Final Effluent Monitoring

Application & Product Data

Tel: +44 (0) 1726 879800
www.partech.co.uk
Effluent Monitoring

Final Effluent Channel

Package Plant Outlet

River Discharge Point
The effluent monitor is the policeman at the end of the treatment process. Providing an alarm when the effluent quality is deteriorating.

A change in the effluent conditions can indicate a process that is starting to fail, providing an early warning.

An effluent monitor can pick up high levels of residual dosing chemicals that are not being used correctly, this indicates an overdosing condition.

When the effluent quality is very good, it is often possible to bypass or modulate high energy tertiary treatment plants.
From upstream process → Clarifier → Tertiary Treatment Control

• Monitoring at ✗ allows the operator to inhibit use of the tertiary treatment system when:
  • The effluent is of a good quality and further treatment is not required
  • The effluent is too poor a quality and could damage the tertiary treatment plant

Effluent → River

UV, Sand Filter, Membrane Plant or similar

Return to upstream process
Ensure Success – Pick your Location

Safe easy access to sensor and electronics

Avoid Turbulence

Avoid Other Sensing Structures

Find
• Representative sample point of the process
• Well mixed sample
• Safe to reach sensors

Avoid
• Dead Zone
• Extreme Turbulence
• Other Instrumentation
• Hazardous access to sensor
• Reaching over handrails
Where should the Turbidity or pH sensor go?
Flow upstream of ultrasonic sensor, in controlled flow area

Ultrasonic Level Sensor for flow measurement

Not here – it would interfere with level measurement

Not here – to turbulent and can’t guarantee level

Upstream of ultrasonic sensor, in controlled flow area
Sensors in Weir Boxes

Ultrasonic Level Sensor for flow measurement

Not here – to turbulent

Not here – to turbulent and can’t guarantee level

Not here – it would interfere with level measurement

Upstream of ultrasonic sensor, in controlled flow area
Parameters

- pH, Conductivity, Temperature
- Turbidity or Suspended Solids
- UV254 as a surrogate for COD or as an indication of transmissivity for control of UV treatment
- Nutrients – Ammonia, Phosphate
- Residual Dosing Chemicals – Iron, Aluminium
Why Measure Effluent Turbidity

Turbidity is recognised as an excellent general indicator of process performance:

- Increasing Turbidity provides an early warning of a failure in the treatment process.
- Increasing Turbidity can give a surrogate indication of an increase in more complex measurements such as BOD and COD.
- Increasing Turbidity highlights problems with Pin Floc created by overdosing of Flocculation and Coagulation chemicals such as Aluminium and Iron Salts used for P Removal.
Suspended Solids - Definition

• The mass of dry solid material in a sample, the only true measurement is taken using a laboratory method involving manual filtration and drying of the sample (Standard Method: 2540D)
• Abbreviated as TSS or SS
• Online sensors use inferential methods, relying on a calibration based on the laboratory method above

Turbidity - Definition

• Optical parameter indicating the clarity or cloudiness of a liquid
• Wikipedia - Turbidity is the cloudiness or haziness of a fluid caused by individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.
• Typically units of FTU and NTU are used with calibration against a ??? standard
Suspended Solids or Turbidity

- Turbidity
  - Comparable site to site
  - Ease of calibration
- Suspended Solids
  - Represents each site
  - Matches consent rule
Another general indicator of process performance

• pH outside of normal ambient levels indicates that the effluent is likely to be toxic
• Varying pH indicates that the process is out of control
• A drift to either high or low pH can indicate that under or overdosing is occurring in the process
• Sudden changes indicate that a major incident or change in plant loading has occurred
Measurement of UV light at 254nm cannot be universally applied BUT

• For some effluents it will provide a low cost alternative to an online COD analyser
• Good for: Nitrate not for Ammonia
• Good for organics containing a Benzene Ring (Aromatic) compound
• Often referred to a SAK(C) – spectral Absorption Coefficient
• Provides an output in mg/l Carbon
• UV Transmissivity will provide a control signal to modulate or inhibit UV treatment
Laboratory Tests

