

City of Sugar Land
Ground Storage Tank (GST) Condition Assessment & Asset Management Report
Scope of Services
6/19/2018

Project Overview:

FNI will develop an Asset Management Plan (AMP) for ground water storage tanks (GST) for the City of Sugar Land (COSL) Water utility. The FNI team will apply the AMP on three ground storage tanks within the City. The FNI team will inspect three tanks and provide a framework for the COSL to complete assessments of future tanks.

FNI will provide the client with a summary report outlining the ground storage tank AMP which will include asset inventory, asset levels of service, asset condition assessment, asset deterioration algorithm and remaining useful life estimation and business case risk exposure. The COSL will be able to utilize these reports and templates to perform additional analysis or to import into various databases as they needed.

Task A – Kick-off Meeting/Review Scope of Work and Overall Goals for Project

A Project Kick-off and scope of work review meeting with the COSL project team will be setup to confirm project goals, project schedule, data needs, and deliverables related the tasks within this project.

During this initial project phase, a communications plan will be established in addition to technical, task-related meetings. Monthly Status Reports will also be submitted that summarize progress and document upcoming tasks. The report will outline upcoming key decisions which will require input from or discussion with the City.

FNI will develop and review a data request memorandum outlining critical information needed for the overall project.

Task B – Asset Inventory and Level of Service Review

Conduct a GST Asset Inventory and Level of Service Workshop to outline data needs to ensure the completeness and format of data for use in the Risk Based Renewal Prioritization and Capacity/Operational Level of Service Metrics to be used in Asset Management Plan. Identify existing GST asset data sources the COSL currently has on the ground storage tanks.

B.1 - Review the GST asset data that is available to the FNI team. Review GIS, CMMS as-builds, and other data sources. Determine what useful asset information the city / utility has and that can be used with the Sugar Land team input. Identify relevant asset condition data and gaps that will need to be gathered in the field during the on-premise condition assessment.

B.2 – Review Level of Services alternatives for COSL that will be utilized throughout project for triggers for repair/rehabilitation and replacement business case decision model process.

B.2 – Electronically scan into PDF format the available GST asset information that is deemed useful in decision making for entire asset lifecycle. This will include as-built drawings, GIS data and other electronic information.

Task C- Develop Condition Assessment Approach / Plan

FNI will develop a phased plan for performing a condition assessment of the ground storage tank (GST) facilities. Planning for the GST condition assessments will be coordinated with the COSL project manager, public works water operations team and others as needed to assure necessary activities have been identified, agreed upon and actions taken by COSL prior to the on-site assessment. The objective of this planning is to assure the COSL meets the water demands of it's customers as well as to establish a safe environment for the assessment crew. Work activity and approval of site inspections will be coordinated with the COSL project manager.

The FNI assessment team will inspect 3 of the total 25 ground water storage tanks identified to assess the condition of these facilities. The three types of tanks will be representative of the utilities types of ground storage tanks in service. Those storage tank types are concrete tank, galvanized steel tank, and coated steel tank. Data sheets will be compiled documenting the condition of the major tank components including mechanical, structural, electrical, site and other key facility information on physical condition. FNI will also review available maintenance records for water system facilities. The site visits are for observing the condition only and do not include detailed testing of equipment. Data sheets detailing the results of the site visits will be provided to the City in excel format.

C.1 - Identify pre-inspection activities that need to be addressed and or performed prior to the FNI team assessment.

C.2 – In a workshop setting, plan for assessing the condition of the three types of identified tanks:

Each type of tank will be assessed and the following general items will be documented. The TCEQ guidelines for storage tanks will be used as part of the assessment. The characteristics of concrete and steel tanks will be considered, and slightly different assessment checklist may be developed for these types of tanks.

- a. If there is evidence of a leak at a tank: It will be noted, and the Owner will be informed to determine if further evaluation is required.
- b. If the coatings and or linings are significantly deteriorated and need further inspection: The Engineer will report back to the City with recommended next steps beyond this contract.

C.3 - Items Provided by Owner:

- a. Access to all sites and all locked items that need to be opened
- b. Available plans of tanks and associated systems
- c. Available annual inspection reports

C.4 - Develop Inspection Plan and Checklists for All Tanks:

Observation of the items in the TCEQ Maintenance and Housekeeping provision [§290.46(m)(1)] including:

- a. Vents are in place and properly screened
- b. Roof hatches closed and locked
- c. Flap valves and gasketing provide adequate protection against insects, rodents and other vermin
- d. The interior and exterior coating systems are continuing to provide adequate protection to all metal surfaces
- e. Tank remains in watertight condition

Observation of the relevant items in the TCEQ Water Storage Tank Construction Checklist, including vents, manways, hatches, drains, overflows, ladders, level indicator, instrumentation, inlet and outlet type, roof slope, and other features. This will be included as part of the overall field inspection checklist that will be developed.

