and processing design criterion is discussed in section IV.C.3, Specifications and Design Criterion, Wastewater Storage Capacity~~
~~As discussed in Section IV.D.1, TGD will use various construction material(s) to accommodate differing waste stream characteristics. Both steel and PVC will be used in~~

~~the Waste Storage/Mixing/Reaction System. Pipes and valves associated with the Waste Storage/Mixing Tank #1 and Reaction Tank #1 will be steel and used for storing and processing waste streams incompatible with fiberglass, PVC, and/or epoxy materials. All other piping and valves will be PVC. Piping and equipment will be constructed of carbon steel.~~

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 ~~and Reaction~~ 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~~, monthly and annual~~ inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

Managing Incompatible Wastes

~~In order to fully isolate incompatible waste streams, Waste Storage/Mixing Tank #1 and Reaction Tank #1, and all associated piping, will be completely separate from other waste storage and processing equipment. In order to fully isolate incompatible waste streams, Waste Storage/Mixing Tank #1 and Reaction Tank #1, and all associated piping, will be completely separate from other waste storage and processing equipment.~~ Temporary jumpers may be installed, when incompatible wastes are ~~not~~ being received, to cross-connect equipment ~~for redundancy~~preventing incompatible waste from interacting.

Construction Materials, Corrosion, and Incompatible Materials

~~Texcom Gulf Disposal will use construction materials compatible with the various waste streams authorized for receipt and disposal. Waste Storage and Reaction Tanks # 1 are made of steel and Waste Storage and Mixing Tanks 2, 3, and 4 and Reaction Tank # 2 are made of fiberglass. Waste and Reaction Tanks numbered 1 will be used for waste streams that are potentially incompatible with fiberglass construction materials. Waste and Reaction Tanks numbered 2, 3, and 4 will be used for all wastes that are not incompatible with fiberglass materials. Steel and PVC piping will be used for steel and fiberglass tanks, respectively. Since no corrosive material can be accepted, all tanks and piping will be constructed of steel which also allows for complete facility grounding.~~

~~Texcom Gulf Disposal~~TGD will use construction materials compatible with the various waste streams authorized for receipt and disposal. ~~Waste Storage and Reaction Tanks # 1 are made of steel and Waste Storage and Mixing Tanks 2, 3, and 4 and Reaction Tank # 2 are made of fiberglass. Waste and Reaction Tanks numbered 1 will be used for waste streams that are potentially incompatible with fiberglass construction materials. Waste and Reaction Tanks numbered 2, 3, and 4 will be used for all wastes that are not incompatible with fiberglass materials. Steel and PVC piping will be used for steel and fiberglass tanks, respectively.~~ Since no RCRA corrosive material can be accepted, all tanks and piping will be constructed of steel or other materials which allows for ~~complete~~ 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~~, PID Inj 001~~

Dimensions, Capacities, and Material

Table IV.K~~I~~ Injection Tanks & Pumps and Piping

Unit #	Waste Management Unit/Equipment	~~Dimensions or Diameter~~Specification (diameter)	Material	Capacity
016	Injection Tank # 1	~~14' x 27' 4"~~ API 12-F~~ Modified~~ 12'~~ D~~ ~~15' 6" x 24'~~	Steel [1]~~Fiberglass~~	up to 21,000 g~~30,000 g 21,000 g; 500 bbls~~31.5K g; 750 ~~bbls~~
017	Injection Tank #2	~~14' x 27' 4"~~ API 12-F~~ Modified~~ 12'~~ D 15' 6" x 24'~~	Steel [1]~~Fiberglass~~	up to 21,000 g~~30,000 g 21,000 g; 500 bbls~~31.5K g; 750 ~~bbls~~
NA	~~Triplex Injection Pump~~ Centrifugal Pumps or equivalent	NA	Steel [1]~~Steel~~	500 gpm~~ max~~
NA	Piping to Injection Pump	4"	~~PVC~~ Steel [1]	NA

NA	Piping from Injection Pump	4”	Steel [1] ~~Poly Nitrile Steel~~	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, ~~and~~ 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~~, monthly and annual~~ inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

~~Safety Design Features~~

~~TexCom Gulf Disposal will incorporate three (3) automatic shutdown features into the injection system. The injection pump will be automatically stopped and visual and audible alarms sounded with (1) injection high levels, (2) low salinity concentrations, and (3) high particle concentrations as evidenced by an elevated differential pressure across the polishing filter. The salinity and particle design features are intended to protect the formation from adverse injectate characteristics and to serve as a quality check on TGD's waste water treatment processes.~~

~~Safety Design Features~~

~~Texcom Gulf Disposal will incorporate three (3) automatic shutdown features into the injection system. The injection pump will be automatically stopped and visual and audible alarms sounded with (1) injection high levels, (2) low salinity concentrations, and (3) high particle concentrations as evidenced by an elevated differential pressure across the polishing filter. The salinity and particle design features are intended to protect the formation from adverse injectate characteristics and to serve as a quality check on TGD's waste water treatment processes.~~

