

Arkema St Auban evolves to System 800xA DCS family ABB unique in handling third-party replacement from Emerson Provox



Modernizing the control systems of its major manufacturing plants is helping the Arkema Group maintain its leading position in the speciality chemicals business. Evolving the installed Emerson Provox system at the company's St Auban PVC plant to ABB's System 800xA was thus an obvious route to take. Despite facing some tough technical challenges, ABB took on the job and succeeded handsomely. Without having to shut down its operations, Arkema now has a secure, efficient and future-proof System 800xA running all its production batches.

The Arkema Group is France's leading chemicals producer and a global player in state-of-the-art specialty chemicals with internationally recognized brands and products. Currently Arkema is present in over 40 countries and has approximately 13,800 employees. In Europe, where the group is a major producer of vinyl products, it operates around 80 industrial facilities. To remain competitive in an increasingly tough business environment, Arkema has a clear policy of modernizing its most efficient plants to increase their manufacturing capacity and secure a reliable, cost-effective production.

ABB has been providing automation control products and solutions to Arkema's production plants for many years. Around 75,000 I/Os (inputs/outputs) installed at over 10 sites is good proof of this. In addition, Arkema has made a strong commitment to ABB regarding the modernization of its plants, and in particular the evolution of its third-party heritage control systems to today's world-leading DCS – System 800xA. Evidence of this commitment, and the ability of ABB to respond to it, can be seen in the highly successful migration of Arkema's Saint Menet plant near Marseille.

Saint Menet's Honeywell TDC 3000 system was evolved to System 800xA in a stepwise process where the installation was carried out on-line with no interruptions to production. Encouraged by this success, Arkema now looked to evolve the Emerson Provox system of its St Auban plant located in the southern French Alps.

“Only ABB could meet Arkema’s request to provide an alternative evolution solution to Emerson and replace only what was necessary.”

David Le Duc, ABB Third-Party Systems Evolution Manager, Marseille, France.

Technical and operational challenges

At St Auban, which produces PVC from chlorine and ethylene via a batch process involving five autoclaves, the specific problems that Arkema faced included obsolete Provox HMIs in the form of Provue consoles, difficulties with and high costs of repair to Provox keyboards, and three controller types (MUX, PCIU and DCU) that would soon be obsolete. On the other hand, one of the current controllers (UOC) could be retained for many years to come. At the start of the evolution, the system architecture included 5000 IOs.

Arkema also had other requirements. Existing equipment had to be used to make all connections and non-obsolete equipment was not to be replaced. Evolution also had to be done on-line to avoid production shutdowns. What’s more, as a worldwide supplier of speciality chemicals, Arkema demanded global support from its third-party replacement supplier. All these needs fitted in with ABB’s clear-cut evolution strategy. This is based on protecting the security of long-term user investments and evolving in a step-wise manner that best meets users’ overall processing and automation goals – and ‘only when it makes economic sense’.

In fact, when Arkema looked for a control systems supplier to meet its expressed need – “to provide an alternative evolution solution to Emerson and replace only what is necessary” – it found that ABB was the only vendor able to deliver.

The solution – step-by-step replacement using ABB’s vast evolution portfolio

David Le Duc, ABB Third-Party Systems Evolution Manager in Marseille describes the third-party replacement of Emerson’s Provox as a typical example of how ABB handles evolution projects.

Based on the St Auban plant’s system architecture at the beginning of the project and the stated requirements, ABB proposed a four-step evolution solution with System 800xA architecture:

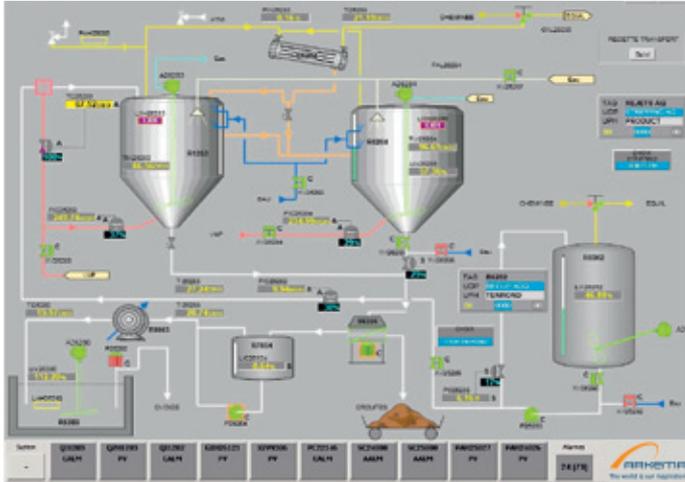
1. Replacing the first of the Provue consoles by a System 800xA HMI
2. Implementing System 800xA Batch Manager
3. Replacing the MUX, DCU and PCIU controllers with ABB’s AC 800M
4. Replacing the UOC controllers with AC 800M when needed (but not before)

