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A PUBLICATION FOR WILLIAMS CUSTOMERS

VOL. 4, ISSUE 1, 2016

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Williams' Commitment to the Gulf of Mexico Runs

Deep

"The Gulf of Mexico is resilient. Even in the face of the worst plunge in oil prices in years, it still has a lot to offer."

Pat Carroll
VP and General Manager
Gulf West

Unlike onshore natural gas production, which has been tapering off as oil prices decline, production in the deepwater Gulf of Mexico has remained strong and is actually on its way to setting a record in 2017.

The U.S. Energy Information Administration (EIA) projects Gulf production will average 1.63 million barrels per day in 2016 and 1.79 million barrels per day in 2017, reaching an all-time high of 1.91 million barrels per day in December 2017.

At those rates, Gulf of Mexico production will account for 18% of total U.S. oil output in 2016 and 21% in 2017, according to EIA.

Offshore Opportunity

According to Williams executives, strong deepwater production has created an opportunity to expand the company's Gulf presence by offering a variety of offshore services.

"There are only a few of us in the midstream infrastructure space that can provide deepwater production handling services because of the expense and technology required,"

said Mark Cizek, vice president & general manager of Williams' Gulf East franchise.

"Our ability to offer deepwater customers a full suite of services, from production handling to gathering to onshore natural gas liquids processing, places Williams in a very unique position. Not many other companies can offer such a comprehensive solution to deepwater plays."

Williams operates 3,633 miles of oil and natural gas pipelines in the Gulf, in addition to floating production platforms and natural gas liquids processing facilities. In 2014 the company completed the Gulfstar Floating Production System (FPS) for the Tubular Bells Field development, an innovative approach to classic spar development.

Gulfstar Model

"Gulfstar created an opportunity for Williams to develop an FPS and construct a commercial model for leasing it, which allowed us to move up one more step in the value chain. It's a great business model which provides a service that the producers value," Cizek says. "Moving forward, we are investigating a variety of hull forms to offer a significant level of flexibility within the Gulfstar product line, depending on the needs of the producer."

The first Gulfstar FPS currently operates in Mississippi Canyon block 724, strategically located near some of the Gulf's top deepwater production areas. Not far from it, Williams owns the Devil's Tower deepwater spar in block 773.

Until 2010, Devil's Tower was the record holder for a production truss spar operating in the deepest water.

“The combination of our two floaters (Gulfstar and Devil's Tower) and associated oil and gas export pipeline systems, along with the capabilities of our Mobile Bay natural gas liquids processing assets, allow us to handle a significant amount of oil and gas coming out of the Central Gulf,” added Cizek.

Technology in the West

Over in the western Gulf, Williams' deepwater focus has been in the ultra-deep Perdido and Keathley Canyon areas.

Operated by Shell Offshore Inc, Perdido is the deepest production spar in the world at a depth of about 8,000 feet. Located in the Alaminos Canyon Area block 857 near the U.S./Mexican border, the platform has a peak production design of 100,000 barrels of oil per day.

Pat Carroll, vice president and general manager of Williams' Gulf West franchise, says recent technological advancements have unlocked production opportunities in areas previously thought impossible to reach.

“In the early development of the Gulf of Mexico, we were really limited by technology to the OCS (Outer Continental Shelf). As technology has advanced, it has made it possible for producers to go deeper and deeper and, more importantly, extract a greater portion of the in place reserves,” said Carroll.

Carroll says that in the Western Gulf, the biggest opportunity for Williams lies in the Lower Tertiary trend. Shell has invested more than \$4 billion to establish the Perdido facility for the Lower Tertiary, featuring subsea tiebacks from four separate fields (handling production from Alaminos Canyon blocks 812, 813, 815, 856, 857, 859 and 901). Williams has invested another half billion dollars to install oil and gas export pipelines to connect this prolific deepwater supply area with existing shelf transmission systems while also doubling its Markham natural gas liquids processing plant along the Texas Gulf Coast.

