



case study

believing in zero: chevron's relentless focus on safety

human energy®



**“Our challenge as individuals
and as a company is to operate with discipline—
to be relentless in executing the best
practices and procedures that have been carefully
developed in each of our operations.
We recognize that our work is never done.”**

— Wes Lohec

Chevron Health, Environment and Safety Vice President

Wes Lohec, Chevron's vice president of Health, Environment and Safety, knows that even the smartest, most capable and most diligent employees will make mistakes during their careers. “Humans aren't perfect, so the question is: How do we make sure that human error doesn't lead to a significant incident?”

Our ability to deliver energy safely is focused on building several layers of safeguards into everything we do. We've spent more than 20 years designing and improving systems that support a strong culture of safety and environmental stewardship. We call this “operational excellence” (OE). At its foundation is the belief that we can prevent serious incidents by properly managing risk.

striving for operational excellence

It's not easy to create and reinforce an effective safety culture given the complexity of our businesses and the diversity of our locations and global workforce. To meet these challenges, we developed the Operational Excellence Management System (OEMS). This is our companywide systematic approach to manage process safety (a blend of engineering and managerial skills to prevent incidents), personal safety, the environment, reliability and efficiency. One of the end goals of the OEMS is to make sure that our employees and contractors go home safely every day.

In 2015, we had one of our best years in overall performance and our best year ever in preventing serious incidents. We outperformed 2015 targets across all of our core workforce safety, process safety and environmental metrics. We set a record-low Days Away From Work Rate for our employee and contractor workforce, at 0.018 per 200,000 work-hours, which beat our 2014 rate. We also achieved a record low in motor vehicle incidents. In 2015, 77 operating units from around the globe received our Zero Is Attainable Personal Safety Award, up 10 units from 2014, and in 2015, 42 operating units received the Zero Is Attainable Process Safety Award, up from 36 units.

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operational excellence objectives

Chevron's OEMS provides a disciplined approach toward managing process safety, personal safety and health, the environment, reliability, and efficiency. We rigorously deploy our processes, standards and regulatory requirements to assure compliance, identify and manage risk of incidents, ensure preparedness for emergency response, and improve overall performance, focusing on five areas:

Safety: Achieve an incident- and injury-free workplace.

Health: Promote a healthy workforce and mitigate significant workplace health risks.

Environment: Identify and mitigate environmental and process safety risks.

Reliability: Operate with industry-leading asset integrity and reliability.

Efficiency: Efficiently use natural resources and assets.

Our commitment to OE extends beyond our employees to include our contractor workforce, our supply chain partners and the communities where we operate.

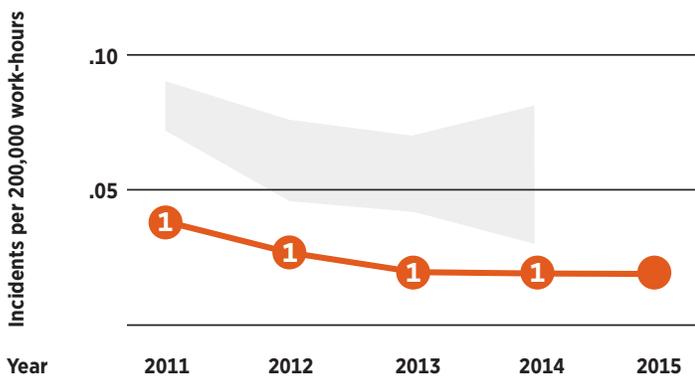


0.02
motor vehicle
crash rate*

In 2015, our workforce Motor Vehicle Crash Rate was the lowest we have ever recorded.

*Workforce vehicle incidents per million miles driven.

days away from work rate



● CVX ranking relative to competitors, 1 being the lowest rate

■ Competitor range: BP, RDS, XOM

Source: Annual company sustainability reports. DAFWR - XOM is lost time incident rates; RDS is lost time incident rates for injuries only.

preventing serious incidents

We have achieved industry-leading performance in preventing injuries. Nevertheless, we are still experiencing incidents that lead to fatalities, which is not acceptable to us. Our focus on safety works, but it's an ongoing job. For example, our employee and full-time-equivalent contractor workforce achieved the longest period without a fatality in company history—477 million work-hours—prior to a fatality in 2015. Each incident and fatality is thoroughly investigated so that we can understand the root causes and learn from them. We then share lessons learned throughout the company and apply them in our daily practices. We are also working with other companies in our industry to improve work processes that will help us prevent these serious incidents.

