

HOUSTON history

PUBLISHED BY WELCOME WILSON HOUSTON HISTORY COLLABORATIVE
VOLUME 16 • NUMBER 1 • FALL 2018

OFFSHORE TECHNOLOGY CONFERENCE A Golden Past, A Brighter Future





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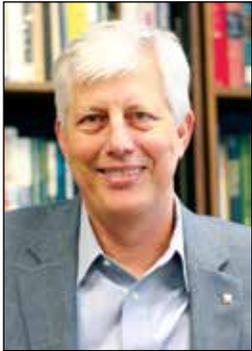
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Anniversaries



Joseph A. Pratt
Editor Emeritus

As the Offshore Technology Conference (OTC) celebrates its golden anniversary, we look back at its activities and reflect on how they have helped Houston emerge as “the energy capital of the world” while boosting the regional economy. Anniversaries are obviously all around us. While I worked on this issue of *Houston History*, a magazine I edited for half of my thirty-year career as a history and business professor at the University of Houston, I had a significant anni-

versary of my own—my seventieth birthday.

Reflecting on the past, I realized that the fiftieth anniversary of OTC’s first annual conference in May 1969 also marked the fiftieth anniversary of my marriage and of my first serious piece of historical research on the oil industry, my senior thesis at Rice University on the history of my dad’s union, the Oil, Chemical, and Atomic Workers (OCAW). Doing *real* research – complete with trips to several archives, conducting interviews, studying secondary sources, writing, and editing – put me firmly on the path to becoming a professor who taught and wrote about the energy industry for forty years at four different universities.

An important part of my preparation for becoming a historian of the oil industry were my summers working in the labor gangs of oil and petrochemical plants to help pay my way through Rice. This was hot, nasty work. I cleaned out tanks once filled with sludge from who knows what and scraped out carbon black residue from the large “dryers” used to make synthetic rubber. Compared to these jobs, the summer I worked twelve hour-days, seven days a week laying pipeline across East Texas seemed almost like a vacation. Doing grown-up work for grown-up pay for the first time gave me greater discipline, a serious work ethic, and a fuller understanding of where money comes from.

As I taught in universities, it disturbed me that oil in particular and energy in general were slighted in the curriculum. Someone needed to teach students about the production and consumption of energy, so I spent the last two decades of my academic career training Ph.D. students in energy-related history, helping build a new sub-discipline in the history profession called “Energy History,” and creating a new “Energy and Sustainability Minor” for undergraduates at the University of Houston.

While completing multiple research projects and books on the history of oil companies and the offshore industry, I have been impressed by the innovativeness and resilience of offshore companies, which have developed an amazing array of new technologies to lower costs and continue to expand into deeper waters. The technological marvels that

made it possible for offshore production to expand became important elements of my research, which was greatly enhanced by my work with the Offshore Energy Center interviewing inductees into its Offshore Hall of Fame at the Ocean Star Museum in Galveston. For me, the cherry on top of my research was writing a series of historical essays on offshore history for *Offshore* magazine as part of its sixtieth anniversary celebration.

OTC has become a central part of the global offshore industry by providing a place for those involved in the industry to discuss the latest advances in offshore technology, to network with colleagues from around the world, and to attend exhibitions of the latest equipment developed to help move the offshore industry into deeper waters in harsher environments. OTC now holds conferences in Brazil and Asia, as well as meetings focused on Arctic technology, extending its far-reaching impacts on the offshore industry and on the city of Houston internationally.

We have published several single-topic issues of the magazine on other significant Houston institutions celebrating milestones, notably the Texas Medical Center, the Johnson Space Center, the Houston Livestock Show and Rodeo, the University of Houston, the Houston Ship Channel, Houston Emergency Medical Services, and the Center for Public History, our home base at UH. OTC’s golden anniversary, similarly offers a fitting occasion to celebrate the history of an organization that has helped our city evolve into a mature metropolis while enhancing the lives of Houstonians.

HOUSTON
history
PUBLISHED BY WELCOME WILSON HOUSTON HISTORY COLLABORATIVE

Celebrating its fifteenth anniversary with this issue, *Houston History* is published by the Welcome Wilson Houston History Collaborative in the UH Center for Public History (CPH). It is the only in-depth publication of our region’s history; it trains students in historical research, writing, and collection of oral histories, giving them marketable workplace skills; and it makes our region’s history accessible to students, teachers, researchers, and anyone interested in Houston’s past. Our work at the magazine relies on the support of generous community donors. Please consider helping us continue our community outreach, innovative training, and research by subscribing to the magazine or donating. Visit www.houstonhistorymagazine.org and click on “Buy Magazines” or “Donate.”

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OFFSHORE TECHNOLOGY CONFERENCE: A Golden Past, A Brighter Future

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COVER PHOTO: *The Offshore Technology Conference is celebrating its Golden Anniversary in 2019. The conference, now held at the NRG Park, has met in Houston since 1969, contributing \$2.5 billion to the city's economy.*

Photo courtesy of OTC.

OTC at 50: Bold Vision Led to Unimagined Success

By Joel Parshall*



Visitors walk the NRG Center exhibit floor at OTC in 2018.

All photos courtesy of OTC unless otherwise noted.

Visionaries possess an extraordinary power to imagine what could be. Yet when a future unfolds that validates them, it may so exceed the original vision that even an extraordinary power of imagination is proved inadequate. The reality that happens vaults well beyond one's wildest dreams. That could be said of the original decision by nine organizations in 1968 to launch the Offshore Technology Conference (OTC) in Houston the following year.

The sponsors were optimistic enough to call it “the first annual conference,” and that vote of confidence has been powerfully affirmed.

The decision to organize the original conference was announced in a May 1968 *Journal of Petroleum Technology* article by Joe Alford, executive secretary of the Society of Petroleum Engineers (SPE). “Nine of the leading engineering and scientific societies in the United States have taken a bold and significant step with the establishment of a new interdisciplinary meeting to be known as the Offshore Technology Conference,” he wrote. The initial conference was to be held 19–21 May 1969 in what was then the new, downtown Houston Convention and Exhibit Center.

MAJOR FORUM

This excerpt from the article summarizes what the sponsors hoped to accomplish: “The new conference will provide a major forum of national importance and scope for the dissemination of technology related to offshore resources and environment. The total benefits and influence of the conference are now beyond prediction, but many knowledgeable persons feel that it will be of considerable value to the



The inside of a decompression chamber as seen on the exhibit floor of the first OTC in 1969.

Photo © *Houston Chronicle*. Used with permission.

nation in our development of oceanography and resources from the oceans.”

Yes, knowledgeable persons felt it would “be of considerable value to the nation.” But there was no intimation of what value the conference might have beyond the borders of the United States or what interest it would generate internationally.

*This article from April 1, 2018 is reprinted with permission from the *Journal of Petroleum Technology* and OTC.



Visitors in 1971 view platform models on the exhibit floor at the Astrohalls in OTC's first year at the Astrodome complex.
Photo © Houston Chronicle. Used with permission.

Hindsight tells us that OTC was an idea whose time had come, and clearly the organizers of the original believed that the time had come for something significant. But did they have any idea of how far-reaching the interest would prove? With participants from more than 100 countries? Of attendance that would breach 100,000 on several occasions? Of programs with well more than 40 sessions and 300 technical papers presented? Of 2,000 or more exhibitors with displays covering 600,000 square feet?

PREMIER GLOBAL EVENT

But those are numbers. To put it in words, the conference is known as the offshore energy industry's premier global event.

"It's absolutely true," said Paul Jones, SPE representative on the OTC Board of Directors who attended his first OTC in 1987. "It's essentially where everybody who's anybody in the offshore industry—and that includes oil and gas production and even alternative energy now, which is a growing sector of our business—comes to Houston for the first week in May to attend a technical program, which is of the highest quality, continue networking, and see some of the new technologies being displayed."

When that "first annual conference" took place, it was an auspicious beginning of modest proportions. It drew 4,200 people and offered 26 technical sessions with 125 papers presented. There were 200 exhibitors, and their displays took up 38,500 square feet. As it ended, the sponsors unanimously voted to return to Houston for a second conference in 1970. That was notable because it had been slated tentatively for New Orleans. Also of note, the preview article in *JPT* for the second conference used the initials OTC as a shorthand reference to the event, the first time that acronym was used.

Attendance shot up to 11,600 in 1970 with 145 technical papers presented and 269 exhibitors occupying 50,000 square feet. The following year, OTC left the convention center for the Astrohalls, several miles south of downtown, at the Astrodome complex.

MOVE TO LARGER SPACE

The move to larger space was fortuitously timed. As attendance grew in the next few years, world oil demand growth,



The Astrodome floor exhibit at the 1981 OTC, where attendance broke 100,000.

Photo © Houston Chronicle. Used with permission.

the topping out of US oil production—at least for several decades—and rising geopolitical tensions converged to bring a sharper focus on the global oil market, oil supplies, and energy security. OTC drew 32,000 attendees in 1974 and 51,000 the following year. The number of exhibitors surpassed 1,500 in 1976, and exhibit space was now 375,000 square feet.

In 1978, attendance reached almost 80,000, and the number of technical papers presented approached 300. A year later, OTC attracted 2,000 exhibitors and needed 450,000 square feet of exhibit space. By this time, there was no longer enough indoor exhibit space in the Astrodome complex, so some exhibits were now set up in the parking lots.

The growth continued to surge, as the event attracted nearly 87,000 in 1980, more than 100,329 a year later, and 108,161, along with 2,500 exhibitors covering 631,000 square feet of space, in 1982.



Offshore technology on display at the 1978 OTC.

A MIXED BLESSING

However, the growth was a mixed blessing. It was apparent that some visitors had little interest in petroleum technology and attended because OTC was big, in the news, and offered a lot of giveaway items at the exhibit booths. Some of the meeting organizers thought the event was becoming a bit of a carnival.

Technical papers presented had easily exceeded 200 from 1975-80, but fell to 184 in 1981 and plummeted to 144 in 1982, which was one less than the number of papers presented in 1970, the conference's second year.

By 1983, the world oil market boom had faded, major mergers of oil-producing companies were in full swing—as buying reserves that were already on a competitor's books looked far less expensive than risking capital on exploration—and OTC attendance dropped to 59,000. The in-

dustry was in a state of contraction, and many exhibiting companies approached the OTC Board to ask if the exhibition could be held every other year because of business conditions.

The board accepted these recommendations and decided to hold only an OTC technical conference in 1984. It should have smelled trouble as soon as it asked companies to sign agreements not to exhibit at any new exhibit that might emerge to compete with OTC. Each company resisted signing an agreement, as it was concerned that its competitors might refuse to sign and thus compel the company to exhibit if another exhibition was held somewhere in the absence of that at OTC. That fear became a reality.



Visitors examine technology at the 1988 OTC exhibit.

LEARNING A HARD LESSON

There were not one, not two, but three competing events that sprouted up in 1984, one at another location in Houston, one in Dallas, and one in New Orleans. For the exhibitors, it proved a much heavier burden than the one they wanted to avoid by requesting the Board of Directors to cancel the original exhibit. The board learned its lesson and since then has voted to hold the exhibit every year, whether in good times or bad.

Crucially, the board elected to hold onto its lease dates at the Astrodome complex, despite cancelling the 1984 exhibition. That ensured a smooth transition to 1985, in which OTC drew 56,000 attendees and technical papers rose to a much healthier 230. Exhibit space remained virtually the same as 2 years earlier, although the number of exhibitors fell to 1,725.

Toward the end of the year, the price of oil began a precipitous fall that eventually brought it down to \$10 per bbl at the end of March 1986, barely a month before the conference. But OTC had already steadied itself by learning from its error of 2 years earlier and committing to an exhibition regardless of business conditions and by re-emphasizing its technical program.

BUILDING A BRIGHTER FUTURE

Attendance was down over the next decade, but if the industry was struggling with depressed conditions, the role of the conference was to bring many of the best minds together and help figure out from a scientific, engineering, and technological perspective how to set it on a better course and build a brighter future. Technical paper presentations never fell below 200 over that span and pushed to a level of 309 in 1996, a record at the time. A year later, attendance topped 40,000 for the first time in 12 years and in 1998 it climbed to almost 50,000.



A debate between energy industry executives and environmental activists, moderated by journalist Hodding Carter III, was televised live from the 1992 OTC. It was the first televised event in the conference's history. Photo © Houston Chronicle. Used with permission.

After 3 decades at the Astrodome complex, the conference in 2002 moved to the new, adjacent Reliant Center at Reliant Park (now NRG Center at NRG Park). By now the industry was building for a strong recovery, which was to take hold later in the decade. Attendance, 49,620 in 2002, rose above 50,000 both of the next 2 years and reached 51,000 in 2004.

In 2006, OTC attracted almost 60,000 people, and attendance jumped to 67,000 in 2007. The conference initiated a full-day workshop for Houston-area science teachers that year, which has now become a fixture at OTC.

Attendance rose to 73,000 in 2008. While the impact of the global financial crisis late in the year caused attendance to decline the following spring, the 67,746 attendees at the 2009 OTC slightly exceeded the number from only 2 years earlier.

ATTENDANCE RECORD BROKEN

The growth resumed with 72,000 attending in 2010, 78,000 in 2011, 89,400 in 2012, 104,800 in 2013, and a record 108,300 in 2014. Later that year, the price of oil entered a tailspin that soon became a full-fledged collapse, as the increase in oil supplies caused by the North American shale production revolution fundamentally reshaped the global market. Over the next 3 years, prices hit lows not seen since 2003.

While OTC attendance fell to just under 95,000 in 2015,

the full impact of the price collapse wasn't seen until the following year when attendance dropped to 68,054. In 2017, the event drew 64,700 people. Yet even with the downturn's impact, the 2016–2017 attendance figures are comparable to the strong 2007 total and markedly higher than the 50,000 level of the early 2000s. What's more, technical paper presentations have been well above 300 in each of the past 3 years. As prices have been stabilizing and rising since late 2017, officials are cautiously optimistic about attendance at the upcoming 50th anniversary conference.



A wellhead is displayed at the 1997 OTC, which marked the first time in twelve years that attendance surpassed 40,000.

OTC A PHENOMENON

Over its 50 years, the Offshore Technology Conference has become a phenomenon, so much so that the Board of Directors in recent years has established three regional conferences modeled on the interdisciplinary basis of the Houston event: OTC Asia, OTC Brasil, and the Arctic Technology Conference.

With its variety of sponsoring organizations, now numbering thirteen, OTC covers a range of topics that no single society could provide in an annual conference and no group



A speaker makes a presentation during a 2018 OTC panel session.

of two or three organizations could offer around a common discipline. The program features specialized, niche sessions and other sessions with broader areas of interest. A session on flow assurance, for example, will have input from SPE and AIChE and draw attendance from members of both groups. And the wide range of the sponsoring groups and subject matter drives a tremendous diversity of exhibitors.

“If you’re involved in the offshore industry and have a story to tell, the first place you want to present the information, as a technical person, is OTC,” Jones said. “Some of the seminal papers we’ve seen in the industry have been presented there and primarily because it’s about the offshore industry globally, not about a specific discipline. All of the technical elements of offshore solutions are discussed, either in papers presented, in panel sessions, or when exhibitors display innovative ideas in offshore technology. It all happens at OTC.”

The conference not only is a magnet for seasoned technical professionals and industry authorities worldwide, it also can be a valuable occasion for people new to the industry.

A YEAR’S TRAINING IN A WEEK

“I used to run a subsea group in Chevron,” Jones said, “and one of the best learning opportunities I could give my people was to have them go to OTC. With new graduates, I used to insist they go there for 4 days. It was a year’s worth of training in a week just because you’re exposed to so much.”

And like so many industry professionals, the first thing Jones did this year “as I’ve done every year, is put OTC in my calendar.”

Joel Parshall is the features editor for the *Journal of Petroleum Technology*.

OTC’S SPONSORING ORGANIZATIONS

The Offshore Technology Conference has 13 sponsoring organizations:

- American Association of Petroleum Geologists (AAPG)
- American Institute of Chemical Engineers (AIChE)
- American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME)
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical and Electronic Engineers, Oceanic and Engineering Society (IEEE-OES)
- Marine Technology Society (MTS)
- Society of Exploration Geophysicists (SEG)
- Society for Mining, Metallurgy, and Exploration (SME)
- Society of Naval Architects and Marine Engineers (SNAME)
- Society of Petroleum Engineers (SPE)
- Minerals, Metals, and Materials Society (TMS)
- Brazilian Petroleum, Gas and Biofuels Institute (IBP) [a regional sponsoring organization]

At OTC’s founding in 1968, there were nine listed sponsoring organizations. SME, SPE, and TMS were constituent parts of AIME but later incorporated separately to expand the list to twelve organizations. Since then, IBP has become a sponsoring organization.

The Offshore Industry, Houston, and the Creation of OTC

By Joseph A. Pratt

The time was ripe for the creation of the Offshore Technology Conference (OTC) in 1969. The offshore industry was nearing the end of a long and productive era from 1946 to 1969, when ambitious and innovative industry pioneers and their companies laid the foundation for the future development of offshore technology. They had developed and refined the basic technologies needed for mobile drilling and the design, construction, and installation of production platforms and offshore pipelines in the 1940s, 1950s, and 1960s. By the mid-1960s some 1,000 platforms in water depths of up to 300 feet produced about one million barrels of oil per day in the Gulf of Mexico. In 1969 the offshore industry stood poised to move off the edge of the continental shelf into deeper waters.¹ There and elsewhere a lengthy list of challenges awaited the offshore industry. Some had

already been identified; others were visible on the horizon. To meet these challenges, the industry would have to close ranks and become a fraternity of sorts, with freer exchange of technical research and closer cooperation among individuals and companies.

Many prominent members of the post-World War II generation attended the first OTC; some organized sessions and presented technical papers or abstracts. They had fought the good fight offshore for twenty-five years, gaining insights into issues such as design criteria for production platforms, technical innovations needed to drill in deeper and deeper waters; and the early, but steady, advances being made in subsea work. They had learned hard lessons that could provide much needed context for a younger generation of offshore engi-



The 1969 OTC On-site Program, marking the conference's inaugural year.



OTC celebrated its fiftieth edition in 2018 with the celebration culminating in the golden anniversary in 2019.

All photos courtesy of OTC.



Attendees leave the Astrohall after a long day of networking during the early years of OTC.

neers and other offshore specialists whose careers returned to these issues as the industry moved forward.

The presence of the old hands at the launch of OTC boded well for the future of the offshore industry. The illustrious careers of many of these men and women before 1969 made them among the first inductees into the Offshore Hall of Fame, established by the Offshore Energy Center in 1998 and housed in the Ocean Star Museum. The program for the 1969 OTC shows that many participants, including some who had made notable contributions to the offshore industry in its formative years, had already conducted serious research on key technical and organizational issues that came to the forefront in future years.² When experienced old pros and ambitious younger people early in their careers sat in the same sessions discussing technical processes, lessons learned from the elders could be swapped for new ideas from the youngsters—to the benefit of both.

The challenges facing the offshore industry in 1969 were not all new. The industry was at a turning point. Its future pointed toward international expansion, venturing out into ever deeper waters, and finding innovative technical solutions to unknown problems that loomed in the oceans but had not yet been encountered in the relatively shallow and tame waters of the Gulf of Mexico. Industry leaders did not have to confront these challenges alone, for they were armed with a relatively new tool — computers. The digital revolution was in full swing, and its application gradually transformed all phases of the industry. Some of the pioneers regretted this change. One said simply, “Intuitive design and an entrepreneurial spirit gave way to computers and an era of no surprises...we were less afraid of failure” before the coming of powerful computers.³ Surely fifty years later many of the young people at the first OTC are quite happy that they have had access to high powered computers during their careers.