Approximately 180 miles east of Perdido in the Lower Tertiary lies Williams' Keathley Canyon Connector pipeline. Completed in 2015, the 20-inch pipeline was constructed in 7,200 feet of water, extending the reach of the Discovery pipeline from South Timbalier block 283 and extending 209 miles to the Walker Ridge, Green Canyon, and Keathley Canyon areas. The system is capable of gathering more than 400 million cubic feet of natural gas per day.

“Keathley Canyon Connector provides us with significant growth opportunities for deepwater gathering volumes on Discovery ultimately delivering volumes to our onshore Larose natural gas liquids processing plant and Paradis fractionator. In addition to our initial connection to the Lucius spar production has

also commenced from the Heidelberg spar. It also runs in close proximity to several known discoveries and numerous prospects,” said Carroll.

Steady and Long-term

Unlike onshore natural gas production, which sees levels ramp up and down quickly based on short-term price movements, Carroll says production in the Gulf tends to be more steady and longer-term. One reason for the difference is the much longer lead time needed to develop an offshore project, compared with one in a shale field. Another reason is that offshore wells typically produce at longer and steadier rates than shale wells.

“What makes the Gulf of Mexico so attractive to producers is that these deepwater wells tend to be extremely productive,” he said. “Although they are expensive to drill and develop, in some cases they are located very close to Williams' established energy infrastructure, which puts us in a very good position to deliver their product to markets across the country.”

He adds, “If you look at shale wells, they have a very high initial production rate. But production begins to decline soon thereafter. In the Gulf, production profiles for projects are pretty stable. Once they ramp up, they produce at that rate for a number of years.”

Although lower expectations for a quick oil rebound are prompting many Gulf of Mexico operators to cut future spending on deepwater exploration, Carroll says that the prospects for capitalizing on deepwater opportunities remain plentiful.

“There may be less drilling and fewer operators than there used to be, but the opportunities are still out there. The Gulf of Mexico is resilient. Even in the face of the worst plunge in oil prices in years, it still has a lot to offer.” ■

WILLIAMS GULF COAST OPERATIONS

- Approximately 970 miles of onshore and offshore natural gas gathering pipelines with a combined capacity of approximately 2.8 Bcf/d¹
- The Mobile Bay and Markham natural gas liquids processing plants with a combined inlet capacity of 1.2 Bcf/d and NGL production capacity of 75,000 barrels per day
- The Larose natural gas liquids processing plant with inlet capacity of 600 MMcf/d and the Paradis fractionator, that can produce 32,000 bpd of NGLs²
- Four deepwater crude oil pipelines with a combined length of nearly 400 miles and capacity of 475 million barrels per day (MMbbls/d)¹
- Four floating production platforms with combined daily inlet capacity of 1.2 Bcf/d of natural gas and 251,000 bbls/d of oil¹

¹ Includes offshore facilities of the Discovery System. Williams Partners owns 60 percent of Discovery and operates it. DCP Midstream Partners, LP, owns the other 40 percent.

² Part of the Discovery System.

Making History

Gulf Trace Project to Serve New Export Facility



“There’s a lot of gas that needs to come this direction.”

Scott Owen
Senior Project Manager
Engineering & Construction

Mark 2016 as an historic year — the year the U.S. became an exporter of natural gas.

Cheniere Energy’s Sabine Pass Liquefaction and Export Terminal in Cameron Parish, Louisiana recently completed its first liquefied natural gas (LNG) delivery to an international market.

Now, Williams Partners is expanding its delivery capacity to serve this export facility.

Approved last year by the Federal Energy Regulatory Commission, the Gulf Trace project includes the installation of a seven mile, 36-inch concrete-coated pipe delivering gas to the Sabine Pass Liquefaction Facility meter station.

