



TURN-KEY HYDROGEN PEROXIDE PROGRAM HELPS REFINERY THROUGH AN AERATION BASIN MAINTENANCE OUTAGE

Project Scope

In the summer of 2010, a large refinery complex in the Northeast was facing a two to three month maintenance outage on one of two aeration basins in their activated sludge wastewater treatment system. During the outage all of the refinery wastewater would need to be routed through the one remaining aeration basin. Since the refinery periodically had difficulty maintaining dissolved oxygen (DO) levels with both aeration basins in service, they needed a temporary and non-capital means to provide the biological treatment system with supplemental DO during the maintenance outage.

Hydrogen peroxide (H₂O₂) has been used as a source of supplemental DO in activated sludge treatment systems for decades. In the aeration basin mixed liquor, H₂O₂ converts to DO according to the following reaction:



This decomposition to DO occurs very rapidly due to the catalytic effect of enzymes (e.g. catalase) present in all activated sludge mixed liquors, and thus provides an immediate source of DO to the biomass. Since H₂O₂ is a liquid, and infinitely soluble in water, the amount of DO provided is not limited by mass transfer of oxygen from the gas phase to the liquid as is the case with mechanical aeration.

More information about this application is provided on www.USPTechnologies.com under Industrial/Supplemental Dissolved Oxygen.



Supplemental Dissolved Oxygen

Solution

When the maintenance outage was initiated and wastewater flow was diverted to the lone aeration basin, DO levels rapidly dropped from the target range of 2-3 mg/L to near zero (0.1-0.2 mg/L). Dosing of 27% hydrogen peroxide into the effluent of dissolved air floatation (DAF) unit, just upstream of the aeration basin was started to offset this unacceptable drop in DO.

Within a matter of hours, a measurable DO increase was observed and continued to trend upward throughout the day. Within 24 hours of starting H₂O₂ dosing, the DO levels in the aeration basin were back in the 1-2 mg/L range, and within 48 hours had reached the refinery targeted 2-3 mg/L range.

Dosing of 27% H₂O₂ was continued throughout the maintenance outage and maintained the DO levels required for effective BOD removal and nitrification (ammonia removal).

It is noteworthy that during the outage the refinery experienced no filamentous bulking episodes. This translated to good clarifier settling, which had historically been a concern when treatment system DOs were experienced.

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Turn-key Scope of Supply

The refinery contracted USP Technologies (USP) to provide to provide a turn-key supply scope that included:

- 27% Refinery Grade hydrogen peroxide (H₂O₂)
- Engineered storage and dosing equipment system
- Equipment installation and maintenance services during the project
- Remote monitoring and product inventory management
- Applications services, including dose rate optimization and process hazard analysis (PHA) support and safety training.

Program Benefits

USP's 27% H₂O₂ treatment program offered the refinery several benefits:

- USP's turn-key supply scope provided a safe and cost effective solution for supply of supplemental dissolved oxygen to this large refinery during the maintenance outage.
- The biological treatment system's performance during the outage convinced the refinery to maintain the H₂O₂ storage and dosing system on site to provide supplemental DO on an as-needed basis during periods of high BOD/COD loading, upstream process upsets, and filamentous bulking episodes.

About USP Technologies

USP Technologies is the leading supplier of peroxygen-based technologies and services for environmental applications. We have been serving the water, wastewater and remediation markets for over 20 years and have offices and field service locations throughout North America. Our consultative approach to problem solving includes application assessment, technology selection and development of a tailored treatment approach. Our full service programs successfully integrate storage and dosing equipment systems, chemical supply, inventory and logistics management, and ongoing field and technical support. This approach provides cost-effective, "hands-off" solutions to our customers. USP Technologies also can provide access to experienced application partners for a turn-key program encompassing engineering, site characterization and technology selection, program implementation, execution and report generation.

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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