

SISLtech, founded in 2009, specializes in advanced control solution design and implementation for WWTPs. Market leader whose client list includes leading international utility companies, SISLtech maintains a global presence implementing the **atl^c** advanced control solution in more than 100 WWTPs worldwide.

The **atl^c** platform optimizes wastewater treatment and guarantees efficient plant performance at a minimum cost. The flexibility of the system enables it to be implemented in plants of any size, setup and quality requirements.



Summary

Friselva WWTP (Spain)

- Big pig slaughterhouse
- Plug flow reactor
- Nutrient requirements
- Diffused aeration

Challenges



To **minimize the impact of the influent load variability** (occasional high N-NO₃⁻) and to **assess the extra energy consumption** required to achieve the tighter quality requirements for discharge to the river.



Results

- **100%** quality requirements
- **30 %** reduction of the aeration system energy costs

Plant characteristics



Friselva WWTP biological reactor

• Aeration strategy before **atl^c** platform implementation:

Aeration strategy based on oxygen measurement

- **Flow:** 1,500 m³/d
- **Size:** 3,000-5,000 pigs/d
- **Biological reactor:**
 - Plug flow configuration
 - 1 unit
- **Aeration system:**
 - 4 blowers
 - 126 kW in total
- **Effluent consent to discharge to the sewer**
 - N-NH₄⁺ < 39 mgN/L
 - N-NO₃⁻ < 10 mgN/L
 - TSS < 500 mg/L
 - COD < 1,500 mgO₂/L

• Effluent consent to discharge to the river

(In the medium term, the plant may have to discharge directly to the river and respect tight quality requirements)

- TN < 10 mgN/L
- TSS < 35 mg/L
- COD < 125 mgO₂/L

For further information, please contact Albert Vilardaga albertvm@sisltech.net

SISLtech

Xaloc 1, 2nd floor – 08150 Parets del Vallès (Barcelona - Spain)
www.sisltech.net – info@sisltech.net – Tel: +34 93 572 04 62

Implemented technical solution

Instrumentation

- Already implemented O₂ probes
- Installation of N-NH₄⁺ with ion selective measurement and N-NO₃⁻ probes with UV measurement

Nitrogen removal advanced control nutriEη

Within **atl** platform, **nutriEη** module is based on N-NH₄⁺ and N-NO₃⁻ concentrations to optimise the effluent quality and regulates the reactor aeration.

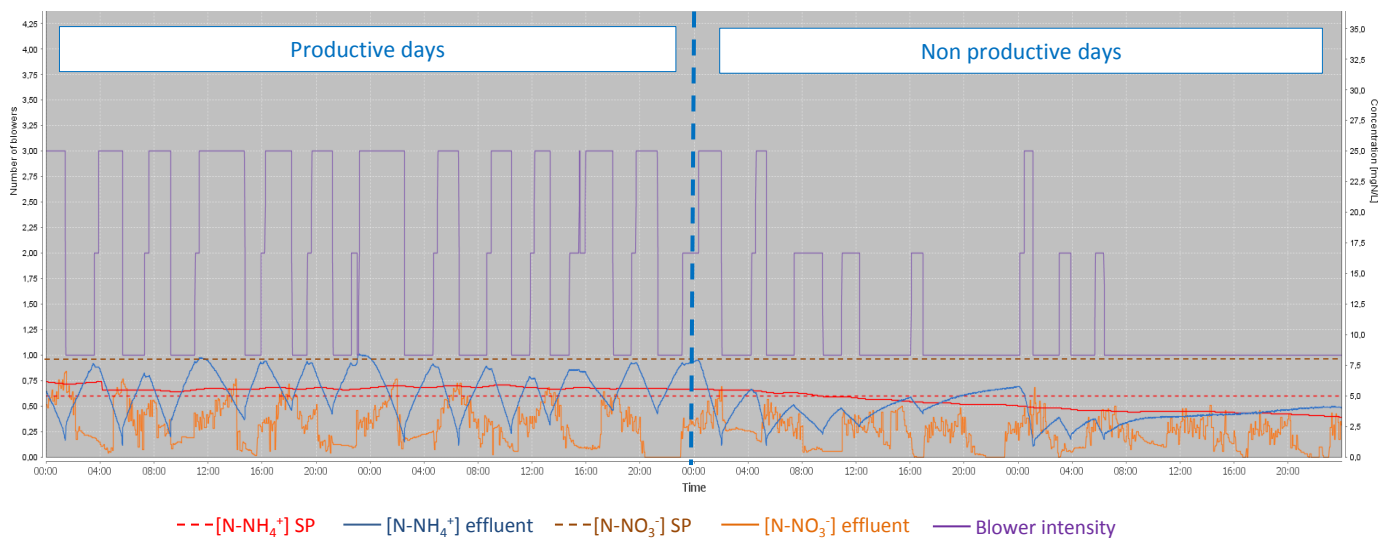
In FRISELVA industrial effluent treatment plant, module **nutriEη** is performed differently depending on **the effluent limits (sewer or river discharge)** the plant has to fulfil.

1. River discharge limits

For **river basin discharge**, the ammonium concentration set point is the same throughout the week and some blowers are turned off when the slaughterhouse stops production and the influent load is lower.

