

the magazine of kiewit corporation

KIEWAYS





Kiewit is one of North America's largest and most respected construction and engineering organizations. With its roots dating back to 1884, the employee-owned company operates through a network of offices and projects in the United States, Canada and Australia. Kiewit offers construction and engineering services in a variety of markets including transportation, water/wastewater, power, oil, gas and chemical, building and mining. Kiewit had 2013 revenues of nearly \$12 billion and employs more than 33,000 staff and craft employees.

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KIEWAYS

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MAGIC IN THE MEMBRANES

Salt is removed from water through the Carlsbad desalination plant's reverse osmosis system. Read more about the system on Page 16.



DEDICATION TO INNOVATION

Kiewit has a long history of using innovation to make our work better, faster and more efficient — without losing sight of safety and quality. One of Kiewit's four core values is Excellence, which drives us to raise the bar, focus on high-quality production, encourage new ideas and build work right the first time.

For the past several years, Kiewit has instituted an internal collection of technologies and best practices that help meet the demands of innovation. If someone on a job or within a district finds a better way to design or build work, we share and find ways to implement those ideas to improve how we operate.

These longstanding continuous improvement practices contribute to a stronger company, better employees and a greater level of service to our clients.

For example, in this issue of Kieways, you'll read about the Carlsbad desalination plant (Page 16), which will be the largest desalination plant in the western hemisphere. Through incredible innovations, Kiewit and its partners are helping bring fresh water to Southern California while minimizing this plant's environmental footprint.

In addition, Kiewit Infrastructure Engineers (Page 12) is using its abilities and knowledge to become a go-to design and engineering team, helping lower project costs and uncovering innovative ways to build infrastructure work across the U.S. and Canada.

Though we remain passionate about the fundamentals of construction, we will always adapt and innovate as part of the Kiewit way.

I hope you enjoy this issue of Kieways.

BRUCE GREWCOCK
Chairman and CEO

IMPACTING COMMUNITIES

Each year Kiewit employees dedicate time and resources to Habitat for Humanity. Learn more about their contributions on Page 5.



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Oil sands, gas plants, oil platforms and more — learn more about Kiewit's wide scope of oil, gas and chemical work.

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Kiewit Infrastructure Engineers is fostering collaboration and innovation on a wide variety of projects to solve problems, save time and cut costs.

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The Carlsbad desalination project will revolutionize the way water is sourced by converting salt water to fresh at the largest desalination plant in the Western Hemisphere.

OUR MARKETS

BUILDING
 MINING
 OIL, GAS & CHEMICAL
 POWER
 TRANSPORTATION
 WATER/WASTEWATER

What began in 1884 with two hardworking brothers has grown into a Fortune 500 construction, mining and engineering powerhouse. As a multi-billion dollar organization, Kiewit can tackle projects of all sizes, in any market. Here's a few interesting facts about Kiewit.



BREAKING GROUND

In September, Kiewit and its partners broke ground on the **Petra Nova** project outside Houston. When completed in 2016, the project will be the largest of its kind in the world. It will trap carbon from a coal unit and pipe it 82 miles to an oil field, where it will be injected underground to help push crude oil to the surface. Oil yield is expected to increase from 500 barrels a day to 15,000 a day.



Kiewit is committed to protecting the environment. Its staff of accredited **Leadership in Energy and Environmental Design (LEED)** professionals and more than

\$1 BILLION

in LEED-certified construction experience ensure the best energy-saving options are incorporated into all projects.



TOP 10 RANKING

Kiewit achieved the **No. 9** spot in the water treatment/supply category on Engineering News-Record (ENR) magazine's **Top 200 Environmental Firms** list.



CUTTING COSTS

The **Northern Rail Extension Phase 1A** project was so successful, even Alaskan taxpayers are reaping the benefits. Kiewit completed the project — which included the construction of the Tanana River Bridge — on-time and under budget. During the August ribbon cutting ceremony, the Alaska Railroad Corporation (ARRC) announced that it will give \$1 million back to the state, sharing the savings with the taxpayers. At 3,300 feet long, the bridge is now the longest in Alaska and will ultimately connect military assets at Fort Wainwright and Eielson Air Force Base with Fort Greeley.



INNOVATION AT THE HEART

Buckskin Mine is using a new tire-monitoring system to remotely track and assess every truck's tire condition and pressure 24/7. The system allows workers to better manage resources and proactively make adjustments in real-time without having to jump in the cab of the truck.



A FLEET OF RESOURCES

Kiewit's largest recent crane project was the **Kearl Oil Sands** project, located 70 kilometers (43.5 miles) north of Fort McMurray, Alberta, Canada. The project peaked at a crane fleet of 21 mobile cranes and three pile-driving cranes. Check out a nighttime view of Kearl on Page 6.



OUR VALUES

PEOPLE | INTEGRITY | EXCELLENCE | **STEWARDSHIP**

For 130 years, Kiewit's culture has thrived on strong principles. From generation to generation, the torch has been passed down and carried by the hands of the company's leaders and workforce. Today, its core values — People, Integrity, Excellence and Stewardship — remain the company's cornerstone and are the way Kiewit runs its business.

