



Industrial wastewater effluent treatment

The Ecofor Service Spa industrial wastewater treatment plant uses Movicon to manage its chemical and biological processes.

Water is often used in production processes in nearly all the industrial sectors. The water used in these processes have to meet certain standards according to the regulations stipulated by the Italian D.Lgs. n. 152/2006 environmental protection laws. In order to comply with these standards and ultimately to sustain and protect the environment it is essential that the purification process treats the wastewater to remove all the pollutants used in the production processes, such as surfactants, oils minerals, phosphorus, metals, dyes as well as turbidity and suspended matter, before discharging it into the environment. It is therefore necessary that each industrial process be connected to a purifying system that performs efficiently and is foolproof. It must be capable of treating liquid waste products with low-medium flow rate but with a high

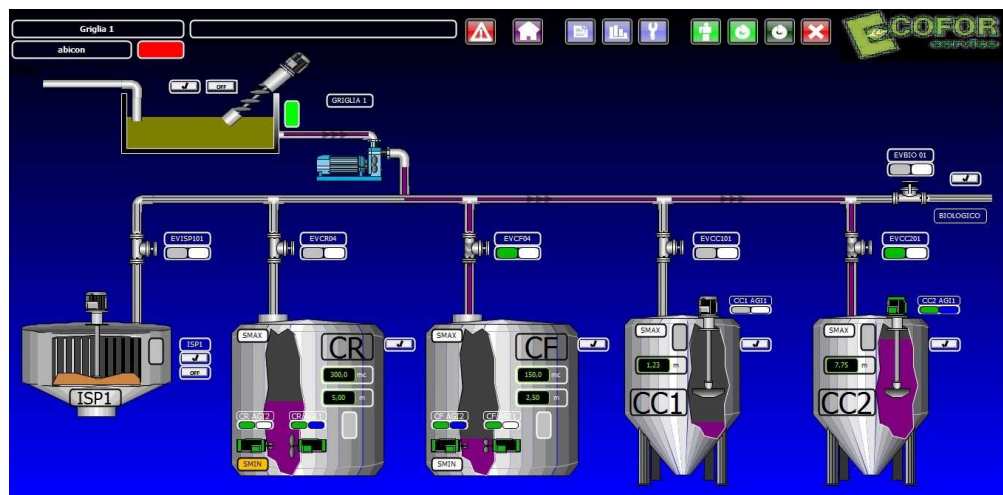
concentration of contaminants. In this context the application of water treatment automation systems, especially control and remote control systems, are essential components to obtaining efficient and secure management of industrial wastewater systems.

The Ecofor plant

Ecofor Service S.p.a creates solutions that are used to correctly run liquid and solid waste cycles compliant to the national environmental protection laws. The company's main objective is to improve the quality of life by reducing the cost of socio-environmental management as much as possible by implementing innovative control systems and testing advanced technologies.

In particular Ecofor commissioned Engineer Gabriele from the Studio Tecnio Orsini, a consultancy agency operating in the home, to do research on building and industrial automation system integration in order to automate and supervise their industrial wastewater treatment plant. The plant together with the office building and laboratories reside in Gello, a town in Pontedera (PI), in the vicinity of the company's landfill site. This landfill site manages all the functions connected to non-hazardous waste disposal caused by all the industrial activities in the region of Tuscany. It is composed of various lots which are greened for environmental restoration and landscaping. Each cultivated lot is filled with a maximum of 240,000 tons of waste a year. The biogas produced from the waste disposal is used for green energy production from renewable sources which would otherwise be dispersed into the atmosphere. The plant system is composed of an extractor center which is directly connected to the landfill wells, a airtight gas treatment system, three endothermic engines that produce a total of 1.8 MW / h of electricity. Finally an emergency system consisting of two automatic flares to prevent gas from dispersing into the atmosphere.

The electric energy produced at the end of



1. Screen showing a plant section with sludge thickeners and filters

this process is injected into the national operator's public network. The amount of energy injected totals 12,000 MW annually which is equivalent to supplying around 4,300 families with electric a year.

The industrial waste treatment process

The industrial waste treatment plant validated with Autorizzazione Integrata Ambientale (A.I.A.) which is the Italian equivalent to IPPC: "Integrated Pollution Prevention and Control" enforced by the Province of Pisa, mainly deals



2. All the important values are historically logged, reported and displayed in Trend formats.

with the leachate produced by the nearby landfill which is collected by using a pressurized underground pipeline. Ammonium sulphate crystals are produced from this wastewater by using a stripping process. These crystals are then reused in the industrial plants as a technical product.

The stripping plant was enhanced at the end of 2012 to include an ammonium sulphate liquid cristalization process to produce salt for industrial use.

