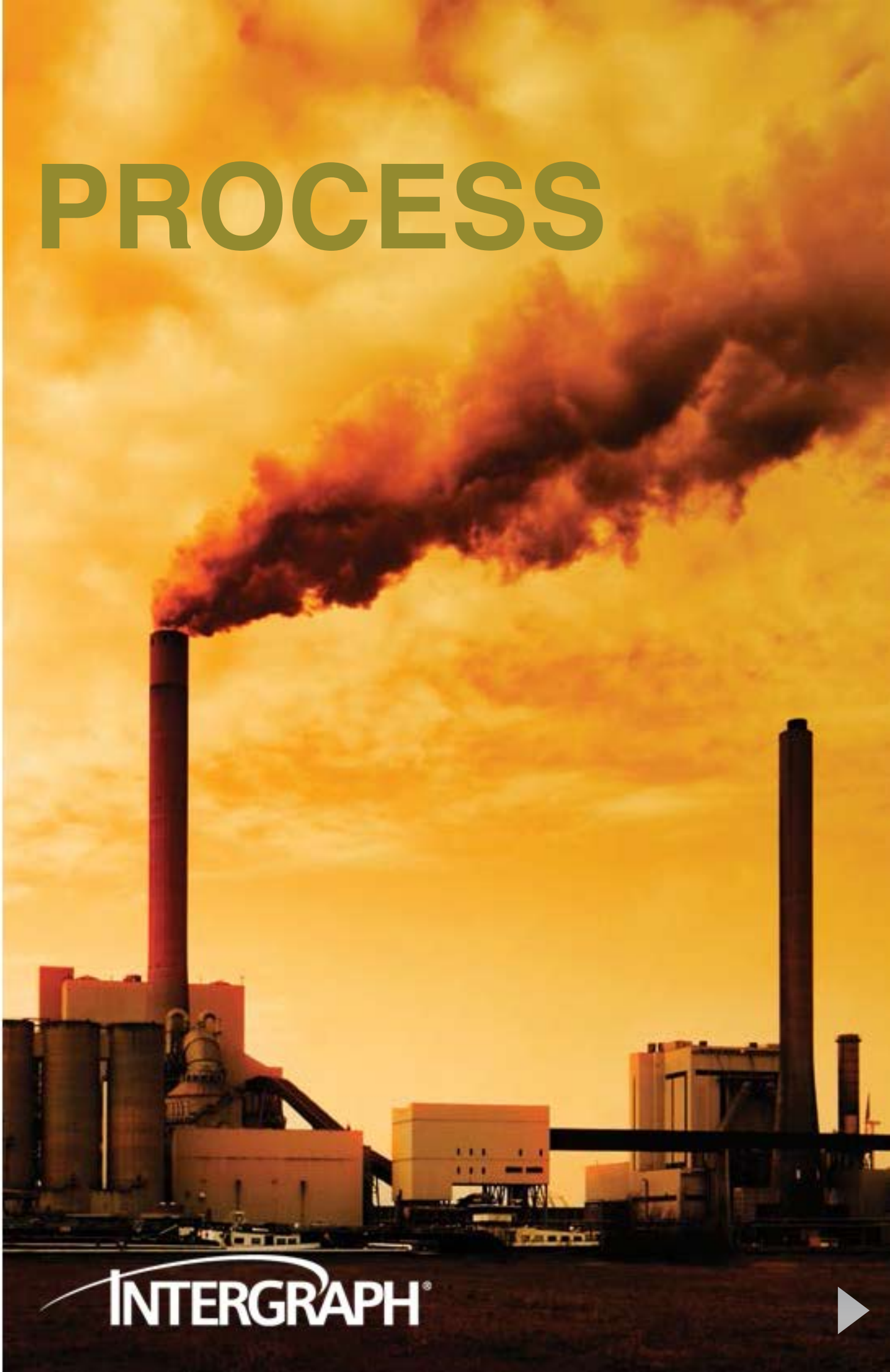
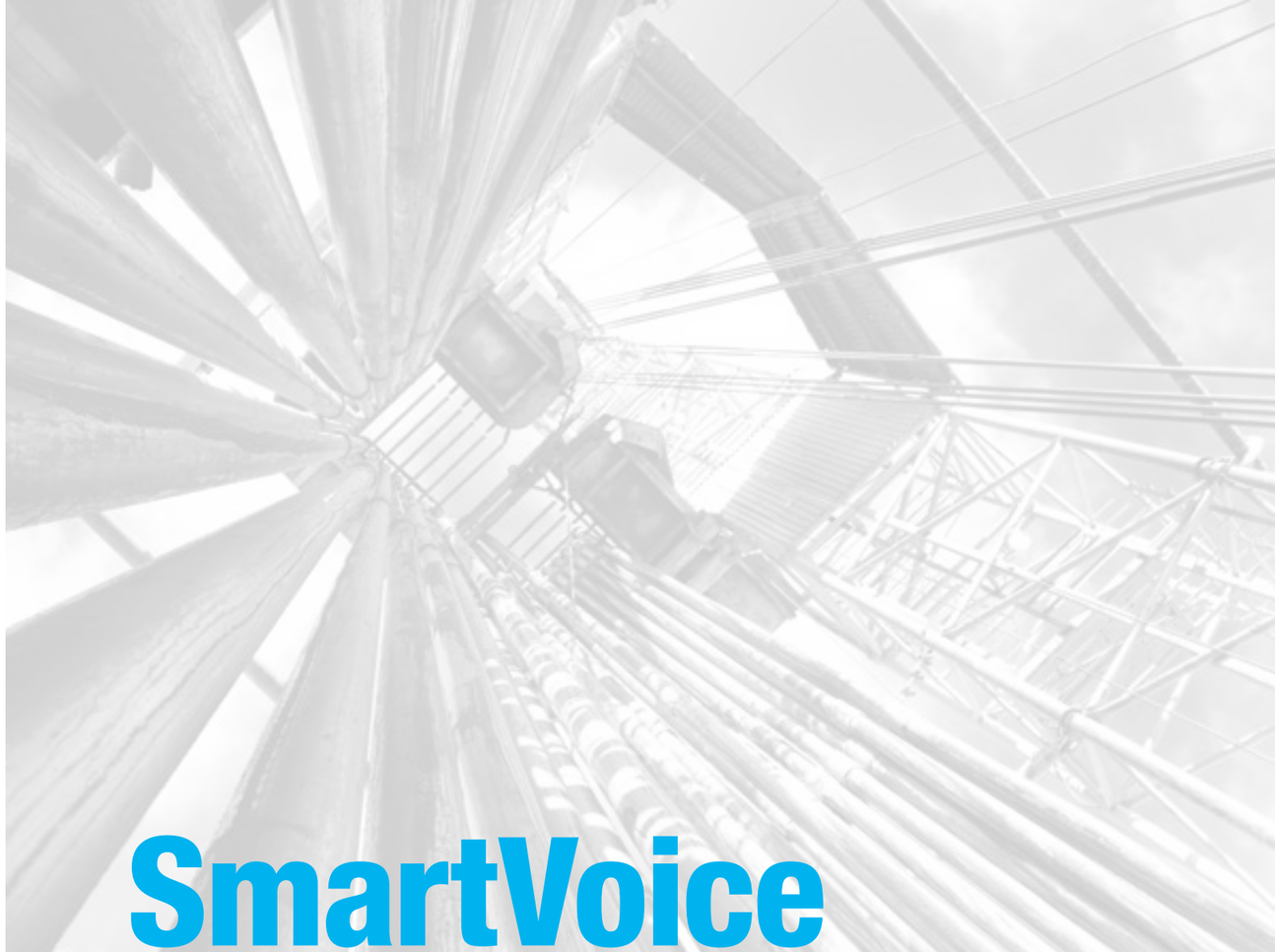
PROCESS



INTERGRAPH®



SmartVoice

Intergraph® Process, Power & Marine Customer Success Stories

VOLUME 2

INTERGRAPH®

INTRODUCTION

Advances and innovations in engineering technology during the last three decades have changed the way people approach their work, the methods and tools they use, the collaborative partnerships they develop, and the solutions they employ to ensure the success of their businesses.

