



Canadian Natural

2016 STEWARDSHIP REPORT TO STAKEHOLDERS



**SUSTAINABLE OPERATIONS THROUGH
INNOVATION AND CONTINUOUS IMPROVEMENT**

CANADIAN NATURAL RESOURCES LIMITED

CANADIAN NATURAL is a senior independent crude oil and natural gas exploration, development and production company based in Calgary, Alberta, Canada. Our strong, diversified asset base is comprised of a balanced portfolio of heavy, light and synthetic crude oil and natural gas.

Canadian Natural operates in Canada, the United Kingdom and Offshore Africa. Being a responsible and sustainable energy producer means that we take every opportunity to work with the communities where we operate. Our activities create value by providing employment, business development opportunities and essential resources for public services, including health, safety, education and training.

2016 at a glance

Economic Contributions

Contributions to Canadian governments:

\$548 million royalties
\$293 million property taxes
\$214 million surface and mineral land leases



Employment creation:

53,600 person-years*



Estimated employment created by our Canadian operations and through our capital investment program, in person-years.

- Direct employment = 13,100
- Indirect employment (suppliers) = 27,200
- Induced employment (economy at large) = 13,300

(*) A 'person-year' of employment refers to the equivalent of one full-time job for one year.

Safety & Asset Integrity

0.5 lowest recorded

Total Recordable Injury Frequency

20% decrease in injury incidents company-wide



11% decrease pipeline leaks/1,000 km in North America Exploration and Production (NA E&P)

5,799 pipelines abandoned in NA E&P since 2012

Environment

18.4 million tonnes

CO₂e conserved in the last five years

16% reduction

in corporate GHG emissions intensity since 2013

75% decrease in fresh water use intensity
since 2008 at Primrose/Wolf Lake



90-99% water recycle rates
at our larger thermal and Horizon operations

Highest number of reclamation certificates
604 submitted; 1,046 received

2,407 hectares reclaimed

8% reduction in total number of spills

Community

\$9.1 million community investment

\$320 million in contracts
to Indigenous businesses and services



\$10 million
employee training and development

7,200+ employees working together and
doing it right to safely meet global energy needs

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MESSAGE TO STAKEHOLDERS

We are pleased to take this opportunity to share with you our 2016 Stewardship Report to Stakeholders. In the pages that follow, you will find some of the highlights that demonstrate our commitment to responsible development and performance in the areas of health and safety, asset integrity, environment, innovation and community.

Our effective strategy and balanced business approach has not wavered in the current commodity price environment. Canadian Natural has been focused on improving the way we do business so as to ensure sustainable operations while leveraging innovation for continuous improvement.

Importantly, Canadian Natural has kept our teams together with no layoffs due to the economic downturn, keeping our culture strong, enabling knowledge sharing amongst employees, and allowing for time to review current and future opportunities. Commodity prices cannot be controlled, however, we can control how we react with effective and efficient operations and an execution strategy that maximizes value. We can foresee a strong future for oil and natural gas in Canada, but it is imperative that we continue to work together to ensure we are improving performance, lowering costs, increasing productivity and investing in innovation.

Enhanced safety performance is a good example of the importance of working together. Engaging frontline staff drives learnings and feedback, embedding safety into our processes to achieve operational excellence and continuous improvement. Enhancing statistical information is helping to more effectively target our safety initiatives and reinforce accountability. As a result of our safety management programs, we achieved the lowest corporate Total Recordable Injury Frequency (TRIF) in company history, representing industry leading safety performance.

Our ongoing focus on asset integrity in 2016 resulted in strong performance, including an 11 per cent reduction in frequency of pipeline leaks/1,000 km in our North American Exploration and Production operations. Benchmarking data shows that Canadian Natural is a top performer, even while operating three times more pipeline length than our nearest peer.

Our greenhouse gas (GHG) emissions reduction strategy continues to deliver improved emissions performance, and sets us on a pathway to deliver long-term emissions reductions. Over the last

five years, we have reduced corporate GHG emissions intensity by 16 per cent. Our solution gas conservation projects have also reduced venting from our heavy oil projects in Alberta by 65 per cent since 2012.

Investing in new technology, innovation and research will continue to improve performance, increase productivity and lower costs well into the future. Canadian Natural is a top investor in research and development for the crude oil and natural gas sector in Canada. We are focused and strategic in our innovation approach, which positions us well to ensure sustainable operations no matter the commodity price environment.

The global challenge remains to continue delivering abundant, affordable, reliable and responsible energy to meet the world's energy needs. Our teams are dedicated and committed to working together with Indigenous communities, stakeholders and governments, as we continue to build a world class company. As a result of ongoing work and continuous improvement, Canadian Natural is well positioned to be a preferred supplier of responsibly produced crude oil and natural gas. Indeed, responsibly-produced crude oil and natural gas will be an important long-term part of a lower carbon future.

We especially want to acknowledge the commitment and dedication of our teams in response to the May 2016 forest fires in Fort McMurray, and invite you to read our feature story on page 19. Our Horizon operation, located just north of Fort McMurray welcomed 3,500 people including families, children and pets. They were provided with safe accommodations, meals, and medical attention. Roughly 2,700 evacuees were flown to either Edmonton or Calgary with the assistance of our Horizon Aerodrome staff and our carrier Canadian North.

As a final note, on June 1st, 2017 Canadian Natural welcomed 2,800 employees from Shell and Marathon Oil through the acquisition of working interests in the Athabasca Oil Sands Project and other assets. We continue to work to optimize our oil sands operations, create value and expand our commitment to responsible development as we build a world-class company.

