

SAGR DOST-LAGOON COLD-WATER NITRIFICATION

| Criteria | | SAGR | |
|--|------------------|------|--|
| Effluent Quality at <1°C | | | |
| Ammonia-N (TAN) | <1 mg/L | • | |
| cBOD₅ | <5 mg/L | • | |
| Suspended Solids (TSS) | <10 mg/L | ٠ | |
| Advanta | iges | | |
| Fully nitrifies in <0.5°C/ <34°F wastewater | | ٠ | |
| Low O&M most com- parable to that of an aerated lagoon | | • | |
| Disinfects E. coli to <125 MPN/100 mL ● | | | |
| Applicat | ions | | |
| Municipal or trial post-lago | Indus- on TAN | • | |

| trial post-lagoon TAN | • |
|-----------------------|---|
| and BOD polishing | |
| Deicing Fluid- | |
| contaminated runoff | • |
| treatment at airports | |

Problem

Lagoons built for BOD and TSS removal have a hard time meeting today's ammonia limits, particularly in climates where water can drop below 5°C. With increasingly stringent treated wastewater discharge restrictions having targeted effluent ammonia levels in recent years, many municipal and industrial clients are concerned they will have to abandon the infrastructure that has served them so well for so long.

The Nexom Answer

SAGR post-lagoon cold-water nitrification has shown at 70+ operating facilities it removes Total Ammonia-Nitrogen (TAN) to <1 mg/L, even in water as cold as <0.5°C. Here's why:

- Rock media provides ample surface area for nitrifying bacteria to grow on, and protects against temperature shock
- Patented Step-Feed grows multiple sets of biomass in warm water so it is there to compensate for bacteria's metabolic slowdown in cold water.
- Polishes BOD and TSS first, as nitrifiers only thrive when BOD is <25 mg/L.

How the SAGR works

The SAGR is a submerged, attached-growth reactor in which lagoon effluent flows through clean aggregate media. Using linear aeration along the floor of the bed, the SAGR ensures high D0 conditions throughout, while (in a typical configuration) water flows horizontally from influent distribution and effluent collection chambers that prevent short-circuiting within the bed.

Designed to be better

Thanks to an environment optimized for internal digestion, a SAGR has no significant build-up of solids. Tests after 12 years have revealed unconstrained hydraulic conductivity, and sludge accumulation models suggest, under design conditions, it will not foul within 60 years of installation.



technologies for cleaner water

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Manitoba First Nation replaces SBR with SAGR for ammonia compliance

Long Plain First Nation (LPFN) is an Ojibway and Dakota community located more than 90 minutes west of Winnipeg, in the Central Plains region of Manitoba. In 2009, there was already an existing wastewater treatment facility inside the community, a Sequencing Batch Reactor (SBR) that was no longer meeting effluent quality requirements due to both facility age and population growth. As a result, community leaders sought a new solution.

But the stakes were higher for the performance of the chosen wastewater treatment system than simple regulatory non-compliance. Given the unique relationship to water held by First Nations peoples, any system installed would need to be capable of reliably and safely discharging into the Assiniboine River, therefore protecting fish and wildlife in the region.

In order to take advantage of the low O&M requirements of a lagoon but still produce the effluent quality needed to protect fish and wildlife, while also continuously discharging through winter, engineers for LPFN chose a two-cell partial-mix aerated lagoon, followed by a SAGR® submerged attached growth reactor for ammonia removal, and two vertical-flow, continuous backwash sand filters with alum addition for phosphorus removal.

Nexom knows treatment

The Nexom team has specialized in biological treatment for 20 years, covering 500+ projects across the U.S and Canada. Our engineers are the leading experts in a range of technologies and invented SAGR cold lagoon nitrification, which enables some of the coldest populated regions in the world achieve full nitrification.



Construction on LPFN's new wastewater

treatment facility started in the winter of 2011 and completed in May 2012. After successful construction completion, Nexom field staff and engineers provided commissioning and operational training in June 2012. Since commissioning, the site has consistently met the federal regulations for all parameters.

Long Plain First Nation now has a technologically advanced wastewater treatment system that is simple to operate and maintain, while also being capable of handling a growing population. Now almost seven years since startup, the system continues to reliably meet federal wastewater regulations, is environmentally responsible, and has put LPFN at the forefront of smallcommunity wastewater treatment in Canada.





UPGRADING WITH A SAGR IS EASY AND EFFECTIVE

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2 of 2