With more than 40 years' history, Intergraph has been helping customers around the world to improve safety, quality, and productivity in their process, power, marine, and offshore facilities. Today, our advanced technology is helping customers change the way they do business by offering solutions that enable them to capture and reuse their intellectual capital across the entire enterprise, enhancing their global competitiveness.

In SmartVoice, you will learn how our customers of all sizes and in all industries are transforming their businesses with Intergraph solutions. Intergraph empowers you to make better, faster operational decisions, leverage best practices from around the world, and explore how other customers are generating more value with Intergraph products and services.

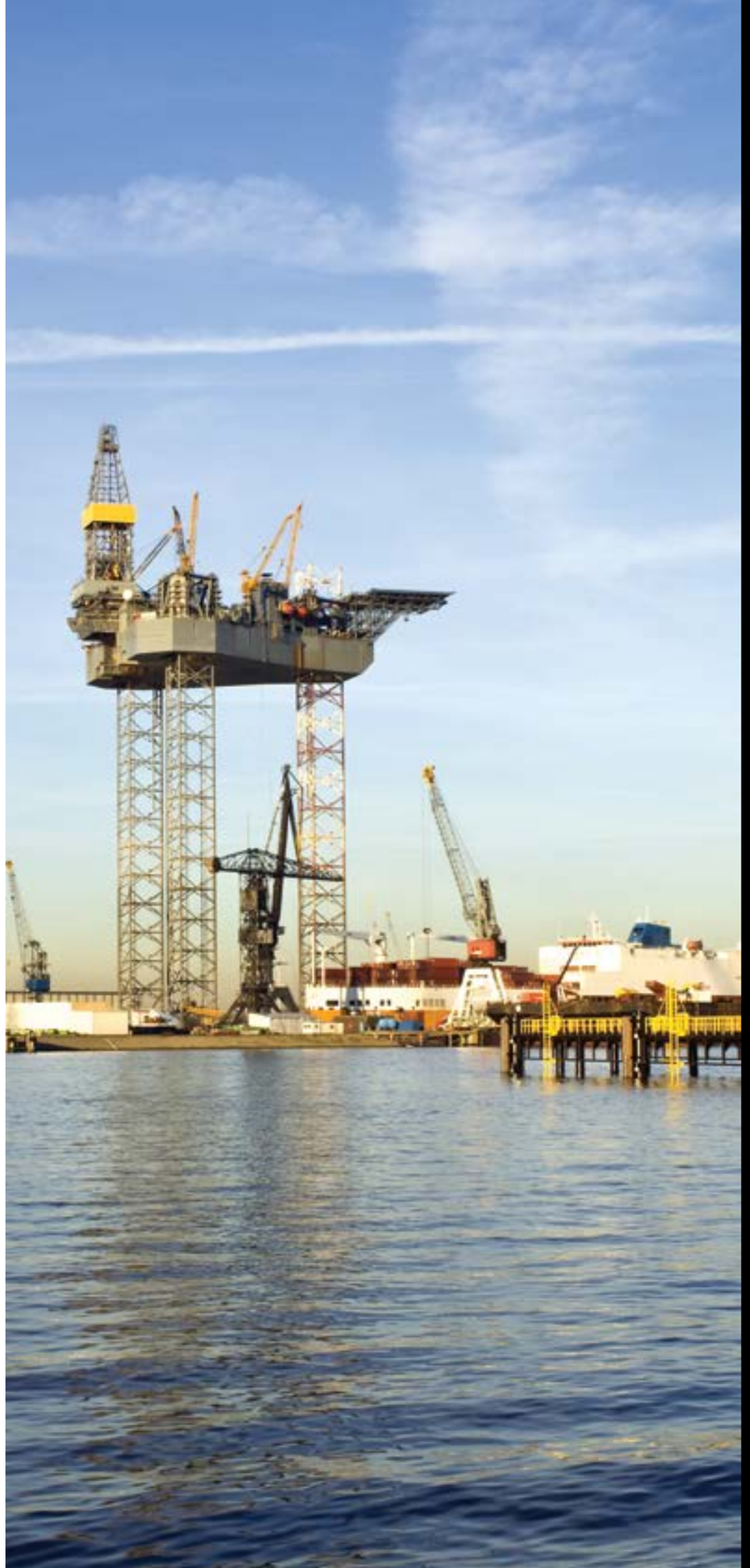
GLOBAL LEADER

Intergraph's Process, Power & Marine division creates solutions that enable the design, construction, and operation of process and power plants, offshore platforms, and ships, and provide the information management capabilities to build and operate those facilities.

Intergraph has been ranked the No. 1 overall worldwide provider of engineering design solutions for industry, according to the ARC Advisory Group. Our leadership position is backed by a proven track record of high-quality product development, a global customer base of industry leaders, and a worldwide sales and support network. Intergraph Process, Power & Marine's business is based on a strong financial foundation and steady growth.

Our customers use Intergraph software and services to design, build, and operate many of the world's largest and most elaborate industrial facilities.

"More than two-thirds of the plants built worldwide are designed using Intergraph software."



HISTORY OF EXCELLENCE

Since offering its first solution for plant design in 1978, Intergraph has focused on developing industry-leading plant and marine design solutions, enabling our customers to use integrated applications to execute projects for increased efficiency and effectiveness. Today, Intergraph is the leading global provider of enterprise engineering software to the process, power, and marine industries. We offer a full suite of solutions that enable proven productivity gains for engineering, procurement, and construction (EPC) firms and owner operators, improving engineering efficiency by up to 30 percent.

1987	Offered our first piping application for plant design.
1984	Launched the leading 3D plant design system.
Late 1990s	Created first data and document management system specifically for the plant design industry.
2000s	Presented suite of integrated, intelligent 2D solutions. Offered leading material management and procurement system specifically for the plant design industry.
Today	Providing the only next-generation 3D solutions for process, power, and marine industries.

INTERGRAPH ENTERPRISE ENGINEERING COMPONENTS

3D MODELING & VISUALIZATION

Save project time and increase production efficiency

For manufacturing and power industries, meeting higher production goals and stricter regulatory requirements begins with building a better plant. Intergraph provides an integrated design environment for plant construction that defines and manages the 3D plant model. The intelligent, rule-based 3D environment enables faster, silo-free plant design and engineering, better collaboration, and reduced time to market. Innovative plant modeling software from Intergraph provides consistent 2D/3D integration between process engineering and detailed engineering disciplines, and true workflow-managed integration across the project enterprise.

