Chambers Named Profile Editor

Patricia L. (Patty) Chambers joined Western Geophysical in October as editor of Profile, bringing more than 15 years of publications and public relations experience to Western's Houston office.

A graduate of the University of Florida College of Journalism, Chambers was previously the assistant editor at the National Association of Corrosion Engineers, Houston. She also worked as an editor and writer for Baylor College of Medicine. Chambers relocated to Texas in 1994, after having spent the majority of her professional career at the University of Florida in Gainesville. She served as director of publications for the UF College of Medicine 1988 to 1994 and the College of Engineering 1981 to 1988, writing, editing, and publishing numerous award-winning magazines, newsletters, catalogs, and brochures. She also was involved in various public relations activities including media relations, alumni relations and special events.

Chambers is an accredited public relations professional (APRP) and has been active in several associations, including the Florida Public Relations Association (FPRA) and the Association of American Medical Colleges' Group on Institutional Advancement. She was elected president of the Gainesville Chapter of FPRA and served three terms as state vice president of FPRA. She was named FPRA's Public Relations Professional of the Year in 1993.
4-D — The New Dimension in Reservoir Monitoring
In recent years, the seismic industry and oil and gas companies have become enthusiastic about 4-D, or time-lapse seismic surveying, and its possibilities for reservoir monitoring.

Applied Technology
The Applied Technology division researches new geophysical data acquisition technologies and explores advanced and innovative techniques to improve Western Geophysical’s operating efforts.

Spec Data
Speculative data is an innovative business approach that has helped position Western Geophysical as the world’s leader in seismic services.

Sable Island
As the island’s wild horses forage for food, Western’s scientists search, too — for a better understanding of the gas fields that may contain enough power to heat a million homes for 25 years.

Capturing the Moment
Enter the Profile photo contest that will showcase Western employees’ photographic talents.
The earliest Westerners developed and passed on a legacy of pride in being the best. Since its beginning, Western Geophysical has enjoyed a reputation for producing the highest level of quality products and services for our customers. But, it is not enough to rest on our laurels — our greatest achievements lie in the future.

In order to maintain our leading role and competitive edge in the geophysical industry, it is important that each of us continues to look for ways to improve the jobs we do and the products and services we deliver. We have a commitment, and an obligation, to deliver the kind of quality service that stands out in our customers' minds.

Our Quality policy states, “It is the policy of Western Geophysical to provide products and services that meet or exceed the customers’ requirements.” That policy is carried out using a variety of techniques of quality improvement.

All paths to Quality are founded on basic principles and concepts that, for most of us, seem like common sense. For example, if we take a great deal of pride in what we do, we know it is not enough to “get by” with just a satisfactory performance. We should strive to become outstanding — to go above and beyond the minimum requirements of our jobs.

Unfortunately, common sense isn’t always common practice. Time constraints, or an unwillingness to change “the way we have always done it,” sometimes gets in the way of developing or adopting more effective and efficient ways of doing things.

However, we must adapt and respond to what our customers tell us is important. Our customer satisfaction survey, for instance, indicated we needed to do a better job of communicating immediately after and between active projects. We listened, and made a strong commitment to improve those lines of communication that are so vital to our business. And, we are improving communication — both inside and outside the company.

In Western Hemisphere land and marine operations, the road to improvement is the Quality, Safety and Productivity (QSP) program. QSP stresses the interdependence of the three crucial elements needed for success: the quality of what you do, the safety of the operation, and the products and services that are delivered.

EAME and the Far East also have adopted quality improvement techniques and concepts combining quality control, quality assurance and quality improvement. Improvements are made by individuals, teams or departments, depending on the goal of a particular project or the complexity of a problem.

In data processing, one road to improvement is a worldwide Quality Assurance system that helps standardize procedures to ensure consistent quality, regardless of the geographic location of the processing center or field crew configuration.

Wherever you are in the world, and whatever path is taken, all Western Geophysical efforts have a common purpose: to produce consistent quality and continually improve the way we do our work. This kind of commitment guarantees our customers will keep coming back and that Western will continue to be the world’s leader in seismic services.

None of us can afford to settle for the status quo. Improvement sometimes requires change and is necessary if we are to continue to grow — both as a company and as individuals. As we work together to improve the things we do, Western will remain at the leading edge of our industry. As Western Geophysical employees, we shouldn’t settle for anything less than being the very best we possibly can.

Richard Watten
President, Western Geophysical
The Board of Directors of Western Atlas Inc. elected James Brasher and Will Honeybourne as corporate vice presidents in November. Both are based in Houston.

Brasher was appointed general counsel and secretary of Western Atlas International Inc. (WAII) in 1987 and in March 1994 he became vice president and group counsel.

Brasher is a graduate of Midwestern State University with B.A. and M.A. degrees in political science. He earned his law degree from Southern Methodist University School of Law.

Honeybourne joined Western Atlas in September as senior vice president of marketing and business development for Western Atlas’ Oilfield Services Group. He is a graduate of Imperial College in London and has more than 25 years of experience in various field and senior management positions within the oilfield services industry.

Western Atlas Oilfield Services strengthened its marketing and business development group with the addition of Jim Gresham as vice president of business development and Fritz Reuter as vice president for strategic planning.

Gresham previously served as senior vice president of Western Hemisphere operations and Reuter was vice president of technology for the Western Atlas Logging Services division.

In his new position, Gresham will be responsible for strengthening senior-level business contacts in the oil and gas industry. He joined Western Atlas Logging Services in 1977 as a field engineer in Louisiana.

Reuter, who joined Western Atlas Logging Services in 1990, will be responsible for market data, intelligence and analysis.

Joe Chatoor has assumed the role of senior vice president, Western Hemisphere for Western Geophysical. Chatoor began his career with Western in 1968 and has held various data processing positions in technology centers in Italy, Australia, Singapore, and the U.K. He also has served as area manager and vice president of data processing for Europe, Africa and the Middle East. He transferred from London to Houston headquarters as senior vice president for worldwide data processing in 1994.

Jesse Perez has been promoted to senior vice president, Finance and Administration. He has served as vice president of finance and controller since 1993. He will continue to be based in the Houston headquarters.

A graduate of the University of Houston and a certified public accountant (CPA), Perez joined Western Geophysical in 1980 as an accounting supervisor. He became area manager of finance and administration in Western’s Singapore office in 1984 and was named controller in 1989.

Gary Fair has been promoted to vice president, Western Hemisphere Data Processing. He was previously general manager of processing software technology.

Fair joined Western Geophysical’s data processing department in 1965 after receiving a bachelor’s degree in physics from Stephen F. Austin State University. He has worked in a variety of management capacities including center manager of Western’s centers in Dallas and Zhuo Xian, China. In 1991 Fair was named area manager of processing operations in the Far East and relocated to Houston headquarters in 1993.
DON SMITH has been promoted to vice president, Finance and controller. He was previously the controller for Western Geophysical and continues to be based in Houston. He earned a bachelor's degree in business administration from the University of Texas.

Smith owned Western's West Coast/Alaska marine division in 1981 and worked as party manager for crews in Alaska and California. During his 16-year career with Western, Smith has served in several accounting positions in the Far East and Houston. He was named assistant controller in 1995 and controller in 1996.

MIKE BERTNESS and JOHN WALKER have joined North America Land Operations as supervisors of Onshore Program Development. They will work closely with both Operations and Spec Data Sales to generate new spec opportunities and sell existing spec data in North America land and transition-zone areas.

Bertness, who earned a degree in safety science from Indiana University of Pennsylvania, has been with Western Geophysical since 1988. He started as a safety representative with seismic crews in Nigeria and has held several HSE positions within the company. He has been HSE Land Operations manager since 1994.

Walker has a degree in geophysical engineering from the Colorado School of Mines and first joined Western in 1985, working on a field crew in China. He left Western briefly to develop optical software, then returned to the company in 1991 as a marketing representative to market the Omega Seismic Processing System.

DOUG CHAPMAN has been named HSE/QSP supervisor for the Western Hemisphere Marine division. His role in helping to develop the division's HSE management was expanded to include responsibility for coordinating quality, safety and productivity (QSP) efforts. He will be working closely with other members of the management team to implement a structured system for QSP.

Chapman joined Western in 1994 as HSE supervisor for transition-zone operations in North America after a long career with Geophysical Service, Inc. and Halliburton. Chapman has an associate’s degree in electronic engineering.

DR ROY FORSHAW has relocated to Houston from Western's London office to assume responsibility as general manager, Seismic Processing Software Development, succeeding Gary Fair.

Forshaw holds a bachelor's degree in physics from the University of Liverpool and a Ph.D in geophysics from the University of Birmingham. He joined Western Geophysical in 1975, working in the research and development departments in Houston and London. In the early 1980's he was named manager of London Technical Support and continued in that position until 1993, when he became manager of Software Marketing and Training.

BOB HARDY has been promoted to manager of Seismic Processing Software Development (SPSD). He will continue to be based in Western's Houston headquarters.

Hardy earned bachelor's degrees in both physics and mathematics. He also holds a master's degree in physics from Yale University.

He joined Western in 1983 as a junior programmer and advanced to senior programmer, programming supervisor, and in 1991 was promoted to assistant manager of SPSD. He has traveled extensively for Western's software support and marketing efforts.
Andy Kushner has assumed responsibility as manager of Software Support, Western Hemisphere Data Processing. He will continue to be based in Houston.

Kushner began his career with Western in 1974 after receiving a degree in mathematics from Duquesne University. He worked on a dynamite field crew in Michigan for a year, then transferred to Houston where he worked in land processing. He joined software development in 1977 and held a variety of positions including resident programmer for Land Processing, Training and Software Testing. He was promoted to program supervisor, assistant manager, and finally manager of the Software Systems Development group in 1990.

Jeff Mayville has been promoted to supervisor, Western Hemisphere OBC Operations. He was previously the supervisor of geophysical support for Western Hemisphere Marine Operations.

Since joining Western in 1977 as a navigation trainee, Mayville has progressed through the ranks of junior observer, observer, coordinator and party manager. He also has served as a safety advisor in worldwide marine operations.

Scott McFarlane has assumed the position of area manager, Finance and Administration. In his new role, McFarlane will support all Western Hemisphere Operations in financial and administrative matters.

McFarlane received a degree in business and economics in 1974 from McMaster University in Ontario, Canada. After spending several years with a major oil company, he joined Western in 1982 as controller in Calgary, Canada. He transferred to Western Atlas Corporate in Houston in 1991. He rejoined Western Geophysical in 1994 as accounting manager.

Jim McRae, resident manager in Beijing, relocated to Singapore to assume the position of manager, New Business Development. In his new role, McRae will promote all product lines with a heavy emphasis on generating new land acquisition business. He will continue as general manager of Western’s Chinese Joint Venture, Orient Offshore Geophysical Service Company.

McRae joined Western Geophysical from Halliburton Geophysical Sciences where he served as manager of operations in Indonesia, data processing manager in China, and in a variety of data processing positions in Australia. He earned an honors degree in mineral technology in 1974 from Otago University in New Zealand.

Joe Scarlett will relocate to Singapore to assume the role of area geophysicist. Scarlett, who earned a bachelor’s degree in geophysical engineering from the Colorado School of Mines in 1985, joined Western immediately following his graduation. Beginning as a quality control seismologist, he worked for five years in China, U.A.E. and Somalia on dynamite and vibroseis land crews. He later advanced to data processor and assistant party manager. He transferred to Houston in 1990 and joined the Applied Technology geophysics group as a research geophysicist involved with crew start-ups and software development. In 1993, he transferred to Western Hemisphere Marine transition-zone operations as a geophysicist and later became supervisor.
Martin Stuvel has returned to Houston as area geophysicist, Western Hemisphere Marine Operations. He was previously the area geophysicist for Far East and Australia Marine Operations.

Stuvel, who earned a bachelor’s degree in geophysics from the University of Texas, joined Western in 1988 as a junior observer with the Western Inlet and Western Polars. After two-and-a-half years he was named geophysicist and later party manager of the Western Hercules, followed by becoming supervisor of the Western Hemisphere Marine Geophysical Support Group. He transferred to Far East and Australia Operations in 1995, representing the area as technical coordinator.

Ken Tornquist has been named manager of the Oklahoma City Data Processing Center. After his graduation from Western State College in Colorado, Tornquist began his career in 1981 as a well-site geologist in Denver. In 1982, he moved to Oklahoma City where he worked for a small acquisition and processing company. In the following years he managed two companies as well as his own business. He started with Western in 1993 as a processing coordinator.

Steven Vasey has been promoted to manager of Canadian operations, based in Calgary, Alberta, Canada.

After receiving his degree in geophysics from the University of Missouri Rolla in 1984, Vasey began his career with Western on the Western Caribbean in the Gulf of Mexico. From marine operations he moved on to marine processing and then to land processing, working his way up to supervisor in the Houston office. His most recent assignment was in program development focusing on 3-D speculative projects in Canada.