As our stakeholders, we invite you to learn more about Canadian Natural's strong performance in 2016. Working together, we will ensure Canadian Natural's success as a world class operator.



N. MURRAY EDWARDS,
EXECUTIVE CHAIRMAN



STEVE W. LAUT,
PRESIDENT



TIM S. MCKAY,
CHIEF OPERATING OFFICER

Canadian Natural's mission statement:
"To develop people to work together, to create value for the Company's shareholders by doing it right, with fun and integrity."

HEALTH AND SAFETY

At Canadian Natural, safety is a core value that underlies all our activities to reach our ultimate goal of 'No harm to people; No safety incidents'.



SAFETY IS A CORE VALUE

The safety of our employees, contractors and the communities where we work are of paramount importance. To achieve our goal of 'No harm to people; No safety incidents', we have a certified Safety Management System (SMS) in place that aligns with industry's highest safety standards. Within the SMS, our Safety Excellence program supports continuous improvement in our performance. We do this through target setting, innovative practices and performance measurement — embedding safety in everything we do.

To ensure safe and reliable operations we have integrated management systems for Personal Safety, Process Safety and Asset Integrity. Process Safety Management (PSM) is a systematic approach to preventing hydrocarbon releases, that not only protects workers but also the public, the environment and our operations.

Our management frameworks ensure compliance with regulations and internal requirements. They rely on our continuous improvement approach and company-wide alignment to be as effective as possible. Our teams are responsible for keeping our management systems (including the Codes of Practice) up to date, and for facilitating ongoing safety training. They conduct inspections, apply learnings and design facilities with inherent safety or loss-prevention engineering. They also provide support to leadership and work with employees and contractors alike towards an incident-free workplace.

Front-line driven safety culture

In order for our management systems to be effective, safety as a core value is reinforced from management down to each and every employee and contractor. As a key foundation of this approach, we foster a front-line driven safety culture where everyone contributes to making the workplace safer. Individuals are empowered to take responsibility, and trained to observe behaviours, identify and mitigate risks, for their own safety and that of those around them.

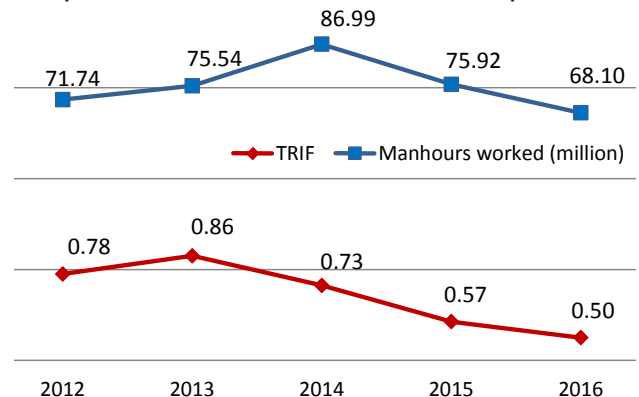
Our management's commitment to providing a safe work environment is demonstrated by having a presence in the field ('touching the steel') and engaging in safety dialogues with our frontline staff to share learnings and feedback. Embedding safety into our daily conversations adds value and strengthens our processes to achieve operational excellence and continuous improvement.

SAFETY EXCELLENCE

Strong safety performance

Our commitment to safety contributed to making 2016 Canadian Natural's strongest year for safety performance. We achieved the lowest corporate Total Recordable Injury Frequency (TRIF) in company history, representing industry leading safety performance.

Corporate TRIF vs manhours worked/200,000 exposure hours



Highlights of our 2016 safety performance:

- 15 per cent reduction in recordable injuries in North America Exploration and Production (NA E&P) and Horizon, and 43 per cent reduction at Canadian Natural Resources International (CNRI) compared to 2015. (Total 20 per cent reduction in injury incidents company-wide).
- 55 per cent decrease in slips, trips and falls at NA E&P and 26 per cent decrease at Horizon since the implementation of the 'Don't Let Your Safety Slip in Winter' campaign in 2014.
- 23 per cent reduction in vehicle incidents at Horizon compared to 2015, through a new Driver Safety System for operators launched in 2016 that warns of distraction or fatigue. Vehicle incidents remain a focus in our NA E&P operations, where incidents increased by 6 per cent.
- 26 per cent reduction in Lost-Time Injury (LTI) frequency at CNRI from 2015 levels. LTI is an injury incident where a worker is unable to return to work the next scheduled day. Our corporate LTI increased slightly compared to 2015, although it remains low and injuries sustained were of low severity.

SAFETY PROGRAMS

Our SMS and Safety Excellence initiatives continue to drive strong performance, meeting our safety expectations, reducing injuries and improving worker safety.

0.5 TRIF
LOWEST RECORDED

20% DECREASE
INJURIES COMPANY-WIDE

Safety Excellence Meetings

Senior management conducted a total of 30 Safety Excellence Meetings with 3,000 participants, including field operations staff, supervisors, and contractors from all our field districts, offshore platforms and head office. These sessions reinforce our leadership's strong commitment to continuous safety performance improvement.

Contractor Safety Excellence Meetings

Management from contractors and Canadian Natural work together to identify action items and establish plans to improve worker safety. Through monitoring and tracking of action plans to completion, contractor safety performance and our corporate TRIF continue to improve every year. For example, contractor TRIF at our NA E&P operations decreased by 59 per cent in 2016 for those contractors with higher incident rates between 2014 and 2015.