INFORMATION MANAGEMENT

Ensure consistency and accuracy of your engineering data

Plant designers and plant owners need plant management software with enhanced decision support capabilities to facilitate global design, production, and life cycle optimization of the plant. Intergraph's information management software maximizes efficiency for industrial and manufacturing plant maintenance and provides plant operation solutions. From concept and design through plant maintenance, operations, and decommissioning, Intergraph enables electronic management of all of the plant's engineering information, integrating information on the physical asset, processes, and regulatory and safety imperatives.

ENGINEERING & SCHEMATICS

Increase data quality and consistency across tasks

To keep a plant operating smoothly over its 30- to 40-year life requires efficient and intelligent plant engineering from the beginning. Intergraph's comprehensive plant engineering solution has been developed for today's 24/7 global engineering workshare environment. All engineering disciplines are intelligent and fully integrated — an engineering change in one area automatically triggers change in all associated objects, no matter where the change occurs. Designed to drive plant optimization, the rule-driven environment prevents engineering errors, thus avoiding shutdowns and lost production.

PROCUREMENT, FABRICATION & CONSTRUCTION

Reduce material surpluses and shortages

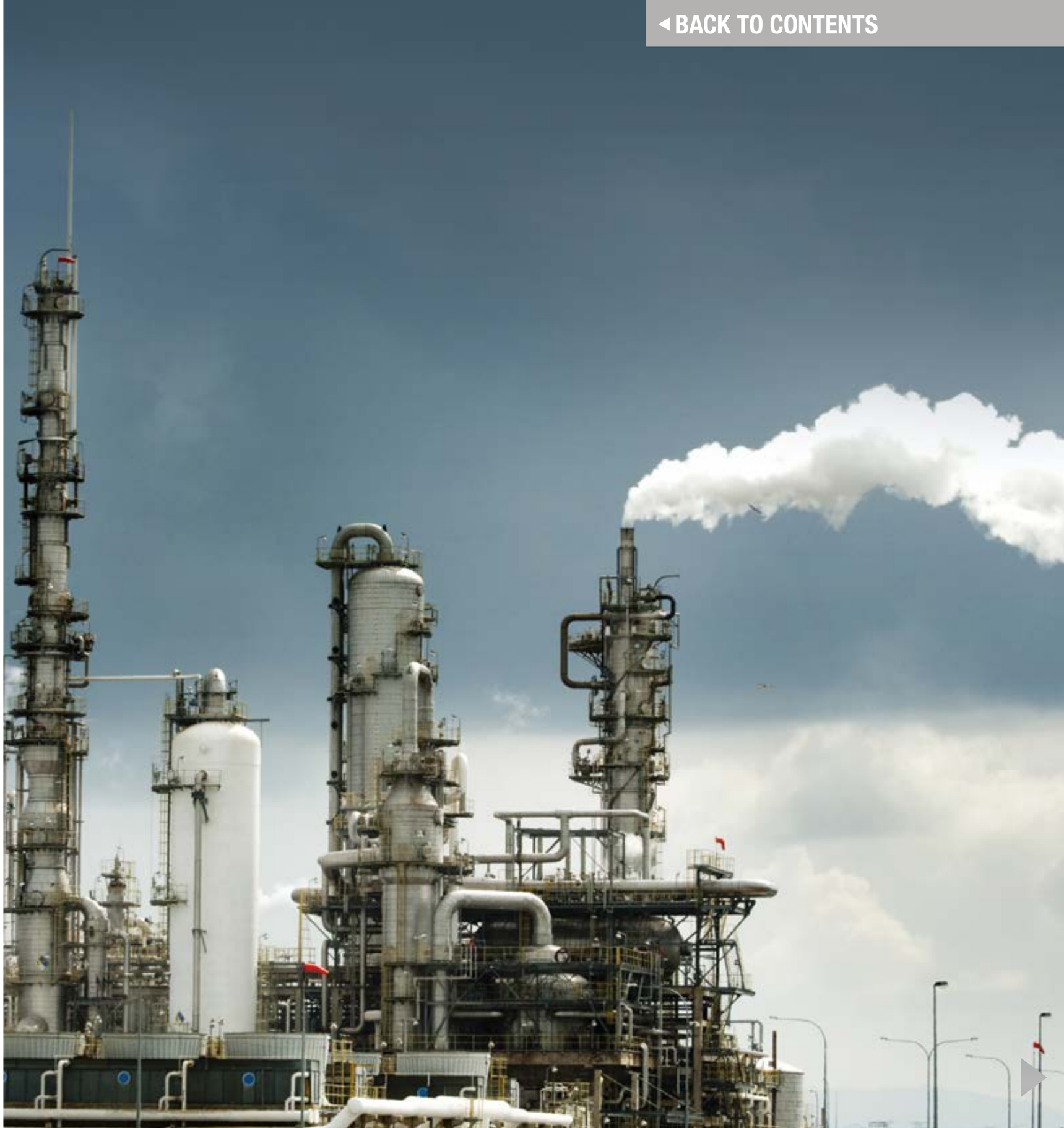
With Intergraph's efficient and accurate plant control system for procurement, fabrication, and construction, plant designers and owners save valuable production time during plant construction. The solution spans the complete project management life cycle — from materials specification and change management through procurement and tracking to inventories, forecast, and material issuing. Intergraph lowers labor costs throughout engineering, procurement, and plant construction. Designed to drive efficiency, our solutions for plant project management can help avoid costly material surpluses and shortages, and reduce overall project risk.

ANALYSIS

Streamline your plant design validation processes

For plant owners and designers, the need to integrate plant design and engineering analysis is vital. One without the other could result in delays and unexpected costs. But with the two working together, you have the ability to validate your plant's design as you go, saving you costly time and resources.

With Intergraph's acquisition of COADE, we now provide plant analysis solutions that set the standard for the industry. Leading plant engineering companies and owner operators worldwide count on our software to deliver accurate, reliable results. Intergraph has transformed primarily manual, time-consuming, and error-prone tasks into seamless and accurate processes. From pipe stress analysis to automated full vessel and oil tank analysis, our software helps you improve safety and reliability while tightening the entire design process to save time and money.



PROCESS

Design, construction, operation, and data management of process plants

Technology is vital to companies in the process industries, and Intergraph's solutions enable them to improve engineering efficiency and increase productivity. They can gain dramatically better control over their valuable information asset needed to comply with any federal regulations and environmental requirements, and eliminate plant shutdowns. With Intergraph technology, they can proactively manage the critical information required to operate the plant safely from day-to-day, which helps save time and reduce costs throughout the plant life cycle.

PROCESS

Providing Drinking Water in the Most Challenging Engineering Conditions

Intergraph PDS design tool shapes the plant producing Adelaide's half-year water needs

PROFILE

Company: ACCIONA Agua

Website: www.acciona-agua.com

Description: ACCIONA Agua is a leader in the water treatment sector with the ability to design, construct and operate drinking water treatment plants, residual purification plants, tertiary treatment plants for re-use and reverse-osmosis desalination plants. ACCIONA Agua is committed to innovation and the application of the latest technologies. ACCIONA Agua aims to contribute to sustainable development in the water sector through innovations in the design, execution and operation of plants for the treatment, purification and desalination of water. In addition to having a significant presence in Spain, Italy and Portugal, the company is expanding in the United States, the Middle East, Australia, Algeria, Mexico, Brazil and Colombia.

