

The Balancing Act

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February 2008 Issue

[The Balancing Act](#)

[Capacity to Recover](#)

[Fossils Fuel the Search](#)

Also in This Issue



[HOW IT WORKS: Oil and Gas: The Recipe](#)



[OUR COMMUNITIES: Building Education in the Philippines](#)



[LETTERS TO THE EDITOR](#)



The Balancing Act

For the many who face increasing work and home demands, keeping a grip can be challenging.

The challenge is not confined to employees in any particular country, industry or profession. Companies everywhere face the vexing issue of how to honor employees' need for time to meet personal responsibilities while not forfeiting agile and productive performance against the competition.



IT Team Lead 'De-stresses' in the Surf

When the going gets tough, Eastern Caribbean IT team lead Mark Bentham waxes down his surfboard and hits the beach.

Chevron, for all its family-friendly policies, is not exempt. Last summer's Global Employee Survey showed that even though 90 percent of employees said they believe the company cares about their

general health and well being (significantly higher than at other benchmarked companies), 53 percent said they find it difficult to manage both their work demands and personal or family needs.

In a related question, 50 percent said that priorities or work objectives at Chevron change frequently and they have trouble completing their work. Notably, these were the only survey areas where scores have gone down since 2004.

Senior management has heeded the message: "We know that employees across the board are concerned about full plates and their ability to be optimally effective," says Chevron Vice Chairman Peter Robertson. "We are determined to make real progress in this area and are looking for ways to help people simplify and streamline their work processes.

"It's clear that a one-size-fits-all approach wouldn't be practical at a global company that operates under so many different cultures, laws and regulations, so while we'll broadly share what we learn and encourage ingenuity, all organizations around the company need to address this issue at their local level."

Juggling Work and Home Challenges

Ask Chevron's 58,000 employees what work/life balancing issues they struggle with most and you'll likely get about 58,000 different responses. Common themes might include:

- High workload – New assignments arrive with no time to catch up on existing work.

- Changing priorities – When business priorities shift, what should we do with the old priorities?
- Personal responsibilities – Child and elder care, spousal scheduling conflicts, and other personal issues often overlap with workplace duties and travel obligations.
- Rotators and shift workers – When replacement relief doesn't show, these employees can't just leave the workplace, no matter what might be happening at home.
- Insufficient time off – Sometimes people feel obliged to work long or extra hours, skip vacations or 9/80 days, or even forgo sick leave when ill in order to complete assignments or not fall behind on deadlines.
- Information overload – It's tough to stay on top of emails, phone messages, reports and other communications we receive from all fronts.
- Interconnectivity – Being constantly connected through emails, laptop computers, Blackberries and cell phones – not to mention working across multiple time zones – makes some people feel they're always on call, even on days off.
- Limited flexibility – Some positions don't lend themselves to 9/80, telecommuting, part-time or other alternative scheduling arrangements; even when they do, it's often hard to "clock out."
- Work validates life – For some people, work takes center stage, to the exclusion of family and community influences on self-worth and purpose in life.
- Off the fast track – There's sometimes a perception that not working full-bore means we're not interested in career advancement, so we miss out on new opportunities.
- Global company – Just when the work day ends in one part of Chevron's world, it's gearing up in another. Because teams located in different time zones must communicate and work together, someone somewhere is probably working long after their work day should be over.

Risks of Doing Nothing

John Dillon Riley, Chevron's manager of Employee Assistance, Work/Life, and Health and Productivity Services, notes that besides the ultimately negative outcome for Chevron that results from burned-out and job-fatigued workers, there are other, serious risks to personal well-being and workplace productivity when work/life balance issues aren't addressed:

Sleep deprivation.

When they don't have enough time to accomplish everything on their to-do lists, many people often sacrifice sleep. They either sleep fewer hours a night, which can quickly take its toll, or their sleep patterns are disturbed, leaving them exhausted in the morning. Either way, lack of sleep can have serious health impacts, leaving you more prone to illness and premature aging. There's also a safety risk: Many traffic and industrial accidents are caused by fatigue or by careless inattention to work at hand because of preoccupations,



Drilling Engineer Balances Work, Motherhood Pressures

Houston-based drilling engineer Heidi-Lynne Balasch knows first-hand how difficult it can be to juggle a demanding job with raising two preschool-age children. Fortunately, Heidi-Lynne has developed a few strategies to cover her bases.

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worries or rushing to get more tasks done, more quickly.

Productivity. People tend to make more mistakes or work less effectively when they're tired, distracted or preoccupied, which creates a vicious cycle of working longer hours to try to catch up. So, while you may think you're helping the company by working heroically long hours, you may actually be lowering its overall performance – not to mention damaging your own reputation for accuracy.

Emotional problems. Relationships with family and friends often suffer when people work long hours or can't "disconnect" from work. And workers can begin to feel bad about themselves as they feel more trapped and confined by relentless work deadlines.