STEWARDSHIP SUCCESS

By preserving its unique culture, Kiewit builds a stronger organization for future generations of employees. Through events like the Women's Construction Leadership Seminar, Kiewit devotes time and resources to developing each and every new generation of leaders. It also makes a positive impact on the communities in which it works through charity and volunteer efforts such as Habitat for Humanity.



WOMEN'S CONSTRUCTION LEADERSHIP SEMINAR

50 students, two days and a top-notch experience

Each year, Kiewit hosts the Women's Construction Leadership Seminar (WCLS) where collegiate, female leaders are selected through an application process to participate in a two-day event to challenge and develop their leadership skills.

Qualified candidates are sophomores and juniors with a passion for construction and/or engineering fields and who have demonstrated leadership skills through extracurricular and community involvement.

Nearly 50 students from 24 colleges and universities across North America attended this year's event, held in early November. Attendees participated in a simulation mirroring the life cycle of a project to give them hands-on experience with bidding and winning and hiring and training employees throughout different markets. For more information on the event, visit kiewit.com/wcls.



HABITAT FOR HUMANITY

7,000 hours, \$170,000 and 14 homes completed

Every day, Kiewit employees build projects that have a positive impact on their communities. Off the job — employees volunteer their time to help Habitat for Humanity do the same thing, one house and family at a time.

Habitat for Humanity has more than 1,500 local affiliates in the U.S. and more than 70 national organizations around the world. Together, the organization has helped to build or repair more than 800,000 houses and has served more than four million people worldwide.

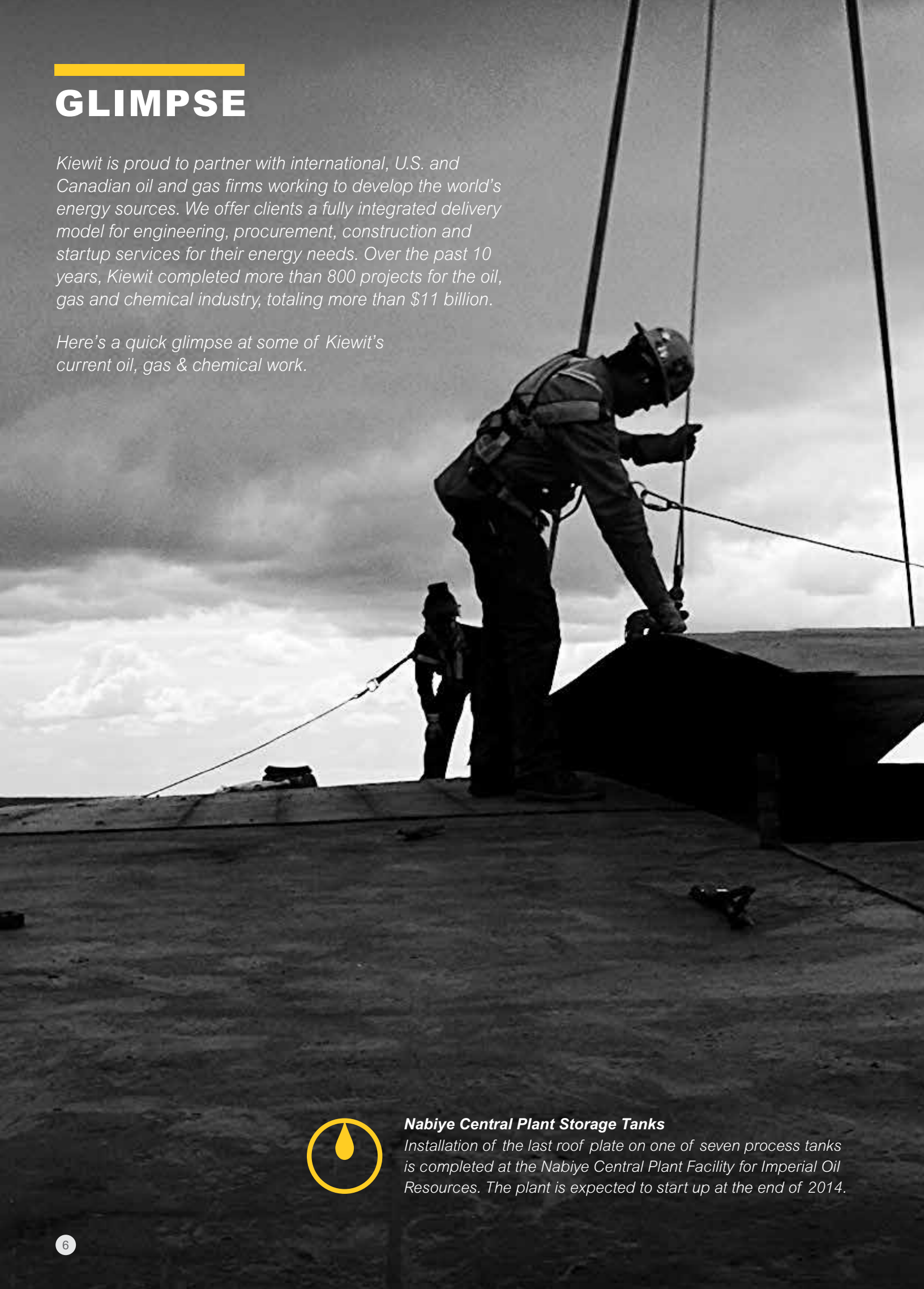
Across the U.S., Kiewit employees have volunteered nearly **7,000 hours**, donated more than **\$170,000** and completed **14 homes** for the international nonprofit organization.