~~IV.D.5 Stormwater and Saltwater Tanks & Pumps and Piping~~

~~*Surface Application, Section IV.G.1*~~

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

~~**Dimensions, Capacities, and Material**~~

~~**Table IV.J Storm water and Saltwater Tanks & Pumps and Piping**~~

Unit #	Waste Management Unit	Dimensions	Material	Capacity
024	Saltwater Tank #1	14' x 27' 4 "	Fiberglass	30,000 g
025	Stormwater Tank #1	14' x 27' 4 "	Fiberglass	30,000 g
026	Freshwater Tank	10' x 16' 6"	Fiberglass	9,000 g
NA	All Pumps	4"	Steel	1000 gpm max
NA	All Piping	4"	PVC	NA

See Section IV.C.3, Specifications and Design Criterion for detailed discussion of issues related to stormwater design and capacity., such as Pumping Accumulated Liquids and Storing 100 Year, 24 Hour Stormwater Volumes.

The Saltwater Tank is used to store saltwater from TGD's onsite saltwater well for mixing of wastewaters and also to periodically flush the injection wells for formation and component health.

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. 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, weekly, monthly and annual inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

Because of the need to accommodate a 100 year, 24 hour storm event, the Stormwater Tank will have overflow lines to both the Saltwater Tank and the Injection Tanks.

Salinity Adjustment
In order to ensure that injectate does not swell the clay constituents in the formation, TGD will ensure that the injectate meets a minimum chloride concentration. TGD will add a sufficient volume of saltwater to raise the injectate to levels above the OMNI laboratory critical salinity test results for clay reaction with freshwater (15,000 ppm). See Attachment 3, Critical Salinity Analysis. Mixing chloride concentrations are 62,000 ppm. See Attachment 4, Formation Fluids Laboratory Analysis, ACE Technologies.

Using the basic equation $C_1V_1 + C_2V_2 = C_fV_f$; where

C_1 = Incoming wastewater concentration (assumed low @ 1 ppm)

V_1 = Incoming wastewater volume

~~C_2 = the mixing solution (saltwater) concentration~~
~~V_2 = the mixing solution volume~~
~~C_f = Final (injectate) concentration (from salinity test)~~
~~V_f = Final injectate volume (wastewater plus diluting volumes)~~

~~Based on the above, a mixing ratio of 0.32 is required to raise injectate chloride levels above the critical salinity value.~~

~~**Table IV.J Calculating Injectate Salinity Adjustment**~~

~~**Waste**~~		~~**Saltwater**~~			~~**Injectate**~~	
~~Concentration (ppm)~~	~~Volume (gallons)~~	~~Concentration (ppm)~~	~~Volume (gallons)~~	~~Ratio~~	~~Concentration (ppm)~~	~~Volume (gallons)~~
~~1~~	~~1000~~	~~62000~~	~~319~~	~~**0.32**~~	~~15000~~	~~1319~~

IV.D.56 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 PID4

Dimensions, Capacities, and Material

Table IV.LK Ancillary Equipment & Pumps and Piping

Unit #	Waste Management Unit/Equipment	Dimensions	Material	Capacity
008	Solids Bin #1	8' x 22'	Steel	20 cubic yards
009	Solids Bin #2	8' x 22'	Steel	20 cubic yards
010	Oil/Water Separator	4' x 10' x 6'	Steel	100 gpm
011	Filtration Unit #1	8' x 8' x 4' 2 pots 3' x 3'	Steel or other compatible material	250 gpm
012	Dewatering System	6' x 16' x 6'	Steel	100 gpm
NA	All Piping	4" Various	PVC 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 Solids Binsroll-off boxes. When operators observe observe levels increasing in one roll-off box is at capacitySolids Bin, 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, however, all operations use of that equipment 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, monthly and annual inspections. Secondary containment, sloped drainage, and sump and pump will also assist with spill control.

ENCLOSURE E

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TCEQ ePay Receipt

Transaction Information

Trace Number:	582EA000302376
Date:	05/18/2018 09:56 AM
Payment Method:	CC - Authorization 000036207P
Amount:	$150.00
ePay Actor:	Lara Garey

Payment Contact Information

Name:	Wade M Wheatley P E
Company:	Gds Associates Inc
Addr ess:	919 Congress Ave Suite 1110, Austin, TX 78701
Phone:	512-494-0369

Cart Items

Voucher	Fee Description	AR Number	Amount
371046	NONHAZARDOUS WASTE PERMIT - NEW, AMENDMENTS & MODIFICATIONS		$100.00
371047	30 TAC 305.53B HWP NOTIFICATION FEE		$50.00

ENCLOSURE G

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58 LAKE WINDSOR CIR
CONROE TX 77384-4481

PENA RAY JR & BETTY M
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MONTGOMERY TX 77356-9023

FILLMAN DONALD F
11211 CROWN PARK DR
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16080 CREIGHTON RD
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TEXCOM GULF DISPOSAL LLC

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12262 FM 3083 RD
CONROE TX 77301-6106

T&W WATER SERVICE CO
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CONROE TX 77305-2927

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PO BOX 691489
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SHEPARD JERRY FRANK
16164 CREIGHTON RD CONROE TX
77302-6024

SALA REAL ESTATE LLC
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CONROE TX 77301-6106

TEXCOM GULF DISPOSAL LLC

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