Diet and exercise. It's easy to succumb to a junk food diet when you don't have time to shop for and prepare healthier alternatives. Stress and sleepiness also often draw people to sweets and excess caffeine for a quick energy jolt, even though the resulting "crash" leaves them more exhausted than before. And, poor diet often goes hand in hand with lack of exercise and fresh air. Either there's not enough time or you're too tired, and the more weight you gain, the harder it is to establish and adhere to an exercise program.

So What Can You Do?

John notes that because everyone's individual situation is different there are no universal answers to easing workload and establishing work/life balance. "Each of us has to reflect on and work out solutions that fit our own lifestyle, personality, commitments and culture," he shares. Here's what the experts advise:



Prioritize

South African Lubricants commercial team leader **Kamil Devilliers** receives about 100 email messages a day. "I find it useful to first take care of the 'easy hits' before tackling more time-consuming action items," he says.

"That way, I have fewer people demanding action from me. Also, I follow up on customer calls first before addressing internal administrative issues."

Prioritize your work.

Regularly analyze what's on your plate and distinguish work that's vital from tasks that are non-essential or can perhaps be delayed. It helps to keep a running list of tasks, organized by priority or complexity of response required. Another good strategy is to update

your list before you leave work each day so you don't forget important items that may have just come up.

Talk to your supervisor. If you've got too much on your plate or need help prioritizing tasks, talk to your supervisor. He or she is likely aware of departmental workloads and may be able to reallocate assignments. But they'll never know you need help if you don't ask.

"Probably everyone has been in the situation where they've set their PMP goals and laid out what needs to be accomplished during the year – when suddenly, new and unanticipated priorities or business needs surface," says John. "What often doesn't happen next, that probably should, is to recalibrate accountabilities with your supervisor.

"In other words, we need to be able to say, 'Okay, I'll concentrate my efforts on these new priorities, but what are we not going to be doing instead?' It's not always easy to initiate that conversation, but it's an important aspect of managing your workload and the reason

some people feel overwhelmed.”

Examine departmental workload. One approach managers and supervisors can take is to scale back on the number of high-priority items employees need to focus on to meet yearly performance goals, while also looking for ways to streamline work processes.

Delegate authority. Look for opportunities where you can share part or all of a project with someone else, ensuring not only that the job will get done promptly, but also that your coworker will be able to acquire much-needed experience and recognition. (Similarly, don't be afraid to ask if you can help out someone else in order to gain experience.)

Tap into Chevron resources. Numerous Chevron resources are available to help you with everything from learning shortcuts in Outlook email to formatting a document to planning your next career move. (See “Related Links” to the right for Chevron resources.)

One of the most helpful benefits Chevron provides is Employee Assistance and Work/Life Services. John notes that the company now has Employee Assistance Programs (EAPs) in 18 regions around the world.

“The company provides this free consulting resource to support Chevron employees and family members in meeting personal and work responsibilities,” he says. “Highly qualified EAP counselors are available on a strictly confidential basis to serve as sounding boards to help clarify and resolve personal and family issues, strategize how to respond to work-related pressures, provide career coaching and help with managing stress, among a host of topics.”



Use the Flexible Work Options

Lafayette, Louisiana, geophysicist **Sara Tirado** and her husband, **Esteban**, a Chevron communications engineer, alternate their 9/80 (compressed work week) schedules so that their children only need to attend daycare four days a week. “On work days, I start work with the earlier schedule and my husband starts later,” she explains. “That way, he drops the kids off and I pick them up, reducing the amount of time they need to spend at the facility.”

Use flexible work

options. Depending on your job type and where you work, you may have a number of flexible work schedule options available that can help you juggle work and personal responsibilities, including 9/80 schedules, part-time work arrangements, flexible start times, working unconventional hours and

telecommuting, among others.

Take time off when needed. It can be difficult to schedule and actually take vacations, but don't get lulled into thinking it's not essential. If you're stressed out, you're probably not doing your best work. Likewise, when you're sick, not only will your own work suffer, but you'll probably infect everyone else, bringing down the whole department's effectiveness.

Also, make sure your job responsibilities are covered in advance before you take vacation so client and coworker needs don't suffer – and so you don't return to a huge backlog of work. “When you leave for vacation – leave,” says John. “No Blackberries, laptops or work cell phones in the suitcase. And resist checking in to see what's up. Colleagues and people you report to will carry on, and your checking in might be interpreted as a lack of

confidence in their ability to do so. It also will interrupt the break you need to have from work responsibilities.”



Plan and Communicate Time Off

Maryse Louis, Information Services project manager in Western Australia, says she always plans her personal and business lives together, since the two often overlap. She also tries to remain flexible: “I don’t plan too far in advance - weekly or monthly, at most,” she explains. “You have to accept that unplanned things will always come up that force you to re-prioritize.” Maryse also suggests clearly communicating your schedule with everyone, at home and at work, so they can plan around your needs and vice versa.