GLIMPSE

Kiewit is proud to partner with international, U.S. and Canadian oil and gas firms working to develop the world's energy sources. We offer clients a fully integrated delivery model for engineering, procurement, construction and startup services for their energy needs. Over the past 10 years, Kiewit completed more than 800 projects for the oil, gas and chemical industry, totaling more than \$11 billion.

Here's a quick glimpse at some of Kiewit's current oil, gas & chemical work.



Nabiye Central Plant Storage Tanks

Installation of the last roof plate on one of seven process tanks is completed at the Nabiye Central Plant Facility for Imperial Oil Resources. The plant is expected to start up at the end of 2014.

Nabiye Central Plant Storage Tanks

1. Seven process tanks are constructed at the Nabiye Central Plant Facility near Cold Lake, Alberta, Canada.

Kearl Oil Sands Project

2. Kiewit has been performing work at the Kearl Oil Sands project located 70 kilometers outside of Fort McMurray, Alberta, Canada, for more than five years.

Delta House Semi-Submersible Platform

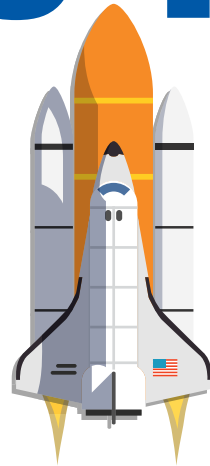
3. Kiewit Offshore Services, located in Ingleside, Texas, fabricated LLOG Exploration Company's 9,500-ton Delta House topsides and performed its lift, set and integration. It was completed in August 2014.

Tioga Gas Plant

4. Difficult weather conditions and labor shortages in North Dakota's Bakken oil field were major challenges that Kiewit overcame to expand Tioga's processing capacity from 120 to 250 million cubic feet of gas per day.



3 PROJECTS 3 RULES



BUILDING ON KIEWIT'S HISTORY WITH NASA'S LYNDON B. JOHNSON SPACE CENTER

A renowned facility in Houston, Texas, is the link to a world far beyond our own. The Lyndon B. Johnson Space Center (JSC) is home to NASA's spaceflight training, research and flight control.

Kiewit's relationship with JSC dates to the center's initial construction in the early 1960s.

Along with W.S. Bellows Construction, Kiewit was awarded NASA's second construction contract when work began on JSC. Named Phase Two, the contract was for the construction of the first buildings. They included the central data office, fire station, water and sewage treatment plant, central heating and cooling plant, and miscellaneous utilities. Phase Two was completed in September 1963.

Around the same time, Kiewit was awarded a side contract that involved foundation work and the erection of structural steel for the integrated Mission Control Center, completed in May 1963.

Today, Kiewit — along with four other general contractors — is part of a Multiple Award Task Order Contract (MATOC) worth up to \$400 million in projects for NASA. The MATOC allows NASA to complete projects as a "task order," work that can be awarded to any of the five contractors without having to complete the months-long government approval process.

Kiewit's current MATOC task orders involve bringing new life to outdated buildings and utilities at JSC, creating a functional, consolidated campus.

The first project is the \$9.0 million design-build refurbishment of Building 45, and is also the first design-build project for NASA. The second project is the nearly \$900,000 Building 13 Mechanical Room update. A third project is the \$3.3 million Campus High Voltage Utility Replacement.

While each project has its own specifications, there are three rules that everyone involved is dedicated to following:

commit to safety, maintain the client relationship and plan ahead.

A COMMON SAFETY GOAL

Before work began, the project teams from Kiewit and NASA both agreed safety would be top priority.

"NASA had complete buy-in because safety is just as important to them as it is to Kiewit," said Kiewit Project Manager Kurt Boyer. "If we fail to think of something, they do, and vice versa. We found that each group had similar reports and permits, so we compared them and whichever one was stricter, that's the version we use on the job."

Every week, the project teams get together with NASA construction representatives for a walk around the job sites to evaluate potential concerns and ensure everyone is working safely.

"NASA's safety program and Kiewit's safety program have a common goal — provide an environment for the development and continuous improvement of a safe workplace," said John Yount, NASA safety engineer.

OPEN BOOK

Kiewit also schedules a weekly meeting with NASA, safety personnel and major subcontractor representatives to ensure everyone is kept in the loop on the work schedule. They address any potential issues upfront and use their "open book" relationship to bounce ideas off one another.

Kiewit Project Engineer Al Morales, who works on the second project, recalls a situation where good communication and the trusting relationship saved more than five hours of work and eliminated potential safety risks.

"Our original plan was to use Building 13's elevator to bring three air coils to the second floor, but they were too large to fit inside the elevator. The next plan was to use manpower

"NASA's safety program and Kiewit's safety program have a common goal — provide an environment for the development and continuous improvement of a safe workplace."