Mark Zajac has been promoted to supervisor, Geophysical Support for Western Hemisphere Marine Operations. After he graduated in 1989 from the Florida Institute of Technology with a degree in oceanographic technology, Zajac joined Western as a navigator aboard the Western Hercules. In 1993, he transferred to the Geophysical Support group as an acquisition geophysicist. Two years later he transferred to Party 116, the Western Atlas, as assistant party manager. Later that same year, he transferred to Party 145, the Western Spirit, also as assistant party manager. In 1996, he returned to the Western Hemisphere Geophysical Support group where, in addition to operations support, his responsibilities included a remote office liaison position representing marine operations at BP Exploration in Houston.
The Web Site Team
Greg Barolak
Rhonda Boone
Joy Brown
Karen Bush
Ron Chambers
Bert Chenn
Jon Florence
Joe Hallmark
Terry Jbeli
Michael Jungnickel
Cynthia Kleyn
Mike Kubala
Pramod Kulkarni
James McDougall
Jeff Middleton
Patricia Morley
Livia Perez
Jerry Peterson
Walt Richie
Steve Swarts
Steve Thompson
Derk Vaughn
John Walsh
Randy Woodruff

Site unseen? Take a look at http://www.waii.com

Western Atlas Sited on the Internet

After many months of planning and preparation, the Western Atlas Oilfield Services Internet site was launched on December 5, 1996. Found at Uniform Resource Locator (URL) address, http://www.waii.com, the site includes information about the history, current news, services and products, employment opportunities, support services, and research and development activities at Western Geophysical, Western Atlas Logging Services, E&P Services and PetroAlliance.

Development of web technology at Western began as early as 1993. In March 1995, Bill Calcote and Steve Sidney, of then Western Atlas Software, prepared an Internet Vision Document proposing ways to use the worldwide web (WWW) for their division. In November, Corporate Communications Manager Rhonda Boone discussed with Sidney development of an external site for all Western Atlas divisions.

It was learned that the information services group at Western Atlas Logging Services (WALS) had also been developing the technology for several years and had begun acquiring the necessary hardware and software to accommodate the project. Internet/Web Support Manager Jeff Middleton at WALS was asked to be the webmaster for the entire Western Atlas site and in February, development work began.

Middleton completed a website proposal outlining the process, and the study became the framework and charter for the company's entry onto the Internet. Web teams were formed at WALS under Patricia Morley and Western Atlas corporate under Boon and Steve Swartz to develop content for Western Geophysical, E&P Services and PetroAlliance. Middleton and web developer Jon Florence designed and installed the site, host the development, review and publication of web material. They also designed the file system and most of the templates and tables that provide the look and feel of the site.

Visitors to the site are greeted by the catching pages designed by Corporate Communications Designer Michael Jungnickel, which blend pictorial representations of activities of the Western Atlas Oilfield Services divisions. The site, designed for easy navigation, has purposely been kept clean and simple. Blue banners at the top of the pages show visitors where they are on the site. There are few layers from top to bottom so information can be found quickly with few pages to download.

Western Geophysical Network System Manager Randy Woodruff was closely involved with the development of the site to ensure that appropriate security measures were in place to protect client and Western data and intellectual property. Precautions include separating the Internet server from the internal network which hosts the company intranet and e-mail facilities. Other measures included redundant firewall protection of the Internet server and the requirement that no computers at the Houston office have connection to both the Internet and the internal network.

While security is a high priority, all employees have access to the Internet. Operating groups with on-going requirements to
use the Internet have stand-alone machines in their areas with approval from a senior vice president. Houston employees also have access to a computer dedicated to Internet use in the Western Geophysical library on the first floor of the 10001 Richmond Avenue building. The library computer has multitasking capability and can accommodate additional terminals if usage indicates more are needed. The installation of this machine was coordinated by Programming Supervisor Joe Hallmark, a member of Western’s web development team.

Visitors to the web site are encouraged to provide feedback and/or request more information by completing a simple form, reached by clicking the Feedback button at the bottom of every page.

Traffic on the website has been building steadily and now averages about 500 “hits” per day “Visits to the site should continue to increase” said Pramod Kulkarni, Corporate Communications advertising coordinator “Our internet address was included in magazine ads placed this spring and information about our site was submitted to major search engines and directories on the web.”

“This is only the beginning, Western’s website is a constantly evolving tool and an important part of our goal to get the Western message out to our clients,” said Rhonda Boone. “Now that we are up and running, we are aggressively seeking more effective ways to use the web and make our site more interesting. All employees are welcome to contribute ideas for use of this new media and suggest content material.”

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1996 SEG CONVENTION A “SOLID” SUCCESS

Western Geophysical achieved “solid” success in several ways at the 66th annual Society of Exploration Geophysicists (SEG) convention held November 10-15, 1996 in Denver, Colorado.

Leading the successes was Western’s introduction of its revolutionary solid streamer for marine surveys. A section of the proprietary solid streamer was on display at the exhibit along with information about its special features.

The Data Sales department discussed the ULTRA SUR VEM deepwater program in the Gulf of Mexico as well as new additions to the spec data library in the shallow waters of the Gulf using ocean-bottom cable (OBC) and telemetry systems. For onshore explorators, there were displays of new 3-D surveys in the Rocky Mountains, Permian Basin/Mid-continent region, and South Texas.

The Research and Development (R&D) group participated in 28 workshops and poster sessions and presented technical papers on all aspects of data acquisition and processing. A series of technical presentations and software demonstrations was given in the amphitheater in Western’s exhibit on topics such as P-wave fracture detection, the Omega Seismic Processing System, and Lamont 4-D software.

Gauging client interest in Western’s products and services, several attendees, including President Richard White, said this was one of the “best conventions ever.” The next SEG convention will be held November 2-7, 1997 in Dallas.

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Western Atlas Acquisition of Norand Creates A Leader in High Growth Data Collection and Mobile Computing Industries

In January, Western Atlas Inc. and Norand Corporation announced a definitive agreement under which Western Atlas will acquire Norand Corporation. Norand designs and develops mobile computing systems and wireless data communications networks. The acquisition was unanimously approved by the Boards of Directors of both companies.

When completed, this acquisition will further strengthen the position of Western Atlas Seattle-based Intermecc division in the automated data collection (ADC) and mobile computing solutions industries.

Under the agreement, Western Atlas will offer $33.50 per share for all 7.8 million shares of Norand common stock outstanding through a cash tender offer. The offer will be subject to receipt of a majority of the common stock of Norand and satisfaction of Hart-Scott-Rodino and other customary approvals and requirements.

“This acquisition will establish Western Atlas — through its Intermecc
Denver Office Moves Downtown

Western Geophysical recently relocated its Denver office from Englewood to downtown Denver. After only one week in their new location, the Denver Center hosted an open house November 12, attracting more than 400 visitors, including clients, employees, and many executives from Western's Houston headquarters during the Society of Exploration Geophysicists (SEG) convention.

The new office occupies nearly two floors, some 35,000 square feet of space, at the Republic Plaza in downtown Denver. At 56 stories, the Republic Plaza is the tallest high-rise building in the downtown area.

“The majority of our clients also are located downtown,” said Jeff Omvig, area processing manager for the Western U.S. and manager of the Denver Center. “This move was practical for us because it increases the opportunities for interaction with our clients due to greater accessibility. And, relocating downtown makes it easier for out-of-town visitors to reach us.”

For the past 15 years, the Denver office had been located almost 15 miles south of Denver in the Denver Technological Center.

“Many employees live in south Denver near the old facility and weren’t enthusiastic about driving into the city every day,” Omvig says. “However, we supplied all our employees with bus passes to help ease their commute. I think most are pleasantly surprised at the convenience and quality of the bus service.

“Downtown Denver also is a very exciting place to work. It is a vibrant city with much to offer, including easy access to excellent restaurants, shops, and health clubs our employees can take advantage of before and after work, or during their lunch hour.”

Western Geophysical President Richard White (center) and N American Land General Manager Jim White (right) welcome clients to Western’s new Denver office.

While the relocation required almost 11 months of planning, the actual move was accomplished over one weekend.

“This was a BIG move for us,” says Omvig. “It was amazing. We shut our machines down on Friday afternoon and had everything up and operational by Monday morning — thanks to the planning and tireless efforts of many hardworking employees.”

The new space didn’t require much renovation. According to Omvig, they were restricted by the terms of the lease agreement from modifying the lobby and executive office areas. Some “build out” was allowed on the 17th floor which houses the processing groups and the research and development department.

“We packed a lot into a very short time between the move and the open house,” says Omvig. “We felt timing the open house with the SEG conference, which was held this year in Denver, would optimize attendance and provide exposure for the center. The plan worked wonderfully. We attracted a pretty good crowd, including many clients and the feedback has been very positive.”
Western Licenses Lamont 4-D Technology for Enhanced Oil Recovery

Western Geophysical and Columbia University entered into a joint agreement to bring to market new software technology that can help locate untapped oil and gas reserves, allowing more production from existing wells.

The technology, consisting of patented Lamont 4-D software, will be available from Western Geophysical as part of a service package or as a licensed software product. The agreement grants Western Geophysical the exclusive worldwide license to this technology for the analysis of 4-D time-lapse seismic data to monitor fluid changes in reservoirs. By monitoring how and where these fluids are bypassed or blocked, oil companies will be able to design drilling strategies to extract oil and gas that are usually left behind.

Designed by scientists at Columbia University's Lamont-Doherty Earth Observatory in Palisades, New York, the Lamont 4-D software was developed in conjunction with a consortium of seven oil companies. It has been tested in 15 oilfields in the North Sea and the Gulf of Mexico and is currently being used in almost half of the active 4-D projects worldwide.

“The acquisition of Lamont 4-D software is part of Western Geophysical’s ongoing commitment to provide leading-edge seismic technology for all phases of petroleum exploration and production,” said Western Geophysical Senior Vice President of Technology Denby Auble. “We expect 4-D seismic surveys and associated interpretation software to be essential ingredients for ensuring the quality and efficiency of E&P operations.”

Western Geophysical will provide distribution, technical support, and further technical enhancement of the Lamont 4-D technology. Columbia University and Western Geophysical also have agreed to collaborate on the development of additional 4-D reservoir technologies.

Library Relocated and Dedicated

After months of planning, along with a fair amount of sawing, hammering, moving walls, painting, laying new carpet, running wires and shelving cart after cart of books, the newly renovated Western Geophysical library opened its doors November 1. On December 13, it was officially dedicated to former Western Geophysical president Booth B. Strange in a small private ceremony. Strange was honored for his leadership, vision and far-reaching contributions to Western and the geophysical industry.

“The library relocated from WG-2 to the first floor of WG-1 to allow easier employee access to information and increased security for library resources,” said Diane Parker, supervisor of information services.

“We moved the library out of relative obscurity into a much brighter, more visible and user-friendly location. I guess you could say it was moved out of darkness into light,” laughed Parker.

The library had been in existence for a number of years and was used primarily by the research and development staff, Parker explained. In the interest of economy, acquisitions were cross-charged and kept by the departments that requested them and the library was staffed only by a part-time contract clerk. In 1994, the card catalog

continued on page 12
was converted to a UNIX based library management system but was difficult for employees to access. And, the collection had become somewhat out of date.

In the spring of 1996 Carl Savit, retired senior vice president of technology and a longtime supporter of the library, passed away.

“Carl showed a great deal of interest in the library and often called me asking for information,” said Parker. “His death really made me think about the library and the need to have it upgraded.” In August, Parker’s proposal to relocate the library to WG-1, with room to grow, was approved by Western Geophysical President Richard White.

“There has been a lot of interest in, and support for, this library,” said Parker. “I think it shows a commitment to employee needs and has helped increase morale. Our plan now is to expand the collection with help from an acquisitions committee. This committee, representing different disciplines within Western, will recommend acquisition and anticipate trends,” she said.

So far, access to the Internet has been the most popular addition to the library, Parker added.

“As we unpacked and moved into the library, several employees stopped by to ask if the library was for them to use,” said Parker. “It is.”

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**Revolutionary Solid Streamer Technology Introduced for Seismic Vessels**

In October, Western Geophysical announced a new proprietary technology for seismic streamers that will significantly increase the efficiency and productivity of marine surveys. For the first time, seismic sensors have been incorporated into new streamers made of a solid flexible material, which is a major improvement over current oil-filled plastic cables.

This technological breakthrough, developed jointly with Thomson Marconi Sonar Pty., Ltd., Sydney, Australia, will dramatically reduce the lifecycle cost for streamers and improve acquisition efficiencies during seismic surveys. Western Atlas has an exclusive multiyear supply agreement with the manufacturer of the new technology.

Marine streamers are the costliest and most critical components aboard modern seismic vessels, and they have a direct impact on survey efficiencies,” said Western Geophysical President Richard White. “While the industry has made some progress over time in the reliability, size and capacity of streamers, all previous solutions limited our survey performance. The new solid streamer will improve both the efficiency and productivity of our data acquisition, while reducing our maintenance and lifecycle costs.”

The major advantages of the new cable are its strength and reliability, which enable it to be retracted back onboard the vessel while the ship maintains its normal speed. This feature also extends acquisition time in hostile environments such as the North Sea where seismic vessels can operate only during relatively short weather breaks.