Communicate clearly.

Make sure that others clearly understand what you’re saying or asking to be done, whether it’s by email, phone or in person. It’s a good idea to ask them to repeat it back to ensure you’ve explained yourself well. And do the same whenever someone communicates with you – nothing is more frustrating than having to redo a task

because you weren’t both on the same page.

Look for stress busters. While work can be one of the most rewarding aspects of life, sometimes you just need to escape and recharge your batteries. For some people that means a hike in the woods, performing music, shopping or playing with the baby. During the workday, get up and stretch, resist the temptation to eat at your desk, go for a short walk or workout, or take a few minutes to chat with a coworker.

Carve Out Time to Reflect

The bottom line, according to John, is that no matter how many tools Chevron may provide to help employees achieve balance, each of us must make fundamental choices about the course we want our lives to take – and what role we want our jobs to play.

“For some people, family trumps job,” says John. “For others, career advancement is how they define personal success and happiness. Ironically, with so many responsibilities pulling us in different directions, one of the biggest challenges we face when dealing with work/life balance issues is even finding the time to ponder them.”

He notes that, in response to outside pressures, people take on more work, strive to remain connected 24-7 and try not to short-change their families. The result: they often put their own self-care issues lower and lower on the priority list. That’s when people stop getting enough sleep, exercise and time off.

John concludes, “The best thing I can recommend is to try and carve out a few minutes each day for self-reflection on how you are spending your time and whether that squares with what you most value. Maybe it’s pausing for a few minutes before entering your home, or taking a short walk at lunch, or going to the gym, or taking a few minutes to pray or meditate – whatever works for you. It won’t automatically happen so you may need to block out time on your calendar.”



Capacity to Recover

Three years after the Southeast Asia tsunamis destroyed everything in their path, communities are proving they can return stronger than ever.

On the fateful morning of December 26, 2004, Syarifah Sufiah was awakened by powerful tremors. She ran into the street where she observed a nightmarish scene: powerful waves were washing away boats, buildings and residents of her community in Indonesia's Aceh province. As the water swept toward her, she recalls, "I climbed a tree to save myself."



Pak Safrizal serves a customer of his mobile phone voucher/computer accessories business, which shares premises with his friend Pak M.Yusuf's barbershop. Pak M.Yusuf (pictured at top with a customer) and his business partner participate in a Swiss Contact program sponsored by Chevron that helps them develop a business plan and other necessary skills for their combined trades. Both men are disabled, but serve as an inspiration to others in the recovering region: Yusuf carries Safrizal, who is unable to walk, while Safrizal writes everything down for Yusuf, who is deaf and cannot speak.

She couldn't save the dressmaking business that she had nurtured for more than 16 years: beautiful silk fabrics, sewing machines and cupboards were all destroyed. She left Aceh in despair. Eight months later, she was back, rebuilding the business, increasing her staff and training others. The catalyst for her recovery was a grant from Chevron and its partner organization, Swiss Contact.

The bustling scene at Syarifah's dress shop (see her video report at right) is emblematic of Chevron's recovery initiative in this portion of Indonesia as well as in 10 other countries where the tsunamis devastated human lives and property. Triggered by the world's strongest earthquake in the past 40 years, the tsunamis left some 250,000 people dead.

Aceh was particularly hard hit, since its capital city of Banda Aceh was just 155 miles (250 km) from the earthquake's epicenter. For this reason, the company created the Chevron Aceh Recovery Initiative (CARI) to assist in the rapid recovery and reconstruction of the areas

most affected by the tsunamis – principally, Aceh province and the neighboring Indonesian island of Nias. To date, Chevron has contributed about \$15 million to support Indonesia's immediate disaster relief and long-term recovery efforts.

To meet immediate needs, Chevron contributed \$2 million to relief organizations working

in India, Indonesia, Malaysia, Sri Lanka, and Thailand. Employees and business units in Indonesia, Singapore, Thailand, the United States and elsewhere also raised money and aid. After identifying Aceh and Nias as the hardest-hit areas, the company focused its major humanitarian efforts on these areas of Indonesia.

The initial relief grew out of a report from Chevron's Syaifuddin ("Fuddin") Abdullah, an Acehese native who visited the province just two days after the tsunami. The assignment had strong emotional overtones for Professor Abdullah, who lost a sister and brother-in-law to the tsunami and could barely recognize his village of Lho' Nga, where only white sands remained in place of any human habitation.

Following Professor Abdullah's recommendations, the company moved quickly, making a substantial donation to the Indonesian Red Cross and dispatching a medical team with medicine, clothing, food and water. Employee contributions helped to fund a second shipment of food and clothing. The company also sent heavy equipment to Banda Aceh to clean up the debris.