Task D - Onsite Condition Assessment

The FNI project manager will verify that all necessary pre-inspection actions have been completed by COSL to assure the tank is safe to inspect. Once verification that all preparation is complete the FNI condition assessment team will visit 3 ground water storage tanks (GST) identified to assess the condition of these facilities. Data sheets will be compiled documenting the condition of each GST parameter such as mechanical, structural, and other physical data. FNI will also review available maintenance records for water system facilities. Data sheets detailing the results of the site visits will be provided to the City in excel format.

D.1 - The inspection schedule, including tank locations to be inspected by date, will be produced and inspections will be carried out accordingly. Daily communication with COSL project manager will be done to confirm all is ready to perform the inspection at each location.

D.2 – Field condition assessments are performed. FNI to update schedule showing GST sites completed and on schedule or not.

D.3- GST condition data is compiled. Ongoing QC by FNI will be performed to assure completeness of data captured for each location.

D.4 – Initial condition assessments are provided to the client upon completion

The inspection FNI inspection team will engage the COSL project manager to verify the checklist of information to be gathered. Sample list below based upon TCEQ requirements:

Exterior inspection checklist:

- Foundation: settling, cracks, deterioration
- Protective Coating: rust, pitting, corrosion, leaks
- Water Level Indicator: operable, cable access opening protected
- Overflow Pipe: flap valve cover accessible, operable, sealed
- Access Ladder: loose bolts or rungs

- Roof: low spots for ponding water, holes along seams, rust
- Air Vents: proper design, screened, sealed edges and seams
- Cathodic Protection Anode Plates: secured and sealed
- Roof Hatch: proper design, locked, hinge bolts secured, gasket

Interior inspection checklist:

- Water Quality Indicators: insects, floating debris, sediment, but no sampling is planned
- Protective Coating: rust, corrosion, scaling
- Structure: floor, walls, columns, and roof will be assessed by visual inspection from the floor of the tank
- Interior Access Ladder: loose bolts or rungs
- Piping: inlet, outlet, overflow, and drain piping

D.6 - Items Provided by Owner:

- a. Inspection of the interior of ground storage tanks will be made safely accessible for entry of the FNI's personnel. COSL will provide required access and safety equipment, including air monitoring devices and additional safety personnel outside the tank during the inspection. FNI will provide their own PPE that can be disinfected prior to entering the ground storage tanks.
- b. COSL will dewater the ground storage tanks.
- c. COSL will disinfect the ground storage tanks following inspections.
- d. Access to all sites and all locked items that need to be opened

Task E- Asset Deterioration/Remaining Useful Life Projection Model

The purpose this task is to utilize field condition inspections, NACE guidelines and work order management data to develop an asset deterioration algorithm that can be utilized for projections of remaining useful life.

- E.1- FNI will develop a scoring system to assign asset condition scores on a scale of 1 to 5 based on inspection and other multiple sources of data for each of the major components within each ground storage tank.
- E.2 – Conduct review workshop with COSL to review FNI scoring results and to make adjustments based on input for COSL operational staff.
- E.3 - Utilize the age of the facility, repair history and condition scoring to assign a remaining useful life projection for each component and the overall facility.

Task F- Business Case Risk Exposure Plan

The purpose this task is to conduct a business case risk exposure financial analysis to determine a recommended rehabilitation/replacement strategy for COSL on its existing ground storage tanks. Rehabilitation and/or replacement of existing assets shall be determined with a quantitative method

based on condition and criticality of the asset. Results will be prepared into a prioritized renewal/replacement plan.

F.1 - Utilize condition and criticality data and other supporting data to perform a risk-based analysis that will be used to produce a prioritized capital renewal plan.

F.2 – Identify project components that needs rehabilitation/replacement without resulting in overall facility replacement.

F.3 – Identify need for overall facility replacement and how the capital cost would support such as level of investment as compared with alternative efforts. [Workshop if required]

Task G - Asset Management Report and Dash Board

FNI will provide the COSL with an asset management report summarizing the storage tank asset inventory, the overall condition assessment scoring results, risk analysis scoring, predictive remaining useful life projections and overall business case risk exposure plan.

G.1- Provide the COSL with a summary report outlining the various components discussed above with the risk exposure scoring shown above. The report will include a forecast of capital funding needed for replacement of end of useful life GST tanks as well as renewal actions needed to assure the resiliency of the GS tank assets in service.

G.2 – FNI will review the Asset Management Report with COSL, deliver all models/tools to the City and review with staff for future use by the City.

Estimated Cost table by task:

Task	Description	Estimated Cost
Task A	Kickoff Meeting / Review Scope of Work	\$ 3,500
Task B	Asset Inventory / Level of Service Review*	\$ 8,000
Task C	Develop Condition Assessment Plan*	\$ 16,000
Task D	Onsite Condition Assessment (3 tanks)	\$ 15,000
Task E	Asset Deterioration/Remaining Useful Life Model*	\$ 21,500
Task F	Business Case Risk Exposure	\$ 19,000
Task G	Asset Management Report & Dash Board	\$ 17,000
	Totals	\$ 100,000

* Includes Workshop