LEMNA ENVIRONMENTAL TECHNOLOGIES, INC.

CASE STUDY

Montana State Hospital
Warm Springs, MT

Cold Climate Treatment Plant Upgrades Lagoons for Long-Term Compliance

The Montana State Hospital, located in the tranquil town of Warm Springs, MT, stands as a cornerstone of the state's mental health care system.

The Hospital needed to upgrade its wastewater treatment facility to address both operational challenges and regulatory compliance requirements. As the largest state-run psychiatric hospital in Montana, the facility generates a significant volume of wastewater daily, containing a complex mix of biological and chemical contaminants. Over time, the existing treatment system became outdated and inefficient, struggling to meet the increased demand and the stricter environmental standards set by regulatory agencies.

Insulated Covers for Heat Retention

The upgrade was essential to ensure the hospital's wastewater treatment system could effectively remove contaminants before safely discharging treated water. This was especially crucial in Warm Springs, where preserving water quality is essential for public health and regulatory compliance. Furthermore, modernization was necessary to enhance the facility's overall efficiency and reliability by integrating advanced treatment technologies to meet growing demands.

Lemna's Tailored Innovative Solution

Lemna Environmental Technologies designed and implemented an advanced lagoon-based treatment system. This system was designed to process a flow of 0.238 MGD. The solution included a three-lagoon series:

- **The Power of Aeration:** The first lagoon, a complete mix cell with high-rate diffusers, became a dynamic hub for rapid BOD_5 and ammonia removal, fostering a thriving environment for both heterotrophic bacteria and nitrifiers.

DESIGN PARAMETERS

	INFLUENT	EFFLUENT
BOD	161 mg/l	30 mg/l
TSS	178 mg/l	30 mg/l
NH3	26.5 mg/l	1.4 mg/l
FLOW	.238 MGD	

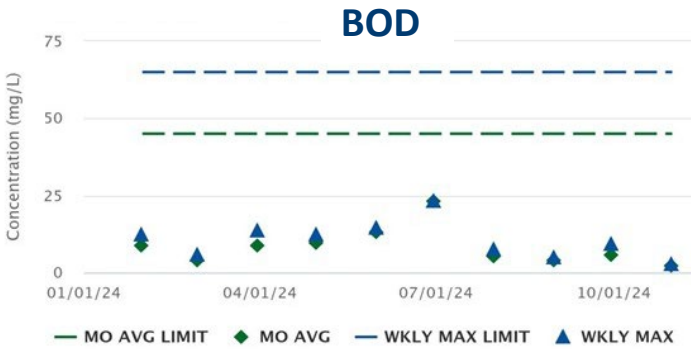
- **Enhanced Settling:** The second and third lagoons were designed as settling cells with low-rate diffusers for further BOD_5 removal and aeration.
- **Cold Weather Resilience:** Modular insulated covers capped all three lagoons, blocking algae growth, stabilizing temperatures, and enabling year-round nitrification—an essential feature for Montana's frigid winters.

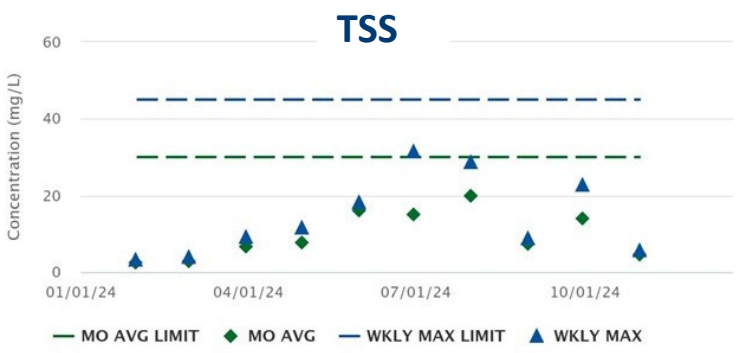
Following the lagoons, the LemTec™ Polishing Reactor (LPR) provided additional BOD and ammonia treatment using submerged growth media and coarse-bubble diffusers powered by two 60 HP blowers.

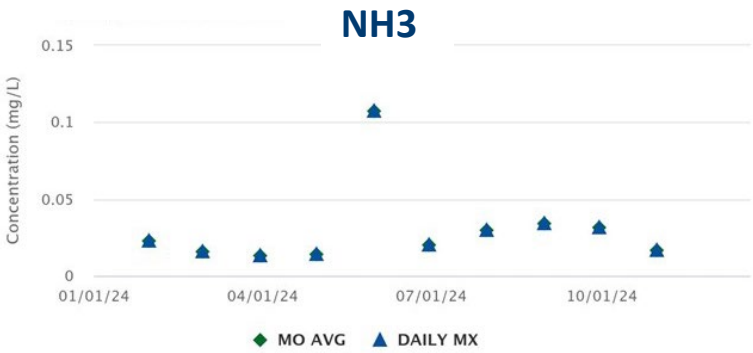
Exceptional Results: Regulatory Compliance and Community Confidence

By upgrading to Lemna's advanced lagoon system, Montana State Hospital has not only secured a reliable and cost-effective wastewater treatment solution but also successfully addressed the challenge of cold-weather nitrification. The system consistently meets BOD, TSS, and ammonia standards, ensuring full regulatory compliance even in harsh winter conditions.

As a result, the hospital has significantly improved treatment performance and strengthened community trust. With its enhanced biological treatment capabilities, the lagoon system safeguards local resources and supports future growth, demonstrating a forward-thinking approach to sustainable wastewater management.







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