One of the most difficult challenges in 1969 was an old,

unsolved problem: The design and construction of production platforms and drilling rigs that could stand up to the concentrated wind and wave power of major hurricanes. Griff Lee, who worked at McDermott for most of his career, recalled the lack of information about the Gulf of Mexico available to the offshore construction industry in the years just after World War II, explaining, “There had been no construction of open frame structures in open water before.” Lacking precedents and having little data about conditions in the Gulf concerning wave heights, wind speeds, or soil conditions, industry pioneers had to start from scratch in designing, building, and installing platforms in the Gulf of Mexico.⁴

Griff Lee, for one, relished the challenge of accumulating much needed data about wave heights and wind velocity in the Gulf of Mexico. The industry needed this data to put together best guesses on standards for offshore construction. This work was done in a world of Big Chief tablets and slide rules, not powerful computers.

It relied not on sophisticated weather satellites, but on storm reports from ships or forecasts from former “weather officers.” During World War II these men had the responsibility of providing the best possible predictions of weather conditions that troops could expect when they landed on beaches or jumped from airplanes. From 1946 into the 1960s the weather officers became the available experts who analyzed conditions in the Gulf of Mexico. More than a decade passed before the industry had reasonable estimates of hurricanes’ power or historical data about their frequency or paths in the Gulf. The best the weather experts could offer was information about hurricanes from “hindcasting,” that is, studying data about storms in the past to construct plausible theories about the likelihood and destructive potential of 25-year storms or 100-year storms and the height above sea level offshore platforms needed to be built to avoid having their decks swept into the ocean by storm-driven waves.

The offshore industry was lucky that during its formative years few major hurricanes threatened offshore facilities in the Gulf. But good luck bred complacency. Three large hurricanes—Hilda in the fall of 1964, Betsy in 1965 (both labeled as “100-year storms”), and the monster storm Camille in 1969—finally shattered the

The 1974 OTC On-site Program cover speaks to the power of offshore waves.



industry's prevailing assumption that the hurricane problem had been solved. Many people at the first OTC had been involved since 1964 or earlier in efforts to better understand the impacts of Gulf hurricanes. Three major storms in the 1960s brought both good news and bad news. The good news was that helicopter fleets servicing the offshore platforms and rigs could evacuate offshore workers quickly and efficiently when a severe hurricane seemed headed their way.⁵ Loss of life was not the problem, however. With no loss of life, Hilda still caused an estimated \$100 million in damages while destroying thirteen platforms and severely damaging five others.

A year later Betsy caused similar damage. One of its casualties was Zapata's new state-of-the-art jack-up drilling rig, "Maverick," which simply disappeared in the storm, never to be found. Camille, a terrifying Category 5 hurricane with top winds estimated at 200 miles per hour, caused extensive damage offshore while destroying and damaging platforms and drilling rigs. This so-called "400-year storm" caused an estimated \$100 million in damages offshore, even though it did not score a direct hit on "offshore alley," the area of the Gulf of Mexico where most offshore platforms are clustered.

Raising greater concern than the loss of money was the reality of the stunning power of an angry Category 5 hurricane, which had tossed around platforms and drilling rigs that many in the offshore industry had assumed could survive major storms. Like Betsy, Camille had its way with old and new platforms alike. Shell—the acknowledged offshore leader in the Gulf of Mexico—lost three recently built platforms, one of which had been installed five months earlier, claiming the title of "tallest fixed deepwater platform in the world" until Camille swept it away.

After thirty years of offshore operations in the Gulf, Camille washed up a new design problem. Mudslides on the ocean floor caused by the storm's powerful surge moved one large platform Shell had designed to withstand 100-foot waves. The flow of mud pushed it down the slippery ocean floor until it came to rest 100 feet away on the bottom of the sea. Anyone who saw the Biloxi, Mississippi, area before and after Hurricane Camille gained a lifetime of respect tinged with fear for major hurricanes. Anyone in the offshore industry who seriously considered the damage Camille would have caused had it moved 100 miles to the west through the most densely developed offshore areas realized that much work remained to be done on the wind, wave, and soil forces produced by big storms.⁶ A good bit of that work came in numerous sessions on wave forces at OTCs, including the first one.

A somewhat similar set of problems arose in the late 1960s when North Sea exploration began in earnest. As in the earliest years in the Gulf of Mexico, those who wanted to develop a new oil frontier in the North Sea had to start from scratch; the drawn-out process of defining the jurisdictional boundaries of the various nations bordering the North Sea delayed exploration, leaving the early entrants into the region with almost no reliable data on wave heights and wind and wave forces on platforms.

In the North Sea, the offshore industry confronted severely cold weather, sudden storm winds strong enough to generate 100-foot waves, and water depths in parts of the sea



Industry professionals engage with one another on the exhibit floor at OTC in 1985.

more than double that encountered by 1969 in the Gulf of Mexico. North Sea winds could be comparable to Category 2 or 3 hurricanes, with gusts up to 120 miles per hour and sustained winds of 80 miles per hour for as long as an hour. Unlike North Sea gales, Gulf of Mexico hurricanes could be tracked, leaving time to evacuate platforms; the rapid rise of North Sea gales meant that at times offshore platforms could not be evacuated. Those who ventured from the Gulf of Mexico to the North Sea in search of oil and gas also faced the challenge of adapting equipment used in the Gulf to the much harsher conditions encountered in the 185,000 square miles covered by the North Sea.⁷

Work offshore in the Arctic, another relatively new petroleum frontier, added the challenges of working in thick layers of ice to harsh conditions similar to those found in the North Sea. One 1969 OTC session had three papers discussing the difficulties encountered in the Cook Inlet southwest of Anchorage. One veteran of offshore work in the Cook Inlet said of his tour of duty there: "Extreme tides and low winter temperatures influence engineering and operating considerations to a greater degree in the Cook Inlet than heretofore experienced in other offshore oilfield development." In the 1960s, *Offshore* magazine gave a more succinct opinion of working conditions in the Cook Inlet, which it called "worse than any spot on the globe."⁸

Those who doubted this observation should have talked with the unlucky Brown & Root employee who drew the short straw when it came time for someone to hop aboard a run-away platform that had escaped its launch barge. He reported back regularly as strong ice floes pushed his platform up and down the icy waters of Cook Inlet. Combined with wind and water currents, these ice floes, which varied from thirty to thirty-five feet in height, exerted three to four times the lateral pressure on platforms experienced by standard

platforms in the Gulf of Mexico. One estimate held that Cook Inlet platforms had to withstand twice the thrust of the Saturn rockets used in the Apollo moon shots.⁹

Although the Cook Inlet was about five hundred miles south of the Arctic Circle, it provided a measure of preparation for future work in the real Arctic. The problems presented by thick ice and extreme ice floes could also be experienced in parts of the Arctic, as could the limited time to work given the harsh winter weather that slowed progress on projects. The discovery of the giant Prudhoe Bay field on Alaska's North Slope in 1968 focused attention on conditions in the Arctic. Laying 800 miles of large diameter pipe from Prudhoe Bay to the ice-free port of Valdez on Alaska's southern coast made extraordinary demands on welders and managers alike.

Even greater demands have emerged since the 1970s in numerous ventures to find and produce oil in the harsh conditions in offshore waters off the North Slope. The problems with Arctic conditions had already caught the attention of some of those at the 1969 conference, and they remain a challenge that the industry has not completely overcome in the forty years since the completion of the Trans-Alaska Pipeline System pipeline in 1977.¹⁰

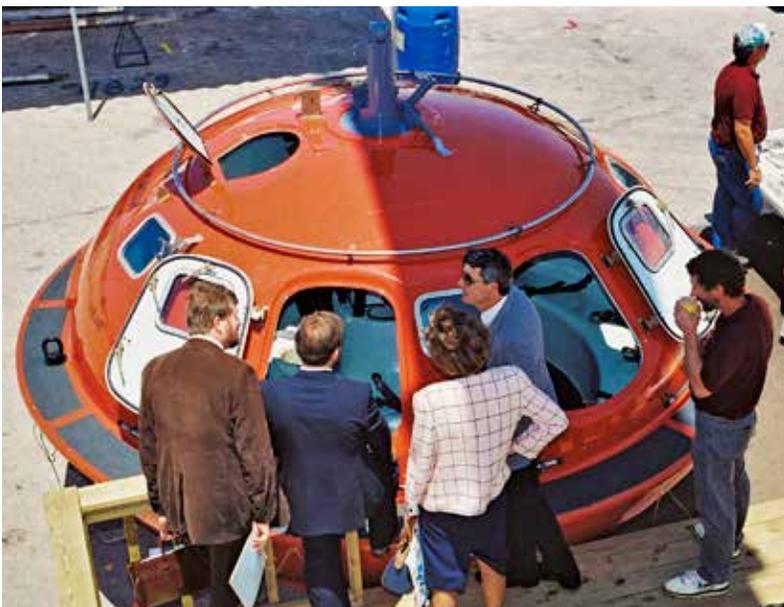
The brochure for the 1969 conference contained many listings of technical papers and abstracts about subsea work. This has remained an important area of technological change in the last fifty years, and it will remain on the agenda for years to come. These early papers laid out frameworks for understanding the demands of subsea work in deeper and harsher environments; they also put forward research programs to meet these demands. They helped demonstrate how technical changes can evolve from ideas to realities through the collaborations of collections of experts over time.

One final challenge in 1969 was most noticeable by its absence in the 1969 OTC brochure. Participants submitted technical papers about the possibility of drilling in 1,300 feet of water in the Santa Barbara Channel with modern semisubmersibles, but they made no mention of the Santa

Barbara oil spill in January of 1969, which occurred four months before OTC's first conference. This spill in a beautiful region produced much heated debate about offshore drilling, particularly in California. The following year a second well-publicized blow-out offshore Louisiana again captured considerable public attention.¹¹ Outrage at such spills fueled the growth of the environmental movement, which gained momentum in the late 1960s. The year after OTC's first conference witnessed the creation of the Environmental Protection Administration (EPA), the Occupational Safety and Health Administration (OSHA), the requirement of Environmental Impact Statements, and much stricter regulations of air and water pollution. Similar changes took place in Europe and Japan, and the oil industry became a target for protesters.



An exhibitor explains his company's technological innovations to an interested attendee at the 1992 OTC.



Attendees explore one of many exhibits outside the Astrodome in 1990.

Although technical innovation has remained the focus of the offshore industry, this episode taught an important lesson. The oil industry would have to commit more resources and expertise to preventing such disasters, or public opinion would push government regulators to assert greater control. "Clean up your own mess" was an admonition many heard from their parents; to do so, the oil industry had to do more to meet the challenge of growing social and political demands on issues as diverse as environmental stewardship, civil rights, and women's rights. The papers at subsequent OTC meetings indicate that combatting oil spills gradually became a topic of discussion.

Overcoming these and other challenges required increased cooperation in the offshore industry. This was good timing, since cooperation was in the air. In 1962, Shell held its "million-dollar school," where, for a substantial fee, Shell provided outsiders a glimpse inside the technical innovations that had made it the leader in the Gulf of Mexico. One unspoken lesson was that individual companies could not venture out alone into deeper and deeper waters. An offshore fraternity of supply and service companies had to



A 1997 exhibitor showcases its latest design advancements for its deep sea diving suit.

accompany them. In addition, innovative competitors were needed to push leaders in the industry to continue to create and apply new technology.

Increasingly, clusters of experts from different companies and professions contributed to the development of many of the cutting-edge technologies needed for offshore expansion in deeper waters and harsher conditions. According to one prominent Shell researcher, the million-dollar school and later OTC meetings served to “loosen the secrecy surrounding companies’ research efforts, making it much easier to release important technical results.”¹²

Another facilitator of growing cooperation was *Offshore* magazine. After its founding in 1954, the magazine quickly became a bulletin board of sorts for the industry, delivering useful and detailed information about important people and events. An older organization that encouraged collaboration in the industry was the National Petroleum Council (NPC), founded in 1946 as an advisory committee to the Secretary of Interior (and then to the Secretary of Energy after the Department of Energy’s creation in 1977). Staffed and funded by the oil and gas industries, for more than seventy years the NPC has given the petroleum industry a place to bring together experts from numerous companies and disciplines. Under the NPC umbrella, these study groups cooperate in the research and writing of reports on questions of interest to high-level policy makers. Included in the NPC’s work have been landmark reports on the offshore industry.¹³

Several failed efforts in Europe in the 1960s to create organizations somewhat like OTC served to emphasize the demand for places where those working offshore could mingle and discuss key issues. Much later OTC responded to the demands for more international meetings by holding conferences in Brazil and Asia, as well as a regular conference focused on the Arctic.

An attendee participates in a product demonstration at OTC 2016.



Among the most important predecessors of OTC were the voluntary committees that met after Hurricanes Hilda and Betsy to have hard-edged, open discussions about the need to establish better standards for offshore operations. The meeting after Hilda took place at the Roosevelt Hotel in New Orleans in 1964, and the one after Betsy met at the Rice Hotel in Houston in 1965. In a sense this was a move toward greater cooperation between the two primary cities involved in the offshore industry in the Gulf of Mexico. Those who voluntarily attended these meetings came fully prepared. They had suffered heavy losses by following standards suggested by hurricane “experts,” and they voiced harsh criticisms of the old order that had focused on the likelihood of 25-year storms and the adequacy of platform decks 30 to 40 feet above mean sea level. Camille made a joke out of this “standard” when it produced waves measured at 75 feet high by Shell.

One loud, persistent demand at the meeting after Betsy was for the establishment of a standing Offshore Standards Committee of the American Petroleum Institute (API). As the largest trade association for the petroleum industry, the API was an ideal organization to foster cooperative initiatives by the industry as a whole; the offshore standards committee soon came into being and set about the difficult task of creating and publicizing realistic standards for design, construction, and operations of offshore facilities.¹⁴

All of these efforts to create forums for discussion and research helped set the stage for the creation of OTC. The time was right in 1969 to create what OTC called “a major forum of national importance and scope for the dissemination of technology related to offshore resources and environment. The total benefits and influence of the conference are now beyond prediction, but many knowledgeable persons feel that it will be of considerable value to the nation in our development of oceanography and resources from the ocean.”¹⁵

Sharing notes on research. Sharing coffee during breaks between sessions. Sharing ideas about potential innovations. Sharing reactions to exhibits. All of these things helped build cooperation; all of them paved pathways toward a stronger offshore industry.



Attendees take a break from walking the aisles of the exhibit hall floor in 2018 to enjoy a live presentation held at an exhibitor's booth.

If the time was right in 1969, the place also was right. Houston was enjoying a long post-war boom for oil, gas, and petrochemicals. Plants built or expanded to support the war effort had reverted back to private hands after the war, and new plants also had sprung up along the Houston Ship Channel and around nearby ports in Beaumont, Port Arthur, and Freeport. Two visible symbols of the maturing oil industry in Houston were the opening in 1963 of the new Humble Building (later renamed the Exxon Building), complete with the Petroleum Club, on the south end of downtown, and the completion of One Shell Plaza on the north side of downtown in 1971.¹⁶ Occupied in large part by two of the world's largest oil companies, the two buildings provided bookends for the new Tenneco Building, which opened in 1963. Along with other leading natural gas transmission companies, including Transco, El Paso, and Texas Eastern, Tenneco chose Houston for its headquarters. The pipelines of these transmission companies provided key connections between the vast natural gas reserves in the southwest and the vast demand for natural gas in major northeastern cities. Natural gas also served as a feedstock for many of the petrochemical plants that proliferated in the region after the war. Houston proclaimed itself "the oil capital of the nation," but it could well have expanded this Texas brag by touting Houston as "the oil, natural gas, and petrochemical capital of the nation."

The 1960s also witnessed a measure of economic diversification in the region, with the continued expansion of the technologically intensive Texas Medical Center, the coming of NASA's Manned Spacecraft Center to Houston in 1963, and the growth of institutions of higher education

(notably the University of Houston, Rice, Texas Southern, and St. Thomas Universities) with strong programs in engineering and chemistry as well as the liberal arts. The talk of the town, including technological advances, was the Astrodome, which opened in 1965 billed as the "Eighth Wonder of the World." The first all-purpose domed sports stadium, it featured such "high tech" innovations as plastic grass, the largest home air conditioner anywhere, and a parking lot for 30,000 cars.¹⁷ The opening in the "arts district" of Jones Hall in 1966 and the Alley Theatre in 1968 indicated that Houston had embraced high culture along with major league baseball and high school football.

The first fifty years of OTC lived up to the promise of its first meeting in 1969. Attracting more than 4,000 participants to the initial conference strongly indicated the hunger for greater interaction and cooperation among those who worked for the many and varied companies in the offshore industry. The planning of the conference over the space of a year by volunteers drawn from the highest levels of the leading offshore companies and the willingness of leading experts from many related fields to organize sessions and write technical papers and abstracts demonstrated clearly that greater cooperation could deliver impressive results. In the context of events that occurred in the offshore industry of the 1960s, the time was right and the place was obvious for OTC to launch an endeavor to help bring the offshore industry together while pushing it forward.

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Key industry professionals engage with one another on the exhibit hall floor.

All photos courtesy of OTC unless otherwise noted.

Deeper Through the Decades, An Interview with Carl Wickizer

Edited by Joseph A. Pratt

The Offshore Technology Conference has been a central forum for sharing information on the extraordinary technical changes that have allowed the offshore industry to expand its operations into deeper waters and harsher environments. Much of the early development of deepwater technologies can be seen through the career of Carl Wickizer (1931-2007), who went to work for Shell Exploration and Production in 1954 after graduating from Oklahoma State University with a civil engineering degree. In his job interview, they talked at length about the emphasis Shell placed on offshore oil as it looked to the future. Engineers were working in the lab and in the field to apply what was being done on land and in the marshes to the open Gulf of Mexico, leading Shell to recruit people with Wickizer's background in structural engineering offshore.

Wickizer spent two years in the Army and returned to Shell, where he worked for several years in South Louisiana marsh fields, which included onshore marine operations. He moved up to supervisory positions in



Carl Wickizer.

Photo courtesy of Brad Wickizer.

production engineering, drilling, production facilities, design, and computer-automated control systems for the oil field, with increasing exposure to the open Gulf of Mexico through economic studies.

In 1973, Wickizer received his first real assignment in the Gulf as a project manager for a pilot subsea system development program aimed at the deepwater of the future. He spent the next twenty years "engineering, researching, testing, and applying deepwater technology," working as a supervisor, engineering manager, technology manager, and research manager before being named projects manager for all of Shell's deepwater projects in the Gulf of Mexico.

Carl Wickizer worked for Shell almost forty years until his retirement in 1993. Bruce Beauboeuf, currently managing editor of *Offshore* magazine, interviewed Wickizer at One Shell Plaza in Houston, Texas, on November 21, 1997. A portion of that interview follows, tracing many of the technological breakthroughs in the industry across five decades.¹



A robotic product demonstration draws a crowd at OTC in the 1970s.

Evolution of Seismic Mapping and Drilling Rigs

I have seen a lot of changes from the time I first started working in the Gulf of Mexico until now. The exploration phase, of course, starts out with doing seismic mapping, which is the primary tool offshore. It is really about the only significant tool once you get past the basic geology of understanding where traps might lie, the kinds of structure you are looking for, and the kinds of source rock that may exist. A lot of basic chemistry and geology goes into thinking before you start doing seismic mapping....As you get into deeper water, that changes from a small boat doing single lines to what is now done with the very large boats and a lot of streamers treading for miles across the Gulf of Mexico, shooting off air pulses that reverberate through the rocks and are echoed back up to receivers that are trailed by the boats and captured on massive computer systems that record billions and billions of bits of data. And then they are all massaged and analyzed

For the first two years, OTC was held at the Albert Thomas Convention Center located in downtown Houston, Texas. This Totally Enclosed, Motor Propelled, Survival Craft, known as a TEMPSC, was on display at OTC in 1971.

and turned into maps that show subsurface structure and, in some cases, even so-called bright spots which indicate hydrocarbon probability. This has changed dramatically in the last ten years [prior to 1997].

