

GELATIN MANUFACTURER

RELIES ON REAL TECH'S WASTEWATER MONITORING SYSTEM

REALTECH
INC.

WATER QUALITY
MONITORING
SOLUTIONS

Case Study



**RAPID DETECTION
ENSURES
NPDES
COMPLIANCE**

LOCATION:

Midwestern
United States

SOURCE TYPE:

Industrial
Wastewater

PARAMETERS:

Biochemical Oxygen
Demand (BOD),
Total Suspended Solids (TSS),
Ammonium (NH₄),

APPLICATIONS:

Event Monitoring,
Wastewater Treatment
Optimization
Compliance Assurance

SYSTEM:

Real Spectrum PL Sensor,
Real Controller Pro,
Air Purge Pump Clean System,
Liquid Ai™



To ensure that the quality of their wastewater effluent doesn't violate permit limits, a gelatin manufacturer relies on Real Tech's wastewater monitoring system for online and real-time BOD, TSS, and ammonium data. While providing strong peace of mind for NPDES permit compliance, the system also serves as a valuable process control tool that enables the operations team to catch events sooner. Data driven decisions made this way yield more appropriate actions and ensure that treatment goals are met.

Overview

A food manufacturing facility in the Midwestern United States produces gelatin, a protein derived from the collagen in animal parts. The production of gelatin generates large volumes of wastewater with high biochemical oxygen demand (BOD), suspended solids (SS), and ammonium/ammonia nitrogen (NH₄/NH₃-N) concentrations. The manufacturing facility manages this high strength wastewater onsite through treatment with dissolved air floatation (DAF) and aeration followed by four large lagoons. Effluent from the lagoons is then discharged directly into a local river.

Increased Production Strains WWTP, Jeopardizes Effluent Water Quality

Over the years, production at the facility has increased without corresponding updates to the wastewater treatment plant (WWTP). This has caused major challenges for the WWTP, prompting the environmental team to investigate solutions that would help manage these ongoing issues and aid in the better treatment of the wastewater effluent. Effluent quality is the highest priority for the environmental team as they strive to comply with EPA NPDES permit limits and ensure protection of their local water system. Of the pollutants monitored, biochemical oxygen demand (BOD), ammonium nitrogen ($\text{NH}_4\text{-N}$) and total suspended solids (TSS) posed the greatest challenges.

Reducing BOD Turnaround Time from Days to Minutes

Delayed results from the lab, consistently 7 to 8 day turnaround time for BOD, significantly hindered the WWTP's ability to react to different situations and meet treatment goals. This led the environmental team to Real Tech and their wastewater monitoring system that is capable of continuously monitoring BOD, TSS and $\text{NH}_4\text{-N}$ with high reliability and accuracy.

The team was impressed by Real Tech's ability to overcome the challenges most sensors face in harsh industrial wastewater environments.

Real Tech's innovative solution combines a robust hardware sensor system with Liquid Ai data analytics support. This has enabled the plant to gain access to accurate and reliable real-time water quality data for complex parameters, such as BOD as shown in Figure 1, and eliminate the weeklong wait for insights into their effluent quality.

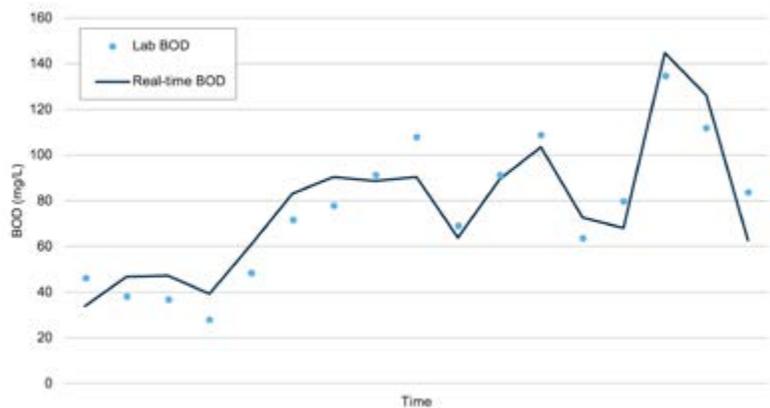


Figure 1: Real-time BOD data from Real Tech monitoring system along with laboratory BOD results.



Liquid Ai™ Data Service in Action

The plant's Liquid Ai service offers the environmental team peace of mind that the integrity of their data is upheld, as Real Tech is continuously monitoring and making improvements to the BOD, TSS and ammonium calibrations over time. Figure 2 displays the value in Liquid Ai data service, showing the real-time TSS data with continuous monitoring and improvement versus a TSS calibration left untouched. As shown in the graph, when the initial site-specific calibration was built, the output by the system was accurate enough for trending purposes. However, changes in wastewater composition that are hard to capture in a short calibration period lead to lower accuracy over time. As the graph displays, the lab results and the real-time TSS unattended results, shown in red, started to deviate from each other.

