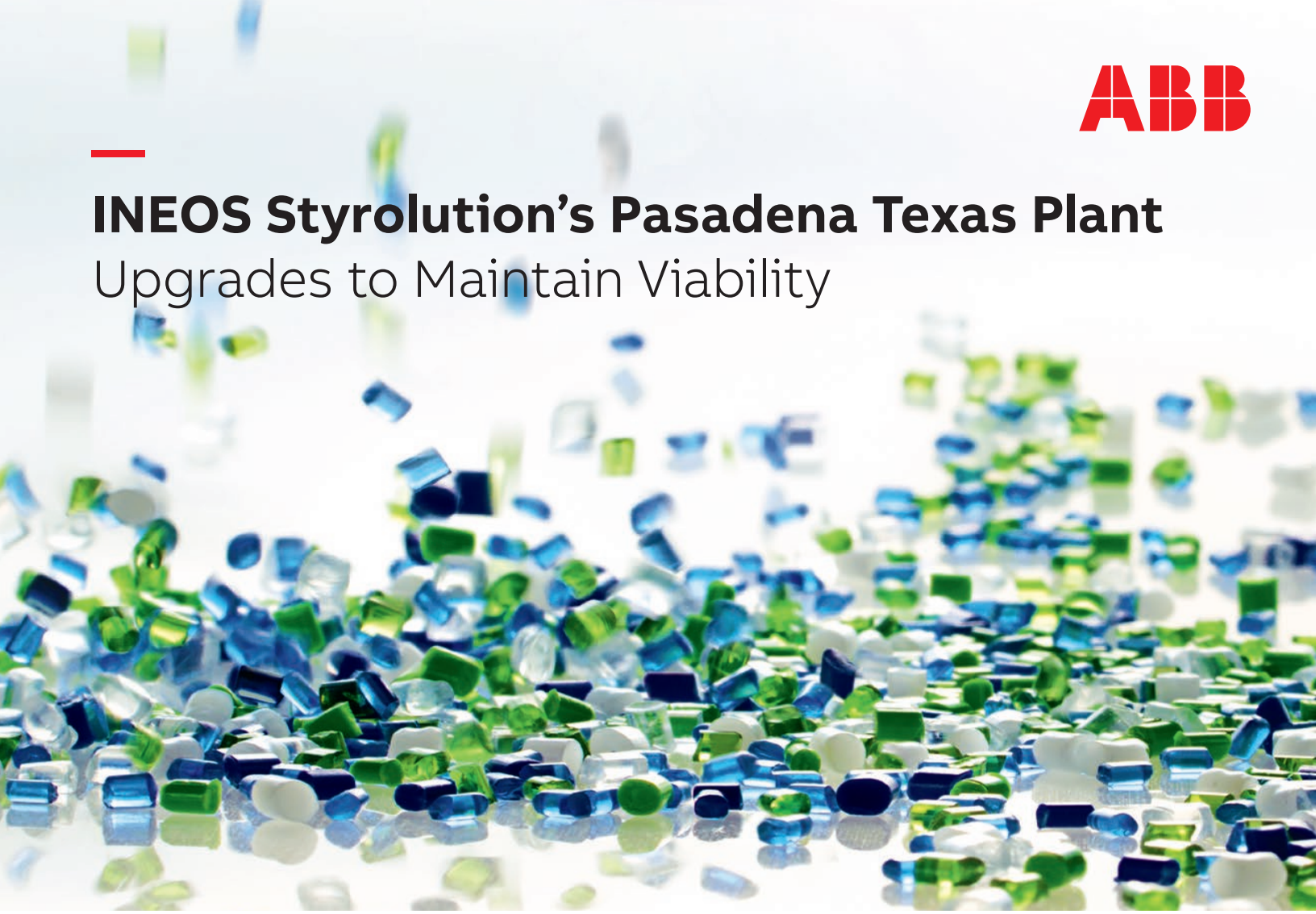
INEOS Styrolution's Pasadena Texas Plant
Upgrades to Maintain Viability



01 INEOS Styrolution is the leading, global styrenics supplier with a focus on styrene monomer, polystyrene, ABS Standard and styrenic specialties. With world-class production facilities and more than 85 years of experience, INEOS Styrolution helps its customers succeed by offering the best possible solution, designed to give them a competitive edge in their markets. The company provides styrenic applications for many everyday products across a broad range of industries, including Automotive, Electronics, Household, Construction, Healthcare, Packaging and Toys/ Sports/ Leisure. In 2017, sales were at 5.3 billion euros. INEOS Styrolution employs approximately 3,300 people and operates 16 production sites in nine countries.