- Sample sent away
- Results not known until at least 24hrs after the event
- Sample degrades in transit

Site Settling Jars/Handheld Meter

- Very operator dependent
- Takes 30 minutes

Portable Monitor

- Calibration can be made to same standards as fixed installation systems
- Available when operator is on site, manual adjustment possible

Fixed Installation Monitor

- 24/7 Monitoring
- Automated control possible
Benefits of Online Monitoring

**Pro’s**
- Continuous In-Line Monitoring reduces the need for time-consuming laboratory analysis
- Removes operator dependency from the measurement
- Real-time monitoring provides more accurate process control
- Improves plant efficiency by providing stability and continuity to the treatment process

**Conn’s**
- Capital costs
- Whole life costs
WaterWatch² Partech’s versatile electronics platform

7300w² Monitor

PARTech ModTech² CABLE PN:154150

MAX CABLE LENGTH 100M

OPTIONAL LOCAL JUNCTION BOX PN:224469

OxyTech² OPT DO SENSOR

WaterTech² PHEVI SENSOR

WaterTech² C4E SENSOR

UP TO 6X 4–20mA OUTPUTS (1 PER MEASUREMENT)

UP TO 12X ALARM OUTPUTS (2 PER MEASUREMENT)
Advanced Features

• 1 or 2 sensor input.
• Multiple Parameter Capability via optional interface unit.
• Graphic display with trending
• USB Interface for data logging for each measurement.
• Fully Featured Dosing Control. PID plus.
• Conventional or Profibus output.
• Triple validation option
• Low Power Operation, ability to lay dormant when intermittent sampling is required.
• Easy to use menu structure.
Example of an Application

ASP STW

INLET WORKS

PO4, NH4

PO4-P

FINAL CLARIFIER

TURBIDITY

DO

ABTIVATED SLUDGE

pH

FINAL EFFLUENT

PRIMARY SETTLEMENT

SLUDGE TREATMENT

partech
The cleaning action is thorough & effective!

Fit for purpose!
**Suspended Solids – TurbiTechw² LS Sensor**

**TurbiTechw² LS**
- Light Scatter Principle.
- 860nm Wavelength
- Designed for use in wastewater applications.
- Sensor can measure both inlet and outfall (discharge) Turbidity
- Can be calibrated for Suspended solids monitoring

**Rugged & Robust sensor designed for the application**

**TurbiTechw² LS**
- Large optical surface & sample volume ensures tolerant of fouling.
- Deposits of fats and grease on the sensor area do not prevent the sensors from measuring unlike smaller optical surfaces.
- Self Cleaning mechanism. Initiated by monitor at user determined frequency.
- Cleaning process only takes 90 seconds
pH and Redox

WaterTech² pH8000
- pH and Temperature
- Applications
  - Inlet Monitoring
  - Final Effluent
  - Drinking Water

WaterTech² Redox8000
- Redox and Temperature
- Applications
  - Intake Protection
  - ASP Control
Sensor Fouling
- The TurbiTech sensors have an integral automatic self cleaning system.
- Optional. Sensors can be retracted and then extended when required for readings.

Air Bubbles
- Good Installation practise reduces problems, high damping on the reading reduces the problem

Varying Sampling Characteristics
- Not a problem in activated sludge process
Avoid Prosecution

Save money

Good Effluent Monitoring will help:

Improve response to process changes

Remove operator error from process adjustment
Andrew Wallace -
Field Sales Engineer
Mobile: 0777 815 0118
Email: andrew@partech.co.uk

Angus Fosten -
Sales and Marketing Director
Mobile: +44 (0) 776 846 5581
Email: angus@partech.co.uk

Clive Teobald -
Sales Engineer
Mobile: 0796 601 3446
Email: clive@partech.co.uk

Jan Johnson -
Sales Administrator
Email: jan@partech.co.uk

David Wilson-
Export Sales Manager
Mobile: +44 (0) 7968 603155
Email: david.wilson@partech.co.uk

Tel: +44 (0) 1726 879800
www.partech.co.uk