Improved reliability also translates into much lower maintenance costs and a longer productive life of the equipment. Initial operational tests indicate the new streamer technology has a better stability in high-seas states where traditional streamer operation had to be shut down because the “noise” environment affected the quality of the data. The buoyancy of these new streamers also makes them fully recoverable at sea.

The Western Legend, the company’s first vessel to be fully equipped with the new streamer technology, will upgrade its capacity to eight streamers during the coming winter season, with other vessels to follow.

“This is another major step in our ongoing efforts to provide customers with the most efficient marine acquisition methods and the lowest operating cost vessels in the industry,” said White. “While the equipment change will be achieved over time as we replace old streamers at the end of the efficiency cycle, the final operational impact will be dramatic for us.”
Western Patriot Upgrades with MSX Cables

In August 1996, the Western Patriot was outfitted with four 6,000-meter high performance, reduced-diameter MSX cables. The 300 cable sections, including spares, active sections, head and tail stretches, cable heads, and bird collars weighed more than 120 tons. Forty-seven crewmembers installed the cables during a two-day call at the port of Tema in Ghana, West Africa.

Close communication between the Houston and London offices and the Western Patriot enabled the team to set priorities, discuss operational proposals and plan the project's timing. The project was coordinated out of London Marine Operations with direction provided by Europe/Africa/Middle East | EAME Marine/Transition Area Manager Larry Wagner, EAME Marine/Transition General Manager William Rabson, and the London office team.

The MSX cables, built by Input/Output, were tested to meet rigorous Western quality standards, and filled and ballasted with cable oil allowing quicker infield deployment. Party Manager Charlie Stewart, on loan from Party 107, provided operational experience.

In Houston, Logistics General Manager Martin Wilshire coordinated the cable shipment to Ghana using an Antonov-124, the only charter aircraft capable of carrying such a sizeable payload. Timing and logistics constraints required the aircraft to arrive and be available for loading within one day.

Aboard the Western Patriot, Supervisor Bernard Marley organized client operations offshore Nigeria. Assistant Party Manager Jim Cruckshank assisted with operational and technical requirements and Assistant Supervisor Tom Vasquez provided logistical support.

In Nigeria, Party Manager Brian O'Neill arranged prompt vessel clearance by flying customs and immigration officials to the ship. O'Neill also stayed in communication with clients to keep them informed of the operational status of the Western Patriot.

On August 12, Captain Jan Janson sailed the Western Patriot into the port of Tema. Nearly 30 laborers per shift worked around the clock using cranes, top loaders, and forklifts to load the cable. During installation, food and other supplies also were loaded on the vessel.

The new MSX cables were quickly wound onto reels with a minimum of difficulty. Senior Coordinator Derek Hough supervised the installation and they were deployed and tested en route to Nigeria under the supervision of technicians Simon Perry and Tim Gibbs. Chief Gun Mechanic Robbie Gunn tested and adjusted new para vanes to match the different in-water characteristics of the thinner-diameter cables. Deployment and systems were checked by experienced observers Murray Dickenson, Colin Gemmell, and Kevin Munday and reinforced by the MSX experience of Tommy Tague, who joined the project from the Western Spirit.

Coordination, advanced planning, and the hard work of the crew enabled the Western Patriot to resume shooting with its new cables, five days after departing Tema.

Addy Awards

Western Atlas' Corporate Communications Department won a gold “Addy” and two silver awards in the Houston Advertising Federation's 35th American Advertising Awards competition. The Addy was presented for the Christmas card ad for Western Geophysical in the Energy Publications category. The same ad won a silver award in the broader Business/Trade Publication category. A card designed for all the Western Atlas divisions on the same theme won another silver award in the Special Event Material — Card category.

The concept and text for the ad were developed by Advertising and Public Relations Coordinator Pramod Kulkarni, Senior Graphic Designer Michael Jungnickel designed and created the special graphics.
The High Profile award is only one of many programs designed to recognize outstanding HSE performance at Western. Please continue your efforts to recognize those individuals, departments and crews who excel in HSE performance.

Demonstrating Safety Awareness and Concern for the Environment

Party 375 is a transition-zone crew operating 24-hours-a-day in the shallow waters and marsh along the U.S. In operation since 1989, party 375 along with parties 320, 321, and 374, comprise Western Geophysical's Southeast U.S. Land and Transition-zone operations. The crew is currently working on a speculative program in Matagorda Bay, Texas. The base of operation for Party 375 is on the quarterboat Blue Bayou.

Recording operations and crew movement in the field are coordinated from the recorder Brenda B. Source vessels Jesse B. and Western Bourreaux, cable vessel Western Willa, and navigation boats Nav I, Nav II, Nav III and Nav IV complete the vessel complement. The current Western Geophysical Matagorda Bay speculative 3-D prospect has lines that extend over Matagorda Island and into the Gulf of Mexico, utilizing a combination of air guns and dynamite as the seismic source.

HSE Awareness and Orientation

Party 375 invests a great deal of time making crewmembers, both new and experienced, aware of the hazards inherent to operating in the transition zone. Crew HSE Advisor Jeff Flanders orients each newhire with the help of an instructional video taken by the crew. The video identifies the tasks performed in the field and the hazards associated with each task. These hazards are identified at the crew level through the use of job safety analyses. Safety procedures are generated and documented, and all required personal protective equipment (PPE) is provided.

Each new crewmember is assigned to an experienced crewmember or "buddy." In the buddy system, the experienced crewmember trains the new employee in job tasks to be performed, and ensures that the newhire develops and maintains safe work habits. When the newhire safely completes two months on the job, the buddy is given a safety award selected from the safety incentive program catalog.

HSE Training

Party 375 has made a commitment to properly educate and train its crewmembers, who are regularly sent to courses presented by Western Geophysical's HSE Department. In addition, the crew HSE advisor, along with Party Manager Tom Pierce and Assistant Party Manager Steve Paine, organizes and conducts HSE training courses on-site for crew members as well as subcontractors. Fire school, explosive, and ATV training providers also are utilized.

Crew Meetings and Audits

In addition to daily safety meetings conducted for each shift, each department holds regular "tailgate" meetings to focus on safety concerns specific to tasks performed by that department.

The crew also implemented an internal cross-audit system, that complements the crew-wide HSE audits. An audit team comprised of Party 375 personnel, Western Geophysical management and personnel from other crews working in the Southeast U.S. conducted an audit in July 1996. All action items identified were scheduled to be completed by January 1997.

HSE Crew Milestones and Goals

Party 375 successfully completed six months without a lost-time incident (LTI) in November 1996 and is currently on pace to reach the one-year milestone in May 1997. The record for Party 375 is three years (585,000 manhours) without an LTI in order to duplicate that accomplishment Party 375 set several goals for 1997, focusing on training and cross-auditing.

Quality, Safety, and Productivity (QSP)

With the help of Western Hemisphere Quality Safety and Productivity (QSP) Manager Jo DeBruyne, Western Hemisphere QSP Advisor Dave Gibson, and Southeast U.S. Supervisor Steve Chang, Party 375 launched its version of Western Hemisphere Land Operations.
QSP program in January. As the year progresses, Party 375 plans to transfer the solid foundation of its HSE program to quality and productivity. By utilizing the tools of a successful HSE program — such as audits, training, and regular meetings — the crew hopes to realize the same success in improving those components of the operation.

Environmental Concerns

It is Western Geophysical’s policy to promote the protection of all natural and cultural environments that may be affected by its activities. Western also seeks continuous improvement in the efficient use of natural resources and energy.

Many of Party 375’s projects are located in, or near, sensitive and fragile environments. As a result, Party 375 must deal regularly with local, state and federal governments, management agencies and similar entities to ensure these environments are not adversely impacted by seismic operations. In the past, Party 375 successfully completed projects in Anahuac National Wildlife Refuge, Delta National Wildlife area and Pass A Louvre State Waterfowl Management area.

While working in the Matagorda Bay area and surrounding islands, Party 375 is always mindful of the local environment. To minimize any potential impact to beaches, wildlife or marine life, their “zero discharge” policy is the focus of many discussions during the HSE meetings. A recycling program ensures that oil, paper and plastic products are disposed of properly, and the boats adhere to a “no wake” policy while transiting the local intracoastal waterway or when near sport fishermen. Crewmembers also are advised to render aid to local boaters if needed, believing in employing a “good neighbor” policy while conducting operations, so that Western’s visit to the area will be regarded as a positive one.

Western Geophysical’s Commitment to Health, Safety, and Environment

SAFETY FIRST

Western Geophysical is proud of the Health, Safety and Environment (HSE) accomplishments of all its crews. This section of Profile recognizes crews achieving significant HSE safety records, e.g., accumulated manhours or days without a Lost-Time Incident (LTI), and client letters of commendation. Congratulations to the members of these crews for their efforts, commitment and a job well done.

Accumulated Manhours Without a Lost-Time Incident

<table>
<thead>
<tr>
<th>Party</th>
<th>Country</th>
<th>Manhours</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>Nigeria</td>
<td>1 million</td>
</tr>
<tr>
<td>398</td>
<td>Nigeria</td>
<td>3.5 million</td>
</tr>
<tr>
<td>765</td>
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<td>1 million</td>
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<tr>
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<td>United Arab Emirates</td>
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<tr>
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<tr>
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<td>Kuwait</td>
<td>1 million</td>
</tr>
<tr>
<td>788</td>
<td>Oman</td>
<td>4.5 million</td>
</tr>
</tbody>
</table>

Client Letters of Commendation

- Party 144 received a letter of HSE commendation from Chevron.
- Party 159 received a letter of HSE and production commendation from Shell Petroleum Development Company of Nigeria.
- Party 771 received a letter of HSE commendation from Exxon Exploration Affiliates of Chad and Niger.

*Note: The Safety First records listed are for the reporting period October 1996 through January 1997.
Emergency Trauma Training in Anchorage

In November, employees from Party 520, Party 711 and Party 794 attended a 44-hour Emergency Trauma Technician (ETT) class conducted in Anchorage. Originally developed at Alaska’s Department of Public Safety Academy in Sitka during the early 1970s, this course is consistent with the National Standard Curriculum for the First Responder. One of the strengths of the program is its adaptability to specific target groups such as remote camps.

Alaska

Employees receiving their ETT credentials were (front row from left) helpers Bryan Gershmel, Reuben Baxter, and Richard Bennet, Course Instructor Dawn Vogt, Instrument Technician Steve Budinger, Party Manager Tom Ainsworth, and Chief Observer Bryan Mothershead, and (back row from left) Cable Pusher Mark Cooper, Helper Kip Kack, Vibrator Mechanic Paul Bauer, Helper Terry Jones, Party Manager Ed Nelson, Assistant Vibrator Mechanic Jeff Cottle, Party Manager John Snyder, Helper Jason Ballot, and HSE Advisor Tim Griffiths.

Azerbaijan

HSE Training Coordinator Carl Danley (front row far right) conducted a Safety Management course in Azerbaijan in October. Attending (in alphabetical order) were Navigator Sam Adeola, Observer Aydin Aliev, Mechanic Ruslan Azizov, Chief Mate Aliev Bedal, Mechanic Steve Chisolm, Comp. Mechanic Oleg Firstov, Navigator Rick Flenniken, mechanics David Hughes and David Hyde, technicians Farkhad Isaev and Murghuz Kohranamov, Second Mate Vasif Khanmamedov, Gun Mechanic Igor Nazarov, Radio Operator Kerimov Rafig, and Mechanic Alexander Sherali.

Nigeria

HSE Training Coordinator Carl Danley (center) conducted a CPR/First Aid Instructor course in November in Nigeria. Attending (in alphabetical order) were Dr Iyamu Felix, Dr Martin Nde, Dr Ernest Nwaigbo, and Dr Badubulu Ogbonda.

Nigeria Party Manager Clive Andrews (right) presents Surveyor Oghenekerew Akpokiano with the 1996 Best Input of Safety Audits award.

Niger

A CPR/First Aid course was conducted in Niger in December by newly-trained course instructors HSE advisors Bill Akers and Kevin Hiett, and crew doctor Maurice Khella.

Attending a CPR/First Aid Instructor course in November in Niger were (in alphabetical order) HSE advisors Bill Akers and Kevin Hiett, and crew doctor Maurice Khella.

Houston

HSE Training Coordinator Carl Danley (left), assisted by Hermann LifeFlight helicopter pilot Andy Falletto, conducted a Landing Zone Coordinator course in December in Houston. Attending (in alphabetical order) were Captain David Allen, HSE Supervisor Doug Chapman, mates Robert Falcone, Richard Gordon, and Robert Hebig, Pilot Samuel Pope, and Captain Robert Wooduff.

Louisiana

A Safety Management course was held in New Iberia, Louisiana, in September. Attending (in alphabetical order) were Jr Observer Brian Ayson, Electronic Technician Gregory Bruce, Chief Engineer William Chisolm, Assistant Engineer Manuel Gasper, Chief Mate Don Hester, Sr Cable Technician Anthony Key, Headlinesman Tristan Lavallais, Chief Engineer Jimmy Maughan, Safety Technician Larry McCracken, Geophysical Trainee Alfred Trailman, and Chief Engineer Art Windell.
Over the past decade, three dimensional (3-D) seismic surveying has increased tremendously and become an accepted industry technology. The advantages of using 3-D technology to provide accurate structural images and stratigraphic information are well documented.