Enhanced capabilities for this 20-year ABB customer as they upgraded their technology base during scheduled turnaround

INEOS STYROLUTION

Technology today changes so rapidly, it is very important for industrial manufacturers to be able to operate their plants safely and effectively. ABB's System 800xA is ABB's latest technology that allows producers to gather, analyze and distribute the information to all the stakeholders in an industrial setting. 800xA helps producers such as Styrolution to achieve greater capabilities and greater utility for their control systems.

Styrolution upgraded their control technology during a scheduled three-week turnaround at their Pasadena, Texas plant. Driven primarily by life cycle considerations around the mature versions of their Microsoft operating system and their ABB System 800xA version 5.0, Styrolution relied extensively on ABB's expertise to support their process automation team during the upgrade. Additionally, Styrolution took advantage of the shutdown period to upgrade their TRIO I/O to S800 I/O enabling additional communication opportunities.

During the turnaround, ABB worked with Styrolution to maximize availability and performance while maintaining their core control systems and components. ABB offers a complete portfolio of life cycle management services, extending from repairs and spare parts to complete plant upgrades and equipment retrofits.

Upgrade Challenges and Goals

Styrolution's system upgrade project team noted that their biggest challenge was conveying to their management the fact that in today's business environment, life cycle is not driven by how long the hardware lasts, but is driven by outside forces such as the end of support for Microsoft products.

Styrolution's goals for the upgrade project

1. Make the changes transparent for customers
2. Preserve all historical data
3. Make sure all changes were successfully completed during the turnaround period
4. Remove possibility of Microsoft version obsolescence

ABB's Evolution Strategy

ABB's evolution strategy enables customers to conduct upgrades using a step-by-step process. This approach protects current equipment and system investments, and is designed to be forward and backwards compatible to meet overall automation goals. Existing and new ABB products, such as controllers and applications, can communicate with one another across generations.

ABB's goals for the upgrade project

1. Protect the customer's intellectual property and preserve it through the entire process
2. Integrate the latest technologies to give them greater capabilities and utilities with the lowest risk
3. Minimize downtime for Styrolution

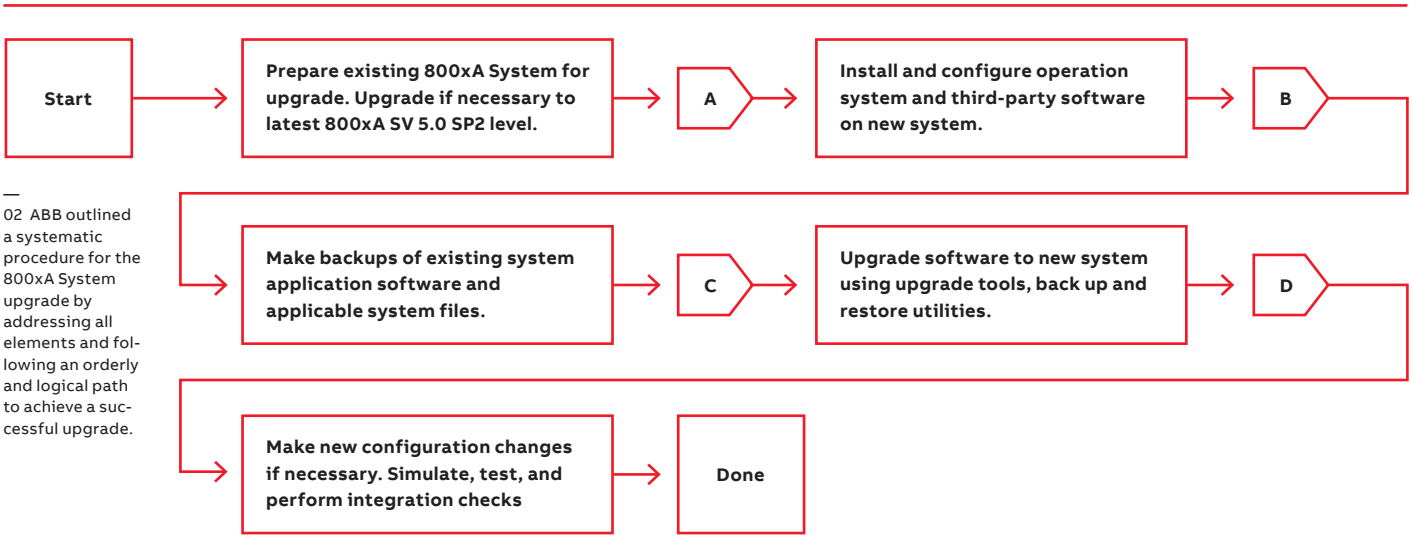
Upgraded Systems for the Styrolution Turnaround