Employees: 700

Industry: Energy

Country: Spain

PRODUCTS USED

- PDS

KEY BENEFITS

- Improvement in the overall quality
- Optimal design in challenging geographical conditions
- Fast generation of accurate data for immediate project applicability
- One source of information ensures consistent change and facilitates decision making
- Increased efficiency and reduced project schedules

IDENTIFYING GOALS

ACCIONA Agua is one of the divisions of the Spanish engineering, construction and infrastructure company Acciona. ACCIONA Agua is a leader in the water treatment sector with the ability to design, construct and operate drinking water treatment plants, residual purification plants, tertiary treatment plants for re-use and reverse-osmosis desalination plants. ACCIONA Agua was the preferred provider to build, operate and maintain a reverse-osmosis desalination plant in Adelaide, Australia, thanks to a consistent plan and an intelligent and automated technology providing higher security and quality control. The plant was to have a capacity to treat 300,000 cubic meters (1,0594,399 cubic feet) per day and was to provide water to the city of Adelaide and surroundings.

The geographic area – on a cliff 52 meters above sea level – where the plant was to be located, along with the environmental protection measures enforced in the zone necessitated a unique design and construction. In addition, the plant in Adelaide is pioneering an advanced membrane ultrafiltration pre-treatment and a double membrane design system, which enables higher energy efficiency and faster purification. All these circumstances demanded a high-quality design and high quality engineering data that enabled the plant to live up to the lofty performance expectations placed on it by the city and its residents.

OVERCOMING CHALLENGES

ACCIONA Agua had used Intergraph's PDS design tool in Sea Water Desalination Plants projects such as Isola di Salina (Italy), Jorf Lasfar (Morocco), CRP Cardón (Venezuela), etc. beginning about four years ago. The tool had proved to provide effective and accurate engineering data and ultimately save project time and the company was convinced that the technology provided the perfect qualities to design such an advanced plant.

The initial challenge in Australia was to introduce the tool to construction teams that were used to working with 2D paper drawings and its duplicates. The challenge was to change the team mindset and to get used to working on 3D and with a single platform. Working with other partners and contractors was easier once everybody worked the one truth. The tool enables teams to create a single drawing, allowing everyone to work with the same information. The objectives were to:

- Meet high-quality design requirements in challenging geographical conditions
- Generate accurate data for immediate project applicability
- Ensure good coordination of contractors through a single source of information

REALIZING RESULTS

The feed flow of sea water is captured through a 1.5 km subterranean tunnel, which needed to be designed under special conditions in order to ensure the tunnel performance parameters and facilitate maintenance. The pressure needed for the water to climb the 52m cliff from sea level is provided by 12 pumpers, reaching a stream flow of 28,400 cubic meters per hour.

"Importing and exporting GIS models was smooth and the integration of the virtual model was consistent. This provided higher usability and competence. PDS allowed engineers optimize isometrics generation. It saves 30 to 40 percent project time for isometrics generation," explained Jon de la Iglesia, head of the Technical Bureau department at ACCIONA Agua.

Engineering data could be used directly for project applicability, including detailing, associations, electrical systems, wiring, and looping. It also enabled faster detection of errors and consistent change, as the project progressed. Changes are faster, more consistent, and human error is reduced by 50 percent. ACCIONA Agua is ready for production earlier, as the tool integration and flexibility reduces construction schedules.

MOVING FORWARD

ACCIONA Agua has invested time in building its libraries in order to optimize the use of the tool and automate as much information as possible. Customizing the engineering data and material handling data generated in the construction of water treatment plants has demanded attention. However, the final product is very satisfactory and the results in terms of shortening building schedules, plant operation and maintenance are manifest.

The Adelaide Desalination Plant has now produced its first desalinated drinking water. The €1.4 billion project at Port Stanvac is on track to be completed by the end of 2012, delivering 100GL of drinking water per year – up to half of Adelaide's annual water needs. ACCIONA Agua is part of Adelaide Aqua, the consortium designing, building and operating for 20 years the renewable energy-powered sea water reverse-osmosis desalination plant, one of the largest plants of its kind anywhere in the world.

In addition, Adelaide's desalination plant performance has boosted ACCIONA Agua's opportunities in their bidding plans to provide water services and design-build-operate contracts in Western Australia, South Australia, Victoria, and Queensland.

acciona Agua

www.acciona-agua.com

Briggs of Burton Completes Crucial Project Phase for Europe's Largest Distillery

Intergraph CADWorx Plant Design Suite helps Briggs to successfully deliver a complex extension project on a COMAH site with the goal to improve productivity, efficiency, and safety

PROFILE

Company: Briggs of Burton

Website: www.briggsplc.co.uk

Description: Briggs of Burton PLC as part of the Briggs Group is involved in the Brewing, Distilling, Beverage, Food, Pharmaceutical, and Health & Beauty markets, providing process engineering solutions for the world's leading companies. Briggs has wide experience of projects ranging from overhauls and upgrades to complete new high-volume greenfield developments.

Employees: 124

Industry: Brewing and Distilling

Country: United Kingdom

PRODUCTS USED

- CADWorx Plant Professional
- CADWorx P&ID
- CADWorx Steel

KEY BENEFITS

- Single point of data access
- Better collaboration between all disciplines
- Less on-site changes
- Time savings
- Short learning curve

IDENTIFYING GOALS

Briggs of Burton PLC is part of the Briggs Group, involved in the Brewing, Distilling, Beverage, Food, Pharmaceutical, and Health and Beauty markets. It provides process engineering solutions for the world's leading companies. In the international brewing and distilling industry Briggs enjoys an outstanding reputation with an engineering heritage that goes back over 270 years. Briggs supplies total capability – from brewhouse to warehouse – by offering leading technologies in mash conversion, lautering, mash filtration, and wort boiling.

Briggs was contracted by the Diageo's Cameronbridge grain distillery in Scotland to construct crucial parts in the complex Project Forth – an undertaking to increase the capacity from an already significant 65 million, to 105 million liters of alcohol per annum.

OVERCOMING CHALLENGES

Building an extension to the existing whisky distillery and maintaining production on the COMAH site, whilst improving efficiency, working safely, and reducing the carbon footprint were some of the challenges that Briggs had to face.

Briggs delivered two of the four stages of Project Forth. Phase two included the design and construction of a new fermenting room containing 16 washbacks and two yeast optimizing vessels, a new Clean-in-Place (CIP) building to service the whole plant, a bulk chemical intake and a storage facility to service the CIP area, as well as an upgrade of a large existing fermenting room. In the next phase, Briggs had to design and build a new mash house for pre-distillation.

The Intergraph CADWorx Suite has been used successfully on a number of previous projects at Briggs and therefore was chosen again for Project Forth.

REALIZING RESULTS

The database created in CADWorx P&ID was accessible for all disciplines on the project and purchasing schedules could be produced hassle-free. Keith Poynton, Engineering Director at Briggs, said: "The accurate take-offs produced from the database resulted in cost savings from fixed prices with the supplier and we were able to maximize discounts by ordering in bulk and with fewer deliveries."

Briggs' team of project engineers used CADWorx Plant to model the whole plant, including the vessels, the pipework, and the steelwork.

