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Life Cycle Management for Oil and Gas Water Treatment Solutions

Protecting Large Capital Assets,
While Reducing Risks

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Smart technologies and connectivity just about everywhere have enabled Siemens Water Solutions to offer comprehensive Life Cycle Management to oil and gas customers worldwide, helping ensure that water treatment facilities are always optimized and available, for decades of safe, dependable use.

Oil and gas water treatment solutions: why Life Cycle Management matters

For most people, the only spare part they know of and, frankly, need to know about is the spare tire in their car trunk or under the bed of their trucks. But anyone involved in the maintenance, repair, and service of the world's oil and gas infrastructure knows different: spare parts are lifelines to keeping exploration, production, and operations up and running.

That's especially true for oil and gas water treatment systems, given the typically harsh environments that they must endure, whether used offshore, onshore, upstream, midstream or downstream. Things break. And if they don't break, in time they wear out—downhole, topside or anywhere between source, refining and final sale. And when disruptions do occur, executives call their maintenance and repair crews first for on-site intelligence, including safety impacts, diagnostics, and timeframes when problems will be fixed and activities can resume.

Of course, the working lives of these engineers and technicians are far from those in your local firehouse awaiting 911's call to action. While they share similar concerns for life and environmental safety, they don't wait for emergencies to happen; they work to prevent them. They also know that as important as having the right spare part at the right time in the right place, their jobs involve much more than so-called "break-fix" work assignments. They're responsible for the life cycle management of their entire production facility—24/7, day-in, day-out, week-to-week, month-to-month and for many years, even decades, to come.

The capital assets for which they are responsible represent hundreds of millions, if not billions, of dollars in investments. Chevron's \$7.5 billion Jack/St. Malo floating production platform in the Gulf of Mexico is just one example.¹ And that's dwarfed by the estimated \$54 billion final cost of the Gorgon LNG plant in Western Australia, a partnership project led by Chevron.² The maintenance, repair and services of the entire infrastructure of these enormous facilities, including its water treatment solutions, must span their decades-long lifecycle. But the same should hold true for much smaller production facilities.

Mapping to customer needs.

For these reasons, Siemens uses the Life Cycle Management model as the core organizing principle for our extensive global water treatment solutions' services and support portfolio that can help customers manage the multi-decade, post-deployment phase, especially for oil and gas applications.



Chevron-led consortium invested \$54 billion in the world's largest LNG plant in Western Australia. The maintenance, repair and services of its entire infrastructure, including its water treatment solutions, must span the facility's decades-long lifecycle.

Life Cycle Management services are aimed at the entire lifecycle of a project, from front-end engineering and EPC support to post-commissioning services during plant operations for years to come. Whereas project deployments can take anywhere from a few months to a few years to complete, we realize our customers' service and support requirements will run much longer. That's why we have extended our own operating perspectives not just years but decades into the future—and organized ourselves accordingly. Will spare parts for our water treatment solutions for the oil and gas industry be hard to find in 2030 or even 2050? We don't think so.

¹ <http://fortune.com/2014/06/09/chevron-goes-to-extremes-in-the-gulf-of-mexico/>

² <http://www.bloomberg.com/news/articles/2016-01-20/chevron-s-costly-lng-project-to-start-in-shadow-of-oil-collapse>

Few companies have the global reach yet local presence to organize themselves and deliver their services and support using a Life Cycle Management approach like Siemens does. First, Siemens has a direct operations footprint in nearly every country in the world. Second, Siemens has the financial strength and portfolio diversity to ensure its vitality as a global enterprise for decades to come. As Siemens researchers discover new technologies and processes, those innovations will be incorporated into future water treatment solutions for customers.

Siemens wants the professionals who operate the world's oil and gas infrastructure—especially the maintenance engineers and technicians among them—to know that after-sales support of our oil and gas water treatment solutions includes not just spare parts but also a whole lot more:

- **Global Life Cycle Management network.** Siemens Water Solutions offices are located in nearly a dozen countries, with 24/7 hotline support from specialized service centers strategically positioned worldwide. In North America, Siemens service centers are located in Calgary, Alberta; Rothschild, Wisconsin; and Broussard, Louisiana. In Latin America, Rio de Janeiro, Brazil. In Europe, Oslo, Norway; Erlangen, Germany. In Al-Khobar, Saudi Arabia. And in Asia-Pacific, Singapore. From these locations, experienced Siemens engineers and technicians can get to just about any installation in the world within 24-48 hours, depending on how remote it is.
- **Consulting, reliability engineering, and maintenance.** Siemens consulting services can help guide you through all lifecycle stages of your Siemens water treatment assets to ensure rapid, reliable, and efficient transitions from concept to EPC services to full operations. Reliability engineering, a Siemens core value, builds the highest quality and dependability into every component and system of our water treatment solutions. Siemens ensures those solutions are as easy as possible to maintain, plus with modern connectivity, able to be monitored remotely when feasible. Siemens experts can also assist with scheduled maintenance. Plus, as we incorporate technology advancements in our products, systems and solutions, we protect you against the impacts of obsolescence by having a strategy in place years ahead of time.
- **Remote condition-based monitoring, diagnostics, and assistance.** Troubleshooting and resolving disruptive issues from a distance can save time and money, while accelerating a facility's return to operations and productivity. Better yet, with the increasing modernization and connectivity of components in Siemens water treatment solutions, condition-based monitoring of a system's health in real time 24/7 is possible. This means trouble can be addressed before costly disruptions can occur. Performance logs can be compiled and tracked automatically, with alerts sent when operating parameters are exceeded.
- **Specialized expertise for individual systems.** Siemens Water Solutions addresses water and wastewater needs of the oil and gas industry with a portfolio that includes physical and chemical separation, biological treatment, and complex hydrothermal technologies. The Siemens Life Cycle Management organization and service centers are staffed with experts in these systems, each supported with sophisticated tools and a shared knowledgebase. Many bring process engineering know-how to their jobs. This critical differentiator can benefit you through the sharing of insights and a more holistic view of issues to resolve them faster by identifying potential causes in a system's broader operating context.