Worksite Safety Observations (WSOs)

This hazard assessment program focuses on improving worksite behaviours through observation of staff, contractors and service providers, their equipment, processes and procedures. In 2016, WSOs contributed to better interactions with contractors, improving safety at our worksites.

A similar behavioural-based observation process called "Doing it Right!" (DiR) used at CNRI reduced lost time injuries by half in 2016 compared to 2015. A focus on hazard recognition and behavioural changes is strengthening our DiR program through implementation of lessons learned.

Supervisor training

To support the WSO and DiR programs, improve the ability of staff to have quality safety conversations and enhance their coaching skills, our safety teams provide supervisor training. Coaching sessions reinforce frontline accountability and leadership skills, preparing supervisors for taking a more active role so they can, in turn, support all workers on site to conduct effective assessments, identifying and removing behaviours that contribute to injuries. This training strengthens the application of our SMS and the integration of the Safety team in daily operating activities.

CONTINUOUS IMPROVEMENT IN SAFETY MANAGEMENT

At Canadian Natural, we are focused on continuous improvement and have an unwavering commitment to safety.

Enhancing organizational structure

In 2016, we started the integration of the Health and Safety, and Industrial Hygiene groups at Horizon. Industrial Hygiene professionals assess and find solutions to the potential impacts

of physical, chemical and biological hazards to protect the health and well-being of employees. Their work was key in enhancing worker safety during the turnaround alongside our Health and Safety group (see story on page 9).

Improving safety through data-based decision-making

Statistical information is improving our safety performance. By better analyzing data and trends, we are able to more effectively target our safety initiatives and reinforce accountability. Statistical data is accessible to all business areas so that they can identify improvement actions and work together with our Safety teams.

Marine safety

To ensure worker safety and prevent incidents at our offshore operations, we worked with our CNRI contractors to better align our Safety, Health and Environment plans and prioritize the right areas. In 2016, we enhanced our contractor meeting process to ensure improvement plans are actively reviewed and tracked to completion. We also introduced the first draft of a Contractor Engagement Guidance that sets clear expectations regarding offshore safety standards and drives the right behaviours. To further improve our communications and working practices, we continue to rely on structured Toolbox Talks and regular meetings as effective components of our SMS.

Working with APEGA

Canadian Natural is working together with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) on the development of a new practice standard for the outsourcing of engineering and geoscience work that will strengthen the engineering profession and public safety. This is the result of an APEGA investigation related to an incident that occurred at Horizon on April 24, 2007, when a tank roof-support structure failed during construction and resulted in the tragic loss of two contractors, and injuries to other workers. Canadian Natural takes every incident seriously and in this case we took immediate steps to strengthen our processes related to contractor management to ensure that health and safety standards are consistently met.

Focus in 2017

In 2017, we are focusing on a "stop, reassess and then proceed" safety message, which aligns with our Safety Excellence program's motto of 'Doing it Right'. This refers to the notion that workers should take all the necessary precautions, follow safety protocols and practices to complete the task correctly each and every time. When something doesn't go as planned or doesn't seem right, workers need to stop, ask questions and re-assess the situation.



EMERGENCY RESPONSE MANAGEMENT

Canadian Natural's integrated management systems are based on proactive risk management, from risk identification to mitigation programs across all our operations, preventing failures that could potentially lead to spills or leaks. In the event of an incident, we have a comprehensive corporate emergency management program in place to ensure that we are properly prepared for a safe and well-coordinated response.

Our Emergency Response Plans (ERPs) are reviewed annually to keep them current. Continuous improvement of our emergency response processes reinforces our commitment to the safety of our people and the public.

More details on our Emergency Management program are described on our [corporate website](#).

Emergency response exercises

ERP exercises are designed to test the efficiency of our preparedness, as well as available tools and resources. They also allow participants to better understand roles, responsibilities and the communication flow in an emergency event. In 2016, we completed 117 exercises in NA E&P operations, 101 at Horizon, and nine intermediate and two major exercises at CNRI.

EMPLOYEE AND CONTRACTOR TRAINING AND COMPETENCY

At Canadian Natural, we know that people are the foundation to our business. Developing people is part of our culture — ensuring we have the right people with the right skills.

In 2016, Canadian Natural invested more than \$10 million in employee and contractor education and training. This includes required safety and competency courses (job-related skills training that allow workers to complete assigned tasks safely and effectively) representing more than 122,000 hours of required training. Beyond this total, there is also field operator training in our North American operations and competency training for

offshore supervisors, some of which are self-study courses with variable hours.

To aid in safety training and incident investigation at Horizon, Canadian Natural uses a 3D model as a communication tool. The 3D model of the entire Horizon facility provides an accurate reference for equipment location and context. We are currently testing how to incorporate this software into animations for incident investigations and interactive employee training of specific standard operating procedures.

To ensure our people have the skills they need to look after their safety and the safety of those around them on worksites, we have systems in place that measure and track all workers' competency and skills training.