The main tool used to achieve this solution is ABB’s Connect to the Emerson Provox system. The Connect provides connectivity for interfacing the existing Provox system with System 800xA architecture. In addition, ABB AC 800 Connect provides the same function for the AC 800M controllers that replaced the three ageing Provox models.

Installing the new controllers required no modification to the operator interface since communication had been simplified between the ABB controllers (via AC 800 Connect) and the one for the Emerson Provox system.



1 Arkema’s new control environment in St Auban. Modern System 800xA operator workstations with advanced HMIs have replaced elderly Provue consoles and Provox keyboards. | 2 David Le Duc, ABB Third-Party Systems Evolution Manager, Marseille, France.



Graphic display from one stage of Arkema's PVC production process after the installation of the System 800xA HMI.

With everyone agreed that this was the right strategy to adopt, the replacement started with the HMI and Batch applications phases. These involved a number of separate operations, including collecting Arkema process data (graphic displays, DSR, Templates, etc.), loading the Arkema database into the ABB environment, and further developing the graphic displays, operator interface and batch procedure. Final configuration of the system, e.g. graphic displays, alarms, etc., was done by Arkema.

Next in line was to assess the new architecture and phase it into production.

System 800xA was put on top of Provox and used in production over eight months of standard operations. In Phase 1, both systems were in parallel, with ABB's in read-only for one month. Phase 2 saw both systems still in parallel, but with System 800xA architecture now being used for standard operation.

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Current status and future work

Arkema now has a control environment for its present and future needs. The newly operational System 800xA meets the chemical group's requirement for secure, cost-effective production with increased capacity. It has great integration capabilities, is flexible, and has a state-of-the-art operator environment. As the response time measurements in the table demonstrate, its performance is also superior to that of the previous Emerson Provox installation.

Work still to be done mainly involves replacing the remaining obsolete controllers with AC 800M. This will be started soon. The UOC controllers will, stay in place for a further 10 years. Throughout this time, ABB's global pool of know-how for helping evolve third-party control systems remains at Arkema's disposal.

Arkema St Auban - Provox Connect - Performances tests (seconds)

Write from ABB 800xA

Update after the write - Analog Value

System	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Avarage
Provox	2,4	4,5	2,1	2	1,8	1,9	1,8	2,3	4,5	4,1	2,74
800xA	2,4	2,7	1,6	1,6	1,8	1,9	1,8	2,3	3	1,7	2,08

Update after the write - Logical value

System	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Avarage
Provox	2,7	3,3	2,1	3,4	2,3	1,2	3,3	2,6	2,6	3,4	2,69
800xA	0,8	1,3	0,9	1,5	1,3	1	1,5	1,5	1,8	1,9	1,35

Comparative response time tests showed that System 800xA performance was faster than Emerson Provox.

Contact us

ABB AB

Open Control Systems

Västerås, Sweden

Phone: +46 (0) 21 32 50 00

Fax: +46 (0) 21 13 78 45

E-Mail: processautomation@se.abb.com

www.abb.com/controlsystems

ABB Inc.

Open Control Systems

Wickliffe, Ohio, USA

Phone: +1 440 585 8500

Fax: +1 440 585 8756

E-Mail: industrialitsolutions@us.abb.com

www.abb.com/controlsystems

ABB Pte Ltd

Open Control Systems

Singapore

Phone: +65 6776 5711

Fax: +65 6778 0222

E-Mail: processautomation@sg.abb.com

www.abb.com/controlsystems

ABB Automation GmbH

Open Control Systems

Mannheim, Germany

Phone: +49 1805 26 67 76

Fax: +49 1805 77 63 29

E-Mail: marketing.control-products@de.abb.com

www.abb.de/controlsystems

ABB Automation LLC

Open Control Systems

Abu Dhabi, United Arab Emirates

Phone: +971 (0) 2 417 1333

Fax: +971 (0) 2 626 3230

E-Mail: processautomation@ae.abb.com

www.abb.com/controlsystems

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