

## MES the right pill for Reckitt Benckiser

Reckitt Benckiser plc (formerly Boots manufacturing plc) at Nottingham employs over 8,000 people in the manufacture of a vast range of pharmaceutical and cosmetic products. A recent expansion to produce a new product allowed the engineering staff to consider the use of a Manufacturing Execution System (MES) to totally automate the process and ensure that it was a validated system under FDA and Good Manufacturing Practise guidelines. The resulting system that was based upon technology delivered and supported by Wonderware United Kingdom. The system runs in real-time, uses Reckitt Benckiser's corporate IT system and Biometric technology for electronic signature and system security.

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From the outset the process IT system had to be FDA validated and use the company's time-proven security and backup strategies. At the same time the engineering team was faced with the dual challenges of a new product and a new process. The £2.9m project was innovative and had to be completed on time. Every piece of equipment in the process had to

technology that would readily integrate to the existing corporate IT scheme. In addition to procurement issues, the company's engineers also examined the longer term cost-of-ownership issues and practical procedures that would affect MTTR (Mean Time To Repair).

The selection of Wonderware's InTouch HMI SCADA and Wonderware Historian real-time database provided the core tools for the job. The need to use the existing IT architecture was best achieved by the use of Terminal Services, this decision also adding benefits of high MTBF and very low MTTR. The final structure of the production proposal had to be agreed with IBM as it is responsible for all of Reckitt Benckiser's IT systems.

Tests were done to gauge the effect of Terminal Services upon network traffic, this proved to be easily manageable on the gigabit fibre optic link. The servers in the system (Terminal Services Server, Tag Server and Wonderware Historian Server) are located in the central IT server area and are integrated with the group Active Directory and therefore have inherited all the group security policies. The Servers are in dual-redundant mode, changeover being automatic. Wonderware Historian's IDAS module has been used to ensure that any process data that is collected during changeover is stored and then forwarded after changeover, with all data being in the correct chronological order.

### Dual-redundant...

Although a significant cost consideration, in the sense of server hardware and software duplication, dual-redundancy was justified for this process as the production data simply cannot be lost when it refers to a validated system. Quite simply, if there is no data then



**Combined MES and ERP interface**

be procured from new, with adaptations made to meet the particular requirements of the process. The successful project would be the first time that the new product had been scaled up from the laboratory.

The company therefore needed to use technology that was easy to deploy and also



### Biometric Sensor in use

the batch affected cannot be shipped and is therefore expensive waste.

#### Biometric...

FDA compliance was mandatory for this process. The use of Biometric “Thumbprint” devices to log on and gain access to the system was new to Reckitt Benckiser. The device offered by Bioscrypt proved to have significant advantages when placed in the demanding environment of particulate dust that the system develops. The Biometric sensors do not require to be “dusted off” before use, a thumb (or any other “memorised” finger) is simply placed on the reader after a password has been entered. The system has proved to deliver very good results for correct pass – fail detection without errors. The Terminal Services workstations are Advantech touch screen PC’s that also provide environmental sealing, the Biometric devices being panel mounted close by the terminals and connected by serial link and specially developed software for terminal services functionality.

#### Information connected...

The function of an MES is to provide real-time computing between planning level software and the controllers on the machines themselves. The connection between the schedule and the MES in the new production area was achieved through a web browser interface, the various batch-specific data being downloaded to the Wonderware Historian

database; this in turn is connected to the tag servers that deliver machine controller-specific instructions for a particular batch’s production.

The machines were provided by various companies to undertake the process of dispensing, blending, milling and basing, with bin cleaning processes in-between operations. Each machine controller is connected to an Ethernet network that is subordinate to the Gigabit Link. The PLC’s within that machines are connected to field devices such as inverter drives and sensors through Profibus; this includes the use of RFID technology to track each bin as it is docked with each filling and discharge station, avoiding inadvertent mis-positioning. Weigh scales are also integrated to the system through Profibus.

The process itself is divided into two main stages, the later part being concerned with final product production and is an Ex explosion area, all technologies that are used having to comply with ATEX regulations for explosive particulate atmospheres. From this area the tabletised product is sent to retail and trade packing stages.

#### Information...

The Wonderware Historian database in addition to handling the batch recipe data also acquires much data from the process itself. This is the key to continuous verification that the product is being manufactured correctly and in accordance with validated procedures. Currently the information that is produced from the system is obtained by SQL query scripts that are designed to emulate the “look and feel” of the previous paper-based standard. Reckitt Benckiser’s engineers are now moving on to utilise Active Factory to report upon many other aspects of the production process, this will reveal clear information about production efficiencies and areas that can be tuned and streamlined when they next review the time to justify revalidation.

#### FDA...

The Bioscrypt Biometric devices and their special terminal services integration driver software, delivered by Wonderware United Kingdom from Apptima, with the FDA-ready Wonderware components provided a complete system that could be FDA validated. This was especially significant in meeting the Access and Security requirements of the FDA’s 21CFR Part 11.

Technology alone should generally lead to improvements, but Reckitt Benckiser knew that it was important to bring the process operators along with the new systems that they would be using. The potentially difficult area of using Biometric devices was the subject of consultation and in fact welcomed by the

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operators as it was far easier to use, avoided the need for frequent password re-entry and provided them with increased protection from any abuse of passwords however unwittingly.

The finished system has been in production for nearly 12 months, in this time Rob Mallett, Reckitt Benckiser's Project Engineering Manager, says, "the products have proved to be reliable in use and have delivered exactly what was expected of them", in commenting about what he learned on the way he said that the only issue that required extra effort was the mapping of the machine controller data for use by the IT system. This proved not to be excessively onerous and was probably, in the main, owing to the diverse machines and the special requirements of the process.

The combination of good planning and a clear user requirements allowed Reckitt Benckiser to get the best from all the suppliers involved in the process. The MES server system runs on the company's standard hardware and architecture allowing it to receive the benefits of all the IT policies that exist in that regime. Reckitt Benckiser's management board in authorising the project left the choice of all engineering decisions with the project team; with the selection of the right software tools and with the right support the project was delivered on time and in budget.

#### **Appendix...**

Since the initial success story the project has undergone a significant change as the manufacturing facility was sold to Reckitt Benckiser (from Boots plc). This caused a wholesale re-configuration of the system to be needed as the site was in fact split and had to have its separate IT systems. Once the server was re-established the topography of the system facilitated the necessary changes as the operator stations were running Terminal Services. Much of the initial investment was therefore retained in the new execution of the IT system.

*Wonderware UK wishes to thank the following companies for their valued contribution to this success story...*

**[formerly] Boots plc**

**[now] Reckitt Benckiser plc**

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SolutionsPT

Wonderware United Kingdom and Wonderware Ireland, Unit 1 Oakfield Road, Cheadle Royal Business Park, Cheadle SK8 3GX  
+44 (0)161 495 4698

[info@wonderware.co.uk](mailto:info@wonderware.co.uk)

[www.wonderware.co.uk](http://www.wonderware.co.uk)