“The Gulf Trace project is among several fully contracted interstate pipeline projects Williams Partners is executing to connect North America’s abundant natural gas supplies to demand growth from the local distribution, electric power generation, industrial and LNG export businesses,” says Rory Miller, senior vice president, Atlantic-Gulf operating area.

As part of the project, Williams Partners also is building a new greenfield compressor station; making horsepower additions to the existing Transco Station 44; and performing mainline modifications at three other existing Transco Stations (45, 50 and 60) to allow for the bi-directional flow of gas.

“This project (Gulf Trace) is to deliver (natural gas) to trains three and four of Cheniere which are expected to be on line in the first quarter of 2017,” says Scott Owen, senior project manager, Engineering & Construction for Williams. “And, we are targeting the first part of 2017 to be in-service to meet their needs.”

Pushing Through

In order to deliver the pipeline construction for this project, our team is using the SWAMP technique to push the pipe through the water filled swamp that is the pipeline right of way along the Gulf Coast.

In this operation, each 40,000-pound pipe joint goes on the push rack through an assembly line of welding stations and an x-ray machine before being guided to its right-of-way destination with the help of floats.



Construction continues on the seven-mile Gulf Trace expansion project, designed to expand the existing pipeline system to deliver gas to the Sabine Pass Liquefaction Facility 2 in Cameron Parish, Louisiana. The project will include two compressor stations and modifications to the existing Transco mainline.

“Right before the pipe drops off the rack, we hook on floats,” Owen says. “Because our trench is filled with water the entire length, we literally just guide the pipe right down the right of way one piece at a time. Certified divers then remove the floats and the pipe gets placed underground.”

The concrete coating helps ensure the pipe remains in place and does not float out of the ground after installed due to water pressures from the high water table in the coastal marsh area.

“We put the concrete around the pipe to neutralize the buoyancy effect, and the concrete helps keep the pipe settled,” Owen explains.

Offsite Staging

Adding to the uniqueness of this project is the fact that one of the compressor stations is actually being prefabricated at another location. The compressor facility that will ultimately be added to Transco Station 44 in Johnson Bayou, Louisiana, is being put together in Channelview, Texas. After being staged there, it will be moved piece by piece by truck and then reassembled at Station 44.

“The site there at Station 44 doesn’t have a lot of extra staging space so we are staging the unit at the facility in Texas and then moving the parts to the Station 44 site as we need them for assembly of the facility at the site,” Owen says.

That compressor station will be placed on a 20-foot platform to account for the potential for high tides that can occur in the Gulf Coast during a hurricane. It’s just another key step in this exceptional engineering and construction effort that is designed with one goal in mind — providing the key infrastructure needed to help our customer meet its needs.

“When we go on line with this expansion of the Transco pipeline system, we are going to be delivering up to 1.2 Bcf/d (billion cubic feet per day) of natural gas to Cheniere,” explains Owen. “There’s a lot of gas that needs to come this direction.” ■

LNG FACTS

Selling some of America’s natural gas resources globally has the potential to create thousands of new jobs, grow manufacturing, generate billions of dollars in royalties and new government revenues and expand U.S. trade.

According to the U.S. International Trade Administration, each \$1 billion of liquefied natural gas (LNG) exports could result in more than 6,000 new jobs. Thus, \$13 billion to \$25 billion worth of LNG exports could mean the creation of between 75,000 and 150,000 new American jobs.

Jobs would be created in natural gas production, the steel industry, pipefitting and many other industries — benefitting communities across the U.S.



A tanker docks at an LNG import terminal in Nynäshamn, Sweden.

Engaging and Activating Support

Williams emerges as leader in digital realm



“Increasingly, we are approaching pipeline projects with a campaign mindset.”

Robert Hatley
Vice President
Communications
& Strategic Outreach

As much-needed energy infrastructure continues to draw opposition, much of the debate plays out in the digital world.

Recognizing this, Williams in 2014 adopted a new strategy to make sure our message — and the message of our customers — is heard loud and clear online.

