Keeping a proper production conditions is the matter of paramount importance in pharmaceutical industry. The most fundamental production and storing environment parameters, such as temperature, air humidity, and appropriate pressure cascade in compartments, must be traced continuously. It is easier for us to comprehend the significance of the issue, when we realize, that any abnormality in this field can result in wasting of many weeks of laboratory testing, or devastating the whole batch of produced medicaments.

Due to reasons mentioned above, Pharmaceutical Works Pliva Cracow Inc. has decided to implement up-to-date, centralized monitoring system, enabling continuous inspection of air-conditioning system parameters in entire company. Till now manufacturing departments, supply warehouses, final product warehouses and quality inspection laboratories were equipped with local monitoring systems of different origin. Work inspection and creating independent reports for every department were necessary because of lack of unified reporting system.

For the same reason employees responsible for air-conditioning system in entire company didn’t have a quick access to the data gathered through local SCADA applications.

Within a framework of investment discussed in this article, centralization of data gathering and visualization system has been planned. Such centralization makes possible for one employee to supervise the entire system and react quickly in case of any problems, and allows the whole system to deliver necessary report and analysis data at the same time, which helps to estimate installations condition and to schedule technical inspections.

Central monitoring station was located in Chief’s power engineer control room, improving economy by direct control of electric power consumption.
Availability of air-conditioning central stations current monitoring in all departments and fixed production schedules allow the dispatcher to intervene in cases of unfounded functioning of one of systems, for example during weekend production pause. In case of power consumption restrictions or overflow of ordered amount of power, the dispatcher can also take a decision about switching off electrical equipment.

The additional reason for investment in the new system was aiming at decreasing of operating costs. As it turns out, exact obedience to production environment monitoring procedure, with no connection between individual systems in company, would result in necessity of increasing the regular employment of local SCADA systems operators. Meanwhile, the assumption was to reduce time and costs connected with production maintenance, and shortening the time of daily and every shift inspections. To achieve these two aims, it was necessary for control unit to have an option of remote production monitoring.

System integrator Abis s.c. from Cracow was entrusted with the task of creating new system. Monitoring system is developed on the basis of Wonderware products. Visualization is realized with the InTouch software, the data are stored in IndustrialSQL Server database.

Process data access is provided with ActiveFactory client software, which allows versatile data analysis, reports generating and overview of historical data graphs. Management personnel can access the IndustrialSQL visualization and data through industrial web portal SuiteVoyager. User-controllable MS Excel reports with convenient data filtering were created, allowing inspection and analysis of alarm conditions and events.

For the sake of variety of SCADA and air-conditioning control systems located in different places of the factory, the most important and difficult issue was carrying out the communication. Very important issue was also the unification of a variety of graphical presentation forms, used in individual departments, and creating one common standard.

Due to specific requirements of pharmaceutical industry regarding recording of alert parameters changes, functionality of standard InTouch software event system was extended with a functions of alert threshold changes recording and alert blocking.

**Fig. 1: System diagram**
Air-conditioning monitoring system consists of:

- main operating station, working as data concentrator from individual subsystems, providing such functionality as: visualization with alerting and alarm configuration, developed in InTouch;
- operating station with FactoryFocus software, providing data overview of individual subsystems, visualization, alerts overview and reporting;
- IndustrialSQL Server industrial database, providing data storing and historical data sharing;
- SuiteVoyager web server, containing data and visualization of individual air-conditioning systems;
- independent department operator stations, not belonging to the domain, equipped with SCADA systems concentrating data from individual air-conditioning systems;
- user stations, allowing application’s individual objects and historical data monitoring, using Internet Explorer or ActiveFactory.

Air-conditioning system visualization was developed so as to fulfill all requirements of future users.

It was possible thanks to, among other things, the wide variety of InTouch software possibilities such as ActiveX controls, extended historical alerts and events database, database queries and using scripts. The following functionality was obtained:

- data screens overview, including air-conditioning system diagrams and measurement values;
- historical trends overview;
- current alarms overview;
- current alarms dispatcher approval, including dispatcher’s comment;
- convenient overview of historical alerts and events;
- logging of alert threshold changes and switching on and off the alert mode as an event;
- individual objects alert mode locking during the repair time;
- creating and review of operator’s notes recorded in the database;
- several access levels with different authorization options;
• access to detailed alerts and historical events report, created in MS Excel;
• short Messages (SMS) sending option in case of lack of communication with subsystem for longer period of time;
• user-controllable alert delay for some of measurements, such as atmospheric pressure in compartments.

Superior unit responsible for factory air-conditioning was equipped, apart from main operator station with InTouch software, with monitoring system overview station with FactoryFocus software. Beside the information accessible on main computer with visualization, additional station shows first of all state of communication between superior unit and subsystems, and information about dispatcher logged into the system. Thanks to this solution management staff has better supervision of system and employees. Data redundancy was achieved by creating second database containing historical alerts on the second station. Using this computer it is possible to review alerts logged on both computers, both current and historical.

Network Application Development (NAD) mechanism was applied on both computers to facilitate software updating. Several mouse clicks suffice to update application on a computer a few hundred meters away, which is very helpful.

Modern air-conditioning monitoring system implementation brought a lot of advantages to the factory. The most important is storing of measurements values, which can be used in complicated analysis and reports, allowing improving the quality of manufactured medicaments. IndustrialSQL Server database allows to easily backup of process data, which reduces risk of loosing important data. Another significant advantage of the new system is improving factory functioning - employees of superior unit, responsible for air-conditioning, have easy access to the monitoring data through the computer located in the offices, and can respond faster for noticed abnormalities.

This document was realized thanks to the support of:
Abis s.c.