Bright spot is not a Shell invention. It is simply a seismic technique which...amplifies reflections from oil in a certain way, allowing you to suspect, with more probability, that there is oil in a particular place. We were on the forefront of





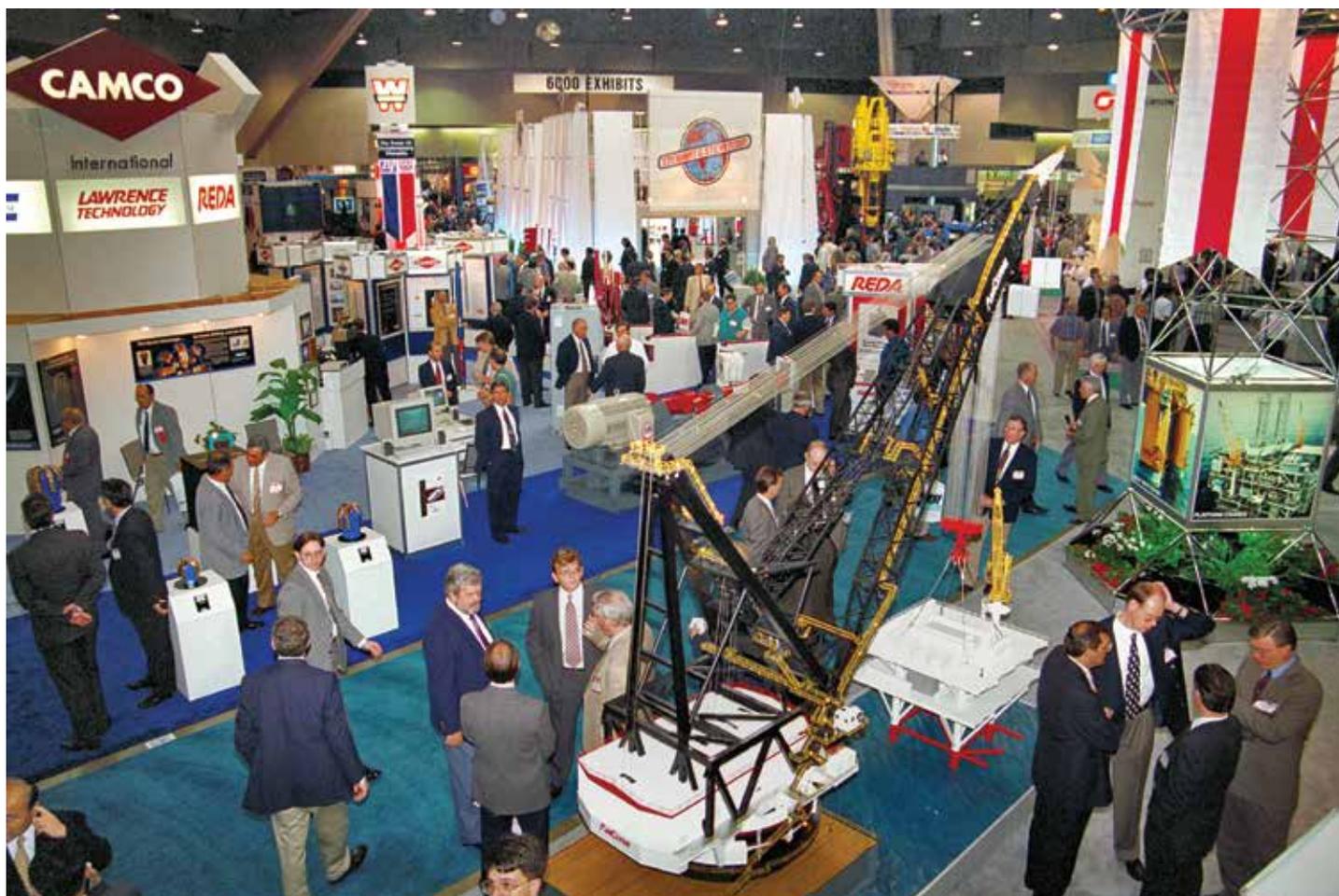
Carl Wickizer worked in the offshore industry for almost forty years and was named Shell's projects manager for all of its deepwater projects in the Gulf of Mexico. Photo courtesy of Brad Wickizer.

In 1985, OTC rebuilt the exhibition and conference to reflect global activity.

developing that technology, but it was being developed by the entire industry all at the same time. Shell Exploration had a lot to do with understanding the bright spot technology and bringing it along, but there were a lot of other companies involved. But it is a technique that is selective; it is effective in a particular area of the world....The bright spot technology that we developed in the Gulf of Mexico worked extremely well for us there, but could not necessarily be extrapolated to other areas of the world. Bright spot technology was being developed in the 1970s, and in the 1980s, we certainly used it extensively.

In shallower water we would go out and do a lot of very simple mapping and then go buy a few leases based on those maps. In the deepwater we are in today [Editor's note: Here and elsewhere in the interview, "today" refers to the late 1990s.] however, the technique is to do a lot of very detailed mapping because the cost of drilling an exploratory well is so high. You essentially do detailed mapping of an entire area, buy all the leases that you can, or at least bid on them within the area, and then do even more detailed seismic mapping before you drill the first well. We spend a lot more time mapping and analyzing prior to drilling the first well out in the deep water because of the high cost of drilling.

Once you have massaged all that data, exploration tries to pinpoint the best place to drill a particular structure to get the first indication of its oil bearing and size. Then you pick a drilling rig suitable to do that kind of exploratory drilling. Of course, in the old days in the very shallow water, it was a barge-mounted rig that just sat on the ocean floor in, say,



ten feet of water. As you moved that into deeper water, it became the jack-up rig, which initially could work in up to 100 feet of water and then later, up to 200, and finally up to 300 or even 450 feet of water. Deeper water required different types of mobile rigs, including floating drilling operations and either semi-submersible or shipshape rigs that can now drill in up to about 7,500 feet of water. Ongoing research and development could take it even deeper to 10,000 feet and beyond.

Bruce Collipp (of Shell) was, more or less, the father of semi-submersible technology. It was extremely important because it gave us the capability to decouple the well on the ocean floor from the rig that was drilling the well, so we were not tied together by any legs. This made it possible to use a floating drilling operation to any water depth. This was a giant breakthrough in the ability to put the wellhead, the blowout preventer, and all these things associated with well safety and the ocean floor on a rig that could float on and float off, without any consequences, and the depth limitation was determined totally by things other than structure.

Soil borings were very important in jack-up rig deployment because you had to understand the foundation in which you were putting those legs in to hold the rig up, and that was very critical in the early days. Soil borings, as such, became a lot less critical in floating drilling operations. But the ability to map not only the surface of the ocean floor but the subsurface portions of the top 200 or 300 or 400 feet, is important to the floating drilling operation. You needed to know what you were getting into before you would penetrate the top part of the ocean, the soil. Drilled into shallow gas bubbles or shallow water flows or consolidated soils, for example, might allow your surface casing to collapse. That capability, with side-scan sonar and shallow seismic techniques, became quite important as we went into deeper and deeper water. In the 1980s, we spent a lot of research and development dollars on new technologies that became important in exploratory drilling on the rank wildcats scattered around the deep water.

In the early days when our seismic mapping techniques were not very refined, we were drilling deltaic sands, which had a way of being sort of hit-and-miss mapping. It was very important to drill a large number of exploratory wells or, at least what we would call delineation wells or confirmation wells, to try to understand the total reserve in place and its configuration before you set the platform...With today's technology, however, we have been able to replace a large number of wells with 3D seismic technology. Because we just cannot afford to drill a large number of wells to define all of these deepwater reservoirs, we have to be able to use very precise, 3D seismic technology, along with a minimum number of wells to define the reserve. That is happening in the deepwater today, and it is one of the real breakthroughs in deepwater production. Without that we would not yet be developing the deepwater.

The Economics of Offshore Technologies

A deepwater well in several thousand feet of water will cost upwards of ten million dollars. You just cannot afford to drill ten deepwater wells or more in order to find out if



Carl Wickizer, center, controls a remotely operated underwater vehicle.

Photo courtesy of Brad Wickizer.

you want to develop it or not because it just drives up the marginal cost for every field. In contrast, you may spend three, four, five million dollars on 3D seismic, and then drill two wells or three wells maximum to define a developable reserve; [this] dramatically cuts down the marginal cost of finding the oil.

The challenges that we met as we moved into deeper water reflected the technical challenges along with the economics of the company. Those technical challenges drove the speed with which we actually moved into the deep water and developed it...The problem was being able to go into the deeper water and withstand the ocean forces, the currents, the wind out there, the wave forces, the big waves, and then to solve the foundation problems, which became greater as you got into deeper water and had the higher forces and weaker soils. All of those problems were compounded by the fact that until we needed to go out in deeper water, nobody knew much about those forces or really understood exactly how they would impact a structure or how to build a structure under those conditions. So, they were starting from scratch. What are the forces of waves or wind on the structure? What does a hurricane really do to a large structure? It took a lot of years to understand how to design and what to design for, and then to actually convert that into a design in steel that we could go out and put in the ocean...

Subsea was the most obvious innovation for deeper water because it could all be done on the ocean floor; it did not require anything that penetrated through all the waves and currents of the ocean and was sticking up above the ocean surface where the hurricane winds could get at it. So, it seemed like the obvious thing to do, and that is where the work began.

Subsea technology, however, had a lot of its own obstacles to overcome. First and foremost, if you are going to put a complex set of valves and controls on the ocean floor where you cannot see it and cannot get to it, it had to be very reliable and designed for that specific purpose. You had to recognize that although we could make dives in about 200 feet of water at that time, we were looking for something that would carry us beyond the 300 feet depth.

Well, that was stretching the limit of diving technology



A 1988 OTC Houston exhibitor showcases the company's latest deep sea diving suit.

also. Today, we can do working dives at one thousand feet, and the actual diving limit is about 1,500 feet. But back in the 1960s, the practical diving limit was only about 200-300 feet. We had to have things that could be done totally remotely to service subsea equipment in lieu of divers....But how can you build systems totally remotely on the ocean floor which can be operated without manned intervention with the well head and all the controls and the valves down there? In 1961, we put in the first Gulf of Mexico remote underwater well. It was in about 100 feet of water, and it was a test bed designed to be totally installed and operated and maintained without intervention by man. As a matter of fact, it did require some divers because it was the first one.

About the same time on the West Coast, we were experimenting with MOBOTS, another approach that used remote underwater vehicles....Over the next 20 years, those techniques were continually refined, tested, expanded, changed, and new technologies were employed. By the 1980s and 1990s it was acceptable, doable technology. So, it becomes a matter not of can you do it, but how much does it cost and is it better than the alternatives?

The other option we started approaching in the same time frame was how to put something floating on the surface that could serve the

same function as a fixed, bottom-supported platform....That took several directions: one was using semi-submersibles that were converted to house the control systems, quarters, and production facilities, tied to a subsea well, which was remote from the particular platform.

Other approaches we explored were tension legged platform, a floating platform that tied to a particular spot by tension legs tied to the ocean floor and spars....The real question gets to be, do you want it tied to subsea wells, which then produce through flexible lines back to that floating structure, which is moving around? Or do you want to support a drilling rig and Christmas trees on the platform that you can reenter using conventional equipment such as conventional workover units, pearl tubing units, wire line units mounted on the TLP? It becomes an economic trade-off for any given reservoir and water depth in deciding which one makes the most sense.

Because of the investment in hardware on the ocean floor and the high cost of drilling in deepwater, the cost of each individual subsea well becomes very high. In contrast, a well completed from a platform is much less expensive and you have a lot less expensive control and hardware on the ocean floor....Again, it is a basic trade-off....You have to look at the overlying cost of an entire field or area of development, to say, "What is the most economic way to develop this field?" So there is a difference in investment strategy. If you do not have much investment capital, you might opt to go with the subsea approach and a floating or a converted-semi approach, to minimize the up-front capital. But if you are not short of investment capital and you are looking more at optimization of cost and return over the next twenty years, then you might opt to go with a TLP because it might give you the best return on your money over that twenty-year period....

A universal problem that accompanies subsea wells is that all wells, when they produce, contain a lot of things which



Attendees were mesmerized by the Decca Survey technologies showcased at OTC 1979.



OTC Houston exhibitors display product models when actual products are physically impossible to bring into the NRG Center.

are not desirable. They produce paraffin. They produce wax. Sometimes they produce sand. If they have gas, they produce hydrates. All of these can plug very long flow lines. One of the challenges that is paramount is understanding which conditions you will face in any given subsea production situation, and you take care of it. Certainly, a lot has been done on insulating flow lines and on providing systems that circulate hot water. All of these are designed to maintain the temperature of the reservoir up to the surface and through a long distance on the ocean floor, which is really a big, cold sink that you have to deal with. And the techniques and technologies for dealing with that problem are just as complex and challenging as the mechanical one and how to deal with the higher pressures of external water columns.

I vividly recall a change in strategy that took place in 1980 and 1981. I was manager of marine systems engineering in our head office in Houston. We still were diligently working on design criteria, how you design tension leg platforms and all the technology for other floating systems. Somebody had decided that we should not be spending our time on that any longer because we probably were not ever going to make any money out of the deepwater. I was transferred out to our research lab to manage our production technology group out there, and we still had some ongoing work on the technology in the scientific area, but we sort of disbanded the engineering group I was managing....[T]hen, about a year or so later, I got a call asking if I would head up a study to

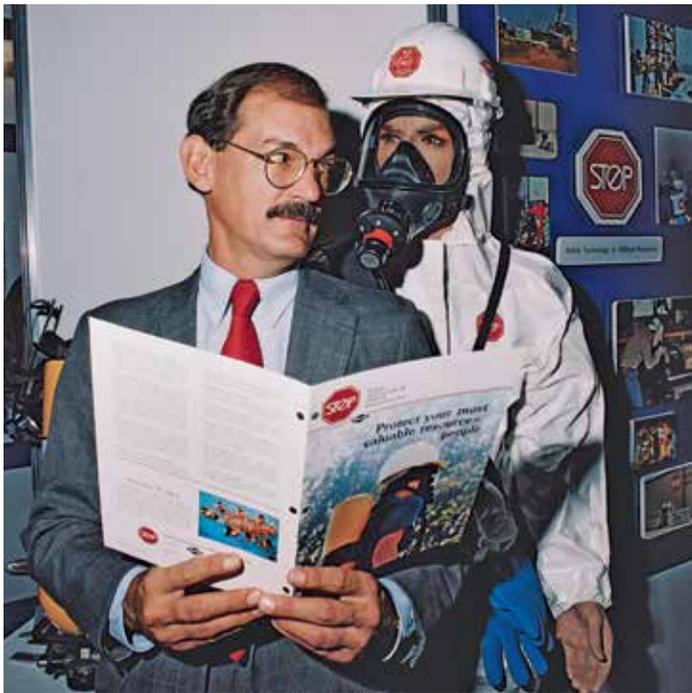
see if and how we could drill on the East Coast in 7,000 feet of water. Our drilling experience at Shell then was limited to about 2,000 feet of water....Exploration said..."We are interested in bidding on some leases out there. Can we drill out there?" So, I put together a group, reached out to some of the people I had already assigned elsewhere and brought them back into the study group. And we did a little study. Could we drill? What would it take? If we found oil and gas, could we develop it? What was the timeframe? What might it cost? We spent several months doing this feasibility study.

Then in 1981, we went out and bought a bunch of deep-water leases in almost 7,000 feet of water. I reassembled the people I had dispersed and put together a team to go out and do that work. We did it over the next three-year period. Unfortunately, we did not make any discoveries out on the East Coast, but we developed capabilities that when we... were talking about leasing the large blocks in real deep water, we had a lot of confidence in our ability to do it and what it would take because we had that three years of experience. So, we really just moved the team back to working in the Gulf. We moved the drilling team, the drilling rigs, the engineers, and pursued the total exploration. "Let's go buy it. We can drill it. We can produce it." That is what we have been doing ever since....

It was not too long ago that experts in the industry were telling us there were no hydrocarbons worthwhile in the deepwater of the Gulf of Mexico. That was changed by the drill. The geology is different in deepwater Gulf than in shal-

low water Gulf. We understood delta deposits, which came from the rivers on the shelf. We did not understand turbidite deposits, which we were drilling in the deep Gulf. Many experts did not believe they would ever give up a lot of oil and gas. That is what an expert is: Somebody who makes a guess based on what he knows at the time.

When the federal government opened up the deepwater acreage and allowed us to go bid on it, there wasn't anything stopping us from going and exploring it. When we explored it, what did we find? We found marbles, we found pebbles, and we found all these glorious fields out there, which are extremely productive, much better than we have ever seen on the shelf...But the key was that we had been doing the work, we had confidence that we knew how to do it, and we were not scared to do it. Until you explore it, who knows? Of course there are always disappointments. You don't ever strike 100% when you go exploring for oil.



Employee safety is not a laughing matter, but this photo taken in the early 1990s adds a bit of humor to the long days of OTC Houston.

In my mind, the biggest breakthrough and the biggest surprise of all going into the deep water in the Gulf of Mexico was the change and characteristic of the wells. For example, in the deltaic sands, an extremely good well produced 1,500 barrels a day; the first deepwater well at Auger, produced 13,000 barrels a day...Back in the old days, a million barrels or a million-and-a-half barrels was considered a good well for the Gulf of Mexico. These deepwater wells we are completing out there now are producing ten times as well as what we ever saw before. You can have a huge reserve, but you still cannot produce that high a rate. So, it is not the huge reserves, but the fact that it takes a relatively few wells to develop those huge reserves. Without that breakthrough, I do not know whether we would be developing the deepwater or not.

Certainly we have had environmental-related problems and accidents....Hurricanes have come through the Gulf of

Mexico, and we had platforms that failed. Everybody had one or two. And over the years, as those platforms failed due to hurricanes we learned that our design criteria were not adequate. It is a matter of evolutionary learning: as you go farther out and you experience new things, you find out what you thought was true to start with and modify it a little bit....And certainly, over the years we have changed our criteria. The API working with companies brought us together so we could change our criteria together....We have sometimes embraced criteria that were too stringent, and we overdesigned. Other times, when the hurricane caused the platform to fail, we realized it was underdesigned. We certainly had costs of cleaning up the debris and abandoning platforms which were damaged, but to my memory we have not had any permanent environmental damages because of underdesign in the Gulf of Mexico. It is more than a case of costing ourselves money to clean up the wrecks of old platforms, which did not stand the test. Certainly, the wave heights we use in design have increased with time. The latest rage is to put in a global warming factor in the criteria to allow for the sea to rise next year, the next few years.

Historically, we did not do much trading of information with other companies. Along with other major companies, we considered that kind of information proprietary. I do not know whether it was right or wrong. In hindsight, we may have stifled the speed at which we developed a little bit. On the other hand, the competition may have actually done a good job in causing us to compete with one another. I cannot really assess that, but I do know that up until this last decade, all of the majors historically did not share much of their information with one another, even on structure design. We did go to OTCs and we did present some papers, but we kept stuff really close to the vest as to what we really were doing.