- System 800xA – Version SV 5.0 to SV 5.1
- Third-party software to 800xA Smart Client
- Automation Sentinel Subscription
- TRIO I/O to S800 I/O

System 800xA Upgrade Planning

About a year before the scheduled turnaround, ABB and Styrolution worked together to outline a systematic path for a successful upgrade from System 800xA version 5.0 to System 800xA version 5.1. During the turnaround, ABB provided: project upgrade oversight; system software engineering; and configuration modification services. To ensure a smooth conversion, ABB implemented, tested and simulated many of these changes at an ABB facility using files provided by Styrolution. During the upgrade, ABB loaded the new 800xA and third-party software configuration data, files and existing applications to new hardware and checked the integrity of each new component.

Upgraded Flow for System Version SV 5.0 SP 2 to SV 5.1



— 02 ABB outlined a systematic procedure for the 800xA System upgrade by addressing all elements and following an orderly and logical path to achieve a successful upgrade.

800xA Evolution – Enhanced Capabilities

800xA Collaboration between people, systems, and equipment

—
03 In order to be competitive, various plant entities, departments and personnel have to work as one flexible, integrated, collaborative environment. For this to be accomplished, an automation platform such as System 800xA with its in-depth connectivity capabilities is needed.

—
04 Smart Client utilizes the extended automation capabilities of the System 800xA technology to provide intelligent data access and viewing functions to assist plant personnel to make quick, informed decisions, take the appropriate action, and improve performance. Live displays of 800xA data are available inside or outside of the Styrolution plant.

System 800xA's integration capabilities extend from process automation to power automation and safety for the highest operator effectiveness and optimized control. System 800xA's is built for collaboration in a fully redundant, reliable environment. It provides connectivity to all ABB distributed control systems (DCS), as well as other ABB and third-party plant systems and applications. Prior to the upgrade, Styrolution had five AC 460 controller subsystems running 800xA version 5.0 for each of their process controllers for the ethyl benzene, styrene and utilities units.

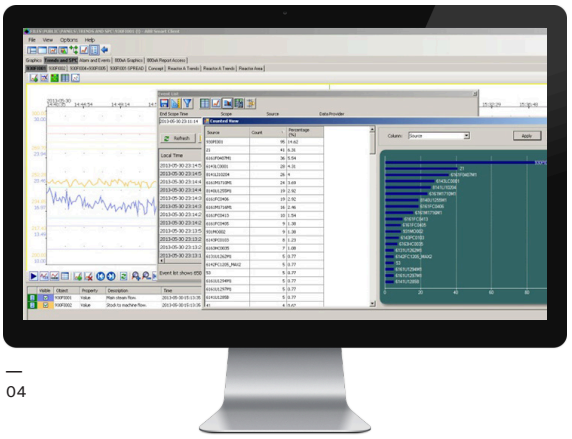
System 800xA Expansion - ABB's Smart Client
Previously, a third-party software allowed Styrolution's engineers and managers to graphically view the process. However, prior to the upgrade to ABB's Smart Client, the Styrolution process automation group needed to manually update the software whenever there was a change in an 800xA graphic. Now when Styrolution makes a change, that change can automatically be imported into the Smart Client. The Smart Client for 800xA 5.1 introduces the possibility to view 800xA process graphics with real-time data in a read-only mode without any additional engineering work. The team's project manager noted, "The installation … went very well. Styrolution was able to keep part of our old system up and running in parallel and right beside the new system. Styrolution was able to test the new graphics page-by-page with the old ones to see what function properly and what didn't, make corrections as Styrolution went along."