Recently, the seismic industry and oil and gas companies have become enthusiastic about 4-D, or time-lapse seismic surveying, and its possibilities for reservoir monitoring.

“Western has been doing research and development work in 4-D since 1985,” says Western Geophysical’s Chief Geophysicist Rick Workman. “Studies we have conducted, including monitoring steam and miscible floods and the movement of gas/oil contacts, appear to be successful.”

Simply explained, 4-D uses a series of repeated 3-D seismic surveys over calendar time. Time, the interval between surveys, is the “fourth dimension.” Seismic images of the base and subsequent surveys are compared to discern differences in the seismic attributes. These differences are correlated to changes in reservoir properties.

The concept of 4-D has gained increased attention as advances in seismic technology have made it possible to obtain more reliable information about fluid distribution in reservoirs. This information allows oil and gas companies to make better informed decisions that can optimize production, improve oil recovery, and reduce costs.

When repeated over time, and integrated with well log, core and other petrophysical and production data, 4-D reservoir monitoring can help characterize reservoirs and help reservoir engineers improve their understanding of hydrocarbon recovery, according to Geoff King, Western Geophysical senior research scientist, London.
4-D benefits

Differences between time-lapse seismic surveys can indicate changes such as fluid movement, pressure changes, or temperature changes in producing reservoirs.

“A key benefit of 4-D is to detect changes in pore fluids and changes in pressure. Both have an effect on velocity and density,” says Workman. “We do not expect the geology to change over time, so differences between time-lapse surveys should indicate changes due to the production process — provided the surveys are repeatable. The repeatability of surveys is the key and is an active area of research at Western.”

The differences between surveys allow undrained portions of the reservoir to be identified and potentially tapped by additional drilling, says Workman. “We also can use the differences to track fluid fronts and infer variations in the reservoir. Those variations are valuable information for making more accurate and detailed reservoir models,” he says. “Improved reservoir models result in better performance predictions when the models are used in reservoir simulators. This can have important economic benefits.”

4-D integration

Understanding reservoir variations and building more accurate reservoir models is a multidisciplinary effort. 4-D seismic data is only one component and must be combined and integrated with well logs, cores, and production data.

Successfully implementing a 4-D project relies on integrating several technologies. While good quality seismic data acquisition and processing are necessary, it also is important that seismic, geologic and engineering software tools be compatible and common models used. “The benefits of using 4-D to monitor reservoirs are maximized when seismic, well, production and engineering data are integrated and when all the geoscientists involved work together as a project team,” says Workman.
4-D data analysis

Because 4-D is a seismic differencing technique, several essential criteria need to be met by modern seismic data. These criteria include expected levels of random noise, signal repeatability, navigation and survey accuracy, and resolution and detection limits.

“The value of seismic data’s contribution to reservoir monitoring depends on its resolution and signal-to-noise ratio,” says King. “And these depend on data acquisition and processing parameters, along with the specific geologic environment for a particular reservoir.”

Important factors include reservoir depth, as well as the nature and complexity of the reservoir and of the overburden.

Western Geophysical 4-D projects

Bob Seymour, manager, 4-D Technology, Europe/Africa/Middle East (EAME), in Western Geophysical’s London office, heads up an operating group providing clients and Western with special 4-D services such as petro-acoustic analysis and synthetic seismic modeling.

“Our group, formed in early 1996, acts as a single point of contact in the region for the trans-disciplinary activity of reservoir modeling,” says Seymour. The 4-D group frequently presents 4-D technology seminars and case histories to clients, deals with client inquiries, and is responsible for marketing and 4-D technology development in the EAME.

The 4-D group includes Seymour, who deals primarily with technical issues and seminars, Andrew Bishop, responsible for 4-D business development; Andy Emery, who concentrates on rock physics and modeling; and Freia Miller, who evaluates the applicability of 4-D to specific oil fields.

“Activity in 4-D work is brisk in all the geographic areas we cover, although most projects are at the planning or field trial stage,” says Seymour. “While not a replacement for traditional monitoring methods, time-lapse seismic is an additional tool in the engineer’s kit.”

In Houston, Workman, along with Research Geophysicist Xuri Huang and Senior Scientist Laurent Meister, continues research and development work in 4-D technology, as does Senior Research Geophysicist Keith Hirsche in the Calgary office.
Future directions

The use of 4-D seismic in reservoir monitoring is expected to become more widespread as its potential financial impact becomes apparent. Many 4-D projects have already been successful, but 4-D is still at the proving stage where 3-D was about a decade or more ago.

Technology can be expected to improve dramatically over the next few years, spurred by economic incentives to get more hydrocarbon production from today's reserves. Among developments to be expected is a general reduction in cycle time of the entire system, to make results more useful for day-to-day field management, says King.

Further developments and progress in data acquisition, data processing, data analysis, and integrating technologies and software also are expected.

"There is a lot of interest in 4-D, but we still have a lot to prove," says Workman. "There are technical issues to address as well as economic success and the value of the information gained by this technology. At Western, our activities in time-lapse research and development and in conducting 4-D studies will help make 4-D seismic an accepted, well-utilized technology."
Supporting Western’s Field Efforts

Applied Technology’s research, training, and technical services focus on innovative and advanced data acquisition techniques.

By Patty Chambers

Researching new geophysical data acquisition technologies and exploring advanced and innovative techniques to improve Western Geophysical’s operating efforts in land and marine theaters is the charge of the 82 men and women who work in Applied Technology. This division is responsible for seeing that Western crews have at their disposal the latest and most efficient surveying technology.

“Our mandate is to search for, and research, new venues that will enhance the quality of the data being acquired as well as improve the productivity of Western’s operations in the field,” says Ugo Picchiani, general manager of Applied Technology. “We focus on developing the most suitable and up-to-date technologies, on testing and acquiring the most advanced equipment the industry can supply, and on providing geophysical and technical support to Western’s field efforts.”

Applied Technology, which is part of Western’s Research and Technology department, was restructured a little more than a year ago when Picchiani, a Westerner for 40 years, was put in charge of the division. Part of the restructuring plan involved incorporating the engineering group that was retained after the sale of Western Geophysical’s Exploration Products to Input/Output. Applied Technology now consists of two main sections, Engineering and Geophysics, together with additional support groups such as radio repair and geodetic support.

Applied Technology also shares with Western Hemisphere Marine Operations a seismographic vessel, the Kenda, which is used for research projects and equipment testing. The Kenda is currently conducting an accelerated aging test on Western’s newest solid cable system and is testing other new products such as Western-designed reduced diameter energy source umbilical and reduced diameter seismic cable leader sections. The Kenda also is scheduled to test Input/Output’s new MSX 24-bit multicable shipboard recording system.

Applied Technology General Manager Ugo Picchiani
Gil Wright, Applied Technology navigation, at the console of the MSX 24-bit multicable shipboard recording system, soon to be deployed on a Western vessel.
Seismic comparisons data are often acquired by the Kenda to either test new equipment or evaluate new surveying parameters or techniques.

“We take emerging geophysical technology and move it into Western’s operating areas,” says Mike Norris, area manager for Geophysics.

This involves researching basic and emerging technologies, translating them into usable products through Western’s vendors, installing the technology, and training crew personnel to the level of proficiency required. The group includes geophysicists, surveyors, physicists and engineers with extensive worldwide experience.

“Our section is divided into three primary geophysical support groups—marine, land and mechanical,” adds Norris. “The focus of the first two is self-evident while the mechanical department provides as-needed support to the other Applied Technology groups.”

Engineering, says Director of Engineering Paul Morgan, is comprised of three main groups—engineering, navigation, and field service quality control (FSQC). Both the engineering and navigation groups evaluate, select and adapt vendor hardware and software to fit the needs of land and marine operating crews.

“In many cases, this requires the engineers to design additional software or hardware in order to adapt the vendor’s equipment into a total system solution for the required field application,” says Morgan.

The FSQC group assists the crews by testing and verifying that all newly purchased systems meet or exceed published vendor specifications and functions.

“After fielding, equipment is tested on a regular basis with the results submitted to FSQC for evaluation,” explains Morgan. “This group routinely deals directly with Western’s clients to answer questions about field equipment specifications or the tests performed on a particular piece of equipment.”

And, while Applied Technology is sectioned into two primary operational areas by function and responsibility, the group is anything but divided.

“There is a very heterogeneous mix of training and experience in both of the major sections with many crossovers,” says Jim Cain, manager of administrative support for Applied Technology. “And, our employees have a wealth of experience and a history of commitment to Western. More than half have been with the company more than 10 years, and many for more than 15 years.”

In addition to assisting with day-to-day administrative tasks, Cain maintains Western’s geodetic database and manages the communications services, or radio support group, overseen by Applied Technology.

“The bottom line is that we all work together as a team. This certainly bodes well for overall project management,” he says. “The top priority is to help our field crews collect and process seismic data more efficiently.”

“We spend a lot of time evaluating whether new equipment or systems fit Western’s needs,” he adds. “We may need to add or eliminate features, and act as the interface between vendors and the crews to determine whether the equipment is beneficial for our operations. We want our field crews to have the most advanced and efficient equipment possible so that they may provide a more accurate, faster, or better product to Western’s customers.”
Western field personnel attend an Applied Technology navigation training class in Houston.
Productivity of technological tools is multi-pronged, Cain adds. “While we want a particular piece of equipment to work faster, it also has to be dependable. So, we will run repeated tests to make sure it passes our endurance standards. It won’t be of much use out on a vessel if something works faster but breaks down often.”

In addition to testing or designing new technologies, the Applied Technology group is heavily involved in an educational role, providing training to the crews who will need to use the latest piece of seismic equipment or specialized computer software.

Applied Technology conducts training sessions both in the Houston and London offices as well as directly in the field.

“We are here to support the crews,” says Colin Wilson, navigation manager. “That could mean a week long training session on the latest software package for navigation crews who are rotating through Houston, or, often sending specialists out to the crews. Most of our people are not holed up in a laboratory in the corporate office — they are working directly with the folks who need their expertise.”

Applied Technology has fathered a number of projects that have had a significant impact on crew operating performance and data quality. Included are:

- SPECs – a rapid 3-D design tool that allows the geophysicist to evaluate and optimize acquisition survey parameters. The 3-D design can then be transferred to the field to monitor survey quality and modify the survey design as dictated by field conditions.
- MIDAS™ System – provides integration between marine field acquisition and the initial stages of seismic data processing.
- PosNet – is a local, multi-target differential GPS solution providing high accuracy positions for energy sources, cable heads, tail buoys and support craft.
- Prospect Data Logger (PDL) – provides a database solution for automatically collecting all ancillary data generated on marine streamer vessels and allows automated control of the acquisition process.
- UNAVCHK® System – a full navigation data post-processing system capable of resolving the location of all deployed equipment, such as seismic cables and energy sources, utilizing a single-pass network solution.

Applied Technology personnel and expertise also contributed significantly to the design and implementation of Western’s new series of upgraded, multicable vessels. The Western Monarch was the first of the series.

A representative sampling of other Applied Technology tasks over the past few months includes testing new shipboard recording electronics; assisting, updating and distributing a PosNet operations manual to crews, and providing on-site, start-up assistance to operations in Brazil, Venezuela, Mexico, Canada, Nigeria, Niger, Oman, Russia and the U.S.

“Applied Technology and the services it provides are an investment in Western’s future,” says Picchiam. “The research and support we provide help Western maintain its position as the leader in the geophysical industry.”

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Western’s research vessel, the Kenda
Bill Bank and Dave Whitcher of the field service quality control group look over data from a semi-monthly test sent in by one of the field crews.
Speculative data, also known simply as spec data or just plain spec, has been a part of Western Geophysical's business for more than 30 years. Introduced by former company president Booth Strange in the mid 1960s, this innovative business approach has helped position Western Geophysical as the world's leader in seismic services.

"Spec data has been a large part of Western's business for as long as I can remember," says Joe Walker, general manager of Spec Data Sales and Services. "It is, and will continue to be, an important investment for the future success of our company."

In its most basic form, acquiring speculative data means that Western bears most of the cost of sending out its crews to acquire and process seismic data.

"If an individual client contracts with Western Geophysical to conduct a survey, the data we acquire is proprietary and that company has exclusive rights to the data collected. They also bear the full cost of collecting that data," says Jerry Peterson, manager of data sales, Western Hemisphere.

"With speculative surveys, Western assumes a certain amount of risk in adding to its 'non-exclusive' library of seismic data. We rely on being able to license the data we collect and process," says Peterson.

"Speculative data allows clients to purchase the data on a much lower per unit basis," adds Walker. "More and more of

Rick McFarland, manager of 3-D speculative data services, and Teri Watts, geophysical analyst, preview samples of spec data at one of three client workstations set up in the Houston office.
our clients are using spec data. It is much less expensive and more efficient for them than contracting for proprietary data, or gathering data themselves.

Two of the largest and most important speculative projects in Western's history are the ocean bottom cable Mega Survey™ program and the deepwater Ultra Survey™ program, both conducted in the Gulf of Mexico.