In our quest for zero incidents, we introduced a Serious Injury and Fatality (SIF) metric in 2015. This new metric requires us to intensify scrutiny of actual incidents as well as near misses.

“When you start looking for the serious injury and fatality potential or serious process safety incidents, you start seeing weaknesses in the system. Perhaps there was just one safeguard that prevented an incident from having a much worse outcome,” said Lohec. “As a result, we’re doing a much better job of identifying where we need better safeguards and then taking action to strengthen them.” He cited dropped objects from heights as an example of safety barriers being able to prevent injuries; the barrier doesn’t prevent a worker from dropping something, but it does prevent a serious injury.

In addition to what we learn from implementing the SIF metric, our San Joaquin Valley business unit (SJVBU) in California uses a verification and validation program to assess workers’



“Creating awareness of attributes that could lead employees to make mistakes helps prevent accidents.”

— Greta Lydecker
Chevron Upstream Europe
Managing Director

competencies at job sites with high-risk activities, such as working on electrical systems and lifting equipment that can weigh thousands of pounds, and to coach workers as needed.

The SJVBU also has implemented Human Performance training, which provides workers with practical tools to reduce the potential for errors by evaluating and integrating personal tendencies. More than 2,300 workers were trained in 2015, and another 1,000 are scheduled to be trained in 2016.

“Creating awareness of attributes that could lead employees to make mistakes helps prevent accidents,” said Greta Lydecker, former SJVBU vice president and now Chevron Upstream Europe managing director. “For example, someone who is impatient or required to do a task repeatedly may be prone to skipping steps in a procedure, which could cause an accident. By simply writing down the job steps and checking them off as completed, we can reduce the risk of this error occurring.”



2,300+

workers participated in SJVBU's 2015 Human Performance training,
and another 1,000 are scheduled to be trained in 2016.

applying best practices and technology to prevent incidents

We've seen the results of operating safely by applying best practices, looking inward to improve safety and using new technologies to prevent incidents.

Chevron Shipping Company's (CSC) comprehensive commitment to OE has resulted in industry-leading safety and environmental performance. CSC had zero Days Away From Work incidents in 2014 and 2015, and its operated fleet hasn't had a cargo or bunker spill since November 2003.

This performance is the result of committed leadership and dedicated employees focused on achieving a common goal—zero incidents. A cornerstone of these efforts was the Avoiding the Big Incident study completed in 2012. The study was a comprehensive analysis of CSC's procedures and policies to reduce the possibility of a process safety incident. The report spawned several projects to reduce the likelihood of a catastrophic ship-related incident. For example, procedures that had grown too complex over many years were rewritten to be simpler and clearer. Mariner training was improved and standardized. In 2015, CSC opened a state-of-the-art Marine Learning and Development Center in Glasgow, Scotland, to provide rigorous mariner training for the organization, and it installed ship simulators in San Ramon, California; Luanda, Angola; and Mumbai, India.

We also updated review processes for new ships to ensure that designs reduce the risk of incidents. Procedures and checklists were improved for sea trials and for when we receive a new vessel from a shipbuilder. Management of Change, a best practice to reduce risks, is reinforced to properly document ship modifications.



“This system is operational excellence in action. It’s a natural outgrowth of our focus on process safety, asset integrity, reliability and environmental stewardship.”

— Al Williams
Chevron Pipe Line Company
President

In addition, CSC’s participation in organizations such as the Oil Companies International Marine Forum and the Society of International Gas Tanker and Terminal Operators has helped improve safety and environmental performance standards for oil and petroleum product tankers, liquefied natural gas carriers, terminals, and offshore support vessels worldwide.

Throughout Chevron, we are constantly evaluating and improving our ability to operate safely. Chevron Pipe Line Company’s (CPL) risk management programs include new, technologically advanced systems in its network of operated pipelines, many of which are located in international ports. CPL is one of the first in the pipeline industry to adopt PortVision®—a vessel tracking system that helps identify and prevent problems before incidents occur—as well as round-the-clock monitoring in its Pipeline Control Center, advanced leak-detection camera technology and predictive analytics in its pipeline risk management program.



API Distinguished Safety and Environmental Award

In 2015, Chevron Pipe Line Company received the American Petroleum Institute (API) Distinguished Safety and Environmental Award in the Large Operator category for a “consistent record of safety and environmentally sound operations.”

getting results the right way from start to finish

For Chevron, getting results the right way happens throughout the life of a project—from planning, design and construction through operation and decommissioning.