Chevron's desire to have a sustainable impact and actively participate in the rebuilding and economic recovery of Aceh and Nias led to the CARI initiative.

In March 2005, the corporation's new Tsunami Relief Initiative team developed a short-term educational program designed to help local students gain the necessary skills to contribute to the area's recovery. Later, in May of that year, Chevron and the United States Agency for International Development (USAID) established a \$10 million alliance to fund this vocational training as well as other educational initiatives.

After conferring with leaders from the Acehese government, non-governmental organizations and community leaders, the partners designed a curriculum that included construction, masonry, carpentry, electronics, computer software and hardware, and bookkeeping. Over the next three years, some 350 students were graduated from Polytechnik Caltex Riau in Pekanbaru, an institute already funded by Chevron, and most of them are employed in jobs related to the reconstruction effort.

There are many success stories. For example, Deki Haryadi gained the skills to triple his income as a carpenter, enabling him to support his two aging parents and young siblings. Deki, who completed his training in 2005, praises Chevron for "caring about me as a local person." And with a loan from Swiss Contact, he will start his own carpentry business.

"We are proud to have Chevron provide the vocational training for the program," says Professor Abdullah, who was director of the polytechnic in 2005. "History will note our initiative as a great success story."

In addition to providing short-term vocational training, Chevron has awarded 20 full scholarships to Acehese and Nias students to undertake a three-year bachelor program at the polytechnic. Upon completion of their education, the students must return to their



These women are part of a cooperative group supported by Mercy Corps and Chevron making a popular local dried banana treat. They are based in Meulaboh, capital of West Aceh Regency, and among the areas hardest hit by the 2004 earthquake.

hometowns to apply their skills in Aceh and Nias reconstruction efforts.

These educational programs are part of CARI's capacity-building phase, through which Aceh and Nias can reinvigorate daily economic and community life. The multifaceted CARI livelihood development programs have helped to restore the livelihoods of fishermen, farmers, electricians and scores of other workers. The medical staffs at 21 Indonesian Red Cross branches have been able to deliver quality services to vulnerable communities. And 49 midwives have resumed the critical general and maternal health services they provide to 14 small village communities.



Part of another group of successful graduates from Politeknik Caltex Riau. Approximately 20 graduates have been able to attend on full scholarships provided by Chevron. The scholarships give preference to students affected by the Tsunami. As a condition, the students must, on completion of their training, return to their hometowns to apply their skills in Aceh reconstruction efforts.

Looking to the long-term needs of Aceh and Nias, Chevron and USAID made a major educational commitment to the area in 2007 when they agreed to support the creation of Polytechnic Aceh. Located in Banda Aceh, the polytechnic involves a partnership among Chevron, the Acehese Government, The Aceh-Nias Reconstruction and Rehabilitation Agency, and USAID. The objective of the initiative is to further improve the human resource capabilities of the Acehese particularly and Indonesians generally in key technical fields, thereby contributing to Aceh's long-term economic development.

Aceh governor Irwandi Yusuf praised the initiative, saying: "I enthusiastically endorse the plans for Polytechnic Aceh, which will help meet many of the needs that have been identified in the Government's blueprint for the reconstruction of Aceh and Nias. I applaud

both Chevron and USAID for their commitment to developing the capacity of the Acehese people in the reconstruction process."

The 96,875-square-foot (9,000-sqm) polytechnic will consist of classrooms, laboratories, a library, offices, a mini auditorium, a main hall and administrative rooms. As this article goes to press, many of these facilities are nearly or totally complete, as the construction team works toward an August 2008 opening.

The original class will consist of 180 students, but will eventually grow to accommodate a total of about 700 undergraduates. Ultimately, the graduates of the Polytechnic Aceh will help to drive the area's economy.

Meanwhile, Chevron has been investing in the business development of Aceh through two micro-enterprise initiatives. A two-year Aceh Barat Business Recovery program, begun in 2006 in partnership with the Mercy Corps, is assisting micro and small entrepreneurs to gain access to financial and professional services to restart, manage and expand their businesses. The program has helped financial institutions make about 500 loans in targeted areas, facilitated more than 150 loans directly through guarantees and provided business development services for more than 300 micro and small entrepreneurs. Recipients range from banana processors to furniture makers and include a group of

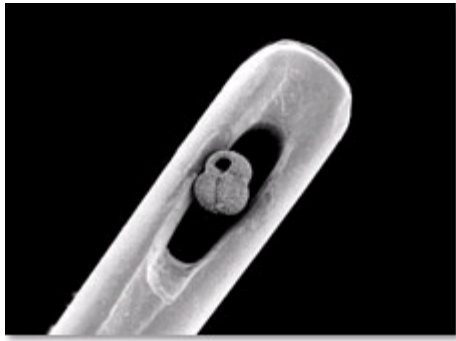
widows who lost their husbands to the tsunami.