**JOHN YOUNT,
NASA SAFETY
ENGINEER**



Project One:

Building 45 Library Redesign Refurbishment \$9.0 million

NASA's first design-build project. Demolish and refurbish the existing 15,000-square-foot library into the new Space Flight Medicine, Occupational Medicine and Behavioral Health Groups facility.



Project Two:

Building 13 Mechanical Room nearly \$900,000

Demolish and replace three air-handling units in the second-floor mechanical room located in Building 13, where satellite equipment is stored and material testing is conducted.



Project Three:

Campus High Voltage Utility Replacement \$3.3 million

Replace high-voltage electrical cables that feed 12 NASA buildings, including Mission Control, through the site utility tunnel located underneath the campus.

Project Rules:

1

Commit to safety

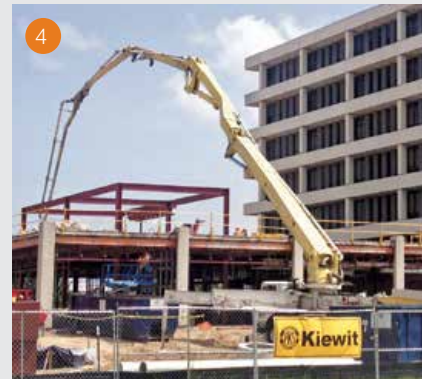
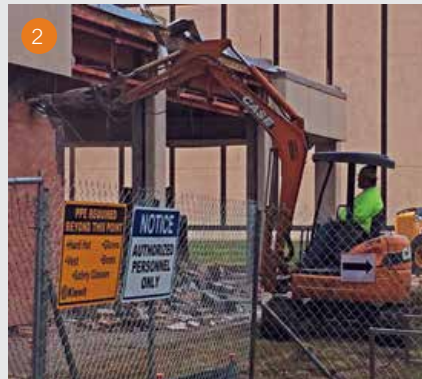
2

Maintain the relationship

3

Plan ahead

A closer look at Building 45 Library Redesign Refurbishment



1. The architectural rendering illustrates how the finished facility will look — on the left, the clinic main entrance and patio seating area; in the middle the astronaut entrance; and on the right, the behavioral health entrance. 2. Employees demolish the exterior brick and precast walls of the existing library, Building 45, which will become the new Space Flight Medicine, Occupational Medicine and Behavioral Health Groups facility. 3. Project team members tour the old Apollo Mission Control, pictured from the left: Project Engineer Alfonso Morales, Superintendent Howard Ladner and Project Manager Kurt Boyer. 4. A pump truck pours the penthouse floor as part of the refurbishment. 5. The interior floor is prepared for the concrete pour after new plumbing and electrical systems are installed. Everything but the roof and fire-grade concrete walls were replaced as part of the update. 6. Employees install support framing for roof vents (left) and finish chilled water piping installations (right).

and carry the equipment up the stairwell.

“This plan would have worked, but it would have taken more than eight hours — and the potential for a safety or quality incident was greater. There was one other option, but we needed to discuss with NASA.

“We set up a meeting, explained the options, conducted in-field observations, and together we found the best solution — to use a crane from their testing facility. The lift was completed in three hours with no problems.”

UNDERSTANDING THE REQUIREMENTS

With any project, there are many factors to consider when developing a construction schedule. For the project teams working on the NASA campus, that’s no exception.

Anyone working on a NASA campus project must complete a full day of training at the Houston Area Safety Council, as well as a safety briefing about how NASA standards differ from industry standards.


Workers are also put through background checks as part of the badging process. The length of time a worker will be on campus determines the type of badge they’ll need and how in-depth the background check will be.

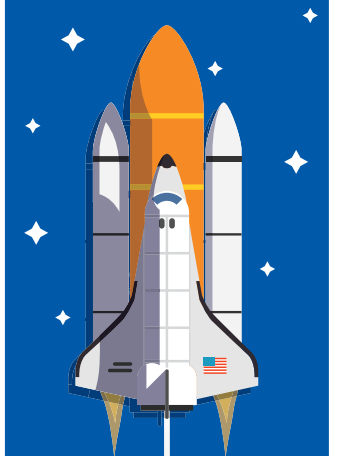
The other major consideration is deliveries — each delivery must access the campus through a specific gate, be inspected, and then be escorted to the job site by the contractor.

Kiewit Engineer Kyle Crosley explains how work in the site utility tunnel — where the team is replacing high-voltage electrical cables — adds one more step to the planning process.

“Since the tunnel is considered a ‘confined space’ at NASA, each morning anyone who will perform work in the tunnel must complete special paperwork, called a Confined Space Entry Permit, to check out a badge. The badge must be turned in at the end of day. They want to know that everyone who went in came back out.”

The project teams keep these factors top of mind to ensure all workers and deliveries have completed the necessary requirements so the projects can stay on schedule.

The first and third projects are scheduled to be completed in February 2015. The second project was completed in November 2014, nearly 70 days in advance of the contractual completion date. 



FEB. 2015

Building 45
Building refurbishment. NASA’s first design-build project.