Cross sections and accurate fabrication drawings were created from the steelwork and pipework models allowing large pipe-bridge sections to be assembled complete with the pipework safely at ground floor level at site. "With space constraints and a river running through the site completing this work at high level would have been very challenging and difficult to achieve safely. The accuracy of the model and steel fabrication drawings ensured an efficient and safe process", said Keith Poynton. Briggs achieved time savings of approximately 10 to 15 percent.

The integration with Navisworks allows the project to be reviewed by all the parties involved – technical or not. Employees with previous 3D AutoCAD experience required just half a day's training in order for them to work productively on the project. The customization capabilities of CADWorx enabled Briggs to extensively tailor the database, symbols and pipe specifications.

The bi-directional integration with Intergraph CAESAR II meant that pipe stress analysis of the steam and condensate pipework could be carried out by a third party without the need of data migration.

MOVING FORWARD

Once again, Briggs has delivered outstanding quality on time and within budget, using Intergraph's CADWorx Plant and Process design solutions. One of the biggest benefits from using CADWorx is the possibility to deliver a substantial amount of work upfront, minimizing cost overruns due to on-site design changes. Intergraph is proud to have been a partner with Briggs for many years now and is looking forward to continue this mutually beneficial relationship into the future, helping Briggs to maintain a competitive edge in today's and tomorrow's market. Here's looking forward to the next 270 years!

www.briggsplc.co.uk

BRIGGS

Proper Planning, Training, and Business Mindset – Key to Success

Creating a competitive advantage at Fluor with SmartPlant Enterprise

Michael Pye, Fluor

At Fluor Corporation, we have had a longstanding relationship with Intergraph. When we learned of the new SmartPlant Enterprise technologies, we took a very strategic approach for the review and evaluation of how they might change our business. We understood that the new data-centric technologies would offer not only much different execution opportunities but also a chance to re-evaluate the legacy processes and organizational structures we have historically used. We coined the evaluation and eventual implementation of the "NEXTGENERATION Initiative" at Fluor. It was created to look at the impact the new technologies would have as well as the work process improvement opportunities that could potentially enhance our execution capabilities. Given how systemic our PDS processes had become over the past 20 years, we realized we needed a proactive approach to successfully deploy the Intergraph SmartPlant suite of technologies within Fluor to be successful. We focused on these key areas:

- Retraining a multi-office global organization in the most efficient manner possible
- Implementing SmartPlant Enterprise applications in an integrated project execution environment
- Determining the work process and organizational changes that position Fluor for a "Next Generation" of project execution
- Implementing a rules-based environment to strengthen our competitive position and support the coming knowledge and experience shortages

TRAINING PROGRAMS

As part of the NEXTGENERATION initiative, we developed a very comprehensive training program to address the challenges we would face in re-tooling our global workforce. We characterized the challenges we would face into three areas:

- People
  - → Overcoming resistance and "fear of change"
  - → Changing from a "file-based," CAD execution mentality to a "data-centric" approach
  - → Driving acceptance of standard processes and configurations such as drawing view templates
- Technology and training
  - → Analyzing the impacts to hardware, security (especially with SmartPlant Foundation) and infrastructure the new technologies may have
  - → Consistent deployment of technologies across multiple offices, countries and business lines and determining how to maintain that consistency
- Executing projects in an integrated SmartPlant Enterprise environment
  - → Providing effective management of a complex environment
  - → Managing the misalignments between SmartPlant Enterprise tools operating within an integrated environment
  - → Managing the environment complexities and limitations for joint venture and third-party participation in the environment
  - → Overcoming legacy work processes using the integrated SmartPlant tools

The NEXTGENERATION training program we developed was broken down into a series of training curriculum and courses that are designed for specific project roles such as project management, design engineering and automation support.

In many cases, not all training must occur prior to project start-up, so the courses have been categorized as follows:

- **Required** – Mandatory courses that must be performed prior to project execution
- **Just-in-time** – Courses that should be taken at the appropriate time during project execution
- **Optional** – Courses that are taken if and when needed
- **On-the-job** – Courses that typically feature informal instruction or training (i.e., coaching), which is performed through project execution on an as-needed basis

Considering the vast size and global distribution of our project execution organization, we designed the program to be as efficient as possible and broke it into the following teaching methodologies:

- **A limited amount of instructor-led presentations** – Intended to be presented by a knowledgeable instructor
- **A significant reliance on self-paced online / computer-based training (CBT)** – These "self-paced" online CBTs include:
  - → **Fluor University Skillsoft** training materials accessed through Fluor University that consist of a combination of Microsoft PowerPoint, audio, and video demonstrations, enabling the student to review and grasp content without the assistance of an instructor
  - → **SmartPlant 3D Tool Training** – Intergraph "core" tool training delivered using Intergraph's SmartPlant Virtual Training (SPVT)
- **SmartPlant Enterprise NEXTGENERATION Coaching** – Fluor engineering and tool work process training is provided through a series of lessons that focus on what is different on projects executed using the new tools and work processes, such as:
  - → Fluor engineering work processes
  - → Functional interface impacts
  - → Tool work processes
  - → Fluor's integrated project execution environment (certified tool configurations)

DEPLOYMENT

Our deployment approach was divided into three phases:

- **Phase 1** – Office Readiness Training is focused on ensuring an office is prepared for NEXTGENERATION deployment by evaluating the office IT infrastructure and preparing the "core" resources within the office prior to project deployments
- **Phase 2** – Initial Project (Office) Deployment Training provides the initial project task force deployment training and provides the office "formal" NEXTGENERATION deployment training and coaching
- **Phase 3** – Ongoing Office Training is focused on any additional staff training required and the global support and governance program to manage changes to the Fluor-certified environments

We also implemented a support structure to address the global offices in Fluor. The structure included:

- **Core Governance Team** to address overall management of the certified configurations, rule development and enhancements and new release certification and testing
- **Regional Support Teams** who focus on the project support needs within the region and provide the regional SmartPlant Foundation support and management
- **Office Support Teams** who provide direct office-level support and assistance

INTEGRATED PROJECT EXECUTION

From the beginning, we knew that the focus on full integration would provide significant benefits and value if achieved. For a change of this magnitude to be successful, we did not want to focus on simply the publishing of information into SmartPlant Foundation, but to fully leverage the publishing and retrieval of data into the SmartPlant Enterprise tools where possible. What we did not expect was the overall complexity and lack of consistency between the SmartPlant Enterprise tools that we discovered. We realized that while the Intergraph technologies enabled a lot of capabilities, they are also are extremely complex to manage, especially in an integrated approach to project execution, and can be a challenge for engineers and designers who are used to "document-centric" processes and procedures.

To address this, we implemented what we refer to as the NEXTGENERATION Certified Environments, which are a series of version-specific tools, and SmartPlant Foundation mappings that have been work process-tested and documented for the information managed and behaviors of the SmartPlant Enterprise environment.

We also create a series of training programs to help educate the project task force members on the integration interdependencies and impacts each tool can have on the environment, and how to manage and adapt to those impacts.

We also felt that a comprehensive, well-documented project work process approach was required to ensure that the work process changes desired by Fluor and the impacts the new technology has would be understood going into a project.