In the last ten years, as we got into the deepwater business, several things became very obvious. One was that we could not go out there (into deeper and deeper water) alone and do what needed to be done. It was just too expensive. The infrastructure was too complex. Even though we were "leading the charge," into deepwater, we really had to have partners to share the costs and the technologies; we had to have alliances with manufacturers who knew what we are doing and tried to work with us. Over a period of a few years, from 1988 to 1993 or 1994, there was a total change in our philosophy and that of the offshore industry. So, today, I think it is quite different. I think people are sharing with one another. They have to.

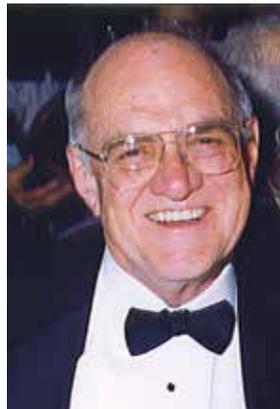
Throughout the Gulf of Mexico we had joint ventures but they were not true partnerships, where everyone is sharing in the thinking and the design and the development procedure. It was more of one company being the leader, being the operator, and making decisions and doing the work, and passing it by the joint venture partners for approval....

It changed overseas before it changed here. In the North Sea, because of the high risk and the high cost, they recognized before we did over here. In the 1970s and early 1980s joint ventures in the North Sea had to be true partnerships and the companies had to work together. They built joint teams of engineers, and that is the way they had to work, because of the high risk and the high cost. The Gulf of

Mexico did not pick up on that and follow it until later when we got into this ultra-deepwater stuff.

When the prices were going straight up in the 1970s, the economists were forecasting they would keep going to keep going. Not only Shell but the industry as a whole...had so much money to spend, and...we in industry made a whole hell of a lot of foolish investments. When the price came back down to something reasonable, which is basically a historic level, there was a period of years where I know we slowed down in investing. But the development went on. Our capital investment was dramatically slowed down while we [Shell] were reexamining what we could afford to invest in and how we could cover our costs. In the late 1980s and early 1990s, we cut our costs dramatically, as did everybody else. We also set some stringent new price guidelines for looking at new investments...One of the big arguments, back in the mid-1980s, was whether we should be in this deepwater or not. But, fortunately, we discovered big fields like “Bullwinkle” and “Auger.” Even at reduced prices, we could afford to develop these. But there was a period of two or three years in there where our returns on investments were inadequate to give the company enough money to invest. I was actually out spending my time in the early 1990s trying to find partners to help us go forward on some projects that we could not fund internally.

Fortunately, we got through that period. We re-engineered the company. We downsized. We spun off properties. We cut operating costs through a lot of tough decisions. We did a whole lot of things that allowed us to become profitable again and get an acceptable return on our investment, which then gave us enough cash flow to invest in the things that we had on the books. That was a very difficult period though.



Carl Wickizer.

The Future of Offshore and Offshore Technology

I think there will be more discoveries as we go deeper in the water in the next ten to twenty years. There will be continued expansion of subsea. There will be more TLPs. There will be more spars. There will be new innovations that we have not even talked about, some other systems. I think there is a right place for all those different kinds of systems, even though people look at them

as competing. They are competing because each of them has a niche, which fits better than something else. We are going to continue to see all of them used in different places. There is no doubt in my mind there are more discoveries to be made in existing water depths and in deeper water depths.

Joseph A. Pratt, Ph.D., is professor emeritus at the University of Houston. He is also the founder and editor emeritus of *Houston History*.



Mikael Leksell, from Siemens, speaks during the Topical Luncheon, “Digitalization Deployed: The Ivar Aasen Field Development Project: The Pursuit of an Ultra-low Manned Platform Pays Dividends in the North Sea.”

Where We Have Arrived: Current Deepwater Technology



Carl Wickizer’s career spans a key period in offshore development, and he was in the thick of it. For “Nifty at Fifty,” Jennifer Presley talked with OTC Chairman Wafik Beydoun who helped put the industry’s technological advances – as illustrated by Wickizer’s interview – in perspective by thinking of the industry’s changes in Empire State Buildings instead of years.

“Fifty years ago, offshore E&P dealt with water depths that were neighboring 300 feet. That is about a quarter of the Empire State Building,” Beydoun said. “Today, offshore E&P operations deal with water depths greater than 10,000 feet. That’s about eight Empire State Buildings stacked on top of each other.” This comparison demonstrates how technological innovations created the opportunity to drill deeper and farther away from the coast.

“In boldly going where no one has gone before, we really went far,” Beydoun contended. “We have learned that these new resources, for them to be economical, need to be large or very productive as compared to an onshore well. Key technologies developed in the past 50 years, like geophysical imaging, ROVs, horizontal and multilateral drilling, subsea systems and station-keeping technologies, have enabled us to explore for and produce from these fields.”²

Connecting the World: OTC as a Platform for Global Exchange

By Johnny Zapata



OTC provides excellent opportunities for global networking, and it is not unusual for participants to wear their national attire.

All photos courtesy of OTC.

The international appeal of the Offshore Technology Conference (OTC) was on full display on opening day of the fourteenth OTC in 1982, when the *Houston Chronicle* praised the cross-cultural experience where ninety different nations were represented and the words “oil, gas, and petroleum” were heard spoken in hundreds of different ways.¹

The same description applied to OTC’s fiftieth conference in 2018. Since its infancy OTC has reflected the worldwide reach of the oil and gas industry through the companies, organizations, and attendees who find their way to Houston each year. When I attended OTC for the first time on April 30, 2018, it came as no surprise that, while walking through the exhibition halls, I could understand Angolans speaking

Portuguese on my right, people speaking Russian to my left, and individuals speaking English with a British accent walking in front of me. Hearing other languages that I know, like Spanish, Turkish, and Italian, as well as others that I do not know, I felt I had traveled the globe within NRG Park.

Now having reached its golden anniversary, OTC continues to be an event where people and organizations from many nations are united in the exchange of ideas under a common banner. Even in 1983, a year that saw oil prices tumbling and OTC’s attendance dropping, the conference welcomed twenty-six nations as exhibitors, two more than the previous year.² In 2018 it was apparent that each coun-

try and firm displayed their most up-to-date, cutting-edge technologies. In offering this international forum, OTC has played a vital role in connecting people from around the world for the last five decades, and what better place than an international city with a rich oil history like Houston to host such an event. Yet, as the OTC phenomenon grew, the need to expand beyond Houston became evident, and OTC added three new conferences and two new locations.

EXPANDING THE OTC FAMILY

To expand its outreach globally and technically OTC added three new events to its calendar: the Arctic Technology Conference and OTC Brasil in 2011, followed by OTC Asia, created in 2012 and inaugurated in 2014. These three conferences serve to “extend OTC’s reach around the world and to focus on specific technical and regional issues.”²³ The expansion of OTC events is a direct response to the needs of a growing industry. The spread of offshore exploration in the Arctic, Brazil’s Atlantic coast, and the waters off Southeast Asia, as well as other parts of the world, created the necessity for new events addressing needs specific to each region. Like their Houston counterpart, these OTC events attract attendees from across the globe and encourage the further exchange of new ideas and technologies under development in places where the offshore industry is still emerging. The high industry demand that led to these expansions attests to the integral role offshore technology plays in the present and future development of the global oil and gas industry as well as the success of the flagship Offshore Technology Conference.

ARCTIC TECHNOLOGY CONFERENCE

The Arctic Technology Conference is the first OTC event of its kind, as the organization states, “The conference is built upon OTC’s successful multidisciplinary approach, with 12 technical societies and organizations working together to deliver the world’s most comprehensive Arctic event.” The post-show report indicated, “The inaugural Arctic Technology Conference (ATC), held 7-9 February 2011 at the George R. Brown Convention Center in Houston, Texas, brought together 1,318 attendees from 23 countries for a world-class event under the theme *Challenges*

Past and present members of the OTC Board of Directors network at the OTC events booth.



Exhibitors at the Arctic Technology Conference showcase their latest innovations, products, and services, as they have done at the original OTC since 1969.

for Today, Opportunities for Tomorrow.” Since the first ATC the conference has met in Houston in 2012, 2014, and 2018; Copenhagen, Denmark, in 2015; and St. John’s, Newfoundland and Labrador in Canada in 2016. Hosting the conference in Copenhagen and St. John’s allowed for broader accessibility, attracting oil and gas professionals from the circum-arctic regions of Europe and North America. According to ATC, “This will create an opportunity for unprecedented communication and collaboration about challenges and solutions for the global exploration and development of onshore and offshore Arctic basins.”²⁴

Though significantly smaller than OTC, the Arctic Technology Conference includes an exhibition and hosts programs such as The Arctic Next Wave. Since 2015 this program has connected young professionals with seasoned energy veterans. That enables participants “to learn from experts with specific knowledge and make connections that will allow them to tackle future Arctic opportunities.” ATC includes the Arctic Distinguished Achievement Awards, modeled after the Offshore Technology Conference (OTC) Distinguished Achievement Awards. The ATC Awards Committee considers nominations for major technological, humanitarian, environmental and leadership contributions to the industry. Additionally every year at ATC more than ninety conference papers have been presented focusing on “solutions and emerging technologies that address the cutting-edge technologies and practices needed for exploration and production in the Arctic.”²⁵

OTC BRASIL

The first Offshore Technology Conference outside of Houston was housed at the Riocentro in Rio de Janeiro, Brazil. Running from October 4-6, 2011, the inaugural OTC Brasil showed promise of its success before the conference began. Strong company interest prompted the expansion of the planned exhibition space, adding 3,500 additional



OTC Brasil attracts firms from all over Brazil and the world to participate in its exhibition.

square meters of net space, boosting total space to more than 14,450 square meters. The conference hosted experts from seventeen countries who presented 145 technical papers.⁶ Since the first OTC Brasil in 2011, three more editions of the conference have taken place in 2013, 2015, and 2017. The next one is scheduled in 2019.

OTC Brasil is organized by OTC and the Brazilian Petroleum, Gas and Biofuels Institute (IBP). These two organizations cooperate alongside fifteen international and Brazilian engineering and scientific organizations, which assist in developing the technical program. Like its parent conference, OTC Brasil features an exhibition. The most recent conference in 2017 had more than 120 exhibitors from twenty countries and attracted more than 8,500 professionals representing operating and service companies.⁷

Additionally the conference works alongside a youth program that allows students from across Brazil to participate in the event. The program *Profissional do Futuro*, — Portuguese for “Professional of the Future” — was created to attract young students to the oil and gas industry and is promoted by IBP. Through participation at OTC, the program gives students the chance to engage in debates, receive orientation, and learn about the different opportunities a career in the industry offers.⁸ By serving as a resource for future professionals, the program goes beyond exchanging technology and ideas by investing in the future human capital of Brazilian offshore technology.

The latest installment of OTC Brasil in 2017 hosted 8,500 professionals and dealt with pre-salt development and the pre-salt layer, a sub-oceanic layer of salt under which large

deposits of oil and gas are found, an issue particular to offshore activity in Brazil.⁹ The success that OTC Brasil enjoyed as the first conference outside of Houston was followed by yet another OTC conference.

OTC ASIA

On the other side of the world on March 25-28, 2014, in Malaysia’s bustling capital Kuala Lumpur, thirteen of the energy industry’s leading professional organizations collaborated to create the OTC Asia. Occupying 5,500 square meters at the Kuala Lumpur Convention Center in the shadow of the Petronas Twin Towers, “the inaugural OTC Asia attracted 25,100 industry professionals representing 88 countries and 98 nationalities. The event also included an exhibition showcasing the products and services of more than 240 companies.”¹⁰ Since its inauguration the biennial conference has returned in 2016 and 2018. With the region’s energy sector being dominated by offshore production, it is no surprise that Malaysia, one of Asia’s emerging oil and gas hubs, was chosen to host a new OTC.

The offshore industry in Asia is developing and is still heavily concentrated in shallow waters. As countries and companies attempt to cultivate untapped reserves, they are exploring more challenging conditions such as deepwater drilling. According to OTC Asia, “Covering developments spanning from Russia to Australia and India to Oceania, OTC Asia [provides] industry professionals the opportunity...to share knowledge and discover cutting-edge technologies to further the region’s growth.” Ultimately the conference wishes to “highlight Asia’s growing importance in the global energy mix.”¹¹



Young professionals listen to a presentation at OTC Brasil 2017.

Similar to OTC in Houston, OTC Brasil, and ATC, OTC Asia features outreach programs that focus on helping young professionals in the industry and a program aimed at high school students. OTC Asia indicates that, “The Next Wave programme is tailored to energy professionals under the age of 36 or with less than 10 years working experience in the energy industry.” Through panel and roundtable breakout sessions, young professionals network

with seasoned professionals and receive information about opportunities in the industry as well as guidance on how to make the most of their careers. Teenagers can participate in the High School Student STEM Program, which is “aimed at attracting and engaging the next generation of oil and gas professionals.” With the use of workshops, high school students and teachers engage in interactive activities such as experiments. The program includes guest speakers, an industry panel session, and an exhibition/technology tour so that students can “learn about emerging technology in the petroleum industry, career opportunities, or how energy makes an impact on our everyday lives.”¹² Thus, OTC Asia invests in the future of offshore in an emerging region.

OTC AROUND THE WORLD

In looking at the value of the expanded OTC conferences, oil and gas historian Joseph A. Pratt explained, “The continued growth in offshore production and the technological innovations needed to operate in deeper water and harsher environments encourage global pressure for OTC. Houston was the obvious location for OTC when U.S.-based companies dominated global offshore activity. Growing competition in the offshore industry with the expanding presence of both national oil companies and privately owned national

Young professionals from around the world take advantage of OTC Asia programs such as The Next Wave.



‘champions’ called forth demand for global competition in sharing technology. OTC responded by creating an international presence.”¹³ Now the family of OTC events has expanded across the globe to better meet the demands of the industry.

Starting in 2011 with the first Arctic Technology Conference followed by OTC Brasil, OTC had its sights on events that would focus on regional issues and challenges in the development of offshore technology. OTC Asia shows the growing importance of offshore in one of the fastest developing regions of the world. Although many other events



OTC Asia attendees read up-to-minute news from the show daily in 2016.

similar to OTC have appeared over the years around the United States and the world, the original OTC and its regional conferences with their global reach continue to serve as the primary platform for the exchange of technology and as a resource to current and future professionals in the field.

As the fiftieth OTC kicked off on April 30, 2018, Scottish bagpipers in kilts could still be seen, and the words “oil, gas, and petroleum” could still be heard in a multitude of languages. As the conference ended on May 3, it was clear that OTC remains true to the spirit of exchange. With a permanent presence on three continents, OTC’s worldwide impact has grown wider and deeper, just like the industry. Looking forward to the next fifty years, each of the regional conferences will ensure that the developments in other parts of the world will receive their rightful attention. ATC, OTC Brasil, and OTC Asia will serve as vectors of new technology as the center of the offshore industry shifts to other parts of the world. One can only expect that in future years the scenes that have characterized OTC and given it its international flavor will also play out in places as far removed from Houston as Rio de Janeiro and Kuala Lumpur.

Johnny Zapata is a graduating senior from the University of Houston Honors College with a dual degree, one with a double major in history and Spanish, and the other with a major in political science. He plans to pursue a master’s degree in international relations and a career in the foreign service. He has interned at *Houston History* for two years.



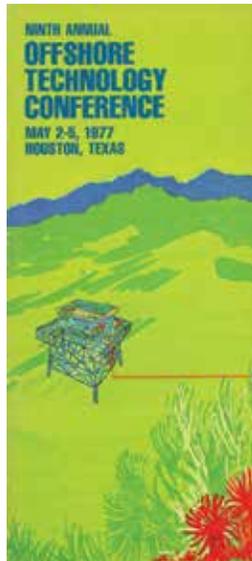
Celebrating OTC’s 50th edition in 2018, bagpipers donning kilts, can be seen marching on opening day in Houston.

“A Love Affair 50 Years and Counting”: OTC’S ECONOMIC AND CULTURAL CONTRIBUTIONS TO HOUSTON

By *Debbie Z. Harwell*

The ninth Offshore Technology Conference (OTC) in May 1977 was my first OTC. It coincided with my first day on the job as assistant front office manager at the 600-room Holiday Inn-Downtown Houston, then the nation’s largest Holiday Inn. In that era before computers, guests completed registration forms by hand on NCR (no carbon required) paper, and desk clerks kept track of the room inventory with cards about 2 x 4 inches — one for each of the 600 rooms — filed in plastic racks that indicated if rooms were occupied, clean and available, or “on change” (meaning the guest had checked out but the room was dirty). Before going off his shift, the night manager briefed me on the hotel’s status, explaining that OTC filled every room from “Galveston to San Antonio” and we were overbooked. He smiled gleefully as he turned to go, saying, “Good luck!” You can imagine how the day ensued.

Despite my baptism by fire, in the years that followed I observed first-hand how OTC brought an energy and excitement to Houston and the hotel – from the planning stages to the last guest’s check out – that was unmatched by any other conference. Mike Waterman, president of Visit Houston, the Greater Houston



The 1977 OTC On-site Program.

All images courtesy of OTC unless otherwise noted.

Convention and Visitors Council (GHCVB), sees OTC as a blessing, explaining, “It’s a truly remarkable show....It brings tens of thousands of people to the city every year. It’s sort of a rite of passage for us as Houstonians....To know that every year we’re going to sell out this entire week to one convention, that’s a gift for us.”¹

The first OTC met at the Albert Thomas Convention and Exhibit Center downtown (now Bayou Place) with 4,200 in attendance, 125 papers presented, and 38,500 square feet of exhibit space occupied by 200 exhibitors. In need of more space, in 1973 OTC moved to the Astrodome complex, now NRG Park, where it has remained. Local businesses still roll out the red carpet at airports, hotels, restaurants, clubs, tourist attractions, and convention related services, as they should, given that OTC has brought in over \$2.5 billion to Houston since the meeting’s inception.²

THE HOSPITALITY INDUSTRY: WELCOME TO HOUSTON

By far the biggest impact OTC has on the city of Houston is seen in the hospitality industry – hotels, restaurants, and bars – followed by transportation companies of all

The OTC 1980 exhibit at the Astrodome drew 86,965 visitors from around the globe.



types. While my coworker exaggerated about filling hotel rooms all the way to San Antonio, OTC's early reach was expansive, stretching from Galveston to the south, Conroe to the north, and Lake Jackson to the southwest, according to OTC manager Doug Ducate in 1980. Galveston drew enough business to justify hotels offering a shuttle to Houston.³

The early OTCs had a reputation for their carnival atmosphere "full of glitz and glamour." OTC chair Donald G. Russell described "vendors flocking to the show ... [competing] for attention with such sideshow shenanigans as jugglers, singers, dancers, ventriloquists, celebrities, ice cream, popcorn, and bathing beauties." Those who attended roamed the exhibits picking up the cherished free gifts, each one better than the next.⁴

Houston also enjoyed a party atmosphere in the 1970s and early 1980s when the U.S. club scene flourished. The city had high-end disco/dance clubs like Élan, which required a membership, and the country and western dance halls like Gilley's, both of which gained fame in the 1980 movie *Urban Cowboy* set in Houston and starring John Travolta.

