



GULF COAST REFINERY - TURN-KEY REFINERY TREATMENT

Project Scope

A gulf coast refinery periodically used hydrogen peroxide (H_2O_2) at their WWTU Bio Unit. The H_2O_2 was used to supply supplemental dissolved oxygen DO to maintain a target DO level of 5 ppm in the aeration basins during high chemical oxygen demand (COD) loading periods.

Two parts of hydrogen peroxide yields one part of dissolved oxygen:



This reaction occurs rapidly in aeration basins, and thus provides an immediate source of DO for the biomass. Since H_2O_2 is a liquid, and infinitely soluble in water, the amount of DO provided to the aeration basin biomass is not limited by mass transfer of oxygen from air to liquid as is the case with mechanical aeration.

A local distributor supplied 35% H_2O_2 to the refinery in 55-gallon drums. The drums were stored on wood pallets, which violated industry safety standards. The drums of 35% H_2O_2 also required changing out the drums, which increased the risk of spills and exposure to operators. The Safety Department identified the violation and deemed the drums of 35% H_2O_2 as unsafe. They were subsequently removed from the plant.

During a turnaround of an upstream unit, higher COD loading depleted the dissolved oxygen level in the WWTU Aeration Basins, resulting in ineffective treatment. Despite the use of additional mechanical aeration (diesel driven air compressors), sufficient wastewater DO levels were not being maintained. An alternative H_2O_2 supply approach had to be implemented right away.

Solution

The refinery approached USP Technologies (USP) to engineer a H_2O_2 chemical dosing system sized to meet the plant's DO demand. The system was requested to include integral secondary containment and had to meet Class 1, Division 2 electrical standards. The plant also expressed concerns about 35% H_2O_2 being a Class 2 Oxidizer.

With consideration to the engineering requirements and the urgency to respond with a treatment plan, USP developed a two-phase response. The first step was to address the immediate H_2O_2 treatment requirement and the second step was to implement a long-term solution.



USP Technologies turn-key dosing system example

Program Benefits

The USP 27% H_2O_2 treatment program offered the refinery several benefits:

- It provided a simple and effective means to provide supplemental dissolved oxygen during periods of high BOD/COD loading to the WWTU Bio Unit.
- The use of a Class 1 Oxidizer (Refinery Grade 27% H_2O_2) and a turn-key storage and dosing system offered a safe solution during periodic increases in BOD/COD loading to the WWTU.
- The program has also enabled the plant to remove the diesel driven rental air compressors, which is an additional cost and emissions issue.

Rapid Response Treatment Program (Phase I)

USP responded to the refinery's immediate need by quickly mobilizing a four-person project team, which included a local account manager and experts in the areas of technical applications, equipment system design and equipment installation/maintenance. The full-service chemical management team installed a USP Rapid Response System consisting of a 5,000-gallon temporary storage trailer and a modular dosing control system. Additionally, with the plant's desire to minimize risk exposure, USP provided a Refinery Grade Hydrogen Peroxide (27%), which is a Class 1 Oxidizer.

Upon the addition of Refinery Grade 27% H₂O₂ to influent of the WWTU Bioreactor System, the mg/L DO target was maintained during the high COD loading period.

Permanent System Treatment Program (Phase II)

Once the temporary system was commissioned, the USP project team turned their attention to providing a permanent chemical storage and dosing system. USP worked with the plant's engineers to determine the optimum dose point as well as the proper location for the chemical storage tank. The USP project team designed a program solution that included the following:

Equipment

- USP-5000 system consisting of a 5,000-gallon, double-wall HDPE storage tank with 110% integral secondary containment and all required safety relief devices.
- A dual-pump chemical dosing module sized to meet chemical dose requirements and designed to specific Class 1, Division 2 electrical requirements.
- All system components are pre-plumbed, pre-wired and passivated to ensure ease of installation and to maintain operational safety and product quality.

Field Services

- USP field service installed, commissioned and maintained the entire system to ensure operational reliability.

Chemical Inventory Management

- USP's ChemWatch™ inventory management system provides remote monitoring capability and enables USP to respond quickly to sudden high usage requirements at the facility.

The changeover occurred following the plant turnaround and was completed by the USP Field Services Team without incident and without disruption to the treatment program.

About USP Technologies

USP Technologies' ongoing mission is to help customers meet their water quality objectives by providing eco-efficient solutions that reduce and recover cost, energy, resources and space. Through a collaborative method of working closely with customers to solve problems, we are dedicated to developing innovative, sustainable and cost-effective solutions that successfully meet the highest standards of environmental stewardship. Our consultative approach includes application assessment, technology selection and field implementation of a custom engineered treatment solution. Our turn-key programs seamlessly integrate storage and dosing equipment systems, chemical supply, inventory and logistics management, and ongoing field and technical support. USP Technologies has been serving the water, wastewater and remediation markets for more than 20 years and has offices and field service locations throughout North America. We are the largest direct supplier of peroxygen-based technologies for environmental service applications and we manage hundreds of successful full-service chemical programs that treat over 1.0 billion gallons of water per day.

Getting Started

We look forward to supporting your treatment needs, whatever the scale of your requirements. To obtain a streamlined treatment solution tailored to your specific project, give us a call at (877) 346-4262.

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