PROCESS

The result was a series of project execution guidelines that describe the new tool and the project engineering work process changes to effectively utilize SmartPlant Enterprise at Fluor:

- Volume 1 – User procedures, project setup and configuration – Focused on the tasks the design team must understand
- Volume 2 – Installation, setup and other technical information – Focused on setup and configuration of the environment
- Volume 3 – NextGeneration work processes – Focused on work processes in the Fluor SmartPlant Enterprise environments

RULES-BASED ENVIRONMENT

As part of the initiative, we also recognized the potential an effective use of a rules environment could have in improving not only the productivity of the processes but also in helping address the aging of our workforce. We implemented a process to identify, classify and prioritize rules and enhancements needed for the SmartPlant Enterprise environment. We classified our rules in three areas:

Rule	Description	Complexity
Productivity enhancements	These rules include modeling wizards, design assistants and automated symbols.	Least complex to develop
Design integrity validations	Rules check the designs for compliance with project rules. These may be: • Engineering design rules • Client best practice rules • Industry standards or operations • Construction or safety best practices These help ensure that the level of experience is applied to all projects, regardless of experience level of the team. These rules can be applied as a status check or as a set of services that monitor and manage the design integrity or perform enhanced interference management.	More difficult to develop but provides enhanced value
Rule-based engineering	Complete engineering rule-based reasoning systems offer optimal benefits. For example, Fluor's OptimEyes system is used for FEED plot model development.	Most complex to develop but provides the highest value

To ensure the continued growth and management of our Fluor Rules Library, we implemented a dedicated development and certification team to develop the prioritized rules and enhancements identified. The Fluor Rules Service Engine is then configured for each project as part of the NEXTGENERATION Certified Environments, ensuring all projects leverage the advantages of the rules service engine and enhancements.

While the path to get to where we are today has required considerable effort and time, we feel we have moved over the crest and can see the momentum building. As of June 2011, we have 14 projects in various stages of execution; with three of those projects being moved into the field. We have a SmartPlant Enterprise environment established in 13 offices across Fluor with several more under way. We currently have more than 850 people trained in the new SmartPlant 3D and SmartPlant Foundation technologies and our NEXTGENERATION work processes, with more than 600 of these personnel located in the Asia-Pacific region (APAC).

CHANGING THE WAY WE DO BUSINESS

Fluor's success with SmartPlant Enterprise has been predicated on the planning, hard work, endless preparation and anticipation of a team over a period of years. Based on our approach, we think this truly has the potential to change the way we do business.

Keep in mind this is not a simple roll-out or decision to make. Consider these key takeaways for successful implementation:

- Establish company standards and work processes you want to be followed
- Document and communicate the standards and work process changes so that they can be consistently applied
- Create an effective training program that will give your users the confidence to effectively utilize the systems
- Establish an organization to manage SmartPlant Enterprise deployments across your enterprise
- Prepare and invest in advance of project execution. SmartPlant Enterprise is not a "plug and play" environment and attempting to "learn as you go" can impact the success you will see and project outcomes

As you approach your decision on implementing SmartPlant Enterprise, think of what your ultimate goals are for your company and how they can best be achieved. Through proper planning, training and business mindset, tremendous value can be achieved.

Michael Pye serves as project automation global excellence leader at Fluor Corp. He is based in Greenville, South Carolina, U.S.

www.fluor.com FLUOR.

IET Enjoys an Edge on Turnkey Projects in Northern Africa Thanks to SmartPlant Enterprise

High-quality design and knowledge sharing among contractors are instrumental to keep owner operators satisfied

PROFILE

Company: Industrial Engineering Technologies

Website: www.iet-engineering.com

Description: IET is an Industrial Engineering Company. As a full service company, IET has the expertise to provide turnkey systems for its customers, which includes products of its own design. For each project, IET is able to complete, partially or totally, the following services:

- Project engineering: Basic studies, project management & detailed studies.
- Site services: Construction and erection supervision and start up, and tests supervision.
- Studies, consulting and expertise: Technical-economic studies and management consulting.

Employees: 70

Industry: Energy

Country: Tunisia

PRODUCTS USED

- SmartPlant Instrumentation
- SmartPlant P&ID
- SmartPlant 3D
- SmartSketch®

KEY BENEFITS

- Online and remote design
- Integration of various engineering disciplines
- Improved project management workflow and document management system
- Ability to anticipate and to react to changes

IDENTIFYING GOALS

Industrial Engineering Technologies (IET) is a small engineering company in Tunisia, which is expanding very fast carried by its strong drive and ambitious plans. Created in 2003 by the steel manufacturer and pipe fabricator SOCOMENIN, it was confided the task of carrying out turnkey project of increasing capacity. IET expertise and knowledge teams soon found a market in Tunisia and expanded to neighboring countries in Northern Africa. Located in the hub of a petroleum rich area, IET engineering services, consulting and project management services have found a very prolific, but also highly demanding cluster of international oil and gas operators.

Such fast expansion in the last few years demanded IET to capture and implement the latest technology to provide advanced design of industrial plant at the lowest cost and with high efficiency. The company chose for Intergraph solutions because it is increasingly demanded by Owner Operators working in the Northern Africa region, seeking quality design for their turnkey projects, which can be performed from and delivered to different locations and online.

OBJECTIVES

- To gain qualitative design improvements for improved plant configuration
- To achieve Flexible information flows and remote engineering access
- To streamlined processes, improve project management workflows and document management system
- To accomplish more effective change management and faster decision-making

REALIZING RESULTS

The company was already using a number of Intergraph products, such as PV Elite for Pressure Vessel Design and CAESAR II for Piping Flexibility analysis sand stress calculation, in addition to other products for steel structure design such as ROBOT and TEKLA/Xsteel.

IET decided to implement Intergraph SmartPlant products to get a leap forward in its services. The software implementation was assisted by Intergraph and required integration with TEKLA structures/Xsteel and piping customization according to French standards.

The use of Intergraph solutions allows IET to provide higher quality design in a shorter period of time, integrate various disciplines engineering data, work remotely and online, interface more efficiently with other tools and anticipate and react to changes in the project. Their customers have experienced guaranteed results and improved performance, which had a positive impact in customer satisfaction.

MOVING FORWARD

After a year training its employees, IET is currently using SmartPlant 3D on small projects, such as the extension of hydrocarbon facilities and phosphoric acid pulp units. Twelve people are using the tools, eight of them with simultaneous access.

At this stage, IET is developing several tools to increase profitability of the solution, including the preparation of a pipe supports library and the creation of an audio-visual training program covering all aspect of the tools in order to prepare the team for increasing the number of SmartPlant 3D users.

Once all the staff is up to speed, the solutions will be used in larger and more complex turnkey projects in Tunisia, Algeria and Libya. This will also attract more international company to subcontract engineering activities in Northern Africa, contributing to enhance the region industrial activities and its economic performance.

www.iet-engineering.com

PROCESS

NOV FGS Implements SmartPlant Isometrics for Production of Fiberglass-composite Pipes

Intergraph technology enables automation for increased productivity and accuracy

PROFILE

Company: NOV Fiber Glass Systems

Website: www.nov.com

Description: National Oilwell Varco Fiber Glass Systems (NOV FGS) is the combination of Star Fiberglass, Smith Fibercast, and Ameron (www.ameron-fpg.com) product lines, bringing over 60 years of time-tested composite pipe experience to the oilfield, chemical and industrial, petroleum marketing, and marine and offshore markets. Its broad range of temperatures, pressures, and corrosion barriers allow the company to best match a product with the required application. NOV FGS is headquartered in San Antonio, Texas, and has 15 manufacturing facilities around the world.

Industry: Process

Country: U.S.

