

CASE STUDY: HIT Systems

Headworks' Modular HIT Systems Provide a Variety of Solutions to WWT Challenges!

Background

Headworks Bio supplies biological treatment systems based on the moving bed biofilm reactor ("MBBR") technology for a wide array of needs including modular units for smaller requirements or temporary needs. These Headworks Integrated Treatment ("HIT[®]") systems are extremely flexible and the technology is available in various formats from small complete units to modular field erected tanks.

In this article, we describe some of the HIT system configurations we've recently supplied to clients in sewage, offshore drilling and mining markets. The suitable flow sizes for such compact systems (often referred to as package plants) range from 30 – 2,000 m³/h (8,000 – 800,000 gpd).

Beside the benefits of the MBBR process, the modular format brings many additional advantages:

1. Minimal required site work and onsite labor. Remote sites such as mines near the Arctic Circle and an offshore drilling company are some of the customers who have installed HIT systems.
2. The equipment is pre-assembled in our fabrication shop and commissioned. This minimizes the chances of costly re-work onsite.
3. Easy to transport to multiple sites. When treatment objectives are met at one site, the treatment system may be moved to another site. Skid mounting offers flexibility in operations – for example, when an oil-well is completed the treatment system may be moved to a new oil-well work site.
4. The modular treatment systems can be implemented in a variety of tanks: custom-fabricated tanks, frac tanks used in the oil and gas drilling industry or in a complete assembly made of SS304, SS316 and composite materials.
5. HIT Systems minimize tank and shipping costs. When the modular treatment systems are installed in a standardized tanks such as frac tanks or ISO shipping containers, the cost of the the overall project can be significantly reduced.
6. The design enables expansion of treatment capacity when

needed. When required treatment capacity is difficult to predict, the modular systems can be quickly implemented for an initial capacity and expanded as need depending on future capacity required.



Figure 1: Headworks Modular System transported to site in Qatar



Figure 2: Schematic of a Modular System installed inside an ISO shipping container

CASE STUDY 1: Off Shore Drilling Company in West Africa

Due to the limited availability of skilled labor, limited space and tight schedule, the client was looking for a modular system completely installed, tested and commissioned in our fabrication shop and shipped in a shipping container. The client also wanted to be a responsible part of the community and provide treated reusable water to the area. The only onsite work would be connecting the influent and effluent pipes. After the successful implementation of Phase 1 system, the client ordered another system for Phase 2.



Tanker trucks transporting sewage in Qatar.

A municipality in Qatar was impressed with the minimal site work associated with Headworks modular plants. It purchased two systems, each with a capacity of 200 m³/day, or 55,000 GPD. The overall project implementation time was reduced to 4-6 months instead of 2-3 years for onsite concrete-tank treatment systems. The flexible and affordable modular system enables the municipality to expand at a measured pace as the population grows rather than building a large centralized plant.



Figure 4: Decentralized Modular Treatment System in Qatar

CASE STUDY 3: Gold Mine in Remote Northern Saskatchewan, Canada

The gold mine in Saskatchewan is located close to the Arctic Circle and accessible only during the winter for a few months over an ice road. The rest of the year there is access only by chartered flights. When the gold mine had to treat explosives laden

wastewater, MBBR was the obvious solution. Due to the very tight deadlines to get the equipment to the site before the ice road melted as well as other site constraints, Headworks came up with an innovative solution to implement a modular treatment system inside readily available frac tanks. Delivery was on time and in budget.



Figure 5: Modular Treatment System inside a frac tank

The MBBR process installed at the gold mine took only a few weeks to acclimate and reached the full potential within one month. In addition, even with highly varying flows (Figure 6), effluent ammonia concentrations (NH₃-N TK 120) were less than 2 mg/l. The temperature of the wastewater went from 20° C (68° F) at startup down to 8° C (46° F) within a few months (Figure 7). The system performance was excellent even with all of the extreme load and temperature variations.



Figure 3: Modular System for an offshore driller in West Africa

CASE STUDY 2: Decentralized Sewage Treatment System in Qatar

Due to the rapid population growth in the Middle East, municipalities and governments are determined to keep up on building infrastructure. It is not uncommon to see trucks transporting sewage to a central treatment plant due to the lack of sewer connections in some places. Decentralized plants can create point of use solutions as new communities are developed. The delay associated with building a centralized treatment plant is another factor favoring HIT Systems.

Conclusion

Virtually any industrial or municipal wastewater challenge has been solved by the Headworks Bio team. With installations in 35 countries, we have the experience you need to take your worst water and make it reusable!

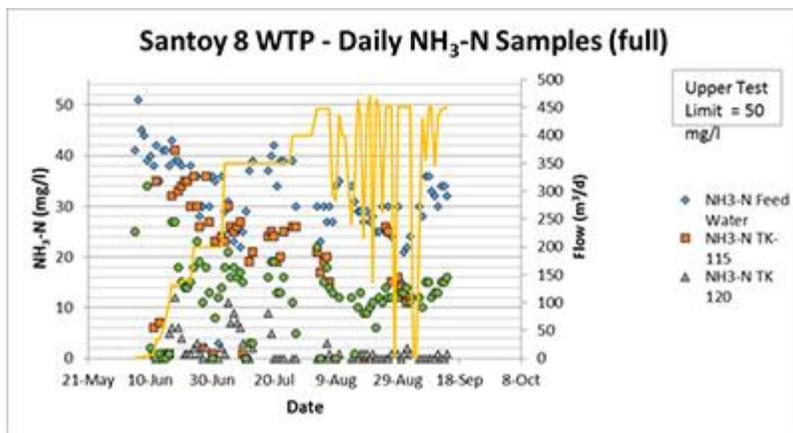


Figure 6: Modular System's resiliency with widely varying flows

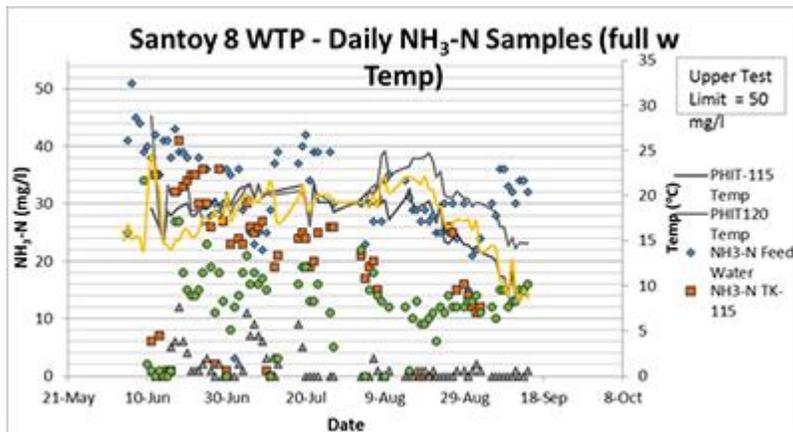


Figure 7: Modular System's resiliency with widely varying temperatures