As the price of oil began to fall in 1983, exhibitors wanted to be certain they were reaping the most benefit from their investment and focused on real customers in a cost-conscious way. In 1984 OTC made the decision to temporarily change its format from an exhibition with technical presentations to solely presentations. Russell believed this would "make it a better, healthier event in the future." He wanted "a little spice" to make it attractive but not so much that it became a "debacle." Sam Fletcher, who covered OTC for years for the *Houston Chronicle*, observed that the 1984, "OTC will be more like a prim schoolmarm than the Wild

West saloon girl of its past."⁵

Houston's party atmosphere also faded away with the "three-martini lunch." In 2011, Greg Ortale, then GHCVB president, and Sarah McPhillips, then vice president of convention services, recalled OTC reflected society's changing attitudes about drinking. When exhibits returned, "the emphasis moved from booze to food....Instead of going to a bar with a club that might have entertainment...they want[ed] to get somebody at a table feed them dinner, and talk to them." Over a meal, vendors could write orders, which is difficult to do when a band is drowning out the negotiations. With that in mind, many restaurants ran OTC specials.⁶

Sonny Look's Sir Loin Inn on South Main by the Astrodome was particularly popular, with a knight on a white horse outside drawing in crowds for the great steaks and Look, dressed in his signature flamboyant jackets, greeting diners. Today local restaurants

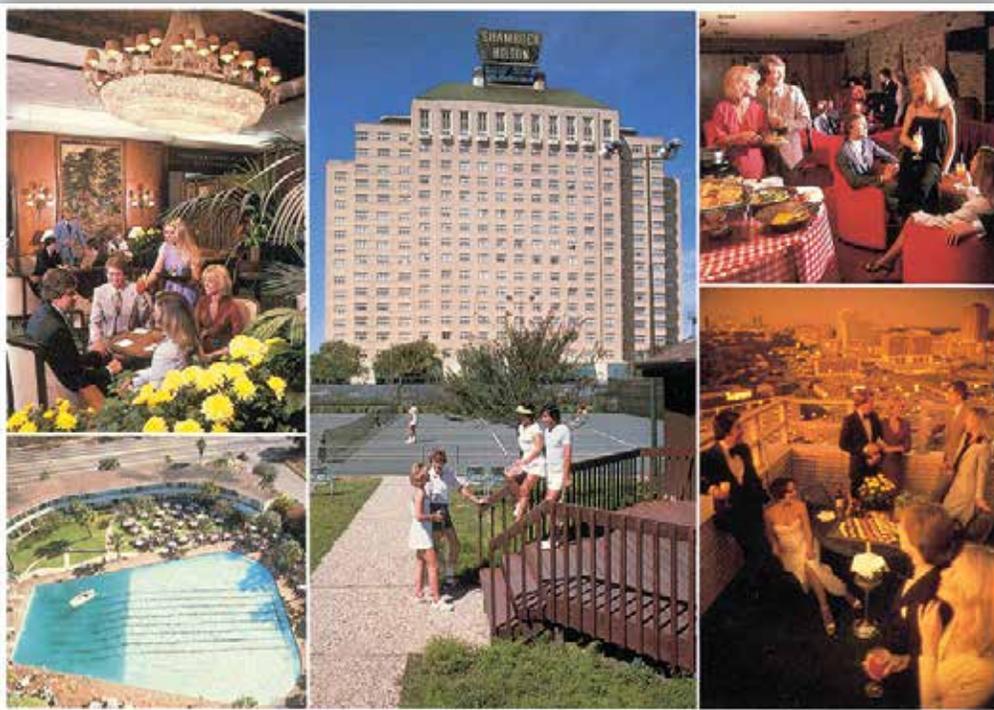


Sonny Look's restaurants were a staple for convention goers, especially the Sir Loin Inn near the Astrodome complex. Known for his flamboyant jackets and customer service, Look, who served as chair of the GHCVB, and then Mayor Louie Welch initiated an annual dinner to show their appreciation to the OTC Board of Directors for selecting Houston as OTC's host city.

Photo courtesy of Carole Look.

continue to cater to OTC and the *Houston Chronicle* includes a list of popular Houston eateries by cuisine in its "FuelFix OTC" section.

During the oil bust, the GHCVB and individual hotels sought business from other sources to make up for the loss of exhibitors in 1984. The Hyatt Regency public relations director noted, "We've increased sales staff and really made a concentrated effort in looking at all business aspects." Helen Perrone of Southwest Inns, which operated nine Holiday Inns around the region, said, "We're trying to attract motor coach tours into the Houston area — tours for senior citizens groups or any special tours bringing people through our area." Nevertheless, hotels still catered to the smaller OTC crowd. For example, in 1984, the hotels closest to OTC, the Astroville, Marriott Astrodome, and Shamrock



The Shamrock Hilton was one of Houston's premiere resort hotels with ornate ballrooms, restaurants, clubs, suites, and a swimming pool large enough to hold water skiing demonstrations. Both its reputation and location made it a favorite for OTC attendees.

Photo courtesy of the Hospitality Industry Archives, University of Houston.

Hilton, had forty-eight hospitality suites. Carol Austin, director of catering services at the Shamrock, told the *Houston Chronicle* in 1985 that she remembered the “massive receptions” companies like Hughes Tool hosted for OTC. “We used to have all three ballrooms going and lines waiting for the elevators. ... People who lived in the hotel would check out of their apartments and stay with friends so they could rent their places out during OTC.” But in 1986, the hotel’s last OTC before being demolished in 1987, the Shamrock had booked only a few hotel rooms and three small lunches.⁷

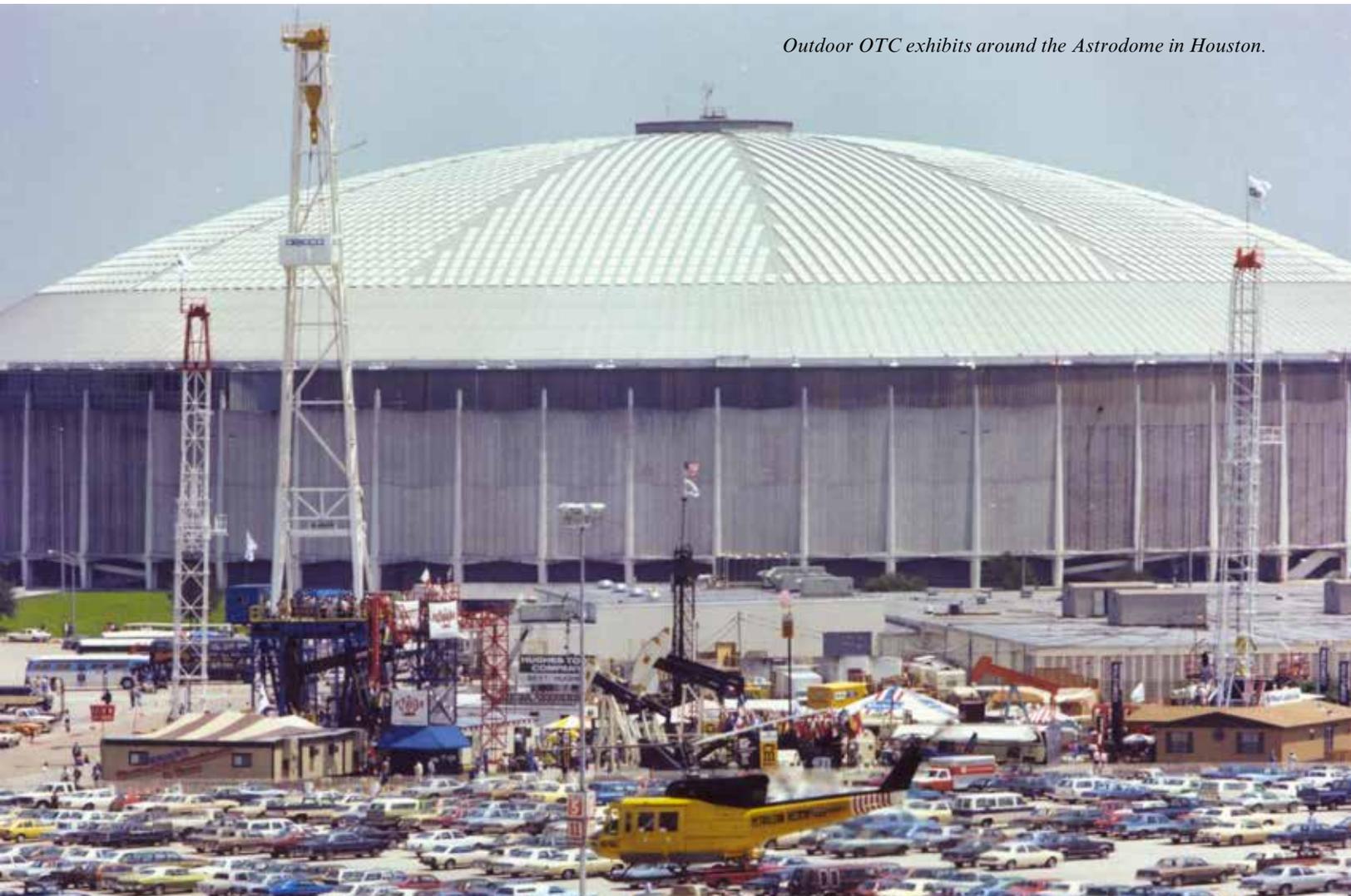
The downturns actually benefitted attendees who, in some cases, could rent \$400 suites (\$900 today) for \$89 per night (\$200 today), the same price as a regular room.⁸ The change also afforded them the added bonus of being able to choose their hotel rather than having to take what they could get as in earlier years, when attendance repeatedly hit new records.

Fortunately for Houston, as oil prices ramped up again and OTC attendance numbers improved, so did the hotel business. In 2011, when attendance hit 78,149, Wayne Chappell pointed out that many hotels had regulars from certain companies or countries who chose to return to the same hotels year after year. At check-out, they made their reservations for the upcoming year, seeing the hotel as “their home away from home.”⁹

CONVENTION SERVICES — GETTING THE SHOW IN AND OUT

Conferences like OTC do not materialize with each company moving in their own materials on their own schedule. Among many things, large shows require a coordinated effort to ensure that the displays farthest away from the entry are set up first and exhibits closest to the entry are set up last, so that no one’s access to their exhibit space is blocked. In 1972 Dallas-based Freeman Companies won the bid to set up OTC, following the company’s success servicing the Society of Petroleum Engineers’ meetings. Freeman, which has offices near NRG and employs a few thousand workers for OTC based on the show’s size in any given year, sets up registration areas and displays, lays carpet, hangs banners and signs in multiple languages, arranges meeting rooms, and other tasks, before reversing course to remove everything at the end of the week. In 1991 owner Don Freeman explained, “In our industry, long-term relationships with accounts are not unusual. We’ve been setting up some of the same events for 30 years or more” because they can get the shows in and out on time and work well with individual exhibitors. The logistics involved for a show the size of OTC are mindboggling, with several hundred thousand square feet of exhibit space and thousands of exhibitors from around the globe. The company not only has the proper

Outdoor OTC exhibits around the Astrodome in Houston.





Students perform experiments and visit the exhibit hall booths during the Energy Education Institute: High School Student STEM Event in 2017.

equipment to do the heavy moving, it also provides rental furniture, signs, and anything else needed to set up an exhibit. Freeman notes, “Timing is a factor,” and in 1991, they began using computers for scheduling.¹⁰

Over Freeman’s forty-seven years, several things made setting up OTC unique for its employees. When OTC began using the Astrodome for exhibits, Don Freeman recalls that the staff had to “put two layers of 3/4-inch plywood over the entire floor of the Astrodome....Everyone was skeptical that it could be done in time and that it would lie flat and stable enough with the Astroturf cushioning under it for the heavy equipment that was going in.” They then built a custom ramp to get the fully-loaded trailers over the stadium’s steep entrance ramp. Further, Freeman points out that few “trade shows have outdoor as well as indoor exhibits.” In addition to large rig equipment outside, OTC had a heliport in the parking lot, which required a temporary tower from the Federal Aviation Administration (FAA). Helicopters ran from the show to airports, as well as to corporate facilities in the Houston region.¹¹

OTC’s longest tenured worker is Sam “Hoppy” Hopkins, who reflected on his experience in a video interview celebrating OTC’s fiftieth show: “I was kind of green when I came in, but I had help along the way. OTC is a great, great place to start off with. You can see how it’s grown and how people work around you here. Everybody enjoys OTC. OTC is one of our [Freeman’s] big clients. We’ve been with [it] so long, 50 years. So I’ve seen it grow from there to where it’s at now. It’s a great feeling to come and work OTC. I look forward to it every year.”¹²

EDUCATIONAL OUTREACH TO THE HOUSTON COMMUNITY

OTC has always been about sharing the latest technology and educating those in attendance through technical presentations, but it has gone much further than that to reach out to the Houston community. In 1979 OTC partnered with KUHT-TV Channel 8, Houston’s public broadcasting station, to broadcast educational programs created by the

Offshore Technology Television Network, directed by communications manager John C. Rash. Over ten hours of programming spanning five days “depict[ed] historical, present and future operations concerning ocean resource development and environmental protection...reflect[ing] the scope of the conference, and seek[ing] to translate the technology of offshore operations into laymen’s terms.” At the twentieth OTC in 1988, the conference included two museum exhibits set up inside and outside the Astrohall that featured examples of equipment in use before the first OTC.¹³

In more recent years, Houstonians beyond the oil industry have also benefitted from the emphasis on education. The Energy Education Institute, first offered in 2007, provides an all-day workshop for local science teachers who participate in hands-on lessons from the U.S. National Energy Education Development (NEED) Project “to help them bring energy topics into their classroom.” On Education Day, traditionally held on Thursday, OTC invites approximately 200-250 high school students to tour the exhibition to meet industry professionals, inquire about oil and gas careers, and learn about technology. In 2018 another group of sixty Houston high school students took part in the OTC Energy Challenge where they were asked to solve “real-world energy challenges.” The teams from Stratford High School, Westside High School, and The Village School received recognitions for their creative solutions.¹⁴

DOLLARS AND SENSE

For fifty years OTC has been a welcome economic boom for the city of Houston, even when the price of oil fluctuated. Conference attendance skyrocketed from 4,200 in 1969 to 51,212 in 1975 and 108,161 in 1982, with hotel guests paying up to \$140 per night (\$430 today). Even when oil prices began to fall and attendance at OTC dropped to 58,755 in 1983, OTC still ranked as one of the top ten conventions in the country and brought in over \$58 million to the Houston economy. The following year, when OTC temporarily dropped the exhibitions in favor of technical presentations, was a blow to Houston hotels, which had seen a building



Students are escorted to a workshop at OTC 2016.

boom from 1980 to 1983 that increased the number of available rooms from 22,000 to 33,000.¹⁵

The impact of the 1980s oil bust on Houston went far beyond the loss of OTC exhibitors for a year. In 1986 crude prices fell 52 percent, and the rig count plummeted from 4,500 in 1981 to 663. Sales of oilfield equipment plunged from \$40 billion to \$9 billion and drilling rigs were torn apart and “sold for scrap at pennies on the dollar.” Houston lost over 225,000 jobs, unemployment topped 9 percent, and 20 percent of office space stood vacant along with 200,000 homes. As the city faced serious questions on how to diversify its economy, OTC attendance picked up, hovering between 25,000 and 51,000 from 1986 through 2005, when it once again began to climb steadily, reaching 72,025 in 2010. It peaked at 108,300 attendees and over 680,000 square feet of exhibit space in 2014, when oil reached \$100 a barrel. In 2011, hotel rooms for conference attendees stretched from The Woodlands to Kemah, with a few companies having separate meetings in Galveston. Diversification also helped protect the city’s hospitality industry, which now boasts

100,000 hotel rooms in greater Houston with 8,000 of those downtown.¹⁶ This enables the city to better serve OTC and cater to other convention groups.

Slumping oil prices the last three years brought another drop in OTC attendance, which averaged 65,000 from 2016 to 2018.¹⁷ But even in a comparatively lean year, Houstonians – restaurant, bar, room service, and catering wait staff; hotel housekeepers, concierges, bell staff, and desk clerks; baristas; taxi, Uber, Lyft, and bus drivers; shoe shiners; NRG and Freeman employees; concession workers; retail clerks; ice carvers and more – express their gratitude for the business OTC brings to town.

Visit Houston president Mike Waterman explains that OTC’s impact goes way beyond the number of hotel rooms. “OTC is by far our largest recurring convention...75,000 to 100,000 coming to your town is a huge deal. Even the locals that work in oil and gas are a boon for us because they are entertaining clients [at] breakfast, lunch or dinner. It’s sort of an amplifier effect when OTC is in town...[Visitors] are going to the Galleria and shopping, especially the international travelers. They’ve heard what a great place Houston is to shop...and distribute a broad degree of purchasing power that we absolutely enjoy.”¹⁸

Additionally, these visits create a ripple effect for future tourism. Waterman points out that OTC’s international market brings visitors to Houston, many for the first time. “They come and see our amazing food and beverage, our amazing cultural and culinary offerings, and they go back to Stavanger, Norway, or Russia and tell their family and their friends how amazing Houston is...Those visitors come back and experience NASA or our Museum District or a cultural district.” This makes OTC much more than a business conference because it also generates a more traditional vacation or leisure experience when people return or extend their stay.¹⁹

The conference offers Houstonians more than just its immediate monetary value as well. For example, for Ken Richardson, executive vice president of global offshore at

Sponsors are recognized in this logo-themed ice sculpture presented at the 2015 Annual Awards Dinner.



American Bureau of Shipping who has attended since 1982, it is about making connections. “My favorite part is meeting people, and catching up with acquaintances and friends who I haven’t seen in a while,” he says. “The conference draws many people who’ve been in this industry for a long time, and various companies put on receptions with interesting crowds of people.” Sybil Oyeagoro, coming from a year-long leave from offshore work to be near her four children, came to OTC to make employment connections. For others, OTC set their careers in motion. Rustom Mody attended his first OTC forty years ago as a young engineer and is now vice president of technical excellence at Houston energy services company Baker Hughes. He recalls, “It was an amazing experience. I just fell in love with the industry.”²⁰

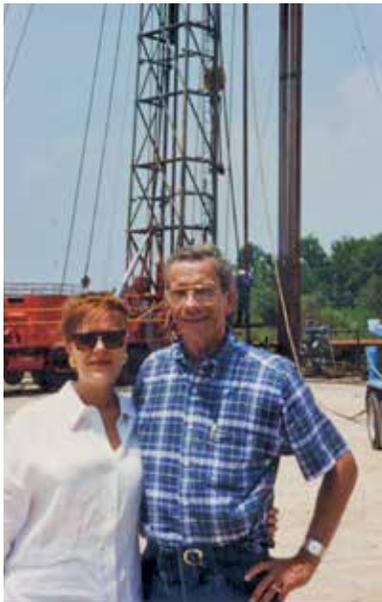
Houston has worked hard to maintain close relationships with convention service providers and the OTC Board of Directors. At one point, when restaurateur and hotel owner Sonny Look chaired the convention council and Louie Welch was mayor, they treated the board to a dinner at the River Oaks Country Club to show their appreciation. Hosting a similar dinner for the board with the mayor and notable Houstonians has since become an annual tradition to kick off the conference. Mike Waterman speaks enthu-

siastically of the dinners he has attended since coming to Houston three years ago, saying, “We want to make sure that the folks at OTC know that we appreciate [them], we’re grateful, and we will always work hard to make sure their event is appreciated and successful because the more successful they are, the more successful we are.”²¹

Just as OTC is celebrating its golden anniversary, the city of Houston, too, is honoring the fiftieth anniversary of their partnership. Houston has been a loyal steward for OTC, welcoming its visitors, presenters, executives, and exhibitors; providing manpower at all levels from shuttle drivers to engineers; and standing steadfastly with OTC through the ups and downs of the oil industry. At the same time, OTC has pumped billions of dollars into the Houston economy and helped reinforce the city’s claim as the energy capital of the world. Mike Waterman observes, “Oil and gas is in our DNA. OTC has now become part of our DNA, just like hospitality is in our DNA,” adding, “We’re always going to make sure that OTC thrives and succeeds. We feel like it is an amazingly mutual relationship, and we’re thrilled to have it. ... A love affair, fifty years and counting.”²²

Debbie Z. Harwell, Ph.D., is the editor of *Houston History*.