The acquisition phase of the Mega Survey was completed last spring. The survey, which covered 705 blocks (more than 16,000 square km), was the largest contiguous 3-D speculative survey ever conducted in the Gulf of Mexico. Originally estimated to take six crew years, Western Geophysical's ocean bottom cable (OBC) crews were able to complete the survey in three-and-a-half years.

By all accounts, the Mega Survey program set a new standard for seismic data quality in the Gulf, particularly in congested areas. Western devoted four crews to the survey, with each crew consisting of four to five vessels. Data acquisition took place 24 hours a day, year-round, and processing software had to be developed and continuously upgraded to keep up with the survey's demands. The Houston marine processing center also doubled its computing resources during the course of the survey.

In spite of the challenges of the shallow-water environment, Western crews were able to produce a speculative survey that is a generation ahead in quality and delivered years ahead of schedule. This survey was so successful that an additional 650 blocks (15,000 square km) of 3-D OBC data were acquired in the areas adjacent to and surrounding the Mega survey.

Last August, data acquisition began for the largest deepwater 3-D seismic survey ever conducted by Western Geophysical in the Gulf of Mexico. The Ultra Survey program, expected to be completed in less than three years, will cover approximately 1,000 outer continental shelf (OCS) blocks.

Western's super-seismic vessels, the Western Spirit and the Western Atlas, are already at work on the Ultra Survey program. The Western Spirit
is utilizing dual compact sleeve source arrays and is towing four of Western's new reduced-diameter 24-bit 8,000 meter recording streamers. The Western Atlas also is pulling multiple 8,000 meter thin-streamer cables for the survey.

The magnitude of the Ultra Survey program, the acquisition methods utilized, and onboard data processing techniques will ensure that Western will be once again making seismic history with the success of this venture in speculative data.

“The Mega and Ultra surveys illustrate the broad scope of Western’s capabilities in both shallow and deep water, and addresses our clients’ interests in the Gulf region,” says Rick McFarland, manager of 3-D speculative data services, adding that Western is rapidly increasing its 3-D land speculative data library as well.

In keeping with Western’s commitment to customer service and satisfaction, spec data sales and service personnel also are developing several new systems to help clients better access available data.

The department is currently setting up three client workstations in the Houston headquarters building. The dedicated workstations, says McFarland, will allow clients to preview speculative data they may be interested in licensing.

“The best way to demonstrate data is to show them on workstations similar to what our clients have available in-house,” he says. “This type of set-up allows them to see samples of what we have available, giving them a better idea of how the data appear and making their selection more timely and convenient.”

“For clients who prefer to have their data printed on paper, we can do that too,” adds McFarland. “We are versatile — our job is to serve our clients and address their changing needs.”

The group also is using a laptop version of the in house workstation, which can be taken to clients’ offices and plugged into larger monitors if necessary.

“Several clients have already come into the office and taken advantage of the workstations to quality control their data,” says McFarland. “The response so far has been positive. I suspect this service will be utilized even more once our clients know of its availability.”
Another project for spec data service is building a database of client information that will allow the group to generate reports and graphic maps on a per client basis.

"This database system will allow us to look at a client's history — such as which 3-D speculative data surveys they've licensed and when, and how much they've spent on our spec data — in a matter of minutes," says Walker

"Not only will the database give us almost immediate client history reports, but it also will help us more efficiently prepare quotes and requests for processing and expedite the billing and contractual process," adds McFarland. "We want to do all we can to help serve our clients and take care of our own internal needs for fast, accurate information."

"Western Geophysical puts a lot of effort into its spec data acquisition, and in trying to develop more effective ways to manage and store that data," says Walker. "We follow stringent quality control parameters and always go the extra mile to ensure accurate data, safety, concern for the environment, and the best service possible for our clients — all while being cost competitive."
Data Storage and Management Capabilities Expanded

To meet the increasing needs of the oil industry for professional data management and storage, Western Geophysical has opened a 2.3 million cubic-foot storage facility, located less than a half mile from its Houston headquarters.

A wealth of data management and data storage services is offered at this new facility, including fully staffed on-site print and tape copying departments. Safety and 24-hour security are ensured through an advanced electronic surveillance system, highly controlled access to the building, temperature and humidity control, and a fire suppression system.

"Western Geophysical has been storing its own 2-D spec data for more than 20 years, and has categorized, indexed, organized and input to comprehensive databases some 1.2 million pieces of seismic film and 3 million tapes," says Patricia Greeson, manager, 2-D Spec Data Services. "We have the expertise to now offer that service to our clients.

"Moving into this facility has allowed us to combine — under one roof — Western's 2-D seismic data and personnel from several different data storage locations, including our main building, the former Halliburton facility, and the Denver and Midland offices," says Greeson. "The move also enables us to store, manage, prepare, print, copy, ship, and broker data for clients."

In addition to the facility in Houston, a smaller data storage facility in New Orleans has been serving client needs for more than three decades. At each facility, comprehensive database management systems support convenient data retrieval, reproduction, and refiling on a daily basis."
Sable Island

As the island’s wild horses forage for food, Western’s scientists search, too — for a better understanding of the gas fields that may contain enough power to heat a million homes for 25 years.

Reporter — Darrell VanMeter
Sable Island, an untamed and windy region off the coast of Nova Scotia, is perhaps better known for the 350 wild horses that graze on beach grass along its shores than it is as a site for oil and gas exploration. Beautiful, rugged, and among the world’s most environmentally sensitive areas, Sable Island, the Gulf of St. Lawrence, and the inland bays and shores of Nova Scotia and Newfoundland, were recently the survey project sites for Western Geophysical’s Crew 167.

More accustomed to working offshore in the Gulf of Mexico, Crew 167 has seen its share of shallow water, oil platforms and obstructions. Hurricanes, tropical storms and fog also are commonplace, but the scope and magnitude of such occurrences cannot compare with the offshore experience of the Maritime provinces of Eastern Canada.

Preparing the crew for transit and retrofitting the vessels to comply with Canadian Coast Guard and Canadian Offshore Petroleum Board regulations took almost three weeks. Inspections were made in Texas and Louisiana by Canadian authorities who flew down to see the crew.

THE BEAUTY OF SABLE ISLAND

The history-rich region of Sable Island lies approximately 185 miles east, southeast of Halifax, Nova Scotia in the North Atlantic Ocean. Referred to as the “graveyard of the Atlantic,” the sandy banks of Sable have been the final resting place for more than 500 ships and thousands of sailors.

Its low profile shoreline, coupled with strong pooling currents and dense fog, a result of the interaction between the warm Gulf Stream and cold Labrador Current, provide conditions that would fool even the most knowledgeable sailor. So many ships fell to its shores that early navigators drew maps depicting Sable Island as being located along much of the eastern seaboard of the U.S. when in fact its dimensions are only 25 miles long about a mile wide.

Considering its size, location and available vegetation, it is quite remarkable that Sable Island is home to one of the last known herds of wild horses. The horses have survived for nearly 250 years, breeding by a process of natural selection without intervention of man. Zoe Lucas, who was contracted to set up guidelines for the seismic crew lives on the island for nine to 10 months of the year, studying the herds and conducting environmental and biological studies funded by various grants.

Rule number one on Sable Island. Don’t bother the horses, nor any other wildlife or vegetation.

Extreme care and preplanning were taken by the crew accessing the island to deploy cables and modules attached to the recording vessels offshore. Orientations for safety and environmental concerns were given to workers upon arrival so that delicate areas would be avoided. And,
Observer Jason Lewis from the Calgary land crew on Sable Island
special low-voltage cables were used to prevent harm to animals in the unlikely event of an animal biting through the protective jacket.

Sable Island, formed from glacial moraine (accumulation of sediments carried and finally deposited by a glacier), may contain enough resources to heat a million homes for 25 years, predicts the Sable Island Offshore Energy Project. A consortium of oil companies, the Energy Project hopes the data collected by the crew will add credibility to its projections.

**SURVEYING WORK BEGINS**

Party 167 fielded a 24-bit BCX recording system in March 1995, making it the first 24-bit ocean-bottom cable (OBC) crew in the world. The crew also utilized dual sensor recording which results in the highest resolution seismic data possible in the marine environment. Once on land, the BCX system switched to the land 24-bit module, the MRX, the industry standard for land acquisition, allowing seamless coverage in the transition zone with a single system.

First production in June started out slow because of thick fog encountered in the offshore waters. It is often said the fog in Nova Scotia is so thick you can sit on the boat railing and lean your back against it. But, be care-

ful because it lifts quickly and you may fall overboard! Well, we found that it sometimes doesn’t lift for weeks. The OBC method of laying out cables, hooking into them with a recording boat, and then shooting argunrs with a source boat is affected much more by fog than a conventional single vessel streamer operation. Then again, a streamer can’t be dragged across an island. Operations don’t really change in fog — vessels just move more cautiously when working in close proximity to one another.

After about a month into the survey, the island’s seals completed their courtship and mating rituals, the fog lifted, the sun was out, and we began mobilizing the land crew to the island. Receiver points were surveyed and equipment deployed.

No shotpoints were taken on the island so that the Arctic tern nesting areas would not be disturbed. Sable Island also has a whale sanctuary, the Gulley, in a deep water area east of our prospect. While in production with our argunrs, whales could be seen playfully surfacing and watching our operation with no apparent cause for concern.

**STORM WARNINGS**

The North Atlantic is not usually associated with tropical storms or hurricanes. The warm, balmy waters of the
Gulf of Mexico are more attractive for storm intensification than the icy waters of the North Atlantic. However, the crew had to evacuate Sable Island four times during the course of the survey because of prevailing storm tracks coming up the east coast. There was tropical storm *Bertha* on July 13, and hurricanes *Edouard* on September 1, *Hortense* on September 13, and *Josephine* on October 9.

During the evacuations, local townsfolk would come to the docks and drive along the pier, viewing our boats as though we were the hottest thing to hit town in years. The local economies, needing a boost, were anxious for an oil boom and we were leading the seismic research that could redefine Sable Island.

Of the storms we encountered, *Hortense* maintained much of its strength after reaching the cold waters. After the hurricane passed just north of the prospect area, the Rowan Gorilla reported peak wave height of 17 meters (55 foot seas).

*Hortense* came inland in Sheet Harbor, Nova Scotia, which was exactly where the crew had evacuated. While the boats were secured to the dock, the local weather service predicted the eye would come inland 60 miles west of the harbor. Being experienced with storms in the Gulf, we realized we would be in the northeast quadrant of the storm and could expect a very large storm surge. The storm also would be coming at high tide and we were in an enclosed bay that could fill up like a bathtub and put the boats on the dock.

We called the Maritime Weather Center and inquired about our location, the storm’s progress and potential...
storm surge forecasts. The local forecaster explained that between the orientation of the entrance of the harbor and the storm track, the water level should rise only a meter over normal high tide. The eye of the storm passed over us with no problems. We were very fortunate to have been in a protective area with high hills to divert the winds aloft.

**DISASTER STRIKES**

The survey continued throughout early fall. Near the end of the survey work at Sable Island, disaster struck when the source vessel, the *Western Aleutian*, blew an engine. The crew jumped into action by disassembling the engine while heading into Halifax. Meanwhile, port engineers from New Iberia, Louisiana located an engine in Galveston, Texas. The engine was put on a hot-shot truck and shipped to Halifax. A husband and wife team drove nonstop for two days before reaching the pier. By this time, the port engineer had arrived and supervised pulling the blown engine out of the boat. The new engine was installed and plumbed in, cranked up, and the boat sent out for sea trials. It functioned perfectly and the vessel was cleared for Sable Island in record time.

While the *Aleutian* was in port, the recording vessel *Western Polaris*, cable boats *Cape San Blas*, and *Cape Sable* lay at anchor about a mile off the north beach. Zodiacs took crewmembers ashore during the day to assist with the demobilization of land gear. The day the *Aleutian* sailed back for Sable Island, gale warnings were issued.

Forecasts from the weather service predicted easterly winds of 35 miles per hour and seas 10 to 12 feet. At the conclusion of the Zodiac operations, the *Polaris* and *Cape Sable* moved to about three miles offshore. The forecast did not raise any concern to the crew as we were in good anchorage, or so we thought. The wind freshened up about 9 a.m. as predicted. However, winds were more in the range of 50 miles per hour. The wind also was more northeasterly, putting the vessels windward to the “graveyard of the Atlantic.” Seas began to show serious signs of “shoaling,” building fast as waves came into the shallow approaches of the island.

The gale warning was upgraded to a storm warning by the weather service. The meteorological term for the weather we experienced was a “bomb” — where a low pressure area moves up the east coast and the central barometric pressure drops dramatically.

About that time, we heard the anchor chain break. Having the mains already running prevented us from being blown ashore and allowed us, and the *Cape Sable*, to try and get to the leeward side of the island.

The *Cape San Blas* was the closest vessel to shore. When the crew went to pick up anchor, the anchor windlass froze up, forcing them to take out a master link in the chain and let their anchor go, as waves began crashing over the bow. As the vessels navigated carefully around the west spit, a very shallow area, the wind continued to blow in excess of 50 miles per hour for about six to seven hours. Seas around the spit approached 25 to 30 feet.