With Water Solutions service offices in nearly a dozen countries, Siemens experts are available whenever and wherever you need us. From spare parts to upgrades and modernization, we have the right people in the right locations to help.

- **Critical spare parts delivery.** By having Life Cycle Management service centers strategically located worldwide, spare parts can be express-shipped on a next-day or even next-flight basis, to minimize downtime and get operations running more quickly. At the same time, Siemens can help you manage your spare parts more cost-effectively. We can help determine the criticality of your equipment, so you can make informed decisions about spare parts inventories and invest only the capital needed to be best prepared for outages.
- **Single point of contact for all systems.** Siemens plays well as a member of any multi-vendor solution that includes our technologies, components, and systems—while also providing a single point of contact for all our water treatment solutions. This can help address issues more quickly, reducing downtime, because it practically eliminates the cycles of finger-pointing and blame that can often otherwise occur.
- **Training and operational excellence.** Because your maintenance and operations staff need to know how to run our water treatment systems, Siemens provides extensive documentation and on-site training. This enables everyone involved to understand how a system works, its full capabilities and limitations, how it interoperates with other facility systems, relevant legal regulations, and the rules of collecting evidential data. Siemens can also work with your teams to develop a continuous improvement process that can help improve performance in terms of safety, quality, efficiency, and availability.
- **Modernization upgrades and ongoing optimization.** The average life cycle of permanent facilities in the oil and gas industry are a minimum of 20 years. With technology's relentless advancements, a lot can change in that time. Smartphones didn't exist 20 years ago, but you can now run a fully automated factory with one. The Life Cycle Management approach by Siemens Water Solutions means we will work with you at all times to provide ongoing optimization along with periodic upgrades to your water treatment systems according to your needs and resources. By applying the latest technology in strategically planned ways, we can enhance your system's performance and reliability, while also ensuring its efficient and safe operation
- **Rental and leasing services.** For short-term, temporary, or emergency water or waste-water treatment services, Siemens Water Solutions offers many of its treatment systems on a rental or leased basis. Siemens service experts will deliver and set up the equipment, train your teams in its operation, and be on-call for further guidance needed. This can help you solve specific water treatment problems quickly, provide flexible approaches, and help conserve capital.



Plant operations these days are challenging to have highly trained and qualified staff, even with automated systems. Fully trained operations personnel who know how to operate within the technical environment and have in-depth knowledge of the plant processes is indispensable for safe, reliable and efficient plant operation, especially in critical situations.

Life Cycle Management: An idea whose time has come — with many benefits

To keep pace with the world's rising energy demands and increasingly strict environmental mandates, the oil and gas industry will need highly efficient, effective, and reliable water treatment systems, like those in the portfolio of Siemens Water Solutions. Fracking, for example, is about as water-intensive as any industrial process can be. To complete a single well for production can require up to nine million gallons of water.³ It also generates enormous volumes of wastewater in the form of produced water, flow back, and drilling mud. All of this must be managed in environmentally sound ways. Other upstream and downstream production facilities use water in their processes and generate wastewater, as well.

Lower your risk and total cost of ownership. Malfunctioning water treatment systems can cause costly disruptions in operations, which the Siemens Life Cycle Management approach can help avoid. As mentioned before, condition-based performance monitoring can alert you to problems before they trigger downtime. Ongoing optimization and upgrades over the years can ensure the greatest operating efficiency and system availability, helping you lower your total cost of ownership (TCO). Over two or three decades, your TCO savings could potentially add up to millions of dollars.

With Siemens as your long-term, day-to-day partner providing local service and support worldwide, you reduce big risk elements—especially unplanned downtime, life safety, and environmental impacts—providing your operations with a smaller risk profile and your own peace of mind. Should downtime occur, you can be assured your Siemens Life Cycle Management team will help minimize it and get you back online as soon as possible.

Time to adopt a Life Cycle Management approach? When Siemens laid the world's first telegraph cable 6,900 miles from London to Calcutta in 1867, you could say it helped accelerate globalization started by seafaring civilizations long before. Siemens has continued to innovate to this day, incorporating ever-smarter technologies and connectivity into more and more of our products, systems, and solutions each year, including our water treatment offerings.

Alongside these advancements, Siemens has used new technologies and connectivity to develop innovative applications and business models, with our Life Cycle Management service model to support our water treatment solutions among them. Increasingly the business benefits of this approach are becoming too compelling to ignore, and we are finding the interest by our oil and gas customers around the world to be rising fast. If you are one of them, we invite you to contact us to find out more.

³ "Flaring our way out of a water crisis," By Yael R. Glazer, F. Todd Davidson and Michael E. Webber, Earth Magazine. October 31, 2015.



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