Campus High Voltage Utility Replacement

NOV. 2014

Building 13
Mechanical Room

SEPT. 1963

Phase Two
Various data and utility buildings

MAY 1963

Mission Control Center
Foundation work and erection of structural steel

KIEWIT WORK FOR JOHNSON SPACE CENTER

COLLABORATE. INNOVATE. SUPPORT.

Three responsibilities are at the heart of Kiewit Infrastructure Engineers (KIE) — collaborating, innovating and supporting projects throughout the company to make sure clients and the public have access to superior design.

Established in 2011, KIE focuses on design and design management for a wide range of contracts in North America.

“Our in-house designers help us take on a bit more control of the design to make sure we come up with the best technical solutions,” said David Miles, KIE executive vice president.

Ultimately, Miles says clients are driving the need for more vertical integration within the construction industry. “We established KIE because we knew that engineering was going to be a bigger part of our business going forward, in terms of design-build and other similar projects.”

The best aspect of having KIE involved in a project, according to Tim Nelson, design management regional lead, is the team’s ability to identify risks during the design phase and save hardships during construction.

“We act as a second pair of eyes,” he said, referring to an increased level of risk assessment and mitigation that benefits projects and clients.

“We have a tremendous service organization that’s able to support all of Kiewit’s jobs,” said John Donatelli, design engineering director. “We have the technical expertise needed to support the variety of projects we build across the U.S. and Canada.”



COLLABORATE

The KIE team is a trusted resource for projects across the company, always looking for ways to provide better outcomes for clients and the public.

“KIE was instrumental in helping us constructively challenge key aspects of the client’s preliminary design and develop alternate approaches that allowed us to be technically compliant and even more competitive,” said Gwyon Nelson, project manager for the Dulles Corridor Metrorail project in Virginia.

KIE is comprised of more than 100 staff on design, design management and proposal teams. Each group brings an array of knowledge on design subcontractor management and geotechnical, structural and civil engineering that covers both temporary engineering and permanent design.

The wide array of work that KIE can support mirrors the diverse projects Kiewit builds. In a given year, KIE engineers will collaborate on 200 projects.





“Not only does KIE understand the technical aspects, but they’re also veterans of the design-build process,” Nelson said. “The team is familiar with the process of deconstructing an owner’s concept design or approach and identifying the parts to focus on, both for the highest commercial opportunity and for technical alternatives.”

Its track record proves KIE can take on all challenges. It’s the go-to team for lowering project costs and uncovering more innovative ways to build projects in the infrastructure, building and energy sectors.

“KIE has a great ability to improve upon where we’re headed and is pretty insightful because of its engineering and construction knowledge,” said Bob Elliott, sponsor for the Jordan Cove LNG project. “It’s unbelievable how much KIE has been an asset to the team.”

Since 2011, KIE team members have been embedded onsite in Newfoundland to support construction of the Hebron gravity-based structure (GBS) oil production platform. The team led the temporary engineering effort, including design of the cofferdam, tower crane foundations, GBS mooring points, formwork, access, heavy lifts and many other designs.

INNOVATE

“We’re always thinking of better ways to do our work,” said Brian Medcalf, engineering manager. Through the use of innovative tools, together with a wealth of expertise and experience, Kiewit can handle any client’s need through KIE.

Recently, the team used innovations on the Midtown Tunnel project in Virginia to design and fabricate the screed barge, which is being used to prepare the riverbed for the tunnel elements.

This expertise was also instrumental in the Permanent Canal Closures and Pumps (PCCP) project, the final major post-Katrina improvements to the New Orleans-area levee system.

“Our team was asked to help with the cofferdams and design of the pile foundations at PCCP based on the complexity and magnitude of the effort,” said Steve Saye, senior geotechnical engineer. “We spent six months in New Orleans working with the project team to ensure the technical challenges were met and the design was completed successfully.”

SUPPORT

KIE assists Kiewit projects around the U.S. and Canada by helping “integrate design and construction to deliver projects on schedule and within budget,” said Tim Nelson.

The team focuses on the execution and management of a project’s design while integrating design and construction through a collaborative approach with design engineering partners. Early involvement in projects means a more thorough, more complete design for clients to review before construction.

The design management team works mostly on design-build projects, including Kiewit’s high-risk, high-profile contracts such as the Goethals Bridge Replacement connecting New York and New Jersey, and the Folsom Dam project in Northern California.

KIE often works behind the scenes to support the project management team. Together, they ensure all parties are on the right path and confirm clients have what they need.

Donatelli said the design team interfaces with design subcontractors and project teams to optimize solutions. “We engage in the pursuit of work, and collaborate with design partners and the project teams to identify the crucial design elements,” he said. “We also make sure that we’re developing those elements to the appropriate level of detail.”

“KIE has provided us with a remarkable addition to our project pursuit efforts,” said Van Groves, district operations director. “It’s a whole new dimension for our business.”

“We’re always thinking of better ways to do our work. Through the use of innovative tools, together with a wealth of expertise and experience, Kiewit can handle any client’s need through KIE.”

BRIAN MEDCALF,
ENGINEERING
MANAGER, KIE



FROM SEA ➔ TO TAP

REVOLUTIONIZING THE WAY
AMERICA SOURCES WATER



About 71 percent of the earth's surface is covered by water. Only 3 percent of that is fresh water.

