

Solvay Research & Technology, a site under high-surveillance



More than 14,000 parameters and 1,000 items of technical information monitored daily by the ALERT system within Solvay Research & Technology (R&T), a particularly sensitive site (Brussels)

Since its creation in 1863 Solvay has established itself as one of the chemical and pharmaceutical industry's world leaders, from R&D to marketing via development, production and commercialisation. Every day, some 29,000 people, including 2,650 dedicated researchers, work to satisfy 160,000 clients. In 2008, the Group achieved a turnover of 9.5 billion euros, generated by its three business sectors: chemicals, plastics and pharmaceuticals.

The group employs almost 3,000 people in Belgium, on five sites: Ixelles (Headquarters), Neder-Over-Heembeek (Solvay R&T), Jemeppe-sur-Sambre (Chemistry and Plastics), Solvay Antwerp (Chemistry) and Audenaerde (Plastics).

Solvay set up its premises at the **Neder-Over-Heembeek** site in the City of Brussels, in order to establish its research activities there. Today, the site has become "**Solvay Research & Technology**". Throughout the course of its development, a multitude of buildings have been added to the site, which currently covers 22 ha including 13 ha of laboratories, offices, test and production premises as well as warehouses and storage areas. Solvay R&T houses several different companies involved in the chemistry and materials industries, also including three start-up companies in the biotechnology sector. Around a thousand people work there and 1,500 inventions have been patented since its creation.



The site energy challenge

The management of such varied infrastructures requires thorough organisation, closely coordinated monitoring and unquestionable skill. The buildings include no less than 14,000 alarm, measurement and information points, which transmit directly to the principal operational tool: the "Building Management System" (BMS). Thanks to this monitoring, Solvay has been able to streamline items of expenditure linked to energy consumption, of which the largest are, in descending order, those linked to electricity, vapour, ventilation and heating. To give an overall idea, the site consumes 44 GW/h of gas and 20 GW/h of electricity every year. It processes 1.7 million m³/h of air from the laboratories and clean rooms, which is the greatest challenge in energy terms.

When Solvay purchased a BMS in 1983, it played a pioneering role, because it was one of the first centralised monitoring and control tools for technical installations. These 14,000 monitoring points thus ensure automated management of the infrastructures for production, distribution and for comfort of its clients (production techniques, HVAC (heating, ventilation and air conditioning), pumps, lighting, temperature regulators etc.).

A site under high-surveillance

Although the site is not identified as a major-accident hazard under the 96/82/EC "Seveso II" Directive, in view of the nature of its activities and stored products (tanks containing up to 400 l of flammable and explosive gases, chemical laboratories and products etc.), Solvay decided to impose control and monitoring of the whole of the installations.

Moreover, this major R&D centre is a space where the intellectual property rights connected to research are just as closely protected. The research archives and registration of patents have inestimable value and their preservation has central strategic importance for the group. It would be unthinkable to allow them to go up in smoke, or to expose them to the risk of theft. The detection of intrusion is therefore amongst the site's priorities.

Apart from the aspects of risk as such, the site requires sensitive surveillance due to the nature of the tests in progress. Some test laboratories require the maintenance of very stable conditions, for example in matters of temperature and humidity. "The slightest variation from the required norms would result in the loss of months of work and the tests would have to be begun again from scratch" emphasises Philippe Sinon, technical facilities "safety & security" manager. The Neder-Over-Heembeek site is equipped with a complex BMS (Building Management System), which continuously monitors the proper functioning of the installations.



More than 9,000 variables monitored 24 hours a day by ALERT

The BMS alone supervises more than 12,000 points: production aerials including two 1.5 MWth cogeneration units, energy and utilities distribution, lifts, heating, air-conditioning, temperature and humidity levels, laboratory air extraction, control of pumps and ventilators, tank levels etc. Altogether, 6,000 variables (out of the 12,000) are parameterised under ALERT in order to ensure automated management and surveillance of the site.

For its part, the fire warning system is subject to almost 3,000 detection points: smoke and heat detectors, alarm buttons, automatic extinguisher systems etc.

Moreover, almost 150 gas detectors are installed on the site, making it possible for response teams to target their activities more specifically according to the nature of the problem. "If it is a question of lack of oxygen, the rescue teams arm themselves with the appropriate protective equipment. For a leak of flammable gas, they take all of the required precautions: no GSMs or watches etc. liable to set off an explosion" notes Philippe Sinon.