In 2007, Chevron built on this initiative by launching the Business Start-up Establishment (BUET) project in partnership with Swiss Contact, a non-profit organization that specializes in developing micro-, small- and medium-sized businesses through business support programs, micro-finance and capacity building. BUET (which means "to lift up" in the Acehnese language) supports the aspirations of potential micro and small entrepreneurs. In particular, it targets graduates of the short-term training program at Polytechnik Caltex Riau as well as entrepreneurs impacted by the tsunami.

One of the initial grant recipients was Salman Rotan, a manufacturer of rattan furniture in Banda Aceh. His 12-year-old business was hobbled by the tsunami. Three of his employees were swept away by the gigantic waves, which also flooded his workshop and destroyed his trucks, tools and stock of finished products. He subsequently resumed his business in a temporary location. Business was slow, until he heard about the BUET program. "Through Chevron and Swiss Contact, I will be able to expand my business and purchase more rattan," he says. "And I'll be able to build a new workshop and machinery to produce furniture for sale in Java and elsewhere."

The BUET program will help establish up to 130 new micro-scale and 40 small-scale enterprises in six Acehnese communities over a three-year period. These businesses have the potential of sustainable job opportunities for 800 employees – individuals who have survived the tsunamis and can now pursue lives filled with new promise.

Chevron's several humanitarian initiatives grow out of our belief in partnerships, "which are a fundamental component of our long-term business strategy," stresses Chris Prattini, formerly managing director of the Chevron IndoAsia Business Unit, now Upstream vice president. "We've been here in Indonesia for 83 years. Being a true partner meant supporting the government and the people of the affected areas recover from this disaster."



Fossils Fuel the Search

Remains from a distant era offer clues to finding oil and gas.

As explorationists drill deeper into ocean waters at rig rates approaching \$350 a minute, they're getting help from scientists trained in digging through time.

Paleontologists, who study the fossilized remains of life, increasingly have been joining drillers, engineers and geologists aboard our drillships and drilling rigs. Their job: As the drillers drill, they use fossils to date each rock layer.



Paleontologist Rome Lytton with a sample of the foraminifera microfossil.

They, and the whole drill crew, are looking for reservoir sands of a particular age, buried miles beneath the seabed, that may contain petroleum. The tiny microfossils – formed from microscopic plants and animals that were buried millions of years ago – are time markers to find those sands.

“I use fossils to tell time,” says Alicia Kahn, an international biostratigrapher with Energy Technology Co. (ETC), now working on a semi-submersible rig offshore Angola.

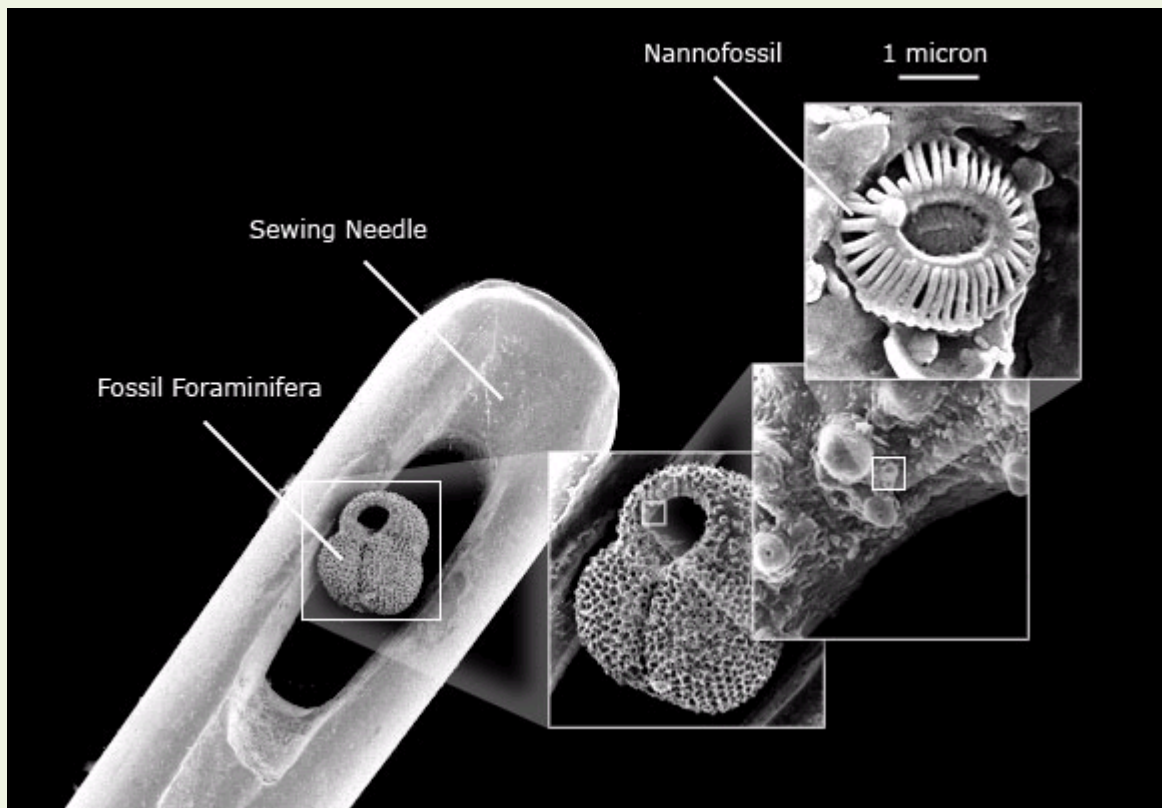
“I work while the crew drills,” explains Kahn. “Geologists on board ask me where we are in terms of age, and the only way to know for sure is through the fossils.”