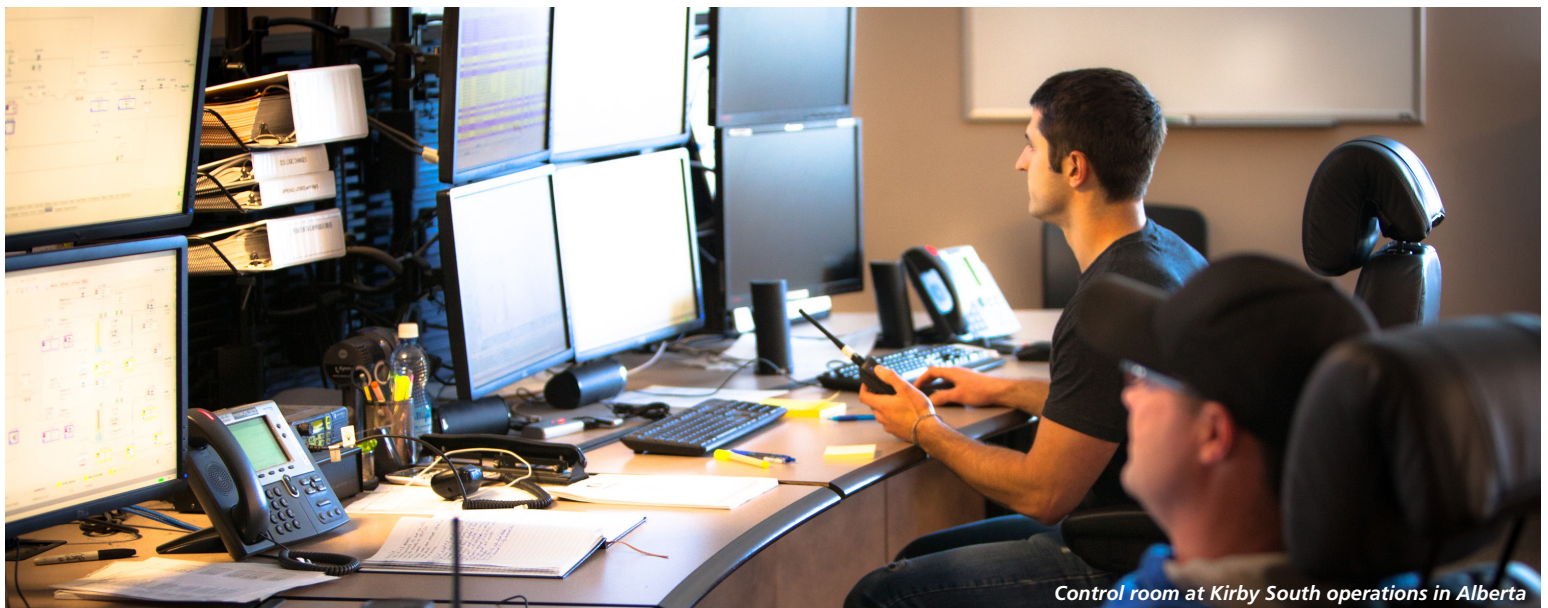
HEALTH AND WELLNESS

Canadian Natural's 'Strive' wellness program continues to provide employees across our operations with opportunities to improve their health and wellness, and prevent illnesses. Strive has proven successful in enhancing employee health and influencing permanent healthy lifestyle changes, as demonstrated in our latest impact evaluation.

Strive continues to experience high participation rates overall. The program includes health risk assessments and personal health screening clinics offered at each location, and different aspects of healthy living, such as exercising, good nutrition and community-based activities like volunteering. Strive is also incentivized and tied to financial rewards that can be used towards healthcare and wellness expenses.

Highlights of 2016 wellness initiatives:

- Developed tailored and targeted communications for each business area to increase program participation.
- Annual health challenges, offered as a unique way for employees to focus on their health and earn rewards, focused on nutrition, exercise and strategies to manage stress.



Control room at Kirby South operations in Alberta

HEALTH AND SAFETY HIGHLIGHTS

PRIORITIES IN 2016

Safety Management System (SMS)

- Embed the unified SMS across North American operations and develop a continuous improvement action plan.
- Complete all SMS action items identified.
- Provide enhanced statistical information and awareness to improve worker safety and regulatory compliance company-wide.

Safety Excellence

- Continue to work with all operations to reduce injuries company-wide.
- Continue emphasis on incident prevention campaign across our North American operations.
- Continue with Safety Excellence meetings and reinforce our focus on safe, compliant and reliable operations.
- Provide support to frontline staff and operations through Enform's 2016 Safety Stand Down theme: 'Keeping "u" Out of Injuries'.

Contractor Safety Management

- Continue Contractor Safety Excellence meetings to drive continuous improvements in performance.
- Extend the frontline Worksite Safety Observations (WSO) supervisor coaching across the Operations team.
- Continue to enhance quality of the interventions in our "Doing it Right!" (DiR) program.
- Update and implement SHE expectations for all major contracts in CNRI, and SHE Improvement Plans.
- Continue to drive the WSO/DiR program through Leadership training.
- Extend hazard identification training to CNRI.

Safety Leadership

- Continue senior management field visits to reinforce supervisors' safety responsibilities.
- Develop an offshore version of the annual Safety Health Environment Action Committee (SHEAC) meeting materials to ensure CNRI frontline workforce alignment.

Emergency Response

- Continue ERP training exercises with senior management.
- Continue to conduct ERP training exercises at each division focusing on key risk areas.

Wellness

- Focus program elements on key areas identified by data analytics (i.e. high risk health areas).
- Continue focus on tailored and targeted communications, and simplifying access and involvement process to increase program participation.