Since then, we’ve made tremendous progress in building Williams’ ability to communicate with key stakeholders through online and digital platforms. We now stand as an industry leader in stakeholder communications that integrate traditional media relations, on-the-ground outreach, and the use of websites and social media channels that support the company’s growth strategy, business goals and major projects.

But, while we’ve been successful in building our current capabilities, the ever-changing external environment requires that we stay focused on continually enhancing our ability to communicate with stakeholders. And, in the current energy market environment, it’s critical that we find ways to communicate that are both low-cost and high-impact.

Driving Engagement

“Increasingly we are approaching pipeline projects with a campaign mindset. We include

an integrated approach of on-the-ground outreach, media relations and online tactics to share information, drive engagement and galvanize support,” said Robert Hatley, vice president of Communications & Strategic Outreach.

“We’re positioned like no other energy company when it comes to our external communications and outreach capabilities. We’ve built a team that understands campaigns and is willing to be proactive and collaborative.”

Two great examples of these integrated communications efforts are our [Atlantic Sunrise](#) and [Pacific Connector](#) projects. These websites include links to the projects’ social channels and ways users can show their support for the projects.

‘Pipe Up’ for Energy

Currently we manage more than 20 social channels and 13 websites to support the company and our pipeline projects. In addition to these channels and websites, in January we launched our corporate blog [Pipe Up](#), which serves as the hub for all of our corporate digital communications.

As our industry’s social media savvy continues to grow, we encourage our customers, vendors, employees and other supporters to join us in using these channels to “pipe up” in support of energy infrastructure. ■



Williams to Congress:

Aerial Surveys Necessary When Planning Pipeline Routes

Williams is urging passage of federal legislation that would allow pipeline developers to increase their use of aerial surveys necessary to collect critical environmental information when planning a pipeline route.

Tim Powell, director of Land, GIS and Permits for the Atlantic – Gulf Operating Area, testified earlier this year before a House Energy & Commerce sub-committee, on behalf of Williams and the Interstate Natural Gas Association of America (INGAA).

Powell urged passage of H.R. 3021, the Aerial Infrastructure Route Survey Act of 2015. Bill versions have now passed both the House and Senate and are being considered by a conference committee for possible passage later this year.

The legislation would require agencies administering federal permit approvals to accept aerial surveys in lieu of field surveys when landowners have denied survey permission, giving that data equal weight so that permit applications can be deemed complete.

Closing a Loophole

The legislation seeks to close a loophole left open in the 2005 Energy Policy Act, which instructed agencies administering federal approvals to cooperate with the Federal Energy Regulatory Commission (FERC) and reach their permit decisions on a timeline established by FERC.

“In practice, many of these agencies simply conclude they don’t have sufficient field survey data to begin their regulatory

reviews,” Powell said. “This is a problem for us.”

Powell made the point that this standard is simply not compatible with the realities of landowner approvals. He added that Williams commonly obtains around 80 percent access prior to submitting an application to FERC; however, if an agency is requiring 100 percent survey, the FERC and permit processes can’t run concurrently. This conflicts with the intent of Congress when enacting the Energy Policy Act.

“It doesn’t have to be this way,” he said. “Requiring 100 percent field survey data may be fine for projects where a developer actually owns the property, but in the case of linear facilities involving rights-of-way, we must obtain permission from each landowner along the route, which for major projects, could number in the hundreds or even thousands.”

‘Catch-22’

A requirement for more ground survey than landowners are willing to provide places the company in a “Catch-22” situation, Powell said.

“On the one hand, the company must seek to gain access to the land in order to gather the data desired by the agencies and to attempt to remain on the timetable set forth by FERC, yet to the extent landowners choose not to cooperate, it becomes impossible for a company to produce a complete application,” he said.

John Seldenrust, senior vice president of Engineering & Construction, said the legislation will allow Williams and its customers to proceed with projects in a timely, reliable and safe manner that benefits all stakeholders. ■

The current standard is not compatible with the realities of landowner approvals.