On a real-time basis, Kahn and Chevron's other paleontologists examine microfossils in the “cuttings,” the rock fragments that break free as the well is drilled. By age-dating these fossils, they confirm when drillers' have reached the well's “target horizons,” key zones of potential oil and gas reservoirs, and the “TD” or total depth of the well.

Other key responsibilities: They use fossils that were deposited at the same time to “correlate” or match up points from well to well across wide areas. They use fossils to reveal information about original environments, including the water depths in which organisms lived and died. Paleontologists also provide critical data for determining where to best set casing points – that is, the depth to stop drilling an interval of a particular diameter hole, so that casing of a given size can be run and cemented.

Microfossils are the earth's most abundant and easily accessible fossils, occurring in huge numbers in sedimentary rock. The pyramids of Egypt, for instance, are made of

sedimentary rocks composed of the shells of foraminifera, a major microfossil group. England's White Cliffs of Dover are thick accumulations of calcareous nannofossils – extremely tiny marine algae.



Micropaleontology star, the foraminifera *globigerinoides ruber*, pictured for scale in the eye of the needle. With additional magnification, shown in increasing stages from left, the nannofossil *emiliana huxleyi* is visible.

In addition to forams and nannofossils, which are routinely analyzed in Chevron's wells around the world, a third group of microfossils is used by our paleontologists: fossilized marine algal cysts called dinoflagellates and land-based pollen and spores – collectively known as palynology.

While microfossils don't reveal oil or gas, they do confirm when drillers have hit their target. And with drilling rig rates at \$500,000 a day, drillers want to hit that target as quickly as possible.

Chevron employs about a dozen paleontologists or biostratigraphers – scientists who use fossils to date and correlate strata. We hire more on a contract basis. A half dozen are based in Houston, others are embedded in business units or working special projects.

They work on wells all over the world – Angola, Australia, Brazil, Libya, Newfoundland, Nigeria, the United States – wherever we're exploring. Many of the wells we are drilling today are in open ocean settings. But before the oil and gas formed from bacteria and algae millions of years ago, these sites may have been in open marine, very near shore, or even onshore in lakes or swamps (for more about how oil and gas are formed see "How it Works").

Many of the marine sections of rock contain thick salt layers that distort seismic imaging. That makes fossils all the more important in identifying the age of strata below the salt.

And that, in turn, makes the biostratigraphers all the more important in spotting missteps.

Take Rome Lytton, one of our senior-most paleontologists. Years ago, Lytton was going over a paleo report on a well that had just been drilled in Louisiana's Caillou Island Field in Terrebonne Parish. Drillers had reached TD, and it was a dry hole. "I looked at the paleontology and said to the team, 'Wait a minute. This zone you see above your reservoir sand? We haven't penetrated it yet. We have the wrong correlation.'" Six months of persuasion later, Lytton convinced the team to go back in and drill the well deeper.

It hit big, and that one Caillou Island well produced 9.1 billion cubic feet of gas and 66 million barrels of condensate before the field sold in 2004.

Sometimes, paleo succeeds by forewarning of failure. That's what happened in a deepwater U.S. Gulf of Mexico partner well. The sands below the salt layer and near the intended TD were much younger than everyone expected. They were Pleistocene sands, less than a million years old, instead of Miocene sands, about 17 million years old, like that in our huge Tahiti Field, now in development. Paleo enabled partners to stop drilling the well several thousand feet short of TD, saving potentially millions of dollars in drilling costs.

In another case, we stopped a Gulf well more than 5,000 feet (1,500 m) short of the TD when the section below salt came in too old. "We'd much rather have had a discovery," says Lytton, "but the drilling dollars saved via the biostrat data could have potentially approached double digit millions."



Chevron paleontologists (from left), Alicia Kahn, Tom Dignes, Roger Witmer and Andy Bowman.

Paleontologists working in the Gulf have amassed an enormous amount of microfossil data through the years. An ETC paleo team reached a major milestone recently by recoding and integrating all Chevron, Texaco and Unocal paleo data into one online database, called ePaleo.

