



Evergreen North America

INDUSTRIAL SERVICES

GEM

AN EVERGREEN NORTH AMERICA COMPANY

Customer Type

Pipeline & Petroleum Products
Terminal

Project # / Name

2019-1-003

Customer Location

Los Angeles, California

Project Date

July 2019

Highlights

OVERVIEW

A major terminal has two tanks accumulating wastewater from various sources year-round, including contaminated rainwater, tank water draws, hydrotests, and cleaning operations. An emerging category of contaminants not previously encountered was PFAS (PerFluoroAlkyl Substances). The compounds came from firefighting foam injected into water used to put out a fire at the terminal. GEM was tasked to remove the PFAS down to non-detect levels (13 parts per trillion), in addition to eliminating VOC's (including BTEX), oil & grease, sulfides, and TSS.

APPROACH

- **Scope of Work** – Provide mobile wastewater treatment services using California DTSC-permitted Transportable Treatment Units (TTU's) to process approximately 540,000 gallons of contaminated wastewater
- **Resources** – Two Technicians and a Supervisor ran the project each shift. Equipment and processes utilized included oil/water separation, air stripping, thermal oxidation, chemical injection, activated carbon, and basket filtration.

PFAS Wastewater Treatment

- Customer's wastewater tank had unanticipated PFAS contents after a fire incident
- GEM successfully removed PFAS to non-detect levels: below 13 parts per trillion
- GEM also met the discharge criteria for other compounds, incl VOC's, oil & grease, etc
- Onsite WWT of PFAS and other waste contaminants saved GEM's Customer over \$1.2 Million compared to Transportation & Disposal

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- **Pre-planning** – After GEM reviewed the POTW (industrial sewer) discharge criteria with our Customer, we collected samples of water to perform treatability studies. We compared pre-treated (raw wastewater) sample results to bench-scale treated samples. The primary contaminants of concern were PFAS, BTEX, emulsified oils & greases, and sulfides. The bench studies enabled us to determine the most economically effective equipment and processes to select for the project.
- **Execution Plan** – GEM updated our Job Safety Analysis to include PFAS treatment, setup the TTU’s, then processed a start-up / shut-down batch of wastewater (approx. 5,000 gallons) and sampled it for all discharge criteria. Upon successful treatment of all target compounds, we resumed treatment on a daily shift basis until all the water was processed. GEM optimized chemical use and carbon changeout to ensure complete treatment of the entire tank’s wastewater contents.
- **Duration & Flow Rates** – Treatment took 16 shifts to process 540,000 gallons averaging nearly 60 gpm

EQUIPMENT USED

- Oil-Water Separator
- Specialty Chemicals
- Air Stripper Towers
- Thermal Oxidizer
- Bag Filtration
- Carbon Filtration

CONCLUSION

- **Outcome** – The benefit of GEM onsite treatment is eliminating customer costs of hauling water to a distant and expensive hazardous waste disposal site
- **Customer Savings** – The typical cost for offsite transportation & disposal (T&D) for this profile of wastewater, which included PFAS and RCRA waste, is anywhere between \$2.50 and \$3.50/gallon all-in. Given the prohibition of disposal of PFAS-contaminated wastewater in California, GEM estimates we saved our customer over \$1.2 Million compared to out-of-state T&D to a hazardous waste processing facility. These figures don’t account for the cost of staff salary associated with waste reporting, nor the risk associated with potential over-the-road spills of hazardous wastewater.



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