Once all the vessels made it around to leeward, we proceeded to get in as close to land as we felt comfortable, ending up about a mile offshore of the lighthouse. After the boats were situated on the south side, the wind picked up again, this time with hurricane force gusts of 75 miles per hour. Inside the bridge of the *Western Polaris*, the spotlight handles rattled as if they were going to be ripped out of the ceiling.
Meanwhile, the *Western Aleutian* was held up about halfway to the prospect and was running a weather pattern in 15 to 20-foot seas. The winds there were not as severe as what we were recording on the island.

The crew continued to work on the project until excessive weather downtime led to a decision to demobilize the crew. The crew was stressed and tired, waiting for orders to return to the warm, sunny Gulf of Mexico for the winter. The orders came, but they were not what was expected!

“Head vessels to Stephenville, Newfoundland to clear customs and immigration.”

**ON TO NEWFOUNDLAND**

The prospect, like Sable Island, contained several areas of transitional work. But, unlike the smooth sandy approaches and flat terrain of Sable, Newfoundland had rocky beaches and the interior land crossings were steep and mountainous. We were taking OBC to another level, and elevation.

The project called for shooting seven 2-D lines. These lines were hybrid everything — airgun offshore, dynamite onshore, dual sensor offshore, geophone onshore. Two particular lines were a consortium of two seismic companies — Western and a local contractor. Our airgun and dynamite shots were shot into both systems simultaneously. The areas of transition were narrow enough to run all OBC cables and modules. The longest OBC portion on land was more than a kilometer.

On the first day of production it snowed, and many of the crew from the Gulf Coast region were ready to leave at that point. However, we convinced them to stay — we had their plane tickets. The prospect in Port-au-Port Bay was very scenic with its snow-capped mountains and crystal clear water. One particular line we deployed with a cable boat in the Gulf of St. Lawrence. Then we laid out six sections of cable into the rocky shoreline with a Mark VI Zodiac.

From there we deployed, by hand, four OBC cables on land going up a slight ridge with heavy brush dropping straight down a rocky cliff some 80 feet into Port-au-Port Bay. Again we continued operations from the beach with a Zodiac to the recording vessel, *Western Polaris*. From the recorder, our seismic cables reached all the way across the bay through the transition-zone and onshore for one kilometer.

Snow storms were a frequent occurrence and whiteout conditions always a possibility, so extra precautions were taken prior to Zodiac operations to make sure vessel tracking would be maintained.
It was particularly impressive to stand atop a ridge overlooking the Gulf of St. Lawrence and see the source vessel Western Aleutian shooting into cables under your feet, then walking 15 feet down the road and see the Western Polaris in Port-au Port Bay collecting state of the art seismic data with continuous coverage through a unique transition-zone area.

For the better part of half the year, Crew 167—almost 150 members, including some local laborers—worked diligently at performing OBC operations in the Canadian Maritime region, meeting all the technical and logistical challenges the survey posed.

When the project was completed, Crew 167 cleared customs in November and headed back to the warmer, more familiar waters of the Gulf of Mexico. The competent and professional people we worked with, and especially the support of personnel in Houston, New Iberia and Calgary; the friends we made; the beautiful scenery we viewed, and the experience we gained will stay in our minds for a long time. ✤
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“Capturing the Moment”

Profile magazine will showcase Western Geophysical employees’ photographic talent when it publishes the winning “Capturing the Moment” photographs in its summer issue. Winners also will have their work displayed in the lobby of WG1 during July.

The contest is open to all Western Geophysical employees and retirees. Spouses, family members, and former employees are not eligible. Please send your best photographs, color or black and white, by May 1, 1997. Cash prizes of $250, $100, and $50 will be given for 1st, 2nd and 3rd place winners in each of four categories. Photos must relate to Western Geophysical, may not have been published previously in Profile, and must have been taken with the past two years (not before 1995). A panel of judges will determine the winning photographs.

Categories include:
- Environment (landscapes, nature, animals)
- People/Lifestyles (individuals, crews)
- Operations (work locations, offices, buildings, boats, equipment)
- Creative (abstract photo illustrations of ideas)

To enter:
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- Prints should be at least 3 x 5 inches. We recommend 5 x 7 or 8 x 10
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- DO NOT attach anything to photos with staples or paper clips.
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Send your entries to
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Western Geophysical
10001 Richmond Avenue
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Western Geophysical Photo Contest Entry Form

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Categories:
- Environment
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- Operations
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Party 732, equipped with a 24-bit Vision™ system and 24 channels of ground electronics, was a crew on the move for most of 1995 and 1996. Stationed in the Red Desert area of southwestern Wyoming near Point of Rocks, the crew spent most of 1995 as one of three crews working on a 500 square mile 3-D spec project, then moved on to Baggs, Wyoming in the late fall.

The crew faced a number of new challenges with this project. The 3-D survey acquisition began in an area of steep canyons, and moved across bentonite hills that were extremely slick and dangerous when wet or covered with snow and ice. The job ended in the Little Snake River Valley, where some receiver lines had as many as 14 river crossings. This also was the first project in which the crew utilized a helicopter to move geophones and cables.

In December 1995, the crew moved to Poplar, Montana, the center of government for the Fort Peck Indian Reservation in northeastern Montana. All of the 3-D survey acquisition was completed on the reservation. Various crewmembers worked closely with tribe officials to determine hiring requirements and work schedules for tribal members. During that winter, the crew encountered high winds, low temperatures, and wind-chill readings below -85°F. Even with bad weather and deep snow, the crew averaged 20 hours of vibrating time per day, providing the client with a high-quality product in a short period of time.

In January 1996, the crew returned to Point of Rocks. Again by using a helicopter, the crew was able to record 125 square miles of data in record time and complete the 500 square-mile project.

In February, the crew was given a proprietary 3-D survey project in Moab, Utah. The ground was covered with six inches of snow when the crew arrived, but by the time the first swath was laid out and the vibes arrived by truck, temperatures rose into the 60s. We again utilized a helicopter to move wire on the project to minimize damage to environmentally sensitive areas. The vibrator trucks followed designated trails under the watchful eye of the client representative. By working the trucks at night in selected areas, and paying close attention to environmental issues, the crew completed this project with minimal impact on the terrain.

After completing the Moab project, Party 732 moved to Shawnee, Oklahoma, an area covered with large trees and dense underbrush. While the vibe lines were cleared for access, the receiver lines could not be cleaned of the underbrush. The challenge was to place the geophones according to the client’s specifications. Vibrating also proved difficult due to the large number of landowners and the small size of each owner’s acreage.

When this project was finished, Party 732 traveled to Bethany, Oklahoma, a small suburb of Oklahoma City. Some of the vibe lines crossed the city golf course, ranch and park area, while other lines were in residence.
yards, tennis courts or church parking lots. The vibrator trucks operated carefully due to heavy vehicle traffic on city streets and curious sightseers.

The Bethany job was finished in mid-March and the crew moved to Chillicothe, Texas. The crew was given three projects in this area — two crossing the Red River and one crossing the Pecos River. The crew again encountered new and different challenges, such as wild hogs that got the attention of unsuspecting crew members moving through the dense mesquite brush. Violent afternoon thunderstorms caused numerous equipment problems. These projects were successfully completed in June.

In July, the crew was sent to Hobbs, New Mexico as one of four crews working on a 3-D spec project. This area is covered with thick mesquite brush, high sand dunes, and oil pipelines, and extra effort was required to move the ground equipment and vibrator trucks through the sand dunes.

From Hobbs, the crew went to Andrews, Texas in September to complete another 3-D spec project. Since this project was already 85 percent finished, the crew spent only two weeks in the Andrews area.

After Andrews, the crew moved to Abilene, Texas to work on a proprietary 3-D survey project in an area of pastures and farm land. Fall rains and snow storms caused low lying areas to remain too wet to proceed. Using AHV II buggy vibrators, we were able to get back into the field sooner than if we had used truck mounted vibrators. The crew completed the project in six weeks and moved to Palestine, Texas.

The permitting phase of this 80-square-mile proprietary 3-D project in east Texas began in early April 1996. Ten permit agents were kept busy acquiring the 5,000 permits needed for the job. After several months of permitting lead time, the surveyors received the go-ahead to start putting flags in the ground.

When the surveying was 25 percent complete, three drilling contractors were hired. We employed nine buggy-type drills and a mini-hole crew to reach holes that were difficult to access. The drilling phase took longer than expected due to rough terrain and complex drilling operations. When the recording crew began work in mid-November, the drilling was 45 percent completed.

The recording crew used a helicopter to move geophones and cables, as well as other equipment into rough terrain with minimal delay. Most of this project was covered with large trees and standing water, and winter temperatures made for difficult working conditions. We also contended with several major highways crossing the spread, the city of Neches on one side of the project, the Palestine River cutting through the south end of the project, and various logging operations. And, abundant rats and tree squirrels chewed through cables in seconds, requiring 23 damaged cables to be replaced in just one day.

Although a challenging project, Party 732 was successful in acquiring a high-quality product, and everyone was proud of the job they performed. Party 732 also would like to thank the other crews and individuals who assisted with this project.

### Alice, Texas

Operating out of Alice, Texas, Party 703 has unofficially become the transition crew of South Texas. Led by Party Manager Branch Seavers and Health/Safety/Environment (HSE) Advisor Owen Tollefson, the crew covered a lot of ground and a wide variety of environments during the past two years.

In the spring of 1994, Party 703 convoyed to the bayous of Port Allen, Louisiana, to tackle a 3-D short-hole job, where the cable crew enjoyed various adventures with “the biggest rats” they had ever seen (Nutria), then returned to the brush country where they spent the summer completing a 3-D survey in the sands of Zapata, Texas. In May 1995, the crew celebrated two years without a lost-time incident (LTI) and were rewarded for their achievement with a trip to AstroWorld in Houston.

The crew moved on to Freer, Falfurrias, Paris, and El Campo, Texas, to complete a variety of 2-D and 3-D vibroseis and short-hole jobs. They finished 1995 in Paul’s Valley, Oklahoma, working on Western
Geophysical’s Golden Trend 3-D Spec project. The prospect proved to be quite a task as it had eight lines crossing the Washita River 22 times before the job could get started.

The crew’s greatest challenge was dealing with La Sal Vieja lakes at the end of the Lago-Montana prospect in Raymondville, Texas. This pair of salt water lakes is filled with runoff from local farmland. This created two problems for Party 703 — how to survey, drill, and shoot in windy conditions on these two lakes that are 2 to 25-feet deep and four square miles, and how to move data acquisition cables and equipment across the corrosive waters. Operations were coordinated through, and observed by, the U.S. Fish and Wildlife Office since the area is partially within a wildlife preserve.

All this could not have been possible without the hard work of the permit team, headed by Field Supervisor Joe Rosas and permit agents Rocky Mann, Urbano Cueva, and Richard Steele. They paved the way for chief surveyors Duane Eudy and Blase Jimenez, and their team of surveyors who opened up the brush country and farmlands for the acquisition team.

The survey effort, using differential global positioning system (DGPS), was completed by survey helpers David Loya, Reynaldo Cavazos, and Joe Johnston, who used air boats to negotiate the shallow waters. Shot hole drilling was accomplished by using a triple fan airboat mounted with a top drive drill for shallow water work and a drill barge for deeper waters. Bill Waldruff of Seismic Drilling Services provided invaluable assistance in this phase of the project.

The cable crew, led by Observer Dennis Rinehart and Cable Pusher Clem Garza (both original 703 crewmembers), successfully completed these difficult tasks with numerous highway crossings, long “pack-ins” through cropland, and treacherous cactus in the brush country. Head Mechanic Enrique “Cuba” Zavalas and Lead Vibrator Operator Tony Juarez delicately maneuvered the team of vibrators through a maze of canals, irrigation lines, and natural gas pipelines. Field Supervisor Marty Nurrie helped through the project and in planning the acquisition phase.

The cables were laid out by Truck Driver Gilbert Sandoval, Boat Driver Raymundo Ortega, and a fearless crew, using a combination of land geophones on the edges and islands, marsh phones in shallow water, and hydrophones in deep water. The land acquisition modules and batteries were suspended out of the water with custom-made floats by Cable Repairman Martin Flores.

The shooting was completed in a small fiberglass boat captained by Party Manager Branch Seever, with Assistant Party Manager Mike Bryan’s hooking up the firing line. HSE Advisor Owen Tollefson stabbed the Uphole phone and manned the shooting box. The first springtime coastal winds often made it difficult for the boat to remain still long enough to hook up to the...
The problem of planting an underwater telephone 2500 to 25-foot deep water was solved by attaching the phone to a telescoping survey pole. When filled with water, it quickly sailed to the bottom.

The resulting 3-D data is of exceptional quality, satisfying the needs of our clients. Processing Supervisor Rick Kania and Analyst Vera Lansky are commended for their ability to incorporate the various types of sources and detectors utilized in this demanding project.

Party 703 returned to Zapata, Texas to spend the summer working in the sand. In June 1996, the crew achieved three years without an LTI and celebrated by traveling with their families to San Antonio, Texas to attend Texas’ newest theme park, Fiesta Texas.