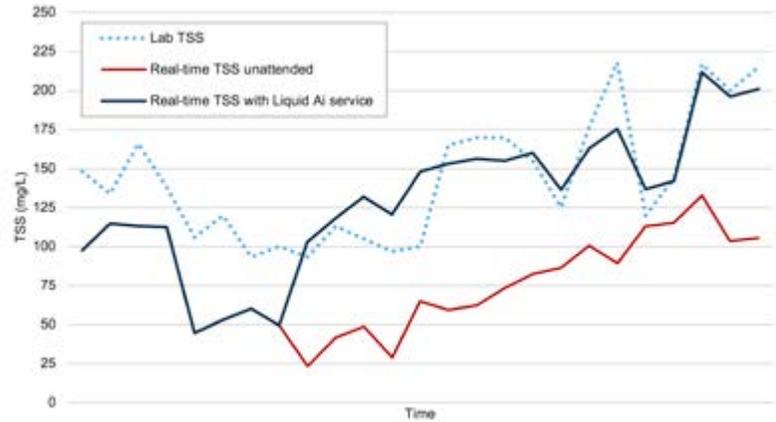


Figure 2: Liquid Ai data service results, representing the difference between a continuously updated calibration and an unattended calibration.

Liquid Ai calibration health data services provided the needed adjustment of the calibration model in the long term where the effect of composition changes is accounted for. This particularly applies to aggregate parameters, such as BOD/COD/TOC and TSS as they represent a large group of compounds rather than a specific chemical compound. The larger the site's calibration set gets, by adding new data over time, the better the match will be between lab results and real-time sensor results as shown in this figure.

In addition to minimizing calibration drift from water composition changes to maintain data integrity, the plants Liquid Ai data service also manages drift from the sensor hardware itself. For this particular site, an ISE (ion selective electrode) ammonium sensor was installed as part of the system. ISE sensors are known to drift if not calibrated frequently. A drifting ISE sensor can still provide valuable information as the output from the sensor will trend similarly to the actual values, as shown in Figure 3. In this case, process control information could be derived from the sensor. However, over time the drift may become very large making it harder to work with the data.

Real Tech's Liquid Ai data services ensure that the readings are corrected, when necessary, to provide higher accuracy. The corrections are done based on reference lab samples to account for the site-specific background effect. In Figure 3, an adjustment was made as indicated by the arrow marked "Liquid Ai service update". This update allowed for much more accurate results. With Liquid Ai service, the team is benefiting from accurate and reliable data, giving them the certainty they need in their results.

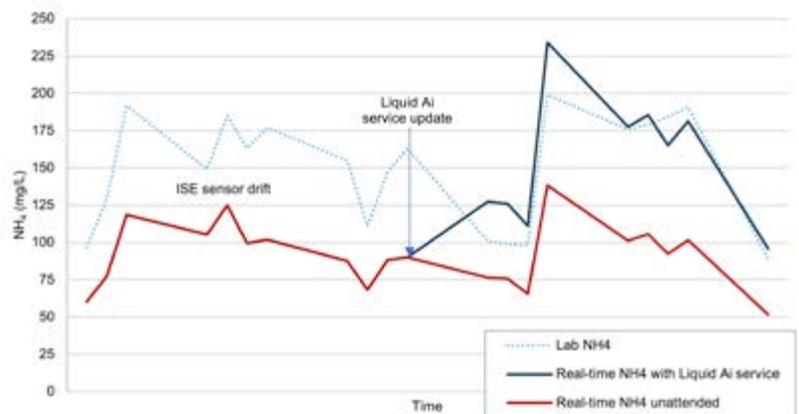


Figure 3: Liquid Ai data services for simple and effective management of ISE sensor drift.

Taking Appropriate Actions to Achieve Compliance

With real-time visibility of their effluent water quality and high confidence in their data, the environmental team at the gelatin manufacturing site is now taking actions every day to improve treatment. Onsite staff have water quality data from the Real Tech system connected to their phones and receive immediate notification when water quality is approaching set thresholds. This allows the staff to not only respond sooner, but with more informed and appropriate actions to quickly and efficiently resolve issues.

The real-time data provides strong value by helping the plant ensure effluent water quality meets permit limits. The facility has the ability to blend wastewater that exceeds the daily concentration limit outlined in their permit with an onsite clean water source. This enables the plant to reduce their effluent concentration and avoid permit violations. The staff use data from the Real Tech system to aid with flow adjustments of the clean water and are then able to monitor to verify the changes made achieved the desired results.

Summary

Taking a proactive approach to gain better insights into their water quality has helped to simplify management for the operations team. While production continues to challenge the WWTP, the team are more confident than ever in meeting their NPDES permit thanks to their real-time BOD, TSS and NH₄ monitoring system from Real Tech.

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