"Chevron appears to be the only corporation that has fully integrated all of its own and merged-companies' data into one workable system," says Roger Witmer, ETC biostratigrapher who manages ePaleo. Witmer intends to expand the database beyond the

U.S. Gulf of Mexico.

This desktop system allows geoscientists to quickly access paleo data for more than 22,000 onshore wells in Louisiana and Texas and 20,000 offshore wells. Geoscientists can search the database for individual wells or groups of wells in a number of ways. It also plots age-versus-depth curves for up to 10 wells at a time, enabling quick comparisons of rock accumulation-rate histories across regional wells. "We can get a lot of critical information in seconds," says Witmer.

And that is good news for our paleontologists. Better news still is the work that lies ahead for them. "When I was in school," says Kahn, who earned her PhD in micropaleontology in 2006, "I never thought I'd be able to work in my field in the petroleum industry."



HOW IT WORKS

Oil and Gas: The Recipe

Just add bacteria and algae, fold in sediment, bake and wait.

Oil and gas can move markets and launch economies. Yet these powerful commodities hail from the humblest of origins. They are the preserved remains of bacteria and algae that lived, died and settled to the bottoms of seas, lakes and swamps many millions of years ago.

The vast majority of this prehistoric matter long ago decomposed into the winds of history. A small fraction, however, was preserved – usually in oxygen-deprived or “dead” waters – thus launching the organic matter onto the first step to becoming oil and gas, or petroleum.

The vast majority of the world’s petroleum comes from marine micro-organisms – bacteria and algae. Terrestrial matter – plants – preserved in swamps generally become coal.

Over geologic time, the preserved organic matter, called kerogen, mixes with minerals and is buried beneath layers of sediment. As the sedimentation, or “overburden,” increases, the kerogen is buried deeper in the earth.

As depth increases, so does the temperature, breaking some of the kerogen down into petroleum, which is composed mostly of hydrocarbons. (Hydrocarbons are organic compounds of hydrogen and carbon.)

The same four factors – compaction, heat, time and chemical action – responsible for turning bacteria and algae into petroleum, also turn sediments into solid rock.

Geologists refer to an “oil window” or temperature range necessary for oil generation, normally around 200°F to 300°F (100°C to 150°C). Below the minimum temperature, the organic matter mainly occurs as kerogen. Above the maximum temperature, nature thermally “cracks” the oil and remaining kerogen into natural gas (known as the “gas window”).

A typical depth for the oil window is 1.5 miles to 4 miles (2.5 km to 6 km) below the surface. The depth depends on the temperature gradient (the rate at which temperature increases with depth), which varies widely, and the rate of burial over time.

Because petroleum is usually lighter than rock or water, it migrates up through rock layers until it reaches the surface or becomes trapped beneath impermeable rock layers, within porous rocks called reservoirs. As a result, even if oil and gas are formed at extreme depths, they may be trapped at shallower depths.

Petroleum may also migrate laterally over great distances or just inches before being

trapped in a reservoir. Once petroleum is concentrated in such a trap, it forms an oil field, from which the liquid can be extracted by drilling and pumping.

The vast majority of our earth's petroleum has long since escaped to the surface and been decomposed by bacteria. The petroleum that Chevron and other energy companies are chasing is but a small fraction of Mother Nature's bounty, trapped by a rare combination of circumstances.



Building Stronger Foundations for Education

New typhoon-resistant school buildings help Philippine communities' long-term recovery from natural disaster.

On November 30, 2006, super typhoon Reming (International Code: Durian) pummeled the Bicol Region in the Philippines with wind speeds of up to 165 mph (265 kph). Mudslides and floodwaters swamped villages, leaving approximately 1,500 people dead or missing.

The province of Albay was the hardest hit. Chevron's geothermal operations in the area employ 150 people, 60 percent of whom live in the town of Tiwi.

"We had no communication lines to Tiwi," says Luli Heras-De Leon, manager of Chevron Geothermal's Policy, Government and Public Affairs. "Tiwi was out of commission for about a month with no power and no phone lines."

Fortunately, when connections were restored, Chevron employees, family members and contractors were all safe and accounted for, although most suffered damage to home or property. Tiwi's infrastructure was in tatters.

"We live and co-exist with the community there," adds Luli. "We immediately searched for ways to respond to the situation and help our host communities."

Opting for Education

Approximately 90 percent of the school buildings in Albay province were damaged or destroyed. In Tiwi, 8,600 elementary school students had to cope with makeshift buildings and sit through classes that had to be extended for a month because of the disruption caused by the typhoon. To make matters worse, the Tiwi local government and the Department of Education did not have adequate financial resources to rebuild many of the schools.

"If there was a good way to contribute to the long-term rehabilitation of Tiwi, it had to be through the public school system," says Tony Yee, president and general manager of Chevron Geothermal. "Education and training is a pillar of Chevron's community engagement programs, so reconstructing the Tiwi schools provided a logical fit."