Smart Client utilizes the extended automation capabilities of the System 800xA technology to provide intelligent data access and viewing functions, enabling Styrolution's users to take needed actions. 800xA Smart Client is a dashboard visualization application that stores trend data in System 800xA, so separate databases for the control system and information system are no longer needed.

800xA Smart Client allows users to:

- Aggregate data and distill information for management
- Make 800xA data available outside of the plant network in a secure and easy way
- Instantly view plant metrics and Key Performance Indicators outside the control room
- Analyze historical data/events from their desktops/laptop

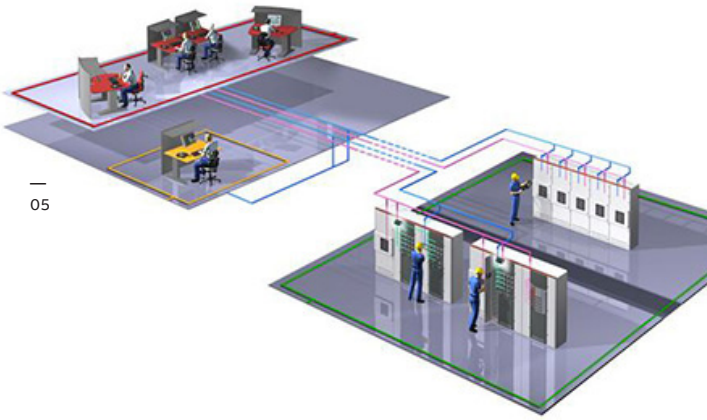
—
03



—
04

—
05 ABB service engineers perform asset analysis by exchanging information with site operators at Styrolution. This allows both sides to look at the real-time condition of the equipment. By collecting diagnostic information from dedicated intelligent electronic devices, Styrolution can optimize maintenance schedules, increase uptime and safety, and reduce operational cost.

Automation Sentinel Maintain Plus Subscription
ABB software, both existing and newly installed during the turnaround, is maintained via ABB Automation Sentinel subscription service. Automation Sentinel provides up-to-date software versions for installed control system software, as well as upgrades to newer software products for existing systems and for System 800xA. The subscription also includes online access to software product documentation and access to technical telephone specialists for software installation assistance and upgrade support.



—
05

TRIO I/O migration to S800 I/O
During this turnaround, one-third of the TRIO I/O was migrated to S800 I/O. Styrolution has plans to replace the remaining two-thirds over the next two turnarounds. The following process was used to ensure a successful migration:

- Delete existing TRIO I/O modules from database
- Add new S800 I/O modules to database
- Assign new S800 I/O Channels to existing loops
- Compile and Install database, check and correct errors

The newly installed S800 I/O is a distributed modular I/O which provides easy installation of the I/O modules and process cabling. It is highly modularized and flexible so that I/O modules can be mounted in many configurations to fit most requirements, both in single or redundant applications.

Remote Diagnostic Services
ABB's Remote Diagnostic Service provides on-demand remote support assistance to diagnose a specific system event or failure. ABB experts have direct access to the equipment via a secure remote connection. Experts can collect data from the field to enable service engineers and operations teams to continuously monitor the performance trends of remote assets and define the correct, timely maintenance procedures to allow predictive rather than time-based maintenance. The product collects diagnostic information from dedicated intelligent electronic devices at Styrolution that provide specific sensors for health condition monitoring. ABB's Remote Diagnostic Services optimize maintenance schedules, increase uptime and safety, and reduce operational cost.

During the project installation there were a few hurdles that Styrolution had to overcome. Some of them were product related and some of them were project related. Tony Burns, Styrolution process control engineer stated,

—
06 Tony Burns is the process control engineer at the Styrolution Pasadena site.

"Overall I would rate ABB's performance as very good doing the turnaround. The obstacles that Styrolution did run across…, they would handle quickly and professionally. It made for a successful project."

ABB Inc.
Industrial Automation Service
579 Executive Campus Drive
Westerville, OH 43082-8870
Phone: +1 614 818 6300
E-Mail: automation.service@us.abb.com

www.abb.com