All the plant's components are interconnected with each other according to a technology model that entails the classic storage tanks, filtering sections, continuous and discontinuous physicochemical treatments, sludge thickening section, sludge dewatering section, ammonia stripping section, equalization sections followed by a system that discharges the final product into a biological plant.

The automation

Each section is connected in network and controlled by a local PLC in distribution mode. The entire control system is connected to a central supervisor which can be accessed by remote control. Each section is represented by graphics on a dedicated supervisor screen page. All the information on the various plant components are transmitted to the supervisor. This information includes pump statuses, valve statuses, analogic voltage values, currents and alarms. The information is digital (pump functioning, valve opening) or analogic (tank levels, concentrations of oxygen, nitrate and ammonia produced in basins) and the flow rate values are in cubic meters/h.



3. The industrial wastewater treatment plants are essential to managing water cycling properly in accordance with the laws to protect the environment in which we live.

All the important analogic values, around 60 in total, are stored and displayed in trends and historical trends.

The system provides efficient plant diagnostics to instantly inform the operator with clear information of any anomaly if they should occur. The alarms are highlighted, traced and recorded for each associated event type. They can also be analysed statistically as well as notified to on-call duty maintenance personnel.

The supervisor, based on the Movicon Scada/HMI technology, is also used for setting values in the field PLC. This values include pump work/pause times, minimum and maximum tank level thresholds, PID controller set-point values and parameters of chemical processes. The important parameters are protected against any unauthorized manipulation and can only be accessed and edited by using the integrated security and user password management.

The Movicon supervisory provides a transparent and intuitive alarm management both for active alarms and to analyse all alarm events recorded and archived in the database.

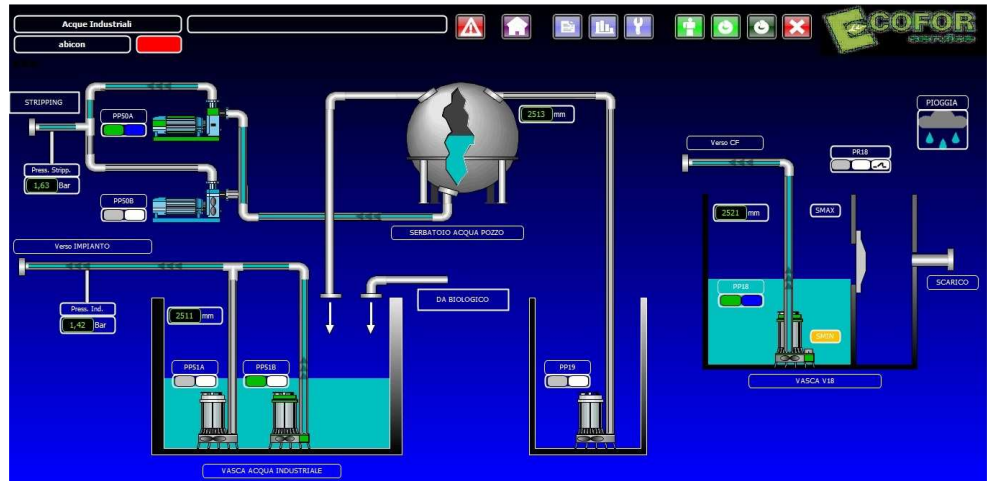
Furthermore each operation performed by the operator such as commands and sensitive set-point changes are recorded and traced in the dedicated historical database by using the integrated Auditing (Audit Trail) function. This function permits an accurate retroactive analysis of the operations that have been performed (audit) and the values that have been changed in order to improve plant management and maintenance efficiency.

Great importance was given to graphics. Each screen contains objects created with the Movicon graphics that can also be animated. For instance pipes can be shown with flowing liquids in different colours and direction arrows and pumps can be shown with rotating impellers.

Movicon also provides automatic IIS web server combination so that the application can be accessed from remote workstations that are connected to the plant's local network using the Web Client technology and the same user profile management created in the project. The plant website can also be accessed by using the internet.

The various parameters can be configured locally on the individual boards or on the supervisor by using specific screen pages to collect data on alarms/trends and manage simple procedures set by shift operators.

The main goal was to establish a unique supervision system that could be quick and easy to manage and extend. It had to be powerful and high performing with the capacity to integrate not only native but different communication protocols as well.



4. The Movicon supervision system enables the operator to manage and control the plant locally and by using the internet thanks to the Web Client technology.

Great focus had to be given to the trends which deemed essential for studying the behaviour of the plant's chemical processes through analysing the collected analogic data. It was also crucial that users have access at all times to view all the process variables in order to operate in the best way possible aided by attractive and transparent graphics.

The Movicon supervision system is responding very well to the goals requested by the customer. It has excelled in terms of flexibility by providing a vast range of quick-to-configure features that have allowed for expansion in every project development phase starting from the blackboard right through to installation and starting up stage with post-sales support.

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