Memories of OTC in the 1970s *By Rebecca Golden Timsar*



Rebecca and Bert Golden.
Photo courtesy of Rebecca Golden Timsar.

As a young girl growing up in Houston with a father in the oil industry, my annual outings to OTC with Dad were a highlight for me – only slightly edged out by overnight visits to the rigs around Columbus, Texas. I loved being with him and learning about what interested him.

When we arrived at OTC, a buzz filled the air and the smell of BBQ wafted across the Astrohall. I saw large offshore platform equipment, submersibles, logging trucks, helicopters, and evacuation boats for the first time. Kids could

get inside everything to really experience the action. We saw demonstrations, entertainment like live banjo music, automobile drawings, pretty ladies—lots of those—and rows of company booths, big and small. The best part was the free goodies. They could not stuff enough swag in my OTC goodie bag – flashlights, pens, stickers, lighters, hats, golf balls, Life Savers, toy helicopters or boats, key chains, and games.

My dad, Bert Golden, recalled the 1970s as the best era for OTC, saying, “I went every day because [OTC] was

smaller and you could get around a lot better...I went to see the technology, see my friends like Bob Grace and Cecile Eicke, and to hear a couple of papers.” My mom, Mira, said, “[OTC] was huge; even when it was small, it was huge.”

Dad explained, “If I needed a particular kind of pump that the injection pump folks wouldn’t build, I could find someone to build it and I did...OTC was a good way to transfer technology from the inventors to the industry, it was a study in face-to-face marketing.” He also liked seeing “Schlumberger, Halliburton, and Baker Hughes exhibits right at the front—always well done.” The last time Dad went six or seven year ago, he felt “it was too big and really more international exhibits and country exhibits,” but added, “which is what it should be.”

When I returned in 2017 to work the University of Houston’s Energy booth, I was disappointed – probably because I was not with my dad and the childhood wonderland, now seen through adult eyes, had been replaced by corporate/country booths with coffee bars but no Life Savers. Nevertheless, my early education at OTC and the special memories with my dad prevail. As I work my way around the globe from the oil deserts of Oman to the swamps of the Niger Delta, in varying capacities, I am always connected to these early years of excitement, innocence, and wonder.

Rebecca Golden Timsar, Ph.D., is the associate director of the Graduate Certificate in Global Energy, Development, and Sustainability (GEDS) at the University of Houston. Dr. Golden Timsar focuses on petrol violence, youth, health, subversive oil and gas activities, gender, religion, and contemporary African society. She holds a Ph.D. in anthropology from Tulane University.



High school students on the exhibit floor in 2016 look to the future during the Student Event: Energy Education Institute Program.

All photos courtesy of OTC.

OTC at 100: A Look Ahead to 2069

Edited by Joseph A. Pratt

The fiftieth anniversary of the Offshore Technology Conference (OTC) offers a reason to look forward and backward. The waves of technological advances that have shaped the growth of the modern offshore industry began in earnest in the late 1940s. Looking back to the years after World War II, we see offshore pioneers with a vision of building an industry in the uncharted waters of the Gulf of Mexico. In 1969, we see the creation of OTC and a technologically advanced offshore industry active around the globe. As we celebrate OTC's golden anniversary in 2019, it is interesting to speculate about the advances in technology in the next fifty years that might transform the offshore industry in ways we can barely imagine today.

In this concluding article, we give people associated with OTC a chance to contemplate the future of their organization. Our exercise in prophecy began with a questionnaire from the editors of *Houston History* to OTC officials and conference chairs, asking for their opinions about the future direction of offshore technology and of OTC and how they see OTC's journey from 2019 to its hundredth anniversary in 2069. Those who responded to our questionnaires include:

- **Wafik Beydoun:** *Current Chairman OTC, Total Kuwait Country Chair*
- **Susan Cunningham:** *Senior Adviser, Darcy Partners; Past OTC Board of Directors Chairperson*
- **Kim Faulk:** *Chair, AAPG Subcommittee to the OTC Program; Chair, OSIG, SUT US*

Editor Joseph A. Pratt, Ph.D., is professor emeritus at the University of Houston. For more than fifty years he has studied and taught about the history of the oil and gas industry. He is also the founder and editor emeritus of *Houston History*.

What emerging technologies might become increasingly important in the next 50 years?

Joe Pratt (JP): This is a key question for understanding both the past and future of OTC. Technology is, after all, OTC's reason for being. In the formative years offshore, individual people and companies often brought forward innovations that then spread through the industry. In the last fifty years advances in older technologies and the creation of new ones have increasingly been the work of large numbers of experts working on the same basic technology in many different companies. Such cooperative efforts have pushed forward the process of incremental improvements in existing technologies and the emergence of new ones.

It is appropriate to begin our journey into the next half century with a quote from a science fiction writer, presented to us by Wafik Beydoun, current Chairman of OTC.



Displaying the program guides from the first and fiftieth OTCs, Wafik Beydoun, OTC Board of Directors Chairman, speaks at the opening ceremony commemorating the fiftieth OTC in 2018.

Wafik Beydoun (WB): When Arthur C. Clarke (famous British science fiction writer) was asked a similar question in the mid-60s he warned: “Only if what I tell you appears absolutely unbelievable, have we any chance of visualizing the future as it really will happen.” Amazingly, many of his predictions back then turned out, 50 years later, to be true!

For the past 50 years, technology has progressed at an amazing pace, sometimes disruptively. In the late 1960s, state-of-the-art technologies included portable calculators, audio cassettes, and high-end computers with a power less than our smart phones today. Who would have imagined that in the 1970s we would be entering the Digital Era, propelling technological changes at an *exponential* rate? The digital transformation is becoming so prevalent in all industries and technologies that it infiltrates our lives and environment in symbiotic and personal ways. Almost everything appears to be riding in the same vehicle, fueled by digitization, and driving into the future with ever increasing speed. The rising tide of the digital revolution is lifting us all, whether we want it or not.

Fifty years from now, in say 2070, the world population could be close to 10 billion, a 33% increase from today, with a life expectancy of over 110 years. This will require an energy demand of 1 Zetta-Joules (+67% from today - Zetta is 10 to the power 21) and an electricity capacity of 45 trillion KWh (80% higher than today). CO₂ emissions resulting from



Unmanned aerial vehicles were introduced as a category to OTC in 2018.

energy consumption are expected to be close to zero from a base line of 33 billion tons today and 13 billion tons 50 years ago. These are big challenges ahead that technologies of the future will need to address, one way or the other.

We need to remain humble in visualizing technologies that far into the future. However, at the same time we need to be “unbelievable” by highlighting technologies that are still in the ideation mode, as compared to emerging technologies that are already prototyped/experimented today (such as using wind, tides/waves, solar, geothermal – likely to mature in 10-20 years). To avoid being too generic or trivial, we limit our crystal ball predictions to technologies of the future that would impact offshore operations. Our resulting final list includes the following:

- Robots with AI (and/or virtual assistants, avatars) wearable or inside us, will be as present in our lives/body and our working environments as smartphones are today; computer-based intelligence will exceed the human brain;
- E&P value chain will be driven by real-time AI simulations, experimentations, digital-twins, integrating all disciplines to maximize profitability and ensure safety and reliability in operations;
- Offshore installations (surface, subsea and subsurface) will have their components interconnected, providing real-time feedback and analytics to monitor/maintain existing assets, optimize complex networks, and deliver performance in production; intelligent nanofluids will be injected in wells, reservoirs, flowlines, pipelines to monitor fluid flow, optimize recovery, correct/repair subsurface incidents, and/or control inflow to the delivery point;
- Offshore exploration and production of hydrogen gas will mature, contributing to H₂ becoming a viable commercial fuel in the energy mix;
- Geoengineering technologies will fix deviations in climate change regionally or locally, regulating the balance in oceans, water cycle, soil, and in the atmosphere, while protecting wildlife.



Attendees are enthralled by a product demonstration at the 2017 OTC exhibition.

Despite all of these far-reaching technological changes in the next fifty years, exceptional and unique human attributes such as creativity and innovativeness will continue to be very highly sought and valued.

We need to point out that these rapid transformations are weakening our well-established institutions for education, work, and employment and undermining the very notion of humans' ability to adapt to this acceleration. Skeptics are already warning that unless technology can be controlled, it will marginalize humankind. How far are humans willing to morph with the digital world or conversely to seek, more than ever before, what differentiates us from that world? I remain confident of one thing: human's ability to learn, adapt, and cope with rapid-fire technological changes while innovating and prospering in the process.

In summary, the next fifty years of the Digital Era promise to be one of the most transformational periods in human history. Regarding offshore activities, technologies related to transforming various resources into energy would be designed to ensure that oceans—which are the largest ecosystems on Earth and remain key assets for maintaining our planet habitable—are more nurtured and protected. We are currently only seeing the tip of the iceberg of emerging technologies. In the next 50 years, these will develop to become incredibly smart and creative, beyond our wildest dreams.

Susan Cunningham (SC):

Fifty years is a long time to think about! Fifty years ago some of the emerging technologies with the greatest impact included: (1) DRAM (affordable computer memory); (2) commercial satellites (instant relaying of pictures/communication); (3) BASIC programming language (democratization of computing); (4) LED's and electro luminescent panels (brighter/cheaper luminescence); and (5) direct distance dialing



Susan Cunningham, Past OTC Board of Directors Chairperson.

(connecting people instantly, not through an operator) and of course – the internet.

Looking forward, we will have significantly increased recovery of oil and gas from reservoirs with biotechnologies; robotics will transform farming, food production, and many other areas; quantum computing will continue to increase computing speed with more complex modeling/simulations/predictions and enabling dramatic leaps in AI; a radical Digital Security solution will be found; resource mining offshore and off the planet will become common; and CO₂ will be captured from the air and turned into new products.

Our industry will continue its relentless day-by-day improvements to technologies and operations, resulting in amazing visualization subsurface and predictive capabilities in operations that will dramatically improve safety, reliability, cost and efficiency. These evolutionary improvements are more likely to increase value than any truly revolutionary new technology.

Is it likely that OTC will expand its coverage to include such energy-related offshore activities as offshore wind power or the harnessing of energy in waves? If so, in what ways?

JP: This question and the next one raise a similar question: What is the best use of OTC's resources in planning expansion—both geographically and in terms of offshore functions? Together, they present interesting insights about the dangers and opportunities of expansion.

WB: For the past several years, we have been noticing an increased interest in offshore renewables (e.g., wind and waves) at OTC events. Technology is now enabling alternative sources of energy from tides, waves, wind, and solar to become more visible and meaningful compared to hydrocarbons. OTC is adapting to this trend by experimenting with novel ways to share key advances in this area. For instance, OTC 2019 in Houston is dedicating several luncheons, breakfasts, and presentations on Offshore Renewables. Stay tuned.



Kimberly Faulk, Chair, AAPG Subcommittee to OTC Program Committee; Chair OSIG, SUT US.

Kim Faulk (KF): It is critically important for OTC to expand our coverage of all offshore-related energy activities, including renewables. Offshore technology is the focus of OTC, which should include all offshore energy-related technologies. For 50 years, OTC has had both a vision and a drive to continue to focus on innovative technologies. To remain a place where innovative minds in the offshore energy community gather and share ideas, it will need to develop better relationships and partnerships with the offshore renewables and scientific communities.

SC: OTC will need to expand its focus to remain relevant. Without changing the purpose of OTC (offshore technology), OTC could expand into technologies that enable the har-

nessing and transportation of energy and natural resources, including mining offshore as mentioned above, and, of course, grow with wind, wave and tidal energies. Offshore-related environmental technologies such as biotech clean-up of plastics could become important parts of OTC.

Alternatively, OTC might expand to include energy technologies in general. In this scenario OTC might need to change its name to the Energy Technology Conference and cover all energy-related technologies regardless of where the water is. This would be a fundamental strategic question for OTC to remain relevant going forward.

JP: These three points of view offer three different perspectives, but they agree that OTC expansion into technologies used in the quest for renewable energies offshore deserve serious consideration.

Do you think the global network of offshore conferences will continue to expand? If so, how might that impact Houston's role in the network?

WB: OTC's flagship conference, held annually in Houston, expanded technically and globally in the early 2010s with the Arctic Technology Conference, OTC Brasil, and OTC Asia. Organizing these regional events was driven by the idea of providing an opportunity for energy professionals located in these regions to meet, exchange ideas, and share opinions on offshore resources and environmental matters, with a focus on regional challenges. So far we have had several successful editions.

In the future, OTC Brasil and OTC Asia would benefit from attracting more professionals, companies, and institutions from neighboring countries in their regions. This would strengthen the regional offshore network by offering more relevant and valuable conferences while expanding the global offshore network through our flagship conference in Houston.

KF: The global network allows better information exchange and faster introduction of emerging technologies. The glob-

al network of offshore conferences will likely continue to grow, but at what rate? The expansion of these conferences started when the cost of oil was at its peak. Will a lower price environment allow continued expansion, or will it require that OTC contract back to its primary roots?

Whether the conferences continue to expand or not, Houston will need to work to remain relevant in an ever-broadening global world. As energy markets shift toward renewables, Houston will need to remain involved and prioritize the things that make Houston strong in the energy sector: innovation, technology, and safety.

SC: The global network of conferences could expand as new technologies in all offshore aspects grow. There is an incredible expansion of new technologies being developed beyond the incumbent professional society expertise that would benefit this diverse offshore possibility. OTC's core competence is understanding and executing quality, relevant technology conferences. Any expanded OTC conferences should be located where they are most relevant.

How might OTC expand its presence in technologies used to improve offshore environmental stewardship and improvement of safety?

SC: OTC could reach out to startups and other companies that are relevant to the industry in areas both inside and from outside the oil and gas industry. This might include companies in biotech, engineering, and chemistry. OTC may also need to include the relevant professional societies on the board and have strategic conversations with their leaders.

JP: Fossil fuel companies, as well as OTC, will almost certainly become more deeply involved in environmental stewardship in the next fifty years, either by choice or as a result of public and regulatory pressure.

Is carbon capture and sequestration (CCS) in offshore operations likely to become of greater concern for OTC and the offshore industry as a whole? If so, how might it be managed?

KF: The license to operate is a larger and larger question each year for energy and service companies. We are all concerned about safety, environmental stewardship, and cultural impacts of energy extraction. OTC's primary focus on safety over the years has made OTC a go-to place for best practice and discussions around offshore safety...Only recently have discussions focused on our license to operate from a cultural and environmental perspective started to happen at OTC. This shift in focus will occur naturally as younger generations join the energy sector as a whole, but we must create space for these technologies and discussions within the OTC program.

CCS should expand in offshore operations over the next fifty years. We are already seeing operators like TOTAL focus on carbon sequestration. AAPG is putting together a session for the 2019 conference focused on carbon capture and sequestration. We believe this will become a focus moving forward as



Then U.S. Congressman John Culberson participates in a product demonstration in 2018.



Attendees and speakers on the OTC exhibit hall floor in 2016.

environmental regulations and the science of climate change shift how we do business in the energy industry.

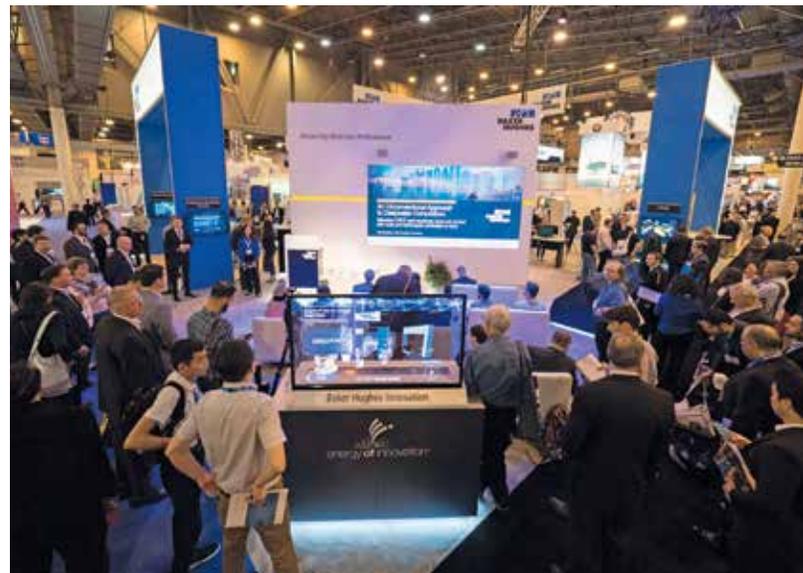
JP: Science and technology, two strengths of OTC, will drive public understanding and public policy on environmental standards; OTC can play an important role in helping define key environmental issues involving the oceans.

Is global warming likely to become a central issue in the offshore industry's work in the next half century? If so, how do you anticipate it will be addressed?

JP: Fifty years out, we will know much more about the severity of the impacts of climate change and the public policies that have—or have not—been put in place to mitigate them. OTC should continue to be a forum for discussions of all phases of the highly charged issues raised by climate change.

KF: Some disciplines like mine are already dealing with the impacts of climate change on the areas we study. Marine archaeological sites along coastlines are the first to be impacted by rising sea levels and stronger, less predictable storm events. I believe we will have to start addressing climate change in more serious ways in upcoming decades. The perils of ignoring climate's impacts on our pipelines, wells, port facilities, shipping, underwater cultural heritage sites, and sensitive biological communities are simply too great to ignore. Ignoring changing sea levels and storm impacts is not a question of believing in climate science, but rather a decision to ignore a tremendous risk.

To deal with increased flood potentials, serious rain events, and stronger, slower coastal storms, the offshore



Attendees stop to listen to a Baker Hughes product demonstration at OTC 2017.

industry will have to focus on providing better modeling, better risk analyses, better evacuation plans, and more robust facilities.

SC: Climate change is not relevant enough to the offshore industry to be a focus of the OTC, but it is a reasonable focus for the industry as a whole. As long as OTC is primarily concerned with offshore issues, I do not think that it should make CCS a significant part of its mission.

A lot of large companies involved in the OTC have their environmental/social sustainability/regulatory groups.



Michael Neill speaks on risk and activity management at a Topical Breakfast, Tools for Process Safety in Offshore and Upstream Operations in 2016.

CERA is big into this area. I would not try to compete here. This is primarily a political and regulatory issue; OTC should focus on technology.

One of the great aspects of the OTC is that it provides a relatively safe and politics free environment for objective conversation for technical professionals. OTC could build on that for conversation. Keeping to more technical topics would likely serve clients well. I would focus on environmental clean-up technologies for example. In particular, I would argue that a very relevant topic is the accumulation of plastics created by the oil, gas, and chemical industries in the oceans.

How can OTC build on the programs it has put in place to encourage greater participation by women and minorities?

KF: OTC has a reputation of being a good place to attend if you are a white male rising within the ranks of the energy sector. Too few women and minorities are visible within the OTC leadership at all levels. We need to broaden the membership of our technical subcommittees, session chairs, authors, exhibitors, and board members. The WISE event is the only event that currently provides a fully inclusive space



Gabriela Arias, chemical engineer for Halliburton (left), and Angela Knight, global diversity leader, GE Oil & Gas, take part in the Networking Event, WISE: Women in the Industry Sharing Experiences at OTC 2015.

within the OTC program, and it routinely pulls in women and minorities who attend no other sessions or events. The individuals who attend WISE are excited about growing within the energy sector and are hungry for a way to be involved in OTC.