As populations continue to increase at a high rate, and as natural resources become scarcer by the day, people around the world are finding reason to be concerned, notably Californians. According to the U.S. Drought Monitor, in summer 2014 severe drought covered almost 98 percent of the state.

For the limited amount of fresh water available to California, it's a long journey to its final destination. The trip starts at a Northern California aqueduct or the Colorado River and ends hundreds of miles later at the coastal city of San Diego.

"San Diego is the last to tap into these resources," said Tony Joyce, project director of the Carlsbad desalination project. "If something were to happen to these resources, this area would be in serious trouble. It is essential to have an alternate reliable source like desalination."

A MASSIVE RESOURCE

Desalination transforms salt water into fresh by removing the salt. And San Diego has a massive source nearby: the Pacific Ocean.

Joyce and the rest of his joint venture team, Kiewit Shea Desalination (KSD), are building what will become the largest desalination plant in the Western Hemisphere.

"We've got the largest reservoir at our doorstep, so it's a great opportunity to generate a new water supply for San Diego County," said Peter MacLaggan, vice president, Poseidon Water, LLC, a private, investor-owned company that develops water/wastewater infrastructure.

"The supply will meet all of the reliability expectations of the residents and businesses in the area, even in the event of a drought like we are presently experiencing."

Poseidon, founded in the mid-1990s, began working to make the Carlsbad desalination project a reality. In the time since KSD broke ground in December 2012, MacLaggan has been pleased with the progress.

"One year after completing the initial demolition work and pouring the first bucket of concrete, we were past our halfway point," he said. "It's truly exciting."

ACCELERATED CONSTRUCTION SCHEDULE

Joyce and his KSD team find it equally exciting.

"There's an excitement and enthusiasm that comes with building a landmark project," he said. "I don't know if I've ever been part of a project where that has been as prevalent as it is here."

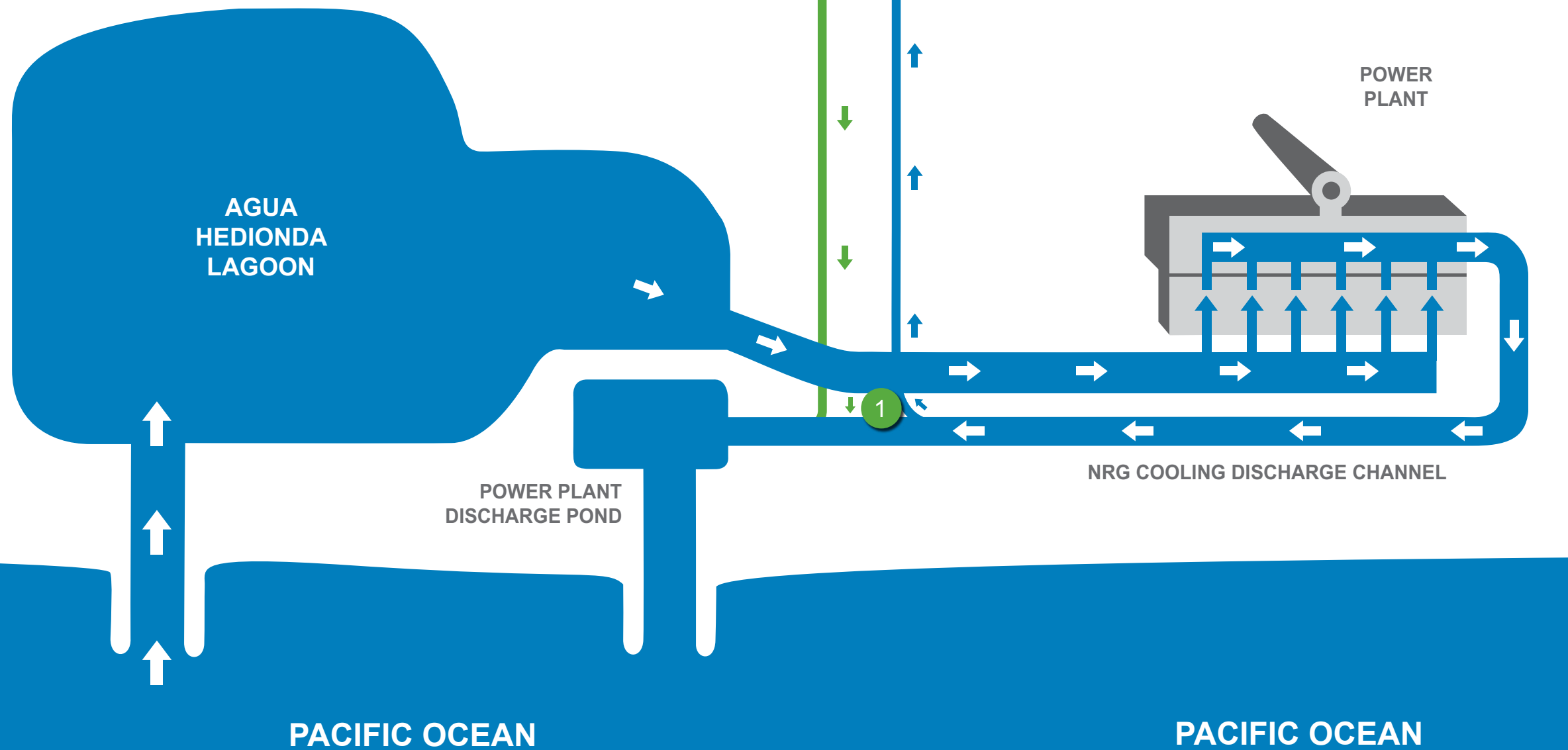
For KSD, it's been all hands on deck. The project scope includes construction of a seawater desalination plant and a 10-mile, 54-inch high-pressure steel pipeline. The latter