Western Cove

In November 1996, the crew of the Western Cove began work on a 2-D speculative survey along a large length of the coast of Angola, West Africa, for the Europe/Africa/Middle East (EAME) New Ventures group. Totaling more than 11,000 mile line kilometers, the survey extends out from earlier shallow-water acquisition to 120 miles offshore, and is located in water depths up to 3,000 meters.

Party 107’s Health, Safety, and Environment (HSE) operations are the immediate responsibility of Party Manager Charlie Stewart. Onboard the Western Cove, Captain Hannes Miesenberger, a veteran captain with Western Geophysical, works closely with Seismic Acquisition Coordinator Nick Freeman to orchestrate HSE activities. These crewmembers, under the guidance of London based Marine Operations Supervisor Bernard Marley, ensure the vessel meets or exceeds our HSE standards and maritime safety guidelines.

Chief Mate Erik Andersen also serves as the safety officer for the crew. In addition to his standard seafaring duties, he ensures all crewmembers have the correct HSE information regarding the vessel, its operations, and company policies.

Part of the crew of the Western Cove since the day Western acquired her, Boson Rolando Macuja, along with seamen Melchor Punzalan, Jeorame Ape, and Orlito Natividad, keep the vessel in excellent condition. They maintain, clean, paint, handle all signals and mooring lines, and operate the zodiac workboat and fast rescue craft. Chief Cook Pedro Ferrer and Galley Hand Romy Tanena keep the crew so well fed, they get complaints that crewmembers go home much fatter than when they joined the vessel.

An audit team, consisting of Bernard Marley, Party Manager Steve Fewtrell, Marine HSE Manager Dave Goodman, and HSE Supervisor Richard Llewellyn, recently joined the crew via helicopter from Ponte Noire, Congo. The audit findings and report complemented Party 107 and the Western Cove. Although not one of Western’s newest vessels, the ship has been well maintained and her acquisition capabilities continue to enhance EAME’s position in the marketplace. The audit team appreciated the crew’s hospitality and cooperation.

Party 107 anticipates completion of the New Ventures project early in April 1997. They will then move to other work in Northwest Europe.
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  * Cotton, William R.
  * Fair, Gary L.
  * Martin, Eugene H.
  * McKay, Donald B.
  * Skaaning, Jack C.

30 Years
  * Brown, Pamela W
  * Drira, Abdelfatah
  * Hankock, Guy J
  * Lewis, William F
  * Mason, Nigel S.
  * McDonald, Barry
  * Miranda, Anthony F

29 Years
  * Byrne, John P
  * Cain, James L.
  * Ferrari, Shirley
  * Hough, Derek
  * Jones, Henry C.
  * Leg, Frank
  * Sadler, Terry J

28 Years
  * Barker, Josh W
  * Clark, Donald R.
  * Faris, Nazim F
  * Gross, Stanley
  * Masri, Nadim A.
  * Matek, Emil J
  * Moree, Robert F.G.
  * Nash, Harry E.
  * Sharp, James R.
  * Skerli, Damir S.

27 Years
  * Camacho, Mario
  * Cantu, Joe
  * Hix, Jr., Thomas B.
  * Jones, Robert
  * Lansikey, R. Malcolm
  * Mason, Robert J
  * Reynolds, M. Gerry
  * Smith, Reardon
  * Torres, Helen
  * Vagn, Volker

26 Years
  * Bice, John W
  * Byrne, Michael
  * Crowell, Jaret L.
  * Garcia, Ben
  * Garcia, Hugo F
  * McCleery, John A.
  * Patton, Iris M.
  * Wisecup, R. Daniel

25 Years
  * Brandwood, Max
  * Curt, Leandro
  * Dwyer, Michael B.
  * Pecto, Amparo
  * Garza, Jr., Margarita M.
  * Hill, Patrick George C.
  * McCutchen, Jack L.
  * McKen, Geraldine
  * Patel, Babubhun C.
  * Polisensky, Janosik
  * Sands, William J
  * Tevenden, Walter
  * Theelvold, Dean W
  * Troster, Thomas H.
  * Uhrer, Catherine D.
  * Vacek, Tillie A.
  * Vincent, Richard W
  * Wood, George W
  * Woods, Martin

24 Years
  * Butler, Charles
  * Carroll, Roderick N
  * Cerqua, Agustin
  * Courer, Dwight V
  * Funkhouse, Donald W
  * Gauger, Larry A.
  * Goldberg, Stanley S.
  * Gomez, Bernard
  * Gotermiller, Gale W
  * Greason, Patricia A.
  * Hickman, Thomas
  * Karhu, Viljo H.

Operations Supervisor Bob Nebel (left) receives congratualtions on 35 years of service from Will Forrest, Vice President Western Hemisphere Land (center) and N. America Land General Manager Jim White.

E&P Services President Orval Brannan (left) accepts congratualtions on 30 years of service from Western Atlas President/CEO John Russell.

Sr. Vice President Western Hemisphere Joe Chatoor (left) and Vice President Western Hemisphere Data Processing Gary Fair (right) present Supervisor Glenn Hancock with his 30-year service award.

Senior Vice President EAME Bill Schrom (left) and Africa Land Area Manager Chris Fox (right) congratulate Algeria Operations Administrator Fahri Drira on 30 years of service.

HSE Advisor Brian Young (left) receives his 30-year service pin from Canada Operations Manager Steve Vasey.
Anniversaries

King, Geoffrey A.
Olvera, Aidee
Parker, David G.
Rodriguez, Lupe
Scheetz, Rickie A.
Truxx, Richard
Wilson, Ronald J

23 Years
Allmandinger, Walter E.
Benanti, Tabbie P
Branch, Roger
Carney, Frederick G.
Carter, Roy
Coyle, Andrew J
Dawson, William
Elliott, Darrel B
Favor, M. Beth
Garza, Fernando
Hickam, William M.
Ho, Emily C
Horwood, Patruck
Jolly, Barbara A
Kingscott, David J
Magana, Raul V
Mahrer, Tim J
Mitchell, Robert L
Pec, Patrick A
Pileggi, sherri
Pires, Alwyn
Preston, Willma J
Ramey, W. Jeffrey
Renner, Ernest
Roberts, Kevin W
Snowman, Leo F
Whetzel, Mark L
Wright, Jr., Clifford W
Zubaty, Erick

Drake, Richard
Forshaw, J. Roy
Garratt, Christopher
Gumaer, Peter G
Hamad, Meriah A. D.
Harris, Ian
Klorer, Jeffrey P
Malik, Mubarak A.
Ness, Jr., Raymond R
Peterson, Gerald L
Rabczuk, Enrique
Rudd, William
Shopman, Karina
Strange, Patrick H
Sullivan, Robert C
Walker, Larry B
Won, Violet

20 Years
Albright, Charles L.
Bulo, Raimo J
Carrr, Steve L
Creel, Douglas G
Dodge, III, Harold P
Grace, Steven
Gwyn, David T
Holmes, David
Hosey, Paul R
Mann, Rameet
Meister, Lee William
Milne, Ian C
Rinehart, Dennis B
Sander, Terence N
Scott, William W
Todhunter, David N
Watts, Peggy T
Zirschky, Zane P

22 Years
Arnato, Anthony J
Bannik, Michael
Barnum, Kenneth L
Bogusz, Christopher
Bool, Christopher J
Brevelle, Frances V
Bright, Gerald R
Carter, Graham M
Chabow, Bruce S
Davis, Allie Sue
Davis, Steven H
De Albuquerque, Ivaci S
Flores, Michael W
Hansen, Kolbjorn
Kelty, Barbara M
Lucas, Stephen
Mangum, Jr., Leo W
McNew, Billy D
Rahal, John G
Thierjung, John C
Wagner, Lawrence E
Williams, Steven R
Yeary, David M

Baker, Carl E
Barragan, Carlos A
Bell, Edward T
Bertolini, Frank C
Borg, Joseph P
Boydston, James L
Cathey, David A
Chapa, John C
Clarke, Timothy S
Cooper, C. Daniel
Dalton, Paul
Espinoza, Juani H
Fisher, Steven E
Freeman, Nicholas A.M.
Gordon-Brown, Ovidio
Houlihan, Michael T
Ibezebo, Augusta A
Jeffries, William R
Johnson, Conrad A
Juszczyk, Antonio A
Kliezing, Michael W
Lallement, Brian D
Landry, Jr., Leland J
Larson, Timothy
Laufe, Jeffrey P
Lawson, Jerry L
Marks, Stephen
Maxey, James A
Moore, Craig A
Moreno, Manuel
Mothershead, Bryan J
Orozco, Alfonso R

21 Years
Alexander, Ricky
Archer, Stewart H
Barrett, Leicester J
Cabalheiro, Juvenal C
Coltharp, Rodney C
Dinch, Erol

Western Atlas Director of Industry Relations Harry Hobbs (left) and Corporate Communications Manager Rhonda Boone (right) congratulate communications coordinators Kathy Pratt and Mike Kubala on their 20-year anniversaries.

Director of Engineering/Applied Technology Paul Morgan (left) presents former Manager of Applied Technology/Engineering George Wood with his 25-year service award.

QC Technician David Whitcker (left) receives his 15-year service pin from Field Systems QC Manager Lupe Rodriguez.

Sr. Customer Support Representative Paul Roper (left) accepts his 15-year service award from former Technical Assistance Center Supervisor Kevin O’Neal.

EAME Data Processing General Manager Chris Usher (second from left) congratulates (from left) Bedford senior geophysical analysts Shashi Mistry and Phil Lloyd, and Playback Operator Paul Gooden on 20 years of service.
Anniversaries

18 Years
* Anderson, Manuel D. J.
* Breedy, Charles J.
* Cano, Philip A.
* Cardona-Perez, F.
* Chow, Dicky K.S.
* Collier, Wyatt
* Collins, Anthony B.
* Contreras, Betty
* Cook, Ian Edward
* Costello, James
* Crane, Patrick M.
* Curry, Michael C.
* Cusker, Peter
* Davidson, Trevor
* Dresner, Jerry D.
* Ellis, Thomas
* Evans, Philip C.
* Evans, Laura
* Fann, Jerry C.
* Fischer, Robert E.
* Fisher, Charles A.
* Francis, Malcolm F.
* Galzar, Frank M.
* Glasshaw, Mark
* Godsave, Christopher
* Golder, Susan J.
* Granule, Timothy W.
* Gravel, Ned W.
* Greve, Russell M.
* Hans, Harold
* Hartfield, David M.
* Hays, Leonard E.
* Hazeldin, Barbara
* Heinrichs, Wilhelm G.
* Hennessey, John J.
* Hicks, Pamela Sue
* Hinwood, James C.
* Hughes, Owen M.
* Inns, Christopher E.
* Instone, Gerald B.
* Johnson, John S.
* Kearney, Robert G.
* Keaveny, Michael J.
* Kingston, Mark W.
* Klirzinger, Jon R.
* Kornman, Antone W.
* Cuong, Duong W.
* Lamanna, Donavan G.
* Little, Orman D.
* Logsdaile, Richard
* Love, Joe S.
* MacCurtain, Patrick
* Malik, Mohammed S.
* Marshall, Michael D.
* Martin, Glen
* Mofette, John R.
* Moore, Grady L.
* Moore, Sheryn A.
* Mullen, John S.
* Mutalal, Joseph P.
* Nassif, Emil W.
* Nelson, Edward J.
* Parker, Stephen M.
* Perk, Roger A.
* Pechta, Simon J.
* Porche, Ronald J.
* Rando, Jr., Noel M.
* Rose, Brent
* Rose, David J.
* Ruvin, Eduardo
* Salvatierra, Agustin
* Schultz, Paul R.
* Siegfried, John
* Snyder, Fred P.
* Swanson, Christopher
* Terpening, Michael E.
* Torpich, Robert M.

17 Years
* Atkins, Thomas L.
* Barlow, Richard
* Benn, Anthony R.
* Berrill, Graham
* Bird, Jr., Ronald B.
* Botterill, Yvette
* Campbell, Robert J.
* Cant, Steven W.
* Carey, Douglas J.
* Carville, Charles V.
* Cistone, Stephen A.

Computer Services Supervisor Bill Jachetta (left) presents Field Service Engineer Bill Jukola with his 15-year service pin.

Perth Processing Supervisor Lawrence Cho and Project Leader Sharon Tan celebrate 15 years of service.

Manager of Computer Operations Gale Gortmiller (left) presents Graphic Plotter Operator Glenn Doremus with his 15-year service award.

(From left) Operations Supervisor Bob Nebel, West Texas Area Manager Rick Drake, and West Texas Operations Manager John Vance (far right) present Party Manager Mark Mitchell with his 15-year service pin.

Party Manager William Parker (second from left) presents 15-year service awards to (from left) Captain George “Butch” Barlow, Senior Gun Mechanic Tommy Rayburn, and Captain John Smith.
Anniversaries

Kazakhstan OBC Operations Field Supervisor Major Smith (right) presents equipment supervisor Peter Phillips with his 15-year service award.

EAME Equipment Manager Ken Barnum (left) presents EAME Equipment Coordinator Wagih Ghaly with his 15-year anniversary award.