PRODUCTS USED

- SmartPlant Isometrics

KEY BENEFITS

- Reduced time in spooling and material take off (MTO) preparation
- Reduced errors for increased MTO accuracy
- Improved productivity through automation and reduced manual editing
- Rapid and easy creation of company-standard fiberglass piping component database

IDENTIFYING GOALS

National Oilwell Varco (NOV) acquired Ameron International Corporation in 2011, creating NOV Fiber Glass Systems (FGS). NOV FGS manufactures and markets the world's most comprehensive line of fiberglass pipe products for the chemical and industrial markets. They are used for oilfield, service station fuel handling, offshore platform, and marine applications.

NOV FGS had been using plain 2D Autodesk AutoCAD to create fabrication spool drawings. This process is both time-consuming and error-prone, leading to shortages of materials during procurement, as well as dimensional errors during manufacturing.

With the growth in business, NOV FGS wanted to boost efficiency of its production, as well as ensure it could effectively handle future growth. The company also sought to increase accuracy of material take off (MTO), which will help to facilitate the production process.

OVERCOMING CHALLENGES

- Establish database-driven spool drawings
- Reduce manual editing during drafting
- Improve productivity
- Minimize errors and produce accurate MTO

REALIZING RESULTS

NOV FGS wanted a standalone solution that is easy to use and would produce accurate results. The company chose Intergraph SmartPlant Isometrics because it was the only software solution available in the market that met these key requirements. In addition, the solution is user-friendly so only minimal training was required. NOV FGS could also customize SmartPlant Isometrics as required because the solution is very flexible.

SmartPlant Isometrics, powered by ISOGEN, is the Intergraph solution designed to document piping systems with industry-standard piping isometric drawings, and is ideal for site-based piping engineers and designers. SmartPlant Isometrics can read design isometrics from almost any 3D plant design system, or create new isometrics quickly and accurately from sketches, providing a high-quality record for planning, cost estimation, inspection, or design of modifications.

NOV FGS implemented SmartPlant Isometrics to generate database spools with accurate and automated MTO. The draftsmen use the Intergraph solution to develop spool drawings for production from NOV FGS clients' isometrics or layouts. The generated MTO is then sent to the sales and production team for planning and preparation.

It was a smooth and easy process for NOV FGS to implement SmartPlant Isometrics and users became proficient in the software very quickly. The solution could be readily adapted to suit the company's work processes, and its ability to provide accurate piping reports delivered great benefits to the handover of information between business departments by ensuring that accurate and timely procurement of materials is always performed. Due to the extensive customization options available in SmartPlant Isometrics, symbols and drawing templates could be established to enable standardized, consistently presented, and industry-standard isometric deliverables to be produced for all projects that NOV FGS undertakes.

SmartPlant Isometrics has also delivered significant time savings to NOV FGS. With its previous methods, it might have taken approximately one hour to create each and every individual spool drawing, including the addition of attribution, cutting and MTO information, and jointing details between male and female parts. Due to the productive pipe-sketching functionality and powerful editing tools of SmartPlant Isometrics, as well as the inclusion of ISOGEN drawing automation, making revisions to piping designs is fast and easy. Using the Intergraph solution, NOV FGS has dramatically reduced design time and errors, with drawing production time per spool drawing now reduced to just minutes. NOV FGS considers all drawings and MTOs produced by SmartPlant Isometrics to be 99 percent accurate.

NOV FGS is very satisfied with the implementation of SmartPlant Isometrics, which has enhanced the company's accuracy and productivity. With SmartPlant Isometrics, NOV FGS is able to generate 25 to 30 spools per day, complete with MTO and ready for production.

MOVING FORWARD

NOV FGS currently has a few thousand items in its database but expects this number to keep growing as it takes on more projects. The company will continue enhancing its system and processes to keep up with business growth, and ensure it fully maximizes the benefit of SmartPlant Isometrics for significant time and cost savings while maintaining high-quality production of fiberglass-composite pipes.

www.nov.com

Accelerating Schedules with Integrated Engineering

SmartPlant Enterprise enables SLECC to enhance global competitiveness

Shengli Engineering and Consulting Company Limited (SLECC) is a leading Chinese EPC company, and a Grade-A registered survey and engineering institute. Since its founding in 1965, it has completed more than 60 domestic and international oilfield surface engineering projects.

Facing an increasingly competitive global marketplace, SLECC sought an integrated EPC solution that would further enhance its capabilities to meet the challenges and requirements of international projects. Its key objectives were to develop its EPC business further by improving project management, to speed up project schedules, and to enhance its core competitiveness. These strategic objectives are aligned with SLECC's vision to build its reputation as a leading international engineering company and to take on more global projects.

CHOOSING THE WORLD LEADER

SLECC recognized that it needed to choose a vendor with the capabilities to support its goals and help in building its international reputation. After a comprehensive evaluation of all the solution providers in the market, SLECC chose Intergraph and the SmartPlant Enterprise integrated suite of solutions to establish its enterprise engineering system because of Intergraph's global leadership position and its proven track record in the industry.

"Our drive to continuously improve our service offering and expand our business globally was a major consideration in our choice of Intergraph's SmartPlant Enterprise," said Yang Li Peng, Information Management System project director at SLECC. "We recognize that SmartPlant Enterprise is proven, established technology in the marketplace and offers a powerful portfolio of best-in-class applications that will enable us to be more responsive to the dynamics of our market."

SmartPlant Enterprise offers industry-leading design and data management solutions, enabling SLECC to capture integrated engineering knowledge at the enterprise level for the competitive advantage needed in today's and tomorrow's market. SmartPlant Enterprise's integrated suite of solutions enables proven productivity gains, improving engineering efficiency by up to 30 percent. This is why the majority of plants built worldwide are designed using Intergraph solutions.

A COMPLETE PROJECT SOLUTION

SLECC selected several SmartPlant Enterprise solutions, including SmartPlant 3D, SmartPlant Foundation, SmartPlant Instrumentation, SmartPlant Electrical, SmartPlant P&ID and SmartPlant Reference Data. By establishing an integrated engineering system enterprise-wide, SLECC is able to support all of its design and engineering projects across all EPC processes.

"We see SmartPlant Enterprise as a complete project solution that meets all our requirements from design to construction, operations and maintenance, and other work processes," said Yang. "In addition, its global worksharing capabilities enable us to engage with international companies and deliver engineering data to owner operators on the same platform."

REAPING THE REWARDS

The implementation of SmartPlant Enterprise has delivered several benefits to SLECC. The integrated engineering platform with intelligent rules and automation built-in has improved design workflows at SLECC, resulting in more effective project management. With the boost in productivity, the EPC has been able to meet tight project schedules. Increased accuracy in engineering data has also led to reduced rework and material waste, delivering significant cost- and time-savings. For example, for mid-sized oil and gas EPC projects, SLECC found that it can accelerate the project schedule by two months with cost-savings of 20 percent.

In addition, the deployment of a standard engineering platform across the entire enterprise has enabled SLECC to establish collaborative work processes. This is aligned with international project management best practices, ensuring that the company is fully equipped and prepared to take on global projects.

"SmartPlant Enterprise is truly an indispensable tool when collaborating with other companies on global projects," said Yang. "Intergraph has helped us tremendously in realizing our vision to be an international player in the market, and has enabled us to be more productive and competitive."