As the industry evolves and younger staff members rise within their organizations, attitudes about race, gender, sexual orientation, and race or country of origin are going to shift. OTC needs to be at the forefront of these conversations and be working to ensure that no panel, session, or exhibit is populated solely with white men. We need to ensure that exhibits are not merely staffed with attractive models who then hand off the incoming client to the male technical staff. We need to ensure that an equal number of session chairs, authors, and technical leads are women. We need to ensure that we are making space for minority viewpoints during question and answer sessions, and that we are making sure we have recruited the best speakers – not just the easy one – to speak to the students and young professionals who attend OTC.



Students perform experiments and visit the exhibit hall booths in 2017 during the Energy Education Institute: High School Student STEM event.

SC: If conversations about diversity could focus on issues more directly relevant to OTC, they would be more compelling to those who are not women or minorities. For example, a shift to more conversation about innovation, which requires thinking other than the norm, indicates that we need “other genders/ethnicities” as well as other demographics and technical functions to be part of it. If panel discussions were led in a purposeful way that illustrates an advanced understanding of the value of diversity to solving our challenges and problems, I suspect it would go a long way. Recognition that OTC’s history is a bit checkered in this regard and admitting to it transparently would also help. Continuing to get senior technical leaders talking about this issue authentically would also go a long way. Authenticity is really important. Have people tell inspiring stories.

KF: Innovation is about diversity – diversity of thought, diversity of view, diversity of background, and diversity of solution. If OTC wants to remain at the innovative forefront of the offshore energy sector we must seek out diversity and make it the hallmark of OTC’s next 50 years.



University of Houston Energy participants at the 2015 OTC R&D University Showcase.

JP: The key value of diversity has been the introduction of different ideas and perspectives. Innovativeness and creativity come in many packages. Greater diversity of perspectives, ideas, and training should be the goal.

How could OTC cooperate with other oil-related organizations to expand the initiatives to educate the broad public about offshore operations and technologies?

SC: The most obvious organizations are the advocacy groups, such as API, IOGP, and other national advocacy groups. I suggest that API and IOGP would be good groups with which to explore this concept. If this works, we could then consider expanding to others.

KF: OTC could work with organizations like the Society for Underwater Technology to run educational programs in schools around the world on offshore technologies and careers. If we want to inspire the next generation to join the offshore industry we need to start showing them what a drilling engineer, or chemical engineer, or naval architect, or marine archaeologist, or geologist, or metocean engineer, or petrophysicist, or safety coordinator really does.

JP: My experience as a member of the “Education Committee” of the Offshore Energy Center’s excellent outreach program suggests that it would be a good partner for OTC. UH Energy also has reached out to help local schools enhance energy education.

What is OTC’s most pressing priority to ensure its success for the next 50 years?

WB: I am very confident that technologies that help transform offshore resources into energy will remain assets for maintaining our planet habitable, in the short and long-term future. Therefore, OTC has all the reasons to succeed, as long as it “keeps its eyes on the stars, and its feet on the ground,” paraphrasing a quote from Theodore Roosevelt. To achieve this it must remain pragmatic in the way it orga-

nizes events, and test new technical and geographical ideas based on perceived trends and opportunities.

KF: OTC must find a way to remain relevant in an increasingly global, interconnected world. We must find a way to contribute to conversations and provide solutions about renewable energy, climate change, and diversity. We must look to the incoming generation and those who have survived the latest downturn to provide new energy and vision for the next 50 years.

SC: Defining OTC’s strategic purpose after some transparent conversations with professional societies, exhibitors, companies, and consultants should be a top priority. A 5-year plan should be included as needed. A change in the Board with the addition of members from other relevant professional societies might be needed. “Outsiders” from digital, bio, robotics, mining, other energy-related activities might make good contributions to the transformation of OTC. A clear focus on innovation produced amazing results in the past; refocusing as sharply as possible in the future on innovation, broadly defined, should do the same.



High school students visit the exhibit floor during the student Energy Education Institute program in 2016.

JP: We conclude with Susan Cunningham’s remarks as she answers our request for thoughts on anything we omitted from the questionnaire.

SC: Since the “crew change” is happening as we speak, is there an effective way to explore “lessons learned” in an oil and gas career? We need better ways to pass on wisdom learned across generations. Discussing successes and failures from the past might help people to think more clearly about what the industry could be in the future. The forum could include people comfortable in the digital world who want to make a difference, as well as more environmentally conscious participants and others more comfortable in a diverse workforce. Get some millennials to talk about what they see as possible. Invite retirees from the offshore industry to recount their past.

I wish I could be around in 50 years to see how this all plays out. I am optimistic that mankind will figure it out. We are good at that. It will be messy and ugly in places, but we cannot even imagine the future in 50 years. The prospect of attending OTC’s 100th anniversary and recalling how events evolved from 1969 to 2069 is exciting. ■

OTC Distinguished Achievement Awards

By Offshore Technology Conference

“Prestigious awards, such as the ones given by the Offshore Technology Conference, are very important because they spotlight exemplary achievements and the outstanding individuals who accomplished them. Truly great deeds are never done for awards; truly great results come to pass when individuals or teams with strong determination and extreme dedication, bordering on stubbornness, find ways to successfully solve significant and tough problems. Such hard work is sometimes recognized and then highlighted by an award, while many equally or even more remarkable candidates remain in the dark. Looking over the list of OTC’s awardees, it is abundantly clear that the Offshore Technology Conference has an outstanding track record to uncover and honor highly deserving individuals and projects. We all can look forward to another 50 years of glorious achievements being introduced at Offshore Technology Conferences and recognized through its awards.”

—**Wolfgang E. Schollnberger**

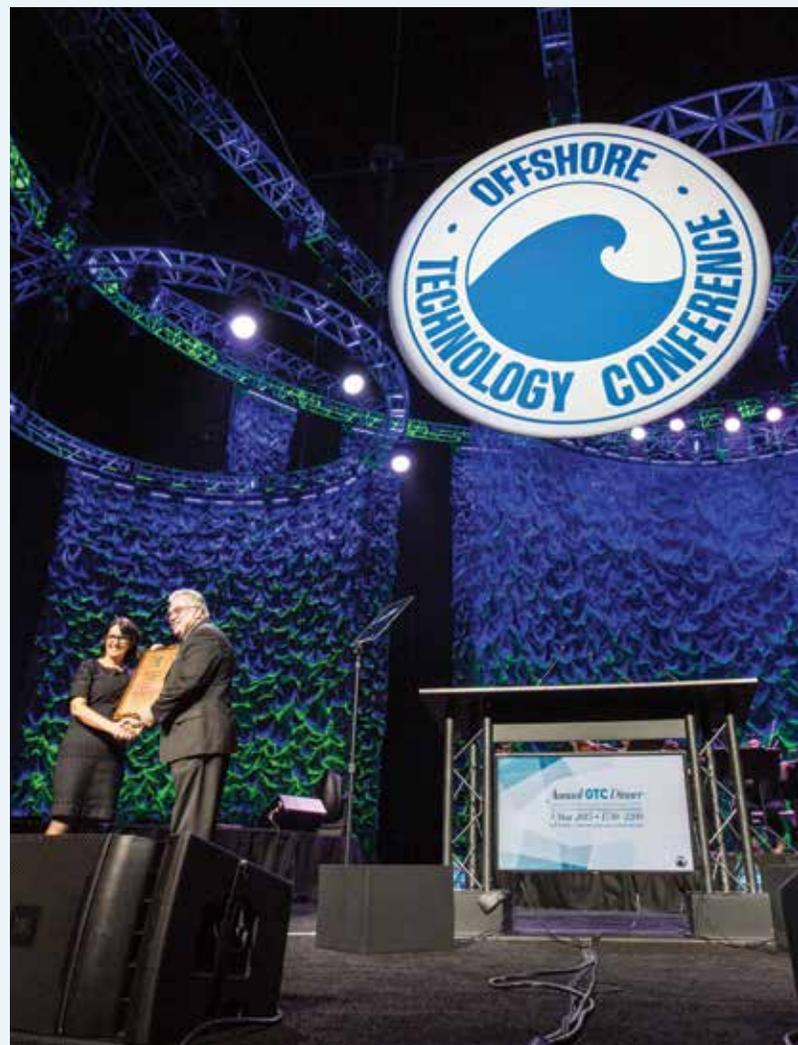
“Every one of the OTC awards, whether for an individual or an organization, recognizes something outstanding that has advanced the ability to explore for, develop, produce or transport oil and gas offshore. I’ve been close to the people and projects that earned recognition for my company, Conoco. Buck Curtis, who was honored in 1987, led the engineering resource group that was primarily responsible not only for the industry’s first tension-leg platform but for other sound and often innovative projects as well. And I’m well-aware of many contributions by contractors and service companies that were essential for our work. I think of Heerema, whose giant derrick barges first made it possible to construct platforms in the winter in the North Sea. Chicago Bridge and Iron conceived, designed and installed the Khazzan underwater storage tanks offshore Dubai that were amazingly successful producing facilities. Brown and Root provided solid engineering and reliable construction equipment and services around the world. Norwegian Contractors built concrete platforms that were instrumental in developing several of the large North Sea fields. And there are many others among those recognized that played important roles in our projects.

I note that Shell was recognized several times, either in general or for specific projects. They richly deserve it. I don’t know if it was a factor in any of their awards, but Shell drilled exploratory wells in the northern North Sea for a year, at least—including in the winter months—before the rest of the industry and before we had the weather forecasting services we now enjoy. Everyone involved in the offshore industry has benefited from the contributions made by the awardees.”

—**Dennis Gregg**

“The two OTC awards that TOTAL received in 2003 and 2013 marked the crowning pinnacle of our achievements for two of the most complex, demanding, but also deeply satisfying projects in the Group’s history. These much-appreciated accolades are veritable industry Oscars. Recognition from the panel was kudos to the quality of our teams and the pioneering work that they, in collaboration with our key contractors and host partner Sonangol, put into these landmark projects. Recognition with an OTC Award for both Pazflor and Girassol was the icing on the cake. It is an industry acknowledged benchmark and was a concrete testament that we had delivered something truly out of the ordinary.”

— **TOTAL**



The 2015 OTC Distinguished Achievement Award for Companies, Organizations and Institutions went to Petrobras.

Photo courtesy of OTC.

The Offshore Technology Conference (OTC) recognizes major technological, humanitarian, safety, environmental, and leadership contributions to the industry each year. In recognition of peer-nominated truly outstanding accomplishments or achievements, the OTC Board honors an individual and an organization as recipients of the prestigious OTC Distinguished Achievement Award. In some years, OTC also awards a Special Citation or Heritage Award to recognize other notable activities or developments that benefit the offshore energy industry.

The Distinguished Achievement Award for Individuals

This award recognizes the accomplishments of an individual or individuals in the field of offshore technology. To be eligible for nomination and consideration by the awards committee, an individual shall have made significant achievement in, or contributions to, any field of offshore technology. Examples include, but are not limited to: (1) contributions to the knowledge and literature of offshore technology; (2) the design or invention of equipment, tools, or technical services; (3) humanitarian, safety or environmental efforts; (4) outstanding leadership; or (5) outstanding service to governments, companies, and organizations. Nominees for the OTC Distinguished Achievement Award should have achieved recognition in the global offshore community.

The Distinguished Achievement Award for Companies, Organizations, and Institutions

This award recognizes the accomplishments of a company, organization, or institution in the field of offshore technolo-

gy. To be eligible for nomination and consideration by the Awards Committee, a company, organization, or institution shall have made a distinguished achievement in, or contribution to, any field of offshore technology. Examples include, but are not limited to, the application of concepts; the design, development, and construction of tools, equipment, techniques, vessels, or instrumentation; contributions to areas of safety, environmental efforts; or engineering or scientific knowledge which has contributed to the development of offshore resources. The nominees for the Distinguished Achievement Award should have achieved recognition in the global offshore community.

Special Citation

A Special Citation may be granted by the Awards Committee to show appreciation or to recognize individuals or organizations in the field of offshore technology. There is no formal set of criteria. The Special Citation award is given at the Awards Committee's discretion, subject to approval by the OTC Board of Directors.

Heritage Award

The Heritage Award is a type of special citation designed to recognize long-term, continuous, distinguished service by an individual in one or more of the following areas of offshore technology: exploration; development and production; management and leadership; safety and environmental stewardship; and research and development. The Heritage Award was first given in 1997 in conjunction with the 50th anniversary of offshore E&P. This award is given at the OTC Awards Committee's discretion, subject to approval by the OTC Board of Directors.

Spotlight on New Technology® Award Program

Through hard work, creativity and “out-of-the-box” thinking, extraordinary new technologies have been developed to find and produce offshore energy sources. The Offshore Technology Conference (OTC) recognizes these forward thinking solutions with the Spotlight on New Technology® award. Initiated by the OTC Board of Directors in 2004, the Spotlight on New Technology® award gives exhibiting companies an opportunity to present their newest and most advanced technologies to more than 60,000 industry leaders. All current OTC event exhibitors are eligible to participate in the program that recognizes the forward thinking solutions to the industry. Technologies to be considered for the program must meet five general criteria—new, innovative, proven, broad interest, and significant impact. Both hardware and software technologies are applicable. Applications are reviewed and evaluated by experts in the appropriate fields of technology. A committee made up of representatives from the OTC Board will judge the applications and determine the award recipients. In support and recognition of innovative technologies being developed by small businesses (less than 300 employees), OTC has created a new Spotlight on New Technology® Small Business Award. Up to two companies may receive this prestigious award each year. These winners will receive the same benefits as the oth-

er Spotlight on New Technology® award winners, but with the added recognition as a “Small Business Award” winner.



Paul Jones, OTC Board Director, congratulates Baker Hughes, a GE company, after winning a Spotlight on New Technology® Award at OTC 2018.
Photo courtesy of OTC.

OTC PROGRAM CHAIRS, BOARD CHAIRS AND DISTINGUISHED ACHIEVEMENT AWARD WINNERS

OTC PROGRAM CHAIRS

2018 David Barton
2017 Charles Knobloch
2016 Darrel Harvey
2015 Dan McConnell
2014 Doreen Chin
2013 Gamal Hassan
2012 J.M. "Joe" Reilly
2011 Dan Smith
2010 Sandeep Khurana
2009 Tom Gee
2008 Dan Orange
2007 Pierre-Alain Delaittre
2006 Tom Kelly

2005 Carolyn Ritchie
2004 William (Skipper) Strong
2003 Jerry Streeter
2002 Edward G. Stokes
2001 Nina Rach
2000 Mike Williams
1999 Bill Luyties
1998 William Kazokas
1997 Arnis Judzis
1996 Rick Hill
1995 Stewart Adamson
1994 Wolfgang E. Schollnberger
1993 Bruce Ahrendsen

1992 Steve Leverette
1991 Cornelius Langewis
1990 William Kazokas
1989 Joe Key
1988 Al Williams
1987 J Kim Vandiver
1986 Pat Rickey
1985 Leroy Williams
1984 Brian Watt
1983 Don Wells
1982 Jim Dailey
1981 Dan Godfrey
1980 Jere Noerager

1979 Marcus E. Milling
1978 William Nicholson
1977 Wayne Ingram
1976 Wilfred McLeod
1975 Claude R. Nielon
1974 James Klotz
1973 Ross Kastor
1972 A.E. Woelfel
1971 Harold S. Field
1970 John O. Hills
1969 Richard F. Nelson

OTC BOARD CHAIRS

2018-2019 Wafik Beydoun
2016-2017 Joe Fowler
2014-2015 Edward G. Stokes
2012-2013 Stephen Balint
2010-2011 Susan Cunningham
2008-2009 Don Vardeman
2006-2007 Arnis Judzis
2004-2005 Rod Allen

2002-2003 Charles A. Richards
2000-2001 Wolfgang E. Schollnberger
1998-1999 Gordon H. Sterling
1996-1997 Roger L. Abel
1994-1995 Stephen M. Cassiani
1992-1993 Dennis E. Gregg
1990-1991 Daniel G. Godfrey
1988-1989 T. Don Stacy

1986-1987 James E. Dailey
1984-1985 Donald G. Russell
1983 Conrad G. Welling
1982 James A. Rickard
1981 William duBarry Thomas
1980 Wayne B. Ingram
1979 Ralph B. Ross
1978 M. Scott Kraemer
1977 Wilber W. Kirk

1976 A. E. Woelfel
1975 Robert H. McLemore
1974 Blakely Smith
1973 J.R. Jackson, Jr.
1972 H.A. Nedom
1971 M.L. Rizzone
1970 Thomas C. Kavanagh
1969 Wayne E. Glenn

OTC DISTINGUISHED ACHIEVEMENT AWARD FOR INDIVIDUALS

2018 Brian Skeels
2017 John Bomba
2016 Don Vardeman
2015 Elmer (Don) Danenberger III
2014 Carl Arne Carlsen
2013 Kenneth (Ken) E. Arnold
2012 Joe Burkhardt
2011 Dr. Curtis (Cort) Cooper
2010 Hugh Elkins
2009 Peter G. Noble, ConocoPhillips
2008 James (Jim) Ray
2007 Marcos I. Assayag, Petrobras
2006 Peter Marshall, Retired, Shell Oil Co.
2005 Professor J. Kim Vandiver, Massachusetts Institute of Technology
2004 F. Richard (Dick) Frisbie, Oceanneering International Inc.

2003 Albert W. Bally, Professor Emeritus, Rice University, Houston
2002 Bruce G. Collipp, Retired, Shell Oil Co.
2001 Howard L. Shatto, Consultant, Retired Shell Oil Company
2000 William S. French, Consultant; Retired, PGS
1999 Jay P. Simpson, O'Brien-Goins-Simpson, Inc. (OGS)
1998 W. P. Rickey, Retired, Exxon Production Research Company
1997 Edward E. Horton, President, Deep Oil Technology, Inc.
1996 Carl G. Langner, Senior Staff Research Engineer, Shell E&P Technology Company
1995 Jay B. Weidler, Senior Vice President, Brown & Root, Inc.

1994 Bramlette McClelland, Consulting Engineer, Founder, McClelland Engineers, Inc.
1993 F.P. Dunn, Shell Oil Co.
1992 Milo M. Backus, University of Texas at Austin
1991 Henri G. Delauze, Comex and Henri G. Delauze, Comex
1990 Herbert Allen, Cameron Iron Works
1989 Bengt M. Johansson, CANMAR
1988 William H. Silcox, Chevron Research Co.
1987 Lawrence B. Curtis, Conoco, Inc.
1986 W. Harry Mayne, Geosource, Inc.
1985 Hudson Matlock, Earth Technology Corp; Lymon C. Reese, University of Texas
1984 Ronald L. Geer, Shell Oil Co.
1983 Peter R. Vail, Exxon Production Research
1982 Fritz Huntsinger, Sr., Vetco Offshore, Inc.