1. Employees work on setting forms for chemical tank pads in what will be the plant's chemical storage area. 2. In addition to solar panels, 12 kilovolts of power will energize the desalination plant. 3. Three vertical turbine pumps at the intake pump station will feed 100 million gallons of water a day into the plant. 4. Two KSD employees discuss the progress of the pipe rack, left. The rack will support pipes ranging from one to 72 inches.

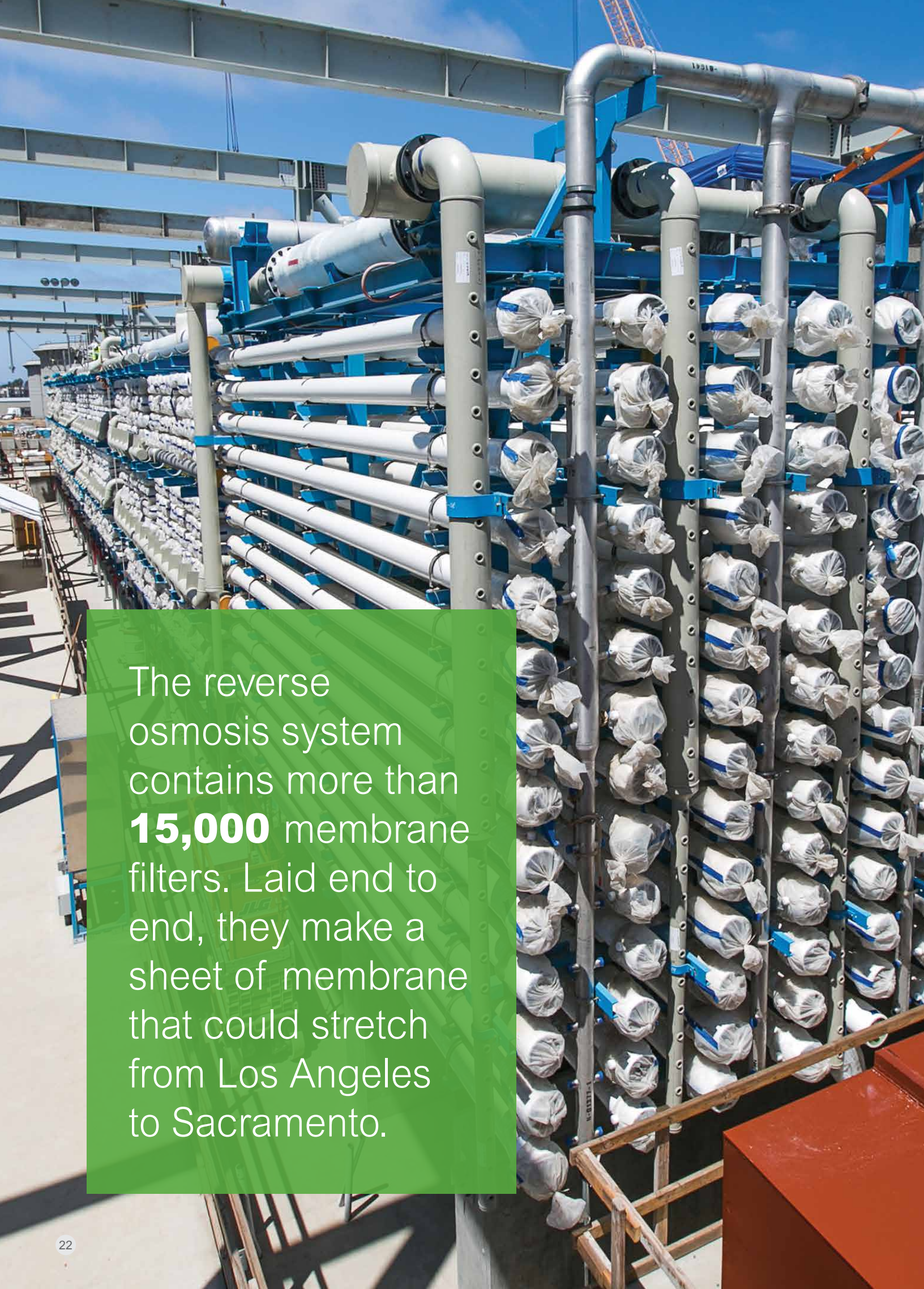
A new kind of hydration

With the right technology, the Pacific Ocean can become a drought-proof source of drinking water for San Diego County. The same technology that will be used in Carlsbad is being used in the largest desalination plants in the world.