Partnerships and a Healthy Approach

To raise funds for typhoon relief, Chevron Geothermal's Human Resources; Health, Environment and Safety; and Policy, Government and Public Affairs departments collaborated on a novel undertaking that involved most of the 500 employees. They were able to contribute through the 10K-a-Day program, in which employees aimed to walk 10,000 steps a day for health benefits. In turn, the company provided matching funds based on the ability of participating employees to meet their daily targets.

Employees kept track of their daily steps for a month and recorded their aggregate performance upon completion of the 30-day cycle.

In total, between the grant provided by Chevron Corporation and the money raised by Chevron Geothermal employees, the IndoAsia Business Unit, and other Chevron organizations in the Philippines, \$160,000 was raised to help rebuild three school buildings, provide relief to the host communities and extend intermediate assistance to the agri-fisheries sector of Tiwi.

“We are very proud of the collaboration between all of the employees and business units in the Philippines, as this was critical to the success of this project,” says Barry Andrews, senior vice president of IndoAsia Business Unit’s Geothermal and Power Operations. “Everyone came together so energetically, thinking only of the needs of the community.”

Model Schools for the Region

Chevron Geothermal Philippines and its project partners, Ayala Foundation USA, Aquinas University Foundation and MIESCOR, turned over three new school buildings to the Tiwi local government and Department of Education on June 26, 2007. Notably, these structures were completed within the desired safety, cost, quality and time parameters.

The new school buildings have been specially designed to withstand typhoons of up to 186-mph (300-kph) wind load, with thicker roof slabs, solid, reinforced concrete walls and tie-beams that connect all exterior and middle footings to address seismic movements.

These school buildings serve as showcases for public infrastructure. “They are quite different from those in place as these are designed to withstand the biggest typhoon,” says Edgar Sevilla, a senior associate of Chevron Geothermal’s PGPA group and manager of the project. “Since the Bicol region is a typhoon-prone area, these school buildings can also double as evacuation centers for local residents during emergencies.”

Tiwi Mayor Jaime C. Villanueva noted that the new school structures “have allowed the teachers’ and pupils’ return to a certain level of normalcy.”

Edgar notes the project team’s success and adds that he and the other members – Art Baria, Roberto Belbis, Norma Caayao, Wilson Clemente, Eric Espinosa, Rico Maligaya, Pol Nodalo and Johnnie Rebutillo – recently completed a project look-back to share lessons learned.

“We looked at many different aspects of the project to make recommendations to any Chevron partnership in the event that we need to respond to a similar natural disaster and provide the necessary interventions to our host communities in the future,” he says.



Letters to the Editor

We wrapped up the year in our last issue not only with a look-back on 2007, but also by looking deeper into the company's past through the covers of *Standard Oil Bulletin* – an article that sparked a fair amount of interest.

Reflection of the Times

It's so wonderful to learn more about our company's heritage ("The Art of Communication," December 2007 issue). I hope in the future there may be similar historical articles about the other legacy companies that now make up Chevron. As a legacy Unocal employee, I was often fascinated at the many ways our company history reflected the times. I have a particular fondness for the Union 76 "Sparkle Girls."

Betty A. Johnson, Houston, Texas, United States

Regarding the painting of the llamas, you state the artist is unknown. Is that his name in the lower left-hand corner? Would love to see more of these old covers. It's too bad this has become a sort of "lost art form." In today's age of digital picture taking, these old paintings still amaze with their intimate detail.

David A. Davidson, Bellaire, Texas, United States

Editor's comment: The inscription you can see at the bottom of this first picture in the gallery of cover paintings is "Scott-Hiner," the name of the company that commissioned the artist, whose name has been lost in the mists of time.

Reaching Out to Youth

I was extremely impressed to discover that Chevron acted with great community awareness and thoughtful activism to grant hurricane-affected areas with a long term \$18 million contribution. It's acts like this that give one hope in a society where the powerful only seem to act to increase their own coffers and give little if any attention to the fact that many people in our economy are engulfed in an incredible struggle.

We live in a global economy, but surely we must continue to be cognizant of the fact that for many inner-city youth this is a hard and fast society. I believe that many of the recent tragedies involving young people are the result of some of this hopelessness and social anonymity.

Micah McLorin, Concord, California, United States

Hitting the Right Note

I feel stupid for being this emotional, but the five winning photos and the photographer's statements ("Human Energy – The Winners," December 2008 issue) were so great and moving to me, I am all misty-eyed. What a great example of beautiful diversity. It is

amazing to me that all this happened with a contest. You guys didn't just hit a home run with this, but in my mind, a grand slam! Congratulations on a job well done!

Name and address withheld

Line Rider has been giving fantastic coverage through the year round. I enjoy the publication. Please, do keep up the good work.

Olusegun Afolabi-Babarinsa, Escravos, Nigeria