How does it work?

- The system operates to achieve a N-NO₃⁻ concentration 24/7 below the set point.
- The N-NH₄⁺ concentration set point is the same during the whole week but since the aeration needs are lower during the non productive days, some blowers are turned off during the weekend.



Results and benefits

100 %
Treated water quality guaranteed

10 %
Reduction of the aeration system energy consumption

For further information, please contact Albert Vilardaga albertvm@sisltech.net

SISLtech

Xaloc 1, 2nd floor – 08150 Parets del Vallès (Barcelona - Spain)
www.sisltech.net – info@sisltech.net – Tel: +34 93 572 04 62

2. Sewer system discharge

For sewer system discharge, **nutri&n** establishes a **24hour average effluent** quality, and regulates the reactor aeration, taking into account **variable energy tariffs (daily strategy)** and the **lower influent load** when the slaughterhouse stops production (**weekly strategy**).

How does it work?

- The **daily tariff strategy** takes into account variable energy tariffs and **displaces energy peak consumption to night periods**:

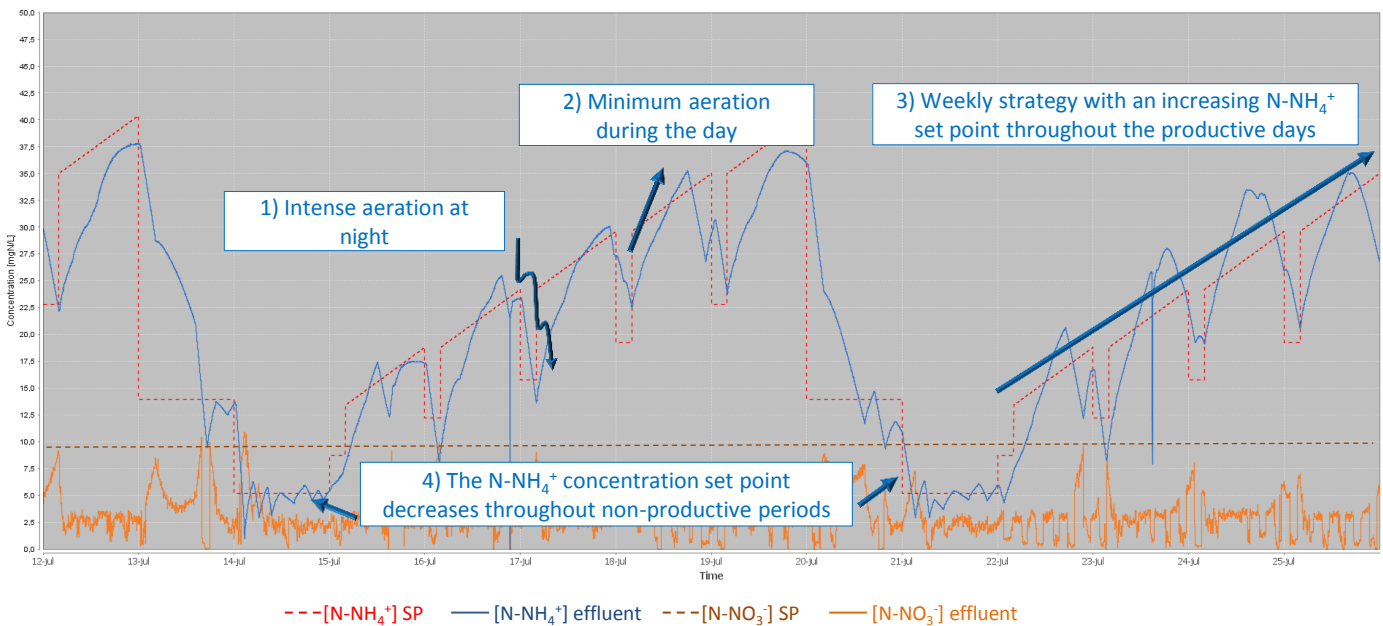
1) the system increases the aeration during the night to decrease the $N-NH_4^+$ concentration, taking advantage of the lower cost of the night tariffs; and

2) decreases the aeration intensity during the day when the price of energy is higher, allowing the $N-NH_4^+$ concentration to increase up to a set point fixed by the stakeholder, but always guaranteeing the fulfilment of the 24hour average $N-NH_4^+$ concentration.

- The **weekly strategy** takes into account the influent load variability throughout the week:

3) the $N-NH_4^+$ concentration set point increases throughout the productive period and follows the effluent load increase; and

4) the $N-NH_4^+$ concentration set point decreases throughout the non-productive period and follows the effluent load reduction.



Results and benefits

100 %
Treated water quality guaranteed

20 %
Reduction of the aeration system energy consumption

30 %
Reduction of the aeration system energy costs

Control (daily tariff/weekly) strategy adapted to industrial needs

For further information, please contact Albert Vilardaga albertvm@sisltech.net

SISLtech

Xaloc 1, 2nd floor – 08150 Parets del Vallès (Barcelona - Spain)
www.sisltech.net – info@sisltech.net – Tel: +34 93 572 04 62