CONSTANT INNOVATION

Today, SLECC has standardized on SmartPlant Enterprise. The integrated suite of solutions is used company-wide for all of the EPC's design and engineering projects. SLECC is continually looking at innovative ways to enhance its use of the system so that it will continue to deliver maximum benefit and value to the company.

For example, SLECC has customized SmartPlant Instrumentation for its specific purposes, with the input of the company's own existing range of templates. This gives SLECC greater flexibility in using SmartPlant Instrumentation for both domestic and international projects, and expands its applicability across a wider range of projects.

Another enhancement that SLECC has implemented is ensuring that SmartPlant Reference Data meets the requirements of Sinopec's procurement department. SmartPlant Reference Data codes are compatible with and correspond with Sinopec's codes. The company also included material code descriptions in Chinese and English to cater to the needs of both local and international users.

"We will continue to enhance our implementation of SmartPlant Enterprise to meet both local and international requirements so that it delivers increased safety, quality and productivity to our engineering projects for years to come," said Yang.

ABOUT SLECC

SLECC is located in Dongying City, Shangdong Province. It is regarded as a leading company for oilfield water injection, water treatment, and shallow offshore oilfield surface engineering. It is a responsible unit of the Technology Centre of Water Injection and Treatment in China's oil industry. SLECC is also a key science and technology research company within Sinopec, a sub-station of postdoctoral scientific research working stations of Shengli Oilfield, and one of the national top 100 survey and engineering institutes in China.

www.slecc.com.cn

With Growing Demand for Alternate Fuels, DSEC Looks to Intergraph Tools

SmartPlant Enterprise improves EPC's productivity and work sharing

PROFILE

Company: De Smet Engineers and Contractors (DSEC)

Website: www.dsengineers.com

Description: De Smet Engineers & Contractors (DSEC) is a privately held LLC incorporated in Belgium in 1989. It has an established reputation as a general EPC contractor, specializing in the agroindustrial field where it is a fully integrated world class provider of engineering, procurement, and construction services. Its activity focuses on providing knowhow in the sugar industry and on providing technologies owned by its affiliated companies or accessible through cooperation agreements. DSEC has worked in more than 25 countries.

Employees: 120

Industry: Agro-industrial, chemical

Country: Belgium, Brazil, Argentina

PRODUCTS USED

- SmartPlant 3D
- SmartPlant Instrumentation
- SmartPlant Review
- SmartPlant P&ID

KEY BENEFITS

- Improved exchange of information
- Increased drawing quality and improved productivity
- Smarter modeling of the equipment using SmartPlant 3D
- Coherence and automation of data transfers between SmartPlant P&ID and SmartPlant 3D

IDENTIFYING GOALS

De Smet Engineers and Contractors (DSEC) provides the agro-industrial and chemical industries with general contracting services from project management to full turnkey design and construction, allowing industrial operators to concentrate on their production commitments. DSEC is active in the fields of sugar and sugar derivates (from beet and cane); bioethanol (from cane and cereals); vegetable oil extraction and refining; biodiesel (from vegetable oils and animal fats); bioenergy generation from biomass (cogeneration); and biochemistry. With 120 employees, Belgium-based DSEC has a potential of annually managing a portfolio of projects around 200 million Euros.

With the growing demand for alternative fuels, DSEC faced the challenge of completing turnkey projects in a limited amount of time and with a pre-defined budget. That requires flexibility and precise planning. To reduce construction costs and time, piping work is pre-assembled. The assembly work is sometimes completed at great distance from the actual plant site. To meet these challenges, DSEC selected the Intergraph SmartPlant Enterprise family of products.

"We felt that with Intergraph, we could benefit from efficient and responsive technical support for software implementation," said Bernard Nokerman, DSEC project manager. "We were also very interested in the integration of SmartPlant 3D with SmartPlant P&ID." DSEC selected several products from the SmartPlant Enterprise suite, including SmartPlant 3D, SmartPlant P&ID, SmartPlant Basic Integrator, SmartPlant Review, and SmartPlant Explorer.

OVERCOMING CHALLENGES

The company's primary objective was to improve productivity using software that was easy to use and that could easily import data from subcontractors. DSEC also wanted reliable software that would be supported in the future. The ability to share the software outside DSEC's main office was also important. Challenges faced during implementation of the SmartPlant Enterprise suite included implementing the solutions simultaneously with production. Implementation was completed with minimal customization of the standard products, providing a quick system startup. Progressive implementation of the different functions according to the projects' workflow helped the team better coordinate its activities and resolve any bugs identified in the system.

Upgrades and hotfixes were implemented during production, while correlation between hardware capacity with system needs led to a change of the servers during operations. No data migration was required. Internal knowledge was used for data development, with only a few subcontractors' models directly imported. Initial production with Intergraph software began very quickly. "The Intergraph team showed superior knowledge, and their quick response always surpassed our expectations," said Nokerman.

REALIZING RESULTS

Intergraph solutions are commonly used for DSEC tasks related to structure, equipment, piping, and drawings. Using SmartPlant Enterprise, DSEC has executed at least six major projects. These projects comprise several thousands of pieces of equipment globally and tens of thousands of pipelines distributed among an average of about 10 process buildings per project. All licenses are used on a daily basis and distributed concurrently.

The main reasons for choosing Intergraph solutions included the ability to seamlessly integrate data between SmartPlant P&ID and SmartPlant 3D; importing and exporting documents in common formats (SAT, DWG, XLS); the quality of technical support, and the ease of training. Compared to its previous 3D system, DSEC noticed effective improvements:

- Improved exchange of data and information with internal and external departments
- Increased drawing quality and improved productivity in isometrics generation
- Smarter modeling of the equipment using SmartPlant 3D
- Coherence and automation of the data transfers between SmartPlant P&ID and SmartPlant 3D, including process parameters
- Easy follow-up of work progress thanks to the link
- Quality control of design activities through the "To-Do List"

"We now enjoy faster startup on projects based on currently developed templates, including equipment models, specifications, and working procedures," Nokerman said.

MOVING FORWARD

DSEC has decided to implement SmartPlant Instrumentation to complement the company's design package, and it will be fully functional shortly. "We expect to use SmartPlant Enterprise's worksharing capabilities where needed," said Nokerman. "The next step will be to improve and set up the collaboration process between our civil works and structural departments and related external engineering subcontractors with a relay to the workshops." Worksharing capabilities have been used successfully in the context of the first projects, and they will be broadly used soon. DSEC noted that a dedicated offshore server brought major improvements when running the system, which has been quite robust.

www.dsengineers.com

ABOUT INTERGRAPH

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

Intergraph operates through two divisions: Process, Power & Marine (PP&M) and Security, Government & Infrastructure (SG&I). Intergraph PP&M provides enterprise engineering software for the design, construction, operation and data management of plants, ships and offshore facilities. Intergraph SG&I provides geospatially powered solutions, including ERDAS technologies, to the public safety and security, defense and intelligence, government, transportation, photogrammetry, and utilities and communications industries. Intergraph Government Solutions (IGS) is a wholly owned subsidiary of Intergraph Corporation responsible for the SG&I U.S. federal business.

Intergraph is part of Hexagon (Nordic exchange: HEXA B; www.hexagon.com), a leading global provider of design, measurement, and visualization technologies that enable customers to design, measure and position objects, and process and present data.

For more information, visit www.intergraph.com.

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