

A photograph of an industrial facility, likely a tannery, showing a complex network of large white and green pipes, valves, and tanks. The scene is brightly lit, and the equipment is arranged in a structured, multi-level layout.

# Ammonium bicarbonate produced from industrial waste

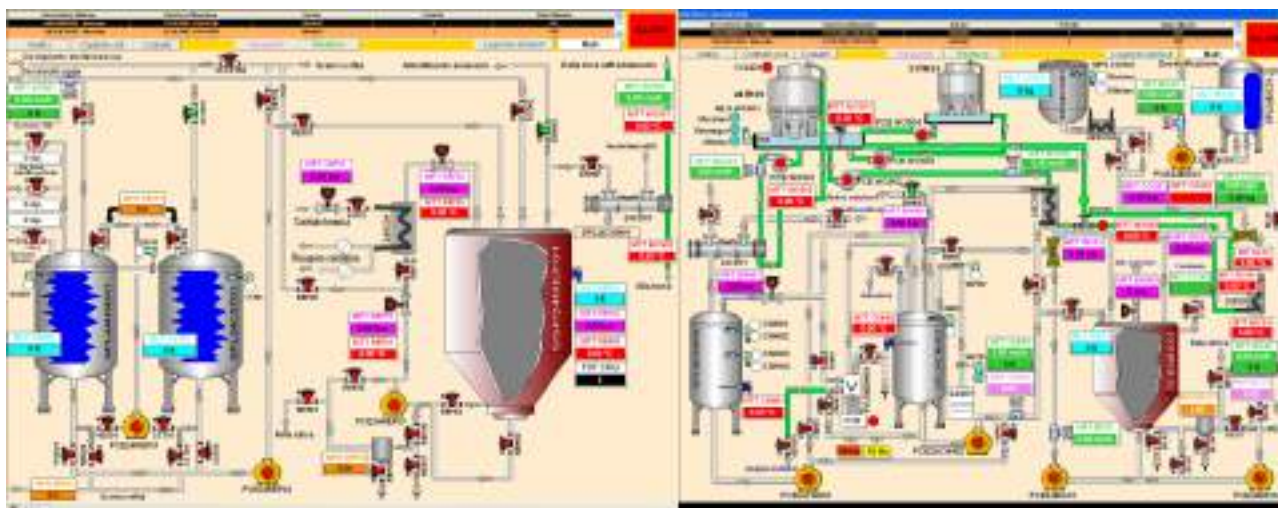
*The consorzio SGS has engineered a very innovative system for disposing and recycling of ammoniacal waste from rawhide tanning processes to produce Ammonium Bicarbonate.*

The consorzio S.G.S. Spa is one of the major manufactures of animal hydrolysed protein, processed at a daily rate of 400 tons from animal by-products from rawhide tanning process waste before being chemically treated to make leather. The industrial transformation process is totally automated with cutting-edge technology capable of guaranteeing complete reuse of by-products discharged from the raw materials used. The plant system, based on innovative process technology and automation at the core of the system, was designed in collaboration with Engineering S.r.l. and Brotinimpianti S.r.l., two companies based in Tuscany that have been in operating in advanced automation systems for many years. This new system is based on PLC+Scada

technology with OMRON products implemented on the PLC side and the Movicon Scada technology implemented on the supervision and control side.

## **Producing bicarbonate by collecting waste from leather tanning**

This system manages the ammonic bicarbonate production by starting from the ammonical waste created from rawhide tanning process, a major activity in the PISA-S.Croce regions. Developed and integrated by SGS S.p.a. from Santa Croce on the Arno (PI), this new advanced system permits a drastic reduction in disposable pollutants for the leather manufacture costing them less to treat tanning process residues.



Process visualization on two independent monitors working side-by-side to give the operator fuller control of the whole situation.

Therefore, not only does this help the leather trade economy but the environment as well, both in a state of emergency. Given the products variability state when entering into the bicarbonization process, it was necessary to undergo a long and complex period of installing an automatic control system. The bicarbonization plant, even though physically small in size, proudly boasts a rich source of instrumentation. 45 analog instruments have been implemented to monitor and control the correct running of the chemical-physics reactions throughout the whole process by taking level, pressure, temperature, weight and refractive index measures, including 13 centrifuge pumps, 51 ON/OFF valves and an inverter.

### **The control system**

The control system, including the electro-mechanics engineering, was done by Brotinimpianti s.r.l based on the client's technical office's indications responsible for developing both the layout and function logic of the whole process.

An Omron CJ1 PLC is used for controlling the plant and has been setup with three communication ports: one ControllerLink Serial connection used for exchanging information with other existing PLCs to manage the feeding through of ammoniac sewage to the bicarbonization process, and one Ethernet port (FINS-Ethernet protocol) towards a double-

monitor PC installed with the Movicon X2 Server for supervising the process. The third connection goes towards a 10" touch display screen connected via serial (HostLink) that was used for test running and setting up the plant before the supervision system when into operation.

To cater for the increasing plant's complexity, the project was developed on installing and configuring the supervision system with the PLC software and displays, a major part of which had already been setup, tried and tested. Due to the multi-variety of features offered by Movicon, one being the option to manage flexible multi-monitor configurations, they chose to incorporate data collection from another factory plant system within the supervision system for recording on historical logs and trends visualization. A part of the new system is dedicated to monitoring environmental pollution controlled regionally by ARPAT (Environmental Protection Agency for Tuscany) who officially requested remote access to relevant data recorded in encoded text format files with a compulsory 5 year life cycle. This specific function was also designed and implemented within the Movicon environment.

### **The Supervision**

The Supervision system underwent extensive customization work to make all those parameters needed for controlling the plant

easily available for operator use. 2 to 5 values are shown for each one of the 45 analogical measures acquired, selectable from a textual menu, and refer to the same number of alarms or regulation thresholds. The potentiality of the Movicon VBA scripting feature is exploited for managing parameter files with the ability to use just one graphical template object only (or faceplate) for all plant devices, whether for Tag variations, text strings or numerical field visualization. This saved the project planners a great deal of developing time and future maintenance.

The system records the process variables on appropriate files in a relational database, with unrestricted freedom of format choice without spending extra to use proprietary solutions. In just to months the Microsoft SQL Server 2000 MSDE engine 2 Gbytes limit was rapidly exceeded due to recording over 100 analog measures every ten seconds. In order to remedy this problem without reverting to expensive supplementary licenses, they decided to migrate the file archives to a MySQL "Open Source" Database that, thanks to the Movicon connection via the ODBC driver, caused no complications when reaching the file archive sizes desired (recirculation) which actually corresponds to 5 GBytes.

Furthermore, Movicon entrusted daily file editing (Text format according to ARPAT specifications) with the sizes needed for sending data, recorded at a rate of every 15 minutes, to ARPAT the environmental protection agency for monitoring the local region's environmental conditions. This function was designed using a scheduler which periodically calls a VBA script to aggregate the necessary data and format it on file accordingly. These files are then made available to the

agency using a FTP server created purposely for this task (FTP open source server: FileZilla Server).

The integrity and discretion of transmitting data are guaranteed by two distinct security levels using a point-to-point link managed by an analog modem connection (with Log-In for remote connections) along with the relative Log-In procedures to access the FTP server.

The plant system also has a Client station connected in ethernet network to the Server PC managing the plant. The Client station permits personnel to manage and monitor processes locally without going to the main control room to do so. The Client station, dislocated in the system, provides the same functions found on the Server accept those relating to data reserved for ARPAT's attention only.



*A pop-up window parameterized with dynamic custom set-point field display.*

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