Finally, the site is equipped with a search system for isolated individual persons. ALERT is connected to the ASCOM wireless telephone system, capable of activating the alert in case of loss of verticality. The rescue teams are then immediately informed of the danger for the person, with precise data on the latter's location, in order to respond rapidly. The ASCOM systems are also equipped with an emergency alert button allowing any operatives in danger to call for this emergency assistance. "The site possesses about twenty ASCOM telephones connected to ALERT, in order to ensure the safety of personnel working alone, in particular at the weekend" Philippe Sinon emphasises.

To further optimise site monitoring, maintenance engineers are equipped with a tablet PC with a GSM - 3G card, allowing them to connect to the ALERT Web platform and view the whole of the alarms in real time, and handle them at their place of action, without being obliged to return to dispatching. The installation of additional aerials to the site's own 2 base stations ensures optimal reliability of cover at more than 99.5% and guarantees permanent broadband access at all points. For alarms which are more critical, or in noisy areas, alarm horns have been installed, with various different alarm signals according to the nature of the problem. The triggering of these alarm horns is entirely managed by ALERT.



Almost 1,000 data items and alarms processed automatically every day thanks to ALERT

Altogether, between 500 and 1,000 items of information are processed every day (63,000 between 23rd November and 18th January 2010): a volume which necessitated automation of the system.

"Before ALERT, our dispatcher used to continuously watch the monitor screens for the BMS and the fire warning system etc., and had to alert the persons responsible for each alarm himself. In the absence of a response, he then had to consult each procedure and find another contact, while other alarms continued to occur" Philippe Sinon remembers. "Moreover, our previous system did not provide enough information to give the response teams specific information: we only had 16 characters at our disposal for sending the alert" he adds.

"Solvay's requirement at the Neder-Over-Heembeek site was to centralise the whole of the alarms into a single system, to automate transmission to the right people in order to optimise the response time, with a maximum level of precision in the information, and within a multimedia management system" recalls Philippe Bénimédourène, Micromedia Benelux manager. Thus, over 145 contacts have been programmed in ALERT who, according to the nature of the alarm, its level of seriousness and the time, are alerted individually, or in response team groups, by SMS and/or by e-mail. Each of them can then take charge of the problem and alert the others via their mobile phone or computer. "This very high speed of communication makes it possible for us to save precious time for actions by technical experts, firemen and rescue teams and thus reduces the safety risks both for personnel and for equipment. A factor which also contributed to our selection of ALERT", Philippe Sinon notes.

At the same time, all of the active alarms can be visualised on ALERT Web, which not only makes real time monitoring possible, but also allows time traceability of problems encountered, intervention times etc.

"We have even connected ALERT to a database allowing the response agent direct access to the procedure to be followed, according to the nature of the problem, directly from their mobile phone or laptop" Phillippe Sinon enthuses.



"ALERT's great strength with regard to this project, which was definitely a decisive factor in our choice for Solvay, is its high-level of interoperability. Its inherently open system, capable of communicating with any other system, allowed us to graft ourselves onto the existing set ups; in spite of their heterogeneous nature" Philippe Bénimédourène emphasises.

“ALERT allowed us to considerably improve site safety, by processing the whole of the alarms in a systematic and optimised manner, thus preventing the risk of unattended alerts and time loss. The precision and rapidity of the information transmitted, as well as the real time traceability of the whole of the parameters, now offers us an optimal system which has brought us simultaneous gains in reactivity, mobility and effectiveness” Philippe Sinon concludes.

Almost total security is ensured at Solvay thanks to the installation of a redundant second ALERT system in another building, to guarantee continuity of service in case of failure of the first. This back-up system functions as the inactive duplicate of the first, and only takes over in case of need.

“ALERT has allowed us to make detailed analyses of each alarm event, according to various criteria (times of occurrence and processing of the data, location, temperature, human presence etc.), thus focusing our efforts on the search for repetition and faults for critical alarms. Within the framework of our ISO 9001 certification and its continuous improvement procedures, we give particularly careful attention to targeting our weaknesses in order to reinforce the quality and reliability of the services provided. Insofar as Solvay R&T offers overall service provision to the companies that it receives on its site, it was of fundamental importance to guarantee them optimum operation of our facilities”, concludes Bernard Poulin, the site’s general facilities manager.