Williams Lands Premier N.Y. Preservation Award for Hangar Restoration



“Not quite the Oscars, but in the architectural community, a very big deal.”

Stephen Kellogg
Project Manager
Engineering & Construction

New York City recently honored Williams with its historic preservation award for the restoration of two aircraft hangars at Floyd Bennett Field.

The Lucy G. Moses Preservation Award is widely considered the highest honor for historic preservation in New York, recognizing construction projects that demonstrate

excellence in the restoration, preservation, or adaptive use of historic buildings. Other recipients included St. Patrick’s Cathedral and the Staten Island Museum.

Presented annually by the New York Landmarks Conservancy, the award “is not quite the Oscars but in the architectural community it is a very big deal,” said Stephen Kellogg, Williams project manager for the Rockaway Delivery Lateral project.

As part of the Rockaway Delivery Lateral project, Williams coordinated with the U.S. National Park Service to develop a plan to



Once an important New York City airport, Floyd Bennett Field is part of Gateway National Recreation Area. The old airport was a point of departure for record-breaking flights by famous aviators, including Amelia Earhart and Howard Hughes. The site opened in 1931 as New York’s first municipal airport and was converted to a Naval Air Station in 1941. During World War II, it was the most active airport in the United States.



ROCKAWAY PROJECT

place its meter and regulating station on historic Floyd Bennett Field, inside one of the abandoned airplane hangar buildings. Although historically significant, the hangar buildings were in serious disrepair and in danger of collapse.

“This was a win-win-win solution,” says Kellogg. “It is great to see our team’s hard work recognized with such a prestigious award.” ■

The Rockaway Delivery Lateral is a 3.2 mile pipeline connecting the Transco pipeline’s existing Lower New York Bay Lateral to the Rockaway Peninsula.

Placed into service on May 15, 2015, the project includes one mile of horizontal directional drilled (HDD) and 2.2 miles of conventionally laid 26-inch pipeline connected to the existing Transco system by two 18-inch hot taps and a subsea manifold used for maintenance and testing.

Williams has worked with federal and state agencies over the last six years to develop the Rockaway Delivery Lateral Project.



Steve Kellogg was on hand in late April to receive the Lucy G. Moses Preservation Award for the restoration of two aircraft hangars at Floyd Bennett Field in New York City.





Independence Day Memories

WILLIAMS' CENTURY OF SERVICE

“Our customers rely on us to deliver the energy that makes their lives move.”

*Kirk Edwards
Operations Technician
Williams*

In the early 1940s, virtually all petroleum consumed on the East Coast arrived via ocean tankers from Venezuela or the Gulf Coast.

That is, until German submarines began sinking the tankers, destabilizing American energy supplies.

As World War II broke out, the United States government turned to Williams for a safer, more secure system to fuel its defense plants in the Northeast. The result — the War Emergency Pipeline systems, also known as Big Inch and Little Inch.

The 24-inch diameter Big Inch, running more than 1,200 miles from Texas to New Jersey, went into service in 1943, while the 20-inch diameter Little Inch (actually a longer system by 200 miles) went into service the next year. Big Inch and Little Inch not only solidified Williams' reputation as the world's foremost pipeline firm, it also drew honors and accolades from U.S. military. Williams became the first

pipeline company to receive the Army-Navy “E” Award for “outstanding performance in wartime construction.”

That commitment to service continues today, as veterans comprise about 10 percent of our workforce.

“When I think of veterans and the most valued traits they bring to a company and work environment, I think of leadership, discipline, situational awareness, adaptability, and esprit de corps,” says D. R. “Bud” Rains, director of projects, Construction Management. “Most of the experiences that a veteran will gain on active duty will never be matched in the civilian world.”



Williams Operations Technician Kirk Edwards joined Williams after 20 years in the U.S. Air Force.

