LOCAL CASE STUDY - Download

Hach helps wastewater treatment plant ensure process control and effluent compliant to regulation

Long Hau, Vietnam

Who is the client?

This centralized wastewater treatment plant in Long Hau has an area of 10,000 m² to treat wastewater. As per Circular No.08/2009/TT-BTNMT (stated on 15/07/2009) by Ministry of Natural Resources and Environment, notified every central WWTP of industrial park must install on-line instrument for controlling its discharged water characteristic, consisted of COD, pH, TSS, DO and other parameters of discharged water depending on EIA. The total treatment capacity of the plant is 5000m³/day.

Figure 1: Client's Plant Overview

What is the challenge?

Client needs to make sure of quality before the discharge in process to ensure effluent compliance and to control the process treatment. Apart from that, laboratory instruments would also have to be of use in this situation, to conduct tests for the wastewater and to have process control.

What is the process and Hach's solution to client?

Complete solution package offered to client from Hach was to comply in the regulation for online monitoring and to utilize Hach laboratory instrumentation to test for wastewater and process required parameters.

Client tested and monitored for the parameters pH/temperature using Hach's pHD Differential pH Convertible Sensor, total suspended solid (TSS) using Hach's Solitax sc Sensor, dissolved oxygen (DO) using Hach's IntelliCAL LDO101 Rugged Luminescent/Optical Dissolved Oxygen (LDO) Probe and chemical oxygen demand (COD) using Hach's UVAS sc Sensor under the wastewater discharge monitoring station. Aside from this, client also installed monitoring cabinet for effluent and data is sent to their own control room and environment department of Long An Province.

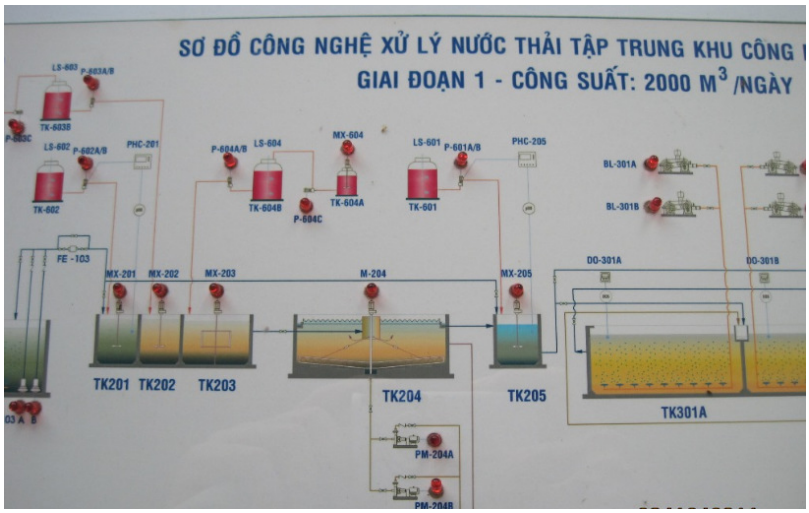

Figure 2: Client's Plant Process

Figure 3: Station Outlook

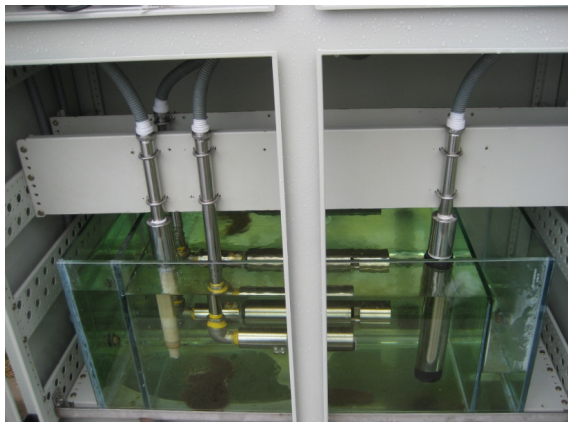

Figure 4: Sensors in the station

While we have the complete solution for process, Hach also provided the complete solution for laboratory. As follows would be the method that client has used DR2800 Spectrophotometer to test. Apart from the following, tests on BOD was done using Hach's BODTrak II Manometric BOD Apparatus, turbidity was done on Hach's 2100P Portable Turbidimeter, conductivity was done on sensION+ 5 Meter and DO was done on sensION+ 6 Meter:

Hach method-instrument	Parameter	Purpose of test
Method 8025- DR2800	Color	Color is not a toxic characteristic, but is listed as aesthetic parameter affecting appearance and palatability of water. Data used to monitor and control removal of color from raw water, typically by chemical coagulants or pre-oxidants.
Method 8008- DR2800	Iron	Determine iron concentration in ground water systems, iron carry-over from iron-based coagulants, iron in distribution systems as a corrosion by-product from cast-iron or steel pipes. Iron is also a food source for iron bacteria which form large masses that clog well screens, pumps and other equipment.
Method 8149- DR2800	Manganese	Use for stain control. At 0.05 mg/L, it causes black stains on plumbing fixtures, laundry and other items in contact with the water.
Method 8206- 16900-08 Method 8039- DR2800	Nitrate	Indicative of the stage of conversion of ammonia and organic nitrogen forms to nitrate by the aerobic biological treatment steps (nitrification).
Method 8213- 16900-08	Total hardness	Verify the effectiveness of hardness removal or scaling control treatment practices. Hardness is also monitored to check effectiveness/regeneration of ion-exchange processes (water softeners).
Method 8000- DR2800	COD	Used as a correlative/early indicator of BOD levels. COD provides a measure of organic "food" available to biological treatment steps and to estimate the effect of the effluent on the receiving water.
Method 8507- DR2800	Nitrite	Indicative of the stage of conversion of ammonia and organic nitrogen forms to nitrate by the aerobic biological treatment steps (nitrification). Nitrite is the intermediate nitrogen form between ammonia and nitrate. Nitrite is highly toxic, and small amounts can upset the delicate biology of a wastewater plant.
Method 8038- DR2800	Ammonia	Monitor conversion of ammonia and organic nitrogen forms to nitrite and nitrate during the WW treatment process. Provides information on process conditions in biological treatment stages. At high concentrations and pH, ammonia can be toxic to sludge digestion microbes.
Method 8051- DR2800	Sulfate	Sulfate minerals can cause scale buildup in water pipes similar may be associated with a bitter taste in water. Elevated sulfate levels in combination with chlorine bleach can make cleaning clothes difficult. Sulfur-oxidizing bacteria produce effects similar to those of iron bacteria. They convert sulfide into sulfate, producing a dark slime that can clog plumbing and/or stain clothing.
Method 8021- DR2800	Chlorine free	Chlorine is used to disinfect WW plant effluents, prior to discharge to a receiving body. It is normally present as "combined" chlorine (chloramines). Chlorination is generally followed by de-chlorination with sulfur compounds, prior to release of effluent.
Method 10071- DR2800	Total nitrogen	Total of ammonia, nitrate, nitrite and organic nitrogen forms.
Method 8190- DR2800	Total phosphorus	Regulatory measurement for plants which remove phosphorus from the wastewater, either biologically or chemically
Method 8023- DR2800	Chromium	Water containing chromium in excess of the water standard (0.05mg/L) over many years could experience allergic dermatitis (skin reactions).

Figure 5: (From left to right) DR2800 Spectrophotometer (Testing parameters: Color, iron, manganese, COD, nitrite, nitrate, ammonia, sulfate, free chlorine, total nitrogen, total phosphorus and chromium), 2100P Turbidimeter testing turbidity, Reagents and sensION+5 testing conductivity, sensION+6 Meters testing dissolved oxygen

How is the end result?

In summary, Hach offers total solution for client with the solution table for list of instrumentation as follows:

Products	Application Point
pH/Temp: pHD Differential pH Convertible Sensor	Wastewater discharge monitoring station
DO: IntelliCAL™ LDO101 Rugged Luminescent/Optical Dissolved Oxygen (LDO) Probe	Wastewater discharge monitoring station
COD: UVAS sc Sensor	Wastewater discharge monitoring station
TSS: Solitax sc Sensor	Wastewater discharge monitoring station
Color, iron, manganese, COD, nitrite, nitrate, ammonia, sulfate, chlorine free, total nitrogen, total phosphorus, chromium: DR2800 Spectrophotometer	Laboratory
BOD: BODTrak™II Manometric BOD Apparatus	Laboratory
Turbidity: 2100P Portable Turbidimeter	Laboratory
Conductivity: sensION+ 5 Meter	Laboratory
DO: sensION+ 6 Meters	Laboratory

Client's Feedback: As Hach has more than sufficient experience, Hach was awarded the job to ensure water is compliant and effluent to the regulation for the output and the quality of water is controlled while minimizing the costs. Client also used Hach's lab equipment and analysis methods to test water/wastewater to make sure the quality before discharged and control the process treatment.

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