The complex El Segundo Refinery Coke Drum Reliability project to replace six massive coke drums—enormous containers that heat crude oil to 920 degrees Fahrenheit (493° C)—was honored by the nonprofit Project Management Institute (PMI) with its highest accolade, the 2015 PMI Project of the Year Award.

The new drums, each weighing roughly 400,000 pounds (181,437 kg), had to be shipped, barged and transported by road from a manufacturing facility in Spain and installed at our refinery in El Segundo, California.

“Planning and collaboration led to the safe and successful execution of this important project. Replacement of the coke drums will help ensure the continued operational reliability of the refinery,” said Frank Semancik, Chevron’s vice president of Complex Process Facilities.

The effort involved development of a unique safety vision and culture involving contractors and employees in different parts of the world to fabricate, deliver and install the units, all without incident. Because installation took place 20 feet above the ground and higher, project leaders implemented a fall-protection protocol requiring workers to wear double harnesses. The team held frequent safety meetings and used a “stop the drop” program that required all tools and materials to be tied off with a leash. Even with 400

ensuring safety

The complex El Segundo Refinery Coke Drum Reliability project was honored by the nonprofit Project Management Institute (PMI) with its highest accolade, the 2015 PMI Project of the Year Award.



people working high above the ground to install the new drums, the project was completed without a single fall or lost-time injury.

El Segundo Refinery's focus on safety extends throughout its daily operations. The refinery was presented with the 2015 Distinguished Safety Award and was named the safest operating refinery in the United States by the American Fuel & Petrochemical Manufacturers Association. To qualify, a long list of award criteria was met, including having no employee or contractor fatalities for the previous five years, no injuries resulting from falls from a height of more than four feet, and no employees or contractors being hospitalized for treatment in the last calendar year.

The El Segundo Refinery's coke drum project and its daily operations demonstrate the importance of operational clarity and consistency needed to prevent incidents. Information that helps improve safety is shared by all of our business units, many of which are in a different hemisphere.

In Nigeria, contractors often speak different languages and come from different cultures of safety. That business unit's massive Meren gas gathering compression platform topside was built in South Korea and transported to and installed in Nigerian waters. The platform collects gas from eight offshore production platforms and sends the gas through pipelines to be processed onshore at the Escravos Gas Plant. Throughout the project, leaders reinforced a "one team" mentality to improve collaboration among a diverse workforce. To prevent falls and other accidents during the fabrication of the nearly four-story-tall platform, it was mandatory for the entire workforce to wear full body harnesses in the work area. Nigerdock, a subcontractor for multiple components of the platform, reported 1.23 million work-hours without a lost-time injury in 2014.

"We need to have a steely focus on looking for vulnerabilities and identifying where our safeguards could be further improved," said Lohec. "Our constant focus will help us reach the point where we really do become an organization that refuses to have a fatality or process safety incident."

It all starts with believing that achieving zero incidents is possible.

Photos

Cover: The *Asia Excellence's* gas engineer, Sergejs Skripelevs (left) and Australasia business unit pilot and loading master Cameron Crampton inspect the flange of one of the ship's liquid lines prior to connecting the loading arms. **2:** Contract workers for Nigerdock, a subcontractor for multiple components of the Meren gas gathering platform in Nigeria. Nigerdock reported 1.23 million work-hours without a lost-time injury in 2014. **3:** San Joaquin Valley business unit (SJVBU) workers standing in Kern River Field, Bakersfield, California. SJVBU uses a verification and validation program to assess workers' competencies at job sites with high-risk activities. **4:** (L to R) Second Officer Dalibor Matijasevic, Chief Officer Olegs Nesterenko and Third Officer Ashvinder Nanda listen as surveyor John Cameron verifies the volume of liquefied natural gas (LNG) loading on board Chevron's *Asia Excellence* LNG carrier before the ship's departure from Barrow Island. **This page:** In late January 2013, Chevron's El Segundo Refinery coke drums arrive from Spain at California's Port of Los Angeles and are transported two at a time over the course of three weeks via barge into the Redondo King Harbor Marina. The drums measure 100 feet in length and 28 feet in diameter and weigh approximately 400,000 pounds each.



additional resources

chevron.com/OEMS
chevron.com/OEtenets
chevron.com/healthsafety

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