16 Years

Agarwal, Vinod K.
Anderson, Ronda B.
Atkinson, Stephen J.
Auble, William D.
Barker, Glen P.
Barnes, John
Barrett, Paul D.
Beal, Carol Joyce
Bennich, Barry N.M.
Brooks, Timothy J.
Browne, Noel E.
Bryans, Bradly W.
Burgess, Scott H.
Buswell, Gregory D.
Cheng, Tsau C.
Claridge, Vera W.
Clark, Christopher A.
Clark, Robert F.
Coble, Ronald E.
Cook, Raymond
Correa, Fernando
Cotino, Rosalia Cox, Michael J.
Davis, John R.
Dawe, Martin P.
Day, Richard A.
Di Battista, Angelo
Dible, Brian J.
Dill, Rebecca A.
Dinth, Erol
Doyle, Kerry T.
Duley, Martin
Ensom, Irene
Ewell, Douglas W.
Flores, Jr., Delfino
Forman, Peter
Frisco, Sandra
Funk, Ruthanne S.
Fyda, John W.
Garcia, Luis
Gerber, Beverly G.
Ghatts, Ezzer S.
Gibson, David W.
Grabiec, John M.
Hagga, Ismail B.
Haidar, Steve A.
Haes, Michael J.
Hartley, Stephen L. C.
Himnian, Patricia
Holmes, Terence J.
Hostelger, James R.
Huey, Gregory J.
Hunt, Deborah
Hyden, John M.
Joseph, Earlene L.
Kapada, Deepak
Kavanagh, Gerard B.
Kemp, Jon A.
Khan, Mohidur R.
Khan, Sardar B.D.
Kicinski, Henry F.
Klein, Vickie J.
Kocaba, Ibrahim
Lam, Va Sun
Lambert, Anthony
Lee, Jenny
Leith, Simon A.
Leonard, John H.
Lopez, Alfredo T.
Luhr, Nieves
Lyons, June F.
Makin, Clyde
Malone, Graeme K.
Marshall, Walter S.
McCoy, Roger Alan
McVinish, Michael L.
Monson, Roger A.
Moore, Neil R.
Nguyen, Tung T.
O’Beirn, Michael P.
Ortega, Donald R.
Palmer, Charles A.
Perez, Henry
Peretz, Jesse
Phillips, Derek G.
Pinto, Marva V.
Pittman, Michael L.
Prihatma, Ijan M.
Purriol, Michael A.
Randall, Eva
Ray, Pamela K.
Read, Garry P.
Richardson, Ian
Richings, Alfred J.
Rimmer, William J.
Roberts, Christopher E.
Roberts, Michael A.
Roberts, Michael W.
Rohr, Colin
Romick, Jan L.
Sangster, Joseph
Schneider, Curt
Scott, James H.
Simpson, June
Smith, Griffith C.
Smith, Kathy A.
Snyder, Deborah A.
Sondagar, Ghamma
Spto, Thomas R.
Stowers, Michael J.
Summers, Joe C.
Swafford, Dave L.
Swerdlow, Richard S.
Tabone, Elseo L.
Tarrant, Mark R.
Thomas, Steven A.
Thompson, Frank C.
Tsuei, Yeu-Hsin
Ungless, Nigel G.E.
Vanocar, Vladimir
Vogler, Raymond E.
Walker, Andrew
Waterman, Robert M.
Watson, Keith D.
Welch, Thomas L.
Williams, Mark L.
Wilson, Colin A.
Wonen, George M.
Anniversaries

Wrake, Anthony
Wu, LEE P.
Yanez, Charles M.
Yapuncich, George T.
Yorkborough, Terry L.
Zapata, Silva

15 Years
- Alexander, Georgina A.
- Alford, Robert D.
- Arthur, Johnny E.
- Arkunson, John R.
- Bauer, Paul R.
- Blackwood, Randy S.
- Blair, Peter
- Blankenship, David W.
- Blee, Cherie G.
- Brown, Peter R.
- Buckross, Paul A.
- Cardenas, Dona E.
- Chalkecombe, Christopher
- Cornelison, Samuel L.
- Cuevas, Joseph
- Dangle, David S.
- Donnelly, Paul H.
- Doremus, Glenn A.
- Doudna, Lawrence D.
- Drenckhahn, Frank J.
- Dumday, Michael W.
- Eginton, Marc
- Elliott, Scott L.
- Esquivel, Patricio
- Flooders, Christopher
- Foil, Myrtle L.
- Foreman, Eleanor
- Franck, Sergio S.
- Frederick, Bruce W.
- Gaudet, Greg
- Ghaly, Wagh M.
- Gibbons, Timothy J.
- Gough, Connie J.
- Gregory, Michael J.F.
- Griffiths, Timothy J.
- Gulunay, Necati
- Hansen, Erik V.
- Hendrickson, Kathryn L.
- Heron, Riley M.
- Hobbs, Alan P.
- Hodo, Robert L.
- Holt, Kenneth R.
- Huebner, Rick C.
- Johnson, Lee
- Jordan, William E.
- Keck, Donald W.
- Khan, Sardar E.
- Leenheer, Jennifer D.
- Lehman, Terry
- Lin, Cecilia
- Lowes, David
- Marshall, Donnie A.
- Martinez, Frances
- Mason, Peter C.
- McManamin, Hugh J.
- McNeil, Charlotte A.
- Mecking, Matthew C.
- Mills, Samuel F.
- Mills, Scott A.
- Morrison, David A.
- Nelson, Thomas O.
- Nicholson, Murdock A.
- O'Neil, Brian V.
- O'Sullivan, Brian P.
- Orozco, Fernando L.
- Paliwoda, David L.
- Parker, William W.
- Pervis, Victoria
- Petree, Dannie W.
- Pink, Paul B.
- Rincon, Ricky
- Risbud, Sharad
- Rogers, Suzanne C.
- Roldan, Ramiro A.
- Roger, Paul
- Ross, Stephen A.
- Satterfield, Rick L.
- Sebza, Michael B.
- Sharp, Nigel B.
- Shaw, Gregory C.
- Simonet, III, Edwin C.
- Skibbe, William P.
- Snyder, John C.
- Snyder, Michael E.
- Spencer, Daniel H.
- Stanley, C. Warwick
- Stathopoulos, David J.
- Szuecs, Richard
- Tableman, Mark J.
- Taylor, Charles D.
- Thomas, Roy A.
- Thompson, Paul W.
- Thomson, Jeffrey K.
- Thornton, Raymond H.
- Trainor, Patrick J.
- Van Dyck, Janece L.
- Vannatter, Darrell F.
- Vauthan, Robert J.
- Virobik, Daniel Lee
- Wilde, Dean W.
- Williams, Sylvester

14 Years
- Brooks, William C.
-Buffham, Wayne G.
- Clark, Richard A.
- Congleton, Christopher
- Dohse, Mark A.
- Edwards, Margaret C.
- Eisenhower, III, Frank L.
- Fleure, Thomas J.
- Fontenot, Lewis
- Gibbons, Michael S.
- Goodman, Perry M.
- Hallmark, Joe L.
- Howell, Jeffrey Mark
- John, Norris F.
- Kneller, Steven L.
- Meyer, Thomas J.
- Morel, Kathryn L.
- Penn, Gerald L.
- Prevette, Dennis F.
- Prozeller, John E.
- Shaver, Shaun R.
- Utech, Randal W.

13 Years
- Ahmad, Ijaz
- Andrews, Clive V.
- Bacon, Bradley J.
- Baker, Ilan A.
- Birdsong, Michael W.
- Brett, Marc N.
- Chodaniec, Cheryl
- Chow, Dicky K.S.
- Corley, Wilson

Marketing Representative Scott Brannan (left) and N. America Land General Manager Jim White (right) present Onshore Program Development Supervisor John Walker with his 10-year pin.

Area Geophysicist Bob Vauthan (center) accepts congratulations on 15 years of service from Marine Data Processing Manager Dennis Gallagher and N. America Data Processing General Manager Judy Adams.

Logistics General Manager Martin Wiltshire (right) and Purchasing Manager Dave Durham (left) congratulate (from left) Purchasing Coordinator Robin Reed and Purchasing Agent Theresa Emrich on 15 years, Data Entry Clerk Elizabeth Rodriguez on five years, and Buyer Randy Taylor on 15 years of service.

(From left) Land Applied Technology Geophysicists Manager Larry Walker congratulates GPS Analyst Farzad Mohagheghi on 10 years and Field Engineer Robert Brink on five years of service.

EAME Data Processing General Manager Chris Usher (center) congratulates list Data Processing Group Leader Ian Banks (left) and Playback Operator Rob Ware on 10 years of service.
Anniversaries

**Denver Processing Center Manager Jeff Omvig (right) celebrating 10 years of service.**

**Oklahoma City Data Processing Center Manager Ken Tornquist (left) presents Sr. Analyst Brian Williams with his 10-year service award.**

**Shipping/Receiving Clerk Johnny E. Arthur (left) accepts congratulations on 15 years of service from Denver Processing Center Manager Jeff Omvig.**

**New Orleans Sr. Geophysicist Raymond May (center) accepts congratulations on 15 years of service from Data Processing Manager Ron Froch (left) and Assistant Manager Joe Bolier.**

**Cuddus, Reenee**
**Deamer, Charles A.**
**Degner, Richard A.**
**Falecchini, Brian G.**
**Furtado, Chrystauro A.**
**Gilbert, John R.**
**Gouldesbrough, Stephen B.**
**Hares, Michael J.**
**Hart, Douglas I.**
**Hensell, Todd R.**
**Hereford, Michael G.**
**Johnson, Colin M.**
**Johnson, Robert H.**
**Jones, John W.**
**Masters, Stephen J.**
**Millson, Vivian**
**Mobley, Jr., Everett C.**
**Monk, Sr., William A.**
**Parry, Jeremy E.**
**Penrod, Eileen K.**
**Rice, Shawn L.**
**Roberson, Danny J.**
**Savone, John B.**
**Selle, John M.**
**Simpson, James D.**
**Trevino, Arcadio L.**
**Unsal, Guven**
**Vento, Charlene M.**
**Watkins, Richard**
**Wheeler, Robert W.**
**Williams, Jr., Wilbur**
**Williamson, Mitchell N.**

**11 Years**
- Bassett, Julia
- Bergin, Robert W.
- Crittall, John
- Enriquez, Hector R.
- Emaul, Yassm
- Field, Mostyn
- Flengen, David M.
- Gajek, Richard
- Hill, Tony E.
- Kristiansen, Ole
- Malone, Joseph C.
- McCarthy, Alan D.
- McNeilly, Sandra L.
- Mokhateghi, Farhad
- Moro, Walter V.
- Mossige, Rume
- Noyes, Linda Jane
- Paton, James F.
- Pipher, Penney
- Record, Derek D.
- Robinson, Charles L.
- Robinson, Geoffrey
- Saye, David B.
- Schuster, Bree C.
- Shackleton, Guy S.
- Smith, Stephen L.
- Smith, Stewart
- Statham, Andrew R.
- Syers, Timothy R.
- Taylor, Steven
- Ubhi, Narinder S.
- Ut, Jeffrey N.
- Vereen, Mark G.
- Voland, Andrew P.
- Willis, Mark A.
- Yorath, Anthony

**10 Years**
- Berry, Harvel E.
- Bushee, Kirk M.
- Byers, John Vivian
- Capes, Clark T.
- Chang, Herman
- Cole, John B.
- Cov, Jesus Amador
- Cuevas, Joseph
- Fore, David
Retirements

Jimmy Blair

In December, Permit Agent Jimmy Blair (left) was honored at a retirement party in Corpus Christi, Texas, surrounded by friends, family, and coworkers. He received congratulations on 43 years of service from Party Manager Branch Seevers.

After attending Southeastern Oklahoma State University, Blair began his career with Western in 1954 as a helper on Party 7 in Paul’s Valley, Oklahoma. His doodling trail made its way through the continental U.S. with extended stops in the South, the Rocky Mountain area, and the southeastern states, for a total of 35 states.

Blair worked as a junior observer, driller, drill helper, surveyor, clerk, draftsman, and gravity meter operator. He settled into the position of permit agent in 1973 in Beeville, Texas. By the time the Blair family had relocated to Beeville, they had moved nearly 50 times—an average of four times per year. His last assignment as permit agent was with Party 703, based in Alice, Texas.

Delores Hines

After 29 years of service, Delores Hines retired in December from Western Geophysical’s Europe/Africa/Middle East (EAME) New Ventures department in Bedford, U.K.

She began her career with Texas Instruments 1967 as quality control assistant, transferring to Geophysical Service Inc., the predecessor of Halliburton Geophysical Services. While at Halliburton, Hines received numerous awards for meritorious service, and joined Western in 1994 as a seismic data clerk.

Friends and colleagues gathered to wish Hines well and present her with retirement gifts. Pictured with Hines (center) are (from left) EAME Spec Sales Account Rep. Steve Butler, Secretary Sue Turner, Seismic Librarian Susan Golder, Assistant 4-D Manager Andrew Bishop, and Supervisor Michael Keaveny.

Correction

In the Winter 1996 issue of Profile, we incorrectly identified Lead Office Services Clerk Ronda Anderson celebrating 10 years of service with Western. She celebrates 15 years of service.