ACHIEVEMENTS IN 2016

- Unified SMS is providing alignment throughout our North American operations.
- Completed SMS internal audit and training sessions, and developed continuous improvement action plans.
- Renewed the Certificate of Recognition (COR) for North American operations with a score of 95%.
- Completed all actions and embedded the continuous improvement process throughout our operations.
- Started integration of Industrial Hygiene, and Health and Safety teams at Horizon.
- Completed training on Effective Investigations and Workplace Inspections at CNRI platforms.
- Increased data use and analysis is driving improvements in safety performance and regulatory compliance.

- Lowest recorded corporate TRIF of 0.5.
- Reduced recordable injuries by 15% in North American operations and by 43% in CNRI compared to 2015.
- Reduced slips, trips and falls by 55% in NA E&P and by 26% in Horizon since 2014 through the "Don't Let Your Safety Slip in Winter" campaign.
- Completed 30 Safety Excellence meetings with senior management and 3,000 participants from all our operations.
- Safety stand down theme was incorporated into our safety dialogues.

- Contractor Safety Meetings continue to improve our performance and reduce incidents.
- Ongoing supervisor safety training reinforced safety procedures and reduced behavioural-based incidents.
- Increased awareness on how to use the WSO/DiR processes across our operations teams.
- Use of statistical information supports field leadership to engage in safety discussions with contractors.
- Focused on hazard recognition and behavioural changes, reducing injuries and strengthening DiR program.
- Introduced draft of new Contractor Engagement Guidance.
- Assessed implementation of hazard identification computer-based training for CNRI.

- Continued to strengthen leadership engagement and supervisors' safety responsibilities.
- Offshore SHEAC delivered key safety themes to our CNRI frontline workers.
- Developed new SHEAC intranet page to reinforce safety as a core value and continuous improvement.

- Completed all scheduled ERP exercises with all levels of management across our operations.
- Completed 229 ERP training exercises company-wide.

- Focused on each component of the wellness program.
- Increased website users through easier online access and platform enhancements.
- Embedded wellness discussions into field meetings with management.
- Resulted in benefit costs for participants rising at just half the rate of non-participants.

PRIORITIES IN 2017

- Identify improvement opportunities in each business area using SMS tools for continuous improvement.
- Complete combined (Bitumen Production, and Upgrading and Utilities) COR audit at Horizon.
- Integrate Safety, Health and Environment (SHE) function with Operations to continue working together on frontline safety at CNRI.
- Continue to advance data use across the company for further safety performance improvements.

- Continue incident prevention campaigns and incident trend reviews to reduce injuries.
- Focus on worksite safety standards and contractor management at Côte d'Ivoire (CDI).
- Complete a workforce engagement survey at CNRI.
- Complete all planned Safety Excellence meetings.
- Provide support to frontline staff and operations through Enform's 2017 Safety Stand Down theme: 'Focus on What's Important'.

- Maintain Contractor Safety Excellence meetings to drive continuous improvements in performance.
- Carry on with leadership training and coaching, and overall support to the WSO and DiR programs.
- Introduce WSO program to CNRI.
- Work closely with third party operators and operations team in CDI to reinforce safety standards.
- Implement hazard identification training in CNRI.

- Complete all planned senior management field visits to reinforce supervisors' safety responsibilities.

- Continue ERP training exercises with senior management.
- Conduct ERP training exercises at each division focusing on key risk areas.

- Increase support and program participation.
- Conduct an employee survey to receive program feedback.

ASSET INTEGRITY

At Canadian Natural, we are committed to high levels of asset integrity to ensure safe, reliable, effective and efficient operations.



ASSET INTEGRITY MANAGEMENT

The cornerstone of our Asset Integrity Management System is ensuring that risks are identified and assessed, and action plans are in place to prevent failures and incidents. To manage the integrity and continuously improve the reliability of our operations — including pipelines, pressure equipment, tanks and infrastructure — a proactive risk-based management approach is in place.

Our management framework incorporates a Corporate Risk Matrix that helps us make decisions consistently across our company. This tool includes health, safety, process safety and asset integrity considerations, as well as an environmental component. This matrix is used to understand and manage risk, prioritize our work and design programs that will ultimately reduce incidents by minimizing the exposure to those risks. Our programs include inspections, evaluations, monitoring and mitigation strategies to safeguard people, the environment, and the integrity of our assets.

Our Asset Integrity Management System also ensures compliance with regulations and drives continuous improvement in our performance through goal setting, tracking and results measurement.

Significant infrastructure

We operate one of the largest inventories of upstream process equipment within Canada, including thousands of kilometres of pipeline and pieces of registered pressure equipment. Canadian Natural Resources International's (CNRI) offshore facilities in the United Kingdom (UK) sector of the North Sea and Africa include:

- four platforms in the North Sea (Ninian Central, Ninian South, Ninian North and Tiffany), and
- four third-party owned and operated Floating Production, Storage and Offtake (FPSO) vessels, in the North Sea (Banff) and in Offshore Africa (Baobab, Allan and Espoir Ivorian).

PROCESS SAFETY MANAGEMENT

The integrity of our process equipment and structures is an essential part of ensuring safety company-wide. Our Process Safety Management (PSM) system provides a structured framework designed to prevent and control serious incidents (such as spills or leaks) that have the potential to release hazardous materials.

Highlights of 2016 PSM initiatives:

- Rolled out Operational Risk Assessments (ORAs) in our North American operations and on all our UK platforms as part of our Safety, Health and Environment (SHE) focus. The ORA process is designed to assess whether there is a potential process safety concern, and if needed, implement short-term mitigation controls until a permanent solution is in place.
- Completed design and operability reviews on major units that came online during Horizon's plant expansion.
- Strengthened Horizon's operations, safety and technical teams through integration of project staff into these groups. These organizational enhancements contribute to fewer incidents, minimized threats, and overall increased reliability of our plant.