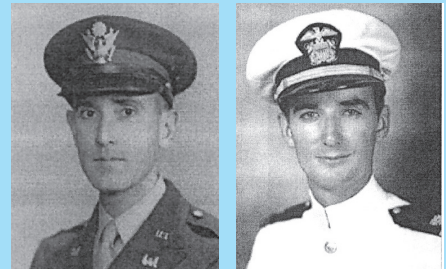
THE WILLIAMS FAMILY LEGACY

To the Williams family, serving their country was just as much a family business as pipelines. Three second-generation members of the founding family served in World War II.

Charlie Williams was in the United States Army Corps of Engineers; he supervised the construction of airfields, pipelines, and roads in the China-Burma-India theater. Charlie served in various executive and board positions from 1949 until he retired in 1974.

Charlie's brother John Williams was with the Navy Civil Engineering Corps; he served in the Pacific theater, including Iwo Jima. John served as Williams CEO from 1949 to 1979 and chairman, 1971-1979.

Charlie and John's cousin David Williams, Jr., was a fighter pilot with the 8th Air Force of the Army Air Corps. He flew missions over Nazi-controlled Europe. David served in various executive and board roles from 1949 until his death in 2000.



Clockwise from top, David Williams, John Williams and Charles Williams all served in the U.S. Military in World War II.

“Veterans have been groomed to take an active role in achieving their objective. This is Job 1 in the United States military. We have the most effective and elite fighting force in the world because individuals are expected to reach higher and achieve greater levels of responsibility.”

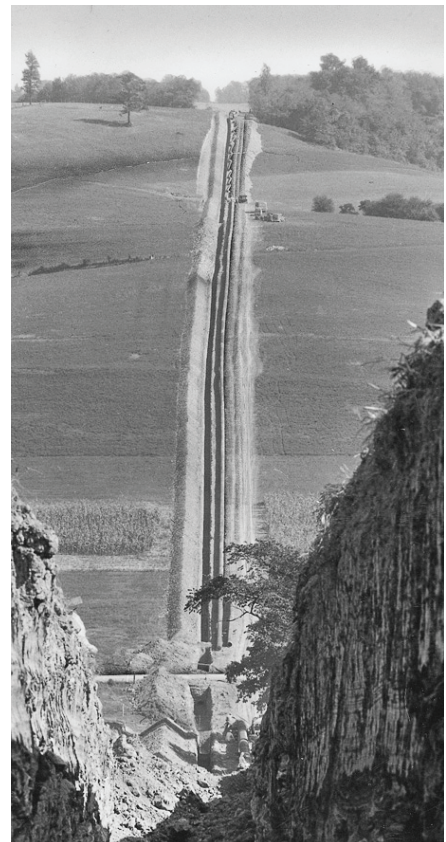
A good example is operations technician Kirk Edwards, who joined Williams after serving 20 years in the U.S. Air Force, retiring as a technical sergeant. Kirk's Air Force background instilled in him the “safety first” mindset essential to working at Williams.

“My mechanical background is what I believed helped me secure my job with Williams,” Edwards says. “Additionally, attention to detail and safety was always imperative when working with military aircraft. During my interview process, I was asked about how I viewed job safety. The fact that it had been drilled into my daily routine for 20 years meant that I knew it always had to come first.”

Edwards believes his military training has a direct impact on Williams' reliability in serving customers. “Our customers rely on us to deliver the energy that makes their lives move. The attention to detail is imperative to ensure that we do not interrupt the flow of natural gas, while ensuring the safety of each other and our neighbors.”

Well beyond their active military service, Williams' veterans continue to help ensure our country's security through safe, reliable energy supplies — just as their predecessors did in building the War Emergency Pipelines all those decades ago. ■

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Built by Williams Brothers during World War II, the Big Inch and Little Big Inch pipelines safely brought vital crude oil, fuel oil and gasoline from Texas to massive war plants and machines in the northeast United States.



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