1981 Lyle S. St. Amant, Louisiana Commission on Coastal and Marine Resources
1980 R. Curtis Crooke, Global Marine
1979 George M. Pavey, Jr., Seismic Engineering Co.
1978 Christian J. Lambertsen, University of Pennsylvania Institute for Environmental Medicine
1977 Alden J. Laborde, Ocean Drilling and Exploration Co.
1976 Arthur Lubinski, Amoco Production Co.
1975 Hollis Dow Hedberg, Gulf Oil Corp.
1974 William Maurice Ewing, Marine Biomedical Institute, UT Medical Branch
1973 Thomas D. Barrow, Exxon Corp.
1972 Jerome L. Goldman, Friede & Goldman, Inc.
1971 Julius A. Stratton, Ford Foundation

OTC DISTINGUISHED ACHIEVEMENT AWARDS FOR COMPANIES, ORGANIZATIONS, AND INSTITUTIONS

2018 Shell and SBM Offshore - Stones Field
2017 LLOG Exploration Offshore, LLC
2016 The Marine Technology Society Dynamic Positioning Committee
2015 Petrobras - Pre-Salt Development
2014 BP - Clair Ridge Development
2013 Total - Pazflor
2012 Shell - Perdido
2011 BP Norway - Life of Field
2010 Anadarko Petroleum and Enterprise Field Services
2009 Sakhalin Energy Investment Company Ltd. - Sakhalin II Phase 2
2008 StatoilHydro - Ormen Lange

2007 Anadarko Petroleum Corp., Helix Energy Solutions, and Enterprise Products Partners - Marco Polo
2006 DORIS Engineering
2005 Kerr-McGee Oil and Gas Corp. and Technip
2004 Shell and BP - Na Kika
2003 TotalFinaElf - Girassol
2002 ExxonMobil Development Company - Hoover / Diana
2001 Petroleo Brasileiro S.A. (Petrobras)
2000 Kerr-McGee Corporation - FPS Neptune
1999 British Petroleum Development Ltd.
1998 Shell Deepwater Development Inc.-Mensa

1997 Amoco Corp.
1996 Conoco, Inc.
1995 Coflexip
1994 Brown & Root, Inc.
1993 Freeport-McMoRan Resource Partners
1992 Petroleo Brasileiro S.A. (Petrobras)
1991 Heerema Offshore Construction Company Group, Inc.
1990 Halliburton Geophysical Services, Inc.
1989 Placid Oil Co.
1988 Norwegian Contractors
1987 Scripps Institute of Oceanography
1986 McClelland Engineers, Inc.
1985 Conoco, Inc.

1984 Exxon Co., U.S.A.
1983 Cameron Iron Works, Inc.
1982 Shell Oil Co.
1981 Gulf Universities Research Consortium
1980 Exxon Co., U.S.A.
1979 Honeywell
1978 IHC Holland
1977 Phillips Petroleum Co.
1976 Texas A&M University
1975 Chicago Bridge and Iron Co.
1973 Global Marine, Inc.
1972 Humble Oil & Refining Co.
1971 Shell Oil Co.

SPECIAL CITATIONS AND HERITAGE AWARDS

2018 Cesar Del Vecchio
2018 Tom Sifferman
2017 George (Mike) Conner and Art Schroeder
2016 George Hirsaki
2016 Yuri Makagon
2015 Ray Ayers
2014 Susan Cunningham

2013 James Brill and E. Dendy Sloan
2012 Charlie Williams
2011 ExxonMobil Development Company
2009 Wolfgang E. Schollnberger
2008 Pierre-Armand Thomas and Gordon Sterling
2007 Owen Kratz, Jon Gjedebø, and John Huff

2006 Matt Simmons
2004 International Association of Drilling Contractors (IADC) and the Offshore Operators Committee
2003 Atlantia Offshore
2002 Dana Larson; Louisiana Department of Wildlife & Fisheries; Texas Parks and Wildlife; and Minerals Management Service

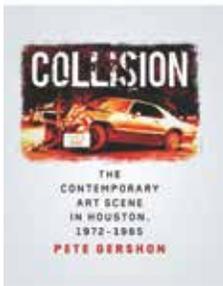
1999 Texaco's Deepstar Project
1998 Offshore Energy Energy
1997 R. J. "Bob" Brown, John E. "Jack" Flipse, Dillard S. Hammett, and Griff C. Lee
1993 Cullen Inquiry

BOOKS



I'm Dr. Red Duke by Bryant Boutwell with a foreword by George H. W. Bush (Texas A&M Press). Based on countless interviews with Duke, his family, and friends, as well as exploring archives, personal papers, and previously unpublished images, Boutwell retells the life of the legendary Dr. James Henry “Red” Duke. A native Texan and famous figure in twentieth century medicine, Duke

founded the Life Flight air ambulance service at Memorial Hermann Hospital and furthered the use of media communications for public outreach. Duke was also an ordained minister, a medical missionary, a conservationist, a hunting guide, and a tank commander. He was heard by hundreds of thousands on the local news broadcasts in the 1980s and 1990s delivering expert medical advice to viewers on everyday issues. Boutwell paints a portrait of the man behind the renowned television image.



Collision: The Contemporary Art Scene in Houston, 1972-1985 by Pete Gershon (Texas A&M Press). In this collective survey of Houston’s art scene in the 1970s and 1980s, Gershon details the city’s emergence as an arts center. This development includes the arrival of Contemporary Arts Museum director James Harithas, a champion for Texan artists, and sculptor James Surls,

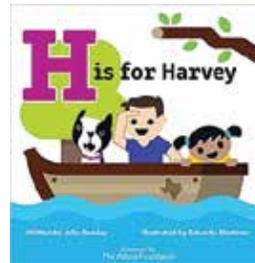
who established the Lawndale Annex in the University of Houston Art Department as a place for Houston artists to flourish. These figures set the scene for the emergence of small, downtown, artist-run spaces such as Studio One, the Center for Art and Performance, Midtown Arts Center, and DiverseWorks. Spanning into the 1980s, exhibits like *Fresh Paint: The Houston School* signifies Houston’s recognition as a major hub for art-making activity.



The Texas Post Office Murals: Art for the People by Philip Parisi (Texas A&M Press). In the midst of the Great Depression, the federal government commissioned murals as part of the New Deal to give jobs to artists and promote beauty and optimism to people worn down by the hard times. Some of these murals decorate the lobby

walls of sixty post offices or federal buildings in Texas. Parisi has gathered 115 photographs of the murals created from Houston, San Antonio, and Dallas to Big Spring, Hamilton, and Baytown. The artists who painted the images, including Tom Lea, Jerry Bywaters, Peter Hurd, Otis Dozier, Alexandre Hogue, and Xavier Gonzalez, showed people at work, industries specific to the Texas region, machinery, transportation, cowboys, the revered Indian chief

Quannah Parker, and folk heroes like Sam Bass and Davy Crockett. Parisi tells stories of how the murals came to be, how the communities influenced and accepted them, and what efforts have been made to preserve and restore them.



H is for Harvey by Julie Beasley (Texas Christian University Press). This wonderful children’s book details the struggles of those affected by Hurricane Harvey through touching rhymes and colorful illustrations. Beasley engages readers with a remarkable story of how the storm brought out the best in

Texans and compassionate people everywhere. It provides families with a better understanding of the historic storm and greater appreciation for human kindness as a whole. With lots of help from the letter H, readers will be swayed by the book’s message of help, healing, and hope to hang on, no matter what storms life throws their way. All of the book’s royalties will go to Harvey relief efforts.

EXHIBIT



A delivery wagon used to deliver fuel to homes in the first quarter of the twentieth century carried three grades of fuel sold in two-gallon quantities.

The San Jacinto Museum of History exhibit, *Big Energy: A Texas Tale of People Powering Progress*, explores how opening the Shell refinery in Deer Park nearly nine decades ago transformed the town and how the growth of the petrochemical industry along the Houston Ship Channel continues to impact the region. The exhibit focuses on the shared history of Deer Park community organizations, an automated immersive experience illustrating how oil and natural gas get from the well to the refinery and the outlets that use petrochemicals, and a finale that shows how prevalent products made from petrochemicals refined along the Ship Channel are in our everyday lives. Admissions is \$6 for adults, \$4 for children under 11, and free for museum members. San Jacinto Museum of History, One Monument Circle, La Porte (Houston), 77571, 9:00 a.m. to 6:00 p.m. daily, (281) 479-2421, www.sanjacinto-museum.org.

Thank you!



Speakers from the “Latinos in Houston” panel, (left to right): Gracie Saenz, Dr. Laura Murillo, Dr. Dorothy Caram, and Christian Navarro (at right) with Houston History editor Debbie Harwell before the panel discussion at Talento Bilingüe de Houston. Photo courtesy of Nancy V. Clark.

The *Houston History* team wishes to thank the speakers Dr. Dorothy Caram, Dr. Laura Murillo, Christian Navarro, and Gracie Saenz; the staffs at Talento Bilingüe de Houston and Doña Maria Mexican Restaurant; and the UH Center for Public History Lecture Series for making the launch party for our spring issue, “Latinos in Houston: Trabajando para la comunidad y familia,” such a tremendous success. We are very fortunate to have had such an enlightened discussion and to have reached a very diverse audience – one of our largest gatherings of Houston history lovers. Our thanks to all of you for your support!



The crowd, which almost filled the theater, listened attentively to the speakers who spoke of their personal journeys as well as the path forward for the continued success of Latinos in Houston

Photo courtesy of Adriana Castro.

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ENDNOTES

THE OFFSHORE INDUSTRY, HOUSTON, AND THE CREATION OF OTC

- 1 F. Jay Schempf, *Pioneering Offshore: The Early Years* (Houston, Texas: PennWell Custom Publishing, Offshore Energy Center: Houston, Texas, 2007). This book provides a lively, interesting account of the events and key people in the offshore industry's formative years. The author makes good use of interviews conducted by Joseph Pratt and Tyler Priest of offshore pioneers inducted into the OEC's Offshore Hall of Fame, which is located in the Ocean Star Museum in Galveston.
- 2 *Offshore Technology Conference: First Annual Conference* (Houston, Texas: May 18-21, 1969). A copy is posted on OTC's web site.
- 3 Joseph A. Pratt, "The Bold and the Foolhardy: Hurricanes and the Early Offshore Industry," in Sally H. Clarke, Naomi R. Lamoreaux, and Steven W. Usselman (eds.), *The Challenge of Remaining Innovative: Insights from Twentieth Century American Business* (Palo Alto: Stanford Business Books—Stanford University Press, 2009), 192-218. Marshall's quote is on page 213.
- 4 *Ibid.*, 192.
- 5 Pratt, "The Bold and the Foolhardy," 206-214.
- 6 *Ibid.*, 195-206.
- 7 Hans Veldman and George Lagers, *50 Years Offshore* (Delft, Holland: Foundation for Offshore Studies, 1997), 91-158.
- 8 *Ibid.*, 78-79; Joseph A. Pratt, "Offshore at 60: Arctic Dreams and Cold Truths," *Offshore* (Houston: November 2014), 50-56.
- 9 *Ibid.*, 50.
- 10 Joseph A. Pratt and William E. Hale, *Exxon: Transforming Energy, 1973-2005* (Austin: Dolph Briscoe Center of American History, University of Texas Press, 2013): 111-128, 269-309.
- 11 Tyler Priest, *The Offshore Imperative: Shell Oil's Search for Petroleum in Postwar America* (College Station: Texas A&M University Press, 2007), 145-146.
- 12 Priest, *The Offshore Imperative*, 95-99. See also Schempf, *Pioneering Offshore*, 166-172.
- 13 Joseph A. Pratt, William H. Becker, and William N. McClenahan, Jr., *Voice of the Marketplace: A History of the National Petroleum Council* (College Station: Texas A&M University Press: 2002).
- 14 Pratt, "The Bold and the Foolhardy," 210-211; Priest, *The Offshore Imperative*, 188-189.
- 15 Joel Parshall, "OTC at 50: Bold Vision Led to Unimagined Success," *Journal of Petroleum Technology* 70, no. 4, April 1, 2018.
- 16 Priest, *The Offshore Imperative*, 140-145.
- 17 Houston Sports Association, *Inside the Astrodome: The Eighth Wonder of the World* (Houston, Texas, 1965), 49, 76-77, 91.

INTERVIEW WITH CARL WICKIZER

- 1 Carl Wickizer, interview by Bruce Beauboeuf, November 21, 1997, UH-Oral History of Houston, Box 8, item 463, Special Collections, University of Houston Libraries.
- 2 Jennifer Presley, "OTC: Nifty At Fifty, OTC's chairman sees adaptability and experience as industry's greatest enablers of its future successes," OTC 2018, April 30, 2018, http://2018.otcnet.org/_media/Show-Daily/OTC18_Show-Daily-PREVIEW_FINALr.pdf.

CONNECTING THE WORLD

- 1 Barbara Shook, "They're Here Again: Thousand Jam Astrodomain for Expertise at OTC," *Houston Chronicle*, May 4, 1982
- 2 Barbara Shook, "OTC expects fewer people, exhibits but stresses industry basics," *Houston Chronicle*, May 1, 1983.
- 3 "History of OTC," Offshore Technology Conference, www.otcnet.org/history-of-otc.
- 4 "Attend," Arctic Technology Conference, www.otcnet.org/arctic/why-attend; "Post-Show Report," Arctic Technology Conference, 2011, www.otcnet.org/arctic/_media/PDFs/ATC2011_PostShowReport_28April2011.pdf; "Post-Show Report," Arctic Technology Conference, 2015, www.otcnet.org/arctic/_media/PDFs/ATC2015PostShowReportFinal.pdf; "Welcome to the First Day of OTC Asia," OTC Asia, March 25, 2014, http://2014.otcnet.org/documents/14OTCA_Day1.pdf.
- 5 "Post-Show Report," 2015; "Attend," 2011.
- 6 Brennan Stark, "OTC Brasil 2011 Has Success in Rio | The Rio Times | Brazil News," *The Rio Times*, October 11, 2011, riotimesonline.com/brazil-news/rio-business/otc-brasil-2011-has-success-in-rio/; English Version: OTC Brasil Expands Exhibition for New Conference in Rio De Janeiro in 2011," Offshore Technology Conference, 2011, www.otcnet.org/press-releases/english-version-otc-brasil-expands-exhibition-for-new-conference-in-rio-de-janeiro-in-2011; Peter Howard Wertheim, "Brazil Conference Highlights Technologies, Opportunities," *Offshore*, November 1, 2011, www.offshore-mag.com/articles/print/volume-71/issue-11/brazil-update/integration-multi-discipline-cooperation-among-the-trends-at-seg-2011.html.
- 7 "OTC Brasil," Offshore Technology Conference, www.otcbrasil.org; "OTC Brasil Brings Together Professionals and Students from the Oil and Gas Sector at Industry Resumption Time," OTC Brasil 2017, October 26, 2017, www.ibp.org.br/personalizado/uploads/2017/10/OTC-Brasil-Release-Last-Day-26OCT17-1.pdf.

- 8 "Professional Do Futuro," Profissional Do Futuro, profissionaldofuturo.ibp.org.br/; "OTC Brasil 2015: Jovens Terão Palestras Sobre Oportunidades De Emprego No Profissional Do Futuro," YouTube, October 23, 2015, www.youtube.com/watch?v=13XOR86ull0&feature=youtu.be.
- 9 George Baker Papers, unsorted collection, Special Collections, University of Houston Libraries; "OTC Brasil Brings Together Professionals and Students."
- 10 "About OTC Asia," OTC Asia 2016, www.2016.otcnet.org/Content/about/1_151.
- 11 "About OTC Asia Conference," *Offshore Technology Conference Asia*, 2014, otcnet.org/pages/about/index.php.
- 12 "The Next Wave A Programme for Young Professionals," Offshore Technology Conference Asia, 2018, 2018.otcnet.org/files/otc_asia_2018_the_next_wave_brochure.pdf; "What Is Planned for 2018?" OTC Asia 2018, 2018, 2018.otcnet.org/Content/Conference; "STEM," OTC Asia 2016, www.2016.otcnet.org/Content/STEM/15_23/.
- 13 Joseph A. Pratt, personal conversation with author, August 2018.

"A LOVE AFFAIR 50 YEARS AND COUNTING"

- 1 Mike Waterman, interview by Debbie Z. Harwell, August 1, 2018, in possession of author. The author wishes to thank Sandra Lord for her assistance in researching this article.
- 2 "Offshore Technology Conference Historical Statistics," 1969-2008, Offshore Technology Conference, <https://web.archive.org/web/20090509151859/http://www.otcnet.org:80/pages/about/history.html>; Jordan Blum, "50 and Counting," *Houston Chronicle*, April 29, 2018, H1, 4; "History of OTC," Offshore Technology Conference, www.otcnet.org/history-of-otc.
- 3 Sam Fletcher, "Exhibition will live up to reputation of 'largest,'" *The Houston Post*, April 29, 1979.
- 4 "Hotels shift focus away from energy," *The Houston Post*, May 6, 1984; Sam Fletcher, "Hoopla threatened OTC, chairman Russell said," *The Houston Post*, n.d. (1984); Sam Fletcher, "Silver anniversary for the OTC," *The Houston Post*, May 3, 1993.
- 5 Fletcher, "Hoopla threatened OTC"; Fletcher, "OTC expects least attendance ever."
- 6 Wayne Chappell, Sarah McPhillips, and Greg Ortale of Greater Houston Convention and Visitor's Bureau, interview by Debbie Harwell, December 12, 2011. The Houston Convention and Visitors Council, became the Greater Houston Convention and Visitors Bureau (GHCVB), which is used for simplicity. Today it is called Visit Houston.
- 7 Sam Fletcher, "OTC expects least attendance ever. Houston's economy also will feel drop," *The Houston Post*, April 1, 1984; Sam Fletcher, "More foreign companies participating. OTC's exhibition show opens Monday," *The Houston Post*, May 4, 1986.
- 8 Sam Fletcher, "More foreign companies participating. OTC's exhibition show opens Monday," *The Houston Post*, May 4, 1986.
- 9 Chappell, McPhillips, and Ortale interview.
- 10 Sam Fletcher, "Don Freeman is the man behind scenes of OTC," *The Houston Post*, May 5, 1991.
- 11 Fletcher, "Don Freeman."
- 12 "OTC Highlights," OTC 2018, <http://2018.otcnet.org/about/otc-highlights>.
- 13 "OTC opens today; 80,000 visitors expected, 90 countries represented," *The Houston Post*, April 30, 1979; Fletcher, "Silver anniversary for the OTC."
- 14 "History of OTC"; "OTC Pumps Energy into Houston," *Drilling Contractor*, March 31, 2010, www.drillingcontractor.org/otc-pumps-energy-into-houston-4980; "2018 Offshore Technology Conference Celebrates 50th Edition," *Business Wire*, May 3, 2018, www.businesswire.com/news/home/20180503006737/en.
- 15 "OTC Historical Attendance," Offshore Technology Conference, www.otcnet.org/history-of-otc; James R. Pieroborn, "Thousands gather for OTC under cloud of economic uncertainty," *Houston Chronicle*, n.d. (1982); Sam Fletcher, "2,500 firms to exhibit at Offshore Technology Conference," *The Houston Post*, May 1, 1983; "Offshore Technology Conference Historical Statistics," 1969-2008; Sam Fletcher, "OTC expects least attendance ever. Houston's economy also will feel drop," *The Houston Post*, April 1, 1984. Room statistics were reported by Randall Hodde with the hospitality accounting firm Laventhol & Horwath.
- 16 Colin Eaton, "Devastating 1980s oil bust fostered diversified economy. Colossal collapse remains the one by which all other crashes are measured," *Houston Chronicle*, August 31, 2016; "OTC Historical Attendance"; "History of OTC"; Jordan Blum and Collin Eaton, "Eyes at offshore conference shift to lands in Permian Basin," *Houston Chronicle*, May 1, 2018; Chappell, McPhillips, and Ortale interview; Waterman interview.
- 17 Jordan Blum and Jose R. Gonzalez, "Offshore woes take toll on OTC crowd," *Houston Chronicle*, May 4, 2018, A1, 10.
- 18 Waterman interview.
- 19 Waterman interview.
- 20 Ilene Bassler, "Company sets standards for marine safety, design," *Houston Chronicle*, May 2, 2018, B2; Jose R. Gonzalez, "Making some memories," *Houston Chronicle*, May 2, 2018, B2; Jordan Blum, "50 and Counting," *Houston Chronicle*, April 29, 2018, H1, 4.
- 21 Chappell, McPhillips, and Ortale interview; Waterman interview.
- 22 Chappell, McPhillips, and Ortale interview; Waterman interview.

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