Focus on continuous improvement

In 2016, 14 reportable hydrocarbon releases occurred in our offshore operations compared to eight in 2015. We have taken steps to further reinforce our operating discipline across our CNRI operations and improve our performance. In particular, our action plans include working with our third-party FPSO operators where half of the incidents occurred in 2016.

Working with third-party operators

We work with our third-party FPSO operators on an ongoing basis. This includes periodic process safety assessments of the vessels and a rigorous audit program to reinforce asset integrity and PSM processes.

Experienced North Sea operations and SHE teams support our third-party contractors in the implementation of improvement plans, to achieve strong integration of our process safety practices into the management systems onboard the FPSOs.

Focus of our 2016 work with third-party operators:

- Implementation of an excellence program focusing on operational discipline, to ensure procedures, training and competency assessments are in place and followed by operators.
- Optimization of our risk-based inspection (RBI) programs for better alignment to our asset integrity performance expectations.

In 2017, our focus will be on priority area inspections to ensure that incident hazards are appropriately identified and managed to proactively prevent failures.

11% DECREASE
PIPELINE LEAKS/1,000
KM IN NA E&P

5,799
PIPELINES ABANDONED
IN NA E&P SINCE 2012

Strong performance during Horizon Turnaround

The 2016 Horizon Turnaround took place between July and August. During the shutdown we completed more than 1,200 maintenance, inspection and repair work orders (600,000 man hours). The turnaround also provided an opportunity to tie-in the major Phase 2B Expansion components, such as Ore Preparation Plant 4, a Gas Oil Hydrotreater Unit and a Vacuum Distillation Unit.

The scope of this planned maintenance shutdown was developed based on our Corporate Risk Matrix, to help ensure Horizon continues to deliver safe, steady and reliable operations. Cross-functional teams — consisting of representatives from Operations, Maintenance, Process Engineering, Engineering and Asset Integrity — assessed hundreds of pieces of equipment to derive a scope that best utilized our resources and enhanced reliability.

Our Health and Safety teams prepared and provided effective support to the turnaround and commissioning activities. We also worked together with our contractors to follow procedures and held daily safety meetings supported by leadership to communicate effectively. Coordination and teamwork between the groups involved maintained the focus on the safety of workers and operations. All this improved not only our safety performance during turnaround, but resulted in successful completion of all planned work and ongoing steady operations at Horizon.



Field Level Hazard Assessment

PIPELINE INTEGRITY

Strong performance

Our ongoing focus on pipeline integrity in 2016 resulted in strong performance with an 11 per cent reduction in our frequency of pipeline leaks/1,000 km in our North America Exploration and Production (NA E&P) operations, down to 1.60 from 1.79 in 2015. Benchmarking data also shows that we are an industry top performer, with a lower number of pipeline incidents/1,000 km in Alberta again this year, while operating over three times as much pipeline length than our nearest peer.

Proactive pipeline integrity management approach

Our proactive approach to pipeline integrity management works to prevent pipeline failures. We assess each pipeline based on the likelihood of failure and the potential consequences of that failure. Our risk-based, comprehensive pipeline integrity management system includes:

- Proven assessment tools to effectively deploy resources and capital to areas of highest exposure — including detailed evaluations of our pipeline inventory with a strong focus on high consequence pipelines.
- Effective and efficient execution of mitigation activities — including corrosion mitigation and monitoring programs, planned inspections and repairs.
- Effective spill and emergency response — if a leak or spill occurs, the consequence is minimized through our Emergency Management and spill preparedness programs.
- Focus on continuous improvement — program auditing and incident investigations allow us to implement lessons learned and ensure best practices are in place.

Pipeline Abandonment Program

Our Abandonment and Discontinuation program is aimed at reducing our environmental liabilities by minimizing our footprint and meeting regulations associated with inactive pipelines. This program ensures pipelines are left in a safe and environmentally sound manner. Over the past five years, we have abandoned or discontinued 5,799 pipelines in Alberta, British Columbia and Saskatchewan.

Pipeline Water Crossing Management

Canadian Natural's pipeline network intersects a number of flowing water bodies. Canadian Natural has a comprehensive GeoHazard Management System that considers long-term geological and environmental conditions for the effective management of our pipelines crossing water bodies.

This system relies on a detailed assessment methodology including:

- a risk-based inventory of each pipeline water crossing and each right-of-way slope of concern;

- a prioritization process that is aligned to our Corporate Risk Criteria Matrix;
- likelihood assessment criteria developed by industry-recognized GeoHazard specialists;
- a stakeholder review process;
- an engineering assessment process; and
- a specialized monitoring (flood and slope activity) and mitigation process.

We continue to successfully leverage technology as part of our ongoing commitment to responsible operations. In 2016, we developed, engineered and implemented an innovative strategy to monitor river flow conditions upstream of high consequence pipeline crossings. This process builds on our existing pipeline management and monitors a series of river flow gauges in real-time. If waters rise to certain thresholds, alerts are sent to our operations staff, allowing for pipeline shut-in prior to a potential integrity incident.

Highlights of 2016 pipeline integrity management initiatives:

- Conducted a comprehensive review of our Echo pipeline (running from Cold Lake to Hardisty, Alberta), to ensure the effectiveness of our leak detection and pressure monitoring systems. Also updated the site-specific ERP to enhance our emergency management system, including rigorous training protocols and yearly exercises to test the efficiency of our response management for this line.
- Conducted a comprehensive engineering assessment and implement additional corrosion mitigation measures at our Primrose and Wolf Lake (PAW) thermal in situ operations.
- Updated all offshore pipeline RBI assessments, and incorporated inspection and maintenance programs information into our Maintenance Management System (MMS). Effective data use highlights priorities and drives performance improvements to achieve safe and reliable pipeline operations.

FACILITIES INTEGRITY

We strive to ensure our pressure equipment is maintained and operated in a safe manner to prevent incidents and safeguard our people and the environment. We have systems in place to manage the integrity of each piece of pressure equipment for all our operations, based on evaluations that prioritize our inspection, monitoring and maintenance plans.

Pressure Equipment Integrity Management Systems

Our Pressure Equipment Integrity Management Systems (PEIMS) for NA E&P and Horizon operations are registered and remain fully compliant with the regional jurisdictions in which we operate. They are subject to periodic audits by the provincial pressure equipment safety authorities — the Alberta Boilers Safety Association (ABSA) and the Technical Safety Authority of Saskatchewan (TSASK).

In alignment with our North American operations, our international division has Integrity Management Systems in place for Pressure Systems (PSIMS), Pipelines (PIMS), Structures (SIMS) and Subsea Control Systems (SCIMS).

Pressure Equipment Assessments

Our Asset Integrity team continued to advance risk-based

assessments and optimize the inspection intervals for pressure equipment in our NA E&P facilities. This thorough technical review validates our equipment reliability and integrity to determine the inspection frequency required.

Highlights of 2016 pressure equipment assessments:

- Conducted six reviews on larger NA E&P facilities and 191 reviews on smaller facilities, to strengthen the effectiveness of our integrity management system and obtain input from our Operations, Asset Integrity, Maintenance and Engineering groups.
- Initiated the first phase of a multi-year program to perform a more comprehensive RBI strategy at Horizon. The first phase focuses on the Secondary Upgrading area of the plant.
- Completed RBI assessments for all CNRI pressure equipment to align our inspection activities with priority areas, and incorporate data into our MMS for effective monitoring and control.
- Completed Authoritative Reviews of our third-party FPSO operators' pressure equipment. This enabled the identification of improvements to their inspection programs, and consistency in approach for targeting priority areas.

STRUCTURAL INTEGRITY

Structural Integrity programs work to maximize the integrity of operational structures with careful design, safe operation and proper maintenance throughout the facilities' lifecycle. When integrated into our Asset Integrity Management System, these programs ensure plans are in place to prevent significant incidents at structures that support our oil and natural gas production facilities. Our offshore infrastructure is the main focus of our Structural Integrity programs due to the operating conditions, age and location of the assets.

Our annual subsea structural integrity inspection and maintenance programs were completed as planned in 2016. A successful evaluation of our conductors at the Ninian South platform resulted in no integrity threats identified. Conductors are the pipes that transport production from the well (on the seabed) to our topside wellheads, and it is important to monitor their condition to confirm they are fit for drilling. To do this, we used an innovative clamping technology and a subsea Remotely Operated Vehicle (ROV). ROVs are used regularly in our subsea inspections to remove diver safety hazards and optimize inspection coverage.

Mooring Chain Integrity Program

Mooring systems are critical pieces of equipment that hold FPSO vessels in place when oil and natural gas production is brought on board for processing and subsequent export.

As a result of our integrity assessments of the Banff FPSO, and in line with our continuous improvement process to prevent failures, we worked closely with the third-party operator to complete timely reviews and improvements of the mooring chains. Also, the mooring system was redesigned and received regulatory approval to proceed. Inspections will continue to occur annually and following significant storm events.

ASSET INTEGRITY HIGHLIGHTS

PRIORITIES IN 2016

Process Safety Management (PSM)

- Process Risk Management support for the Horizon Turnaround and the commissioning of major units.
- Transition into risk-based inspection (RBI) methodology to enhance understanding and match inspection timing and techniques with risks.
- Implement the Operational Risk Assessment (ORA) process and tracking system across Horizon and CNRI.

Pipeline Integrity

- Continue enhanced oversight of proactive pipeline integrity processes at NA E&P.
- Deliver on targets for continued proactive pipeline risk assessments at NA E&P.
- Deliver enhanced pipeline integrity audit process for our NA E&P operations.
- Complete the pilot of the “All-Threats” Assessment Tool and expand its use to additional high consequence pipelines.

Facility Integrity

- Continue focus on proactive risk-assessments of our NA E&P operations.
- Develop risk-based inspection strategy for major NA E&P natural gas plants.
- Complete RBI assessment of Horizon's secondary upgrading area.
- Deliver revalidated inspection plans for static pressure systems at CNRI.
- Implement a plan for commissioning of new units coming online during 2016 at Horizon.
- Execution of Horizon's Turnaround in July 2016.
- Incorporate mooring system audit results to target areas for improvement.
- Complete biannual reviews of high-level Integrity Statements to ensure continued alignment with our strategic priorities and Life of Field plans of our North Sea operations.

ACHIEVEMENTS IN 2016

- Design and operability reviews conducted on all Horizon major units coming online.
- Significant focus on PSM in Côte d'Ivoire (CDI) to reinforce operating discipline and integrity management.
- RBI strategies implemented across our operations.
- ORA rolled out at all our operations, including all CNRI platforms.
- PSM audits conducted on all FPSOs in Offshore Africa highlighted areas for improvement and follow-up actions were tracked to completion.

- Completed pipeline integrity risk reduction projects and continued focus on effectively tracking data for improvement plans.
- Annual assessments successfully completed on all 660 pipeline gathering systems.
- Updated our Pipeline Risk Assessment Tool to more effectively understand and manage threats.
- Enhanced pipeline integrity audit process implemented, and audits performed in all field offices.
- Completed “All-Threats” audit for Echo pipeline, and initiated audit of Pelican Lake pipelines.

- Completed proactive assessments on six large and 191 smaller facilities.
- Initiated work on RBI assessment of Horizon's secondary upgrading area.
- Implemented RBI strategies for CNRI static pressure systems.
- Integrated all new equipment that came online for Horizon Phase 2B Expansion.
- Successfully completed 2016 Horizon Turnaround.
- Developed detailed inspection plans for all the equipment in scope for the 2017 Horizon Turnaround.
- Redesigned Banff FPSO Mooring System and developed inspection programs to identify potential chain integrity threats.
- Completed suite of Asset Integrity Statements for CDI, to reinforce engineering and maintenance plans are in place.

PRIORITIES IN 2017

- Process Risk Management support for the 2017 Horizon Turnaround and the commissioning of major units.
- Complete RBI plans to proactively identify improvement areas across our operations.
- Complete the implementation of the ORA process and tracking systems across NA E&P and CNRI.
- Continue working with third-party FPSO operators to implement improvement plans to reduce hydrocarbon releases.

- Complete annual risk assessments on all gathering systems.
- Rollout of improved Pipeline Risk Assessment Tool.
- Continuous improvement of geo-hazard management program.
- Complete pipeline integrity audits.

- Complete 2017 risk-assessment plan.
- Continue to execute the pressure equipment inspection program, and pressure relief value servicing program at Horizon.
- Develop and implement Integrity Management Programs for all units to be commissioned at Horizon in 2017.
- Execution of the 2017 Horizon Turnaround.
- Improve mooring system reliability.
- Continue to update high-level Asset Integrity Statements bi-annually (next update to occur in 2018).



Horizon Oil Sands operation

ENVIRONMENT

Environmental protection is incorporated in all phases of our projects — from planning and design to operation, decommissioning and final reclamation.

To protect the environment and operate responsibly, we follow comprehensive environmental practices and regulations, drive continuous improvement in our performance and invest in research and development (R&D).

Our Environmental Management System (EMS) provides the framework for managing the impact of our operations on air, land and water, as well as ensuring regulatory compliance. Proactive programs are in place to assess and mitigate the impacts of our operations by setting performance objectives for reducing greenhouse gas (GHG) emissions, improving water use and protecting water sources, minimizing habitat disturbance, advancing land reclamation, and preventing and responding to incidents. Commitment to leadership and training for employees and contractors helps them to identify risks and prevent incidents, which are critical to the success of our EMS.

CLIMATE CHANGE LEADERSHIP

Canada's approach to climate change ensures that Canada's crude oil and natural gas continues to be developed responsibly with world-leading environmental performance standards to strengthen our position compared to other jurisdictions. In this way, Canada's crude oil and natural gas will be an important part of a lower carbon economy.

Canadian Natural is strongly committed to doing our part to lower greenhouse gas emissions, and helping to position Canada as the supplier of choice for safe, secure, reliable and environmentally responsible energy the world needs.

Our GHG management strategy

Canadian Natural, along with our industry partners, is committed to lowering our GHG emissions, comparable to emissions of crude oil from global sources. We support the governments of Canada and Alberta's goal to reduce methane emissions by 45 per cent. In 2016, we established a cross-functional Methane Steering Committee to coordinate methane reduction projects and track policy/regulatory development.

Canadian Natural GHG emission reduction strategy is an integrated corporate approach that involves:

- **Integrating emission reduction in project planning and operations.**
- **Leveraging technology to create value and enhance performance.** Development and adoption of innovative technology drives emission reductions and improves efficiencies.
- **Investing in R&D.** Many of our R&D activities occur in

collaboration with industry, academia and government.

- **Focusing on continuous improvement to drive long-term emissions reductions.** By improving energy conservation and operational efficiencies in our day-to-day practices, we deliver substantial and long-term emissions reductions.
- **Leading in carbon capture and sequestration/storage (CCS).** By taking waste carbon dioxide (CO₂) from our operations and utilizing it for operational input, CCS is a key element in the pathway for oil and natural gas to be part of a lower carbon future.
- **Engaging proactively in policy and regulation to manage climate risks and opportunities, including trading capacity and offsetting emissions.** We work with industry, governments, Indigenous groups and non-governmental organizations to develop climate policies that encourage technological innovation, energy efficiency, and R&D, while maintaining industry competitiveness.

Pathway to a lower carbon energy future

Additionally, as a lower GHG intensive source of energy, natural gas is an integral part of our plan and the pathway to long-term emission reductions. Natural gas will continue to be an important source of energy. Canadian Natural has a diversified and balanced asset portfolio with vast natural gas resources to support future energy demand. Collaboration and continuous improvement are also essential to delivering long-term emission reductions along the pathway to a lower carbon energy future. Together with a broad group of industry sectors, academia and governments, we are sharing technologies and working to find innovative solutions through Canada's