Removing the salt

- 1 Each day, Poseidon Resources will pull 100 million gallons of water from the NRG cooling discharge channel.
- 2 This intake flows about 1,200 feet from the intake pump station into the multimedia filtration basin. Here, the water gravity flows down through anthracite, sand and gravel.
- 3 Next, the seawater flows into a clear-water holding tank where a series of booster pumps help flow the water through micronic filters and into the reverse osmosis (RO) system.
- 4 Water can take two different paths into the RO system. The first involves a series of high-pressure pumps, powered by electricity, that move the water through trains, or arrays, of pressure vessels. Each array holds 144 pressure vessels with eight membrane elements. On the other side of the RO system, seven booster pumps aid in the energy recovery systems. These systems do the same as the high-pressure pumps, but more economically, leveraging the energy of the brine to transfer pressure into the incoming feed-water, which then enters the arrays. Regardless of method, once the pressurized raw seawater pushes its way into the vessels, half goes through the membranes and becomes permeate — or high-quality product water. The other half remains concentrated seawater to be discharged back into the ocean.
- 5 As the salt water exits the vessel, it picks up the remaining salt from the permeate to become salt water concentrate, or brine.
- 6 Once water becomes permeate, it's stripped of all chemicals and minerals. To make high-quality drinking water, the permeate is treated with lime, carbon dioxide and chlorine, which takes place in the post-treatment tanks. It's then piped into the product water storage tank where it temporarily waits before being pumped up the 10-mile conveyance line to the regional potable water distribution system.
- 7 The entire process — from ocean intake to product water storage — will take approximately 20 minutes. The finished product meets the standards of San Diego County Water Authority's (SDCWA) water quality specification.



The reverse osmosis system contains more than **15,000** membrane filters. Laid end to end, they make a sheet of membrane that could stretch from Los Angeles to Sacramento.

stretches from Carlsbad, through the city of Vista and into San Marcos, and connects to the San Diego County Water Authority (SDCWA) delivery system.

Joyce credits much of the project's success to the collaborative, innovative and transparent relationship among all the partners, including SDCWA, Poseidon, the joint venture team and designers IDE Americas, Arcadis and Tetra Tech, Inc.

"All groups come together very quickly to solve challenges, which allows us to build at a fast pace," Joyce said. "In a time of drought, that is very important. Not only are we building this landmark project, but we are building it faster than anyone ever expected and that is because of this team."

KSD's ability to stay ahead of schedule is one of many elements vital to the project's success, said MacLaggan.

"The project delivery by KSD has been outstanding in terms of quality of work, safety, site cleanliness and organization, and in looking ahead and anticipating things that are needed or addressing potential problems long before they're able to arise."

"The fact that you have the largest seawater desalination project in North America being built here — and it's going forward without any difficulty whatsoever — has been a truly remarkable experience for this team," he said.

A LOCAL PROJECT WITH A GLOBAL FLAIR

While desalination is only starting to be considered a viable option in the Western Hemisphere, it's becoming a way of life for many countries on the other side of the planet. IDE, the project's primary process engineer, has been part of three of the largest desalination plants operating in the world.

As a result of desalination, citizens of Israel obtain half of their total water supply from the Mediterranean Sea. A decade ago, none of the country's water came from the sea.

"Carlsbad is the third generation of a series of plants that have been built, tested and proven in Israel, and the highest-efficiency desalination plants in the world," MacLaggan said.

REDUCING ITS FOOTPRINT

Poseidon, KSD and IDE have gone to great lengths to optimize energy efficiency with the project, both to save costs and minimize its environmental footprint. Pumps greater than 500 horsepower will be equipped with premium-duty efficiency motors, minimizing electrical draw on the operations side. With pumps up to 8,000 horsepower, this step goes a long way in conserving energy.

The roof of the plant will be lined with solar panels that will provide a portion of the electricity used in the desalination process. To reduce the carbon footprint, MacLaggan said the team is taking steps to ensure the project is carbon



1. Up to six cranes were in use at one time during construction. 2. Designer IDE typically designs plants like Carlsbad on 25-acre lots. Carlsbad has been designed for and is being built on only seven acres.

“The fact that you have the largest seawater desalination project in North America being built here — and it’s going forward without any difficulty whatsoever — has been a truly remarkable experience for this team.”

PETER MACLAGGAN,
POSEIDON WATER
VICE PRESIDENT

neutral — including, using recycled carbon dioxide in the water treatment process.

Poseidon is also planting trees in the wildfire-damaged areas of a national forest east of San Diego to sequester carbon.

“The desalination process in and of itself does not emit any emissions,” he said. “But we are buying electricity from San Diego Gas and Electric, some of which is provided from fossil fuel generators.”

To further reduce that impact, Poseidon will buy renewable energy credits to eventually produce water with absolutely no carbon footprint.

“We’re really proud of the environmental stewardship that’s going to be linked to this project. We’re creating a brand-new, drought-proof water supply from the Pacific Ocean and doing so in a very environmentally friendly fashion,” MacLaggan said.

HITTING TAPS IN 2015

A 30-year water purchase agreement is in place between the SDCWA and Poseidon for the entire output of the plant. With construction of the plant and pipeline past its halfway point, Californians living and working in San Diego County will be delivered their first drops of desalinated ocean water in 2015. 🌊





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