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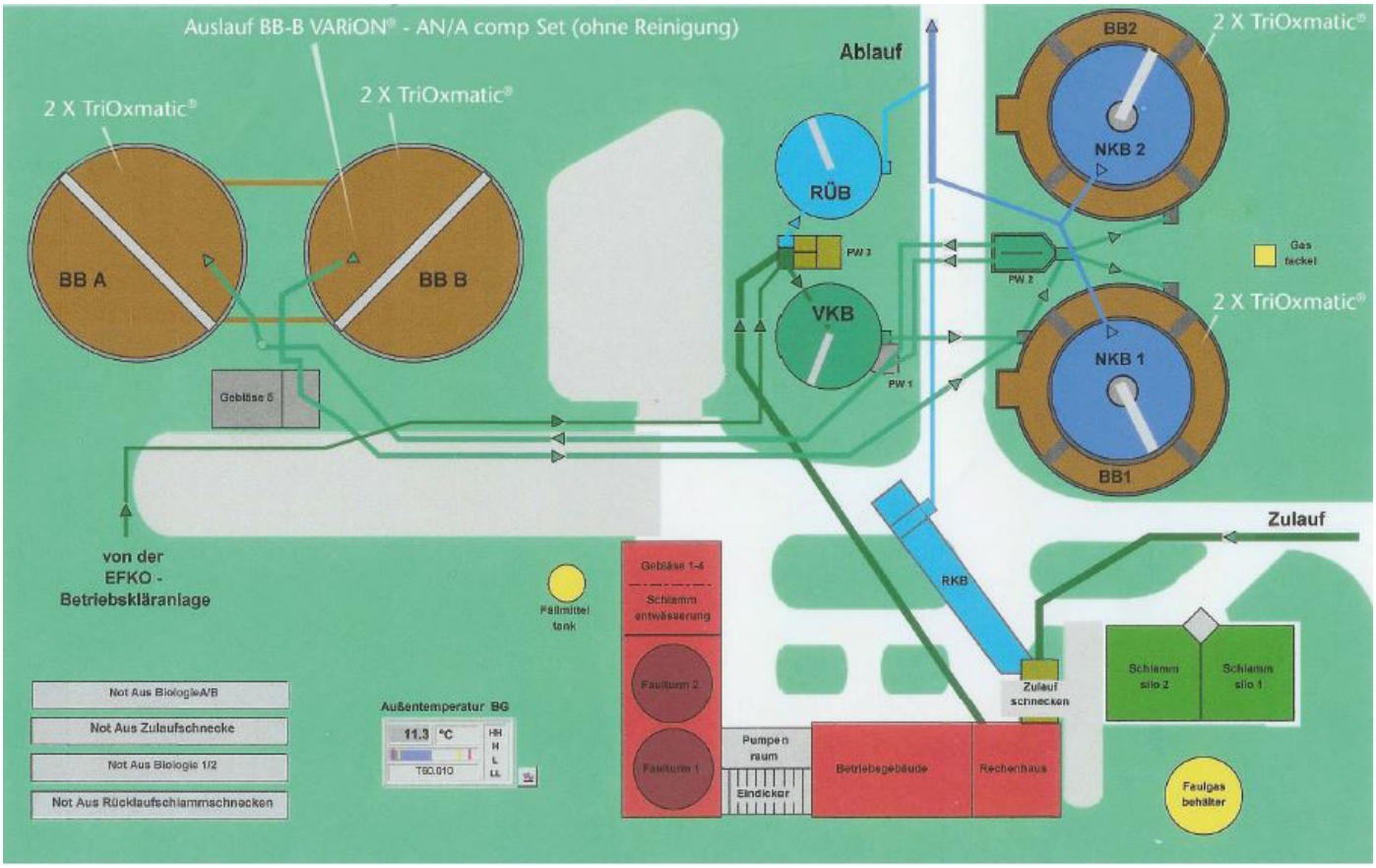
Case Study

# Practical experiences from waste water treatment plant Eferding/Oberösterreich (Upper Austria)

**Description of the plant**

In the years 2004-2005, the capacity of the waste water treatment plant Eferding was extended from 30,000 p.e. to 48,000 to p.e. Upstream of the existing biological tanks (BB1 and BB2), two additional "high load" basins were added (BB-A and BB-B). The report describes the status of the year 2007.

Today the plant works as follows:




**Inlet and operation**

The waste water load is divided. 30% reaches the plant as previously, approx. 70 % of the waste water load is treated in the high load biology. The 70% waste water moves to the activation basin (BB-B) which is ventilated intermittently.
After reducing the ammonium value to under 10mg/L, the waste water from BB-B, together with the remaining 30% of the total load, moves to the two old activation basins (BB1 and BB2).

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These basins are also operated intermittently, the treatment period of the waste water being considerably shorter than in BB-B due to the smaller basin size.
During normal operation, the BB-A basin that is not ventilated is used as an upstream denitrification.

In each of the four activation basins, two D. O. sensors (TriOxmatic® 700 IQ) are installed (a total of 8) to measure the respective D. O. concentration and to control the air that is blown in.
For the above described intermittent operation of the plant, not only the D. O. concentration in the activation basin is important but also the duration of the ventilation period.

Too long ventilation periods consume energy, too short ventilation periods cause insufficient nitrification and thus increased $NH_4^+$ outlet values, both of which cost the operator money.

**Advantages due to ammonium and nitrate measurement**
At Eferding, therefore, the measured parameters $NH_4^+$ $NO_3^-$ are of special importance. At the outlet of BB-B, the ammonium and nitrate concentration is measured continuously and insitu, i.e. without time delay by the VARiON® sensor (Xylem).
It would be possible to control ventilation directly by means of the $NH_4^+$ value. At Eferding, however, it was decided to use an indirect variant of control.

The proven "time-break-control" (nitrification/denitrification) is retained but the ventilation times are adjusted to the determined nitrogen load; this guarantees safe $NH_4^+$ degradation with a considerable amount of energy saved though the inlet values are highly fluctuating.

At Eferding, the measuring location at the outlet of BB-B was very well selected because this is the "bottleneck" of the plant.
The big volume from BB-B and 30% of the total flow is distributed to BB1 and BB2. A too high $NH_4^+$ value from the upstream "high load biology" (BB-B) could no longer be decomposed by the old and smaller part of the waste water treatment plant Eferding (with BB1 and BB2). Increased N outlet values would be the result.

The declared outlet values are now always safely achieved.
They are for $NH_4^+ < 5$mg/L, for BOD5 < 20mg/L, for COD < 75mg/L, for total P < 1mg/L.

**Results**
The declared degradation rate for total N is 70%, with an inlet total N of 76mg/L (yearly mean).
The flexible adjustment of the previously existing "time break control" is regarded as the great advantage for the waste water treatment plant Eferding.

An "unregulated time break control" was changed to a "regulated time break control" with the help of the VARiON® sensor.
Load fluctuations are recognized and met with increased degradation performance.

**Conclusion**
At Eferding, load fluctuations are virtually incalculable due to the wastewater inlet of a sludge drying plant; they are manageable, however, by using the VARiON® sensor.
The energy demand of the new wastewater treatment plant is not higher despite the considerably increased load.

Converted to degradation rates, the plant operators report energy savings of approx. 30% compared to the previously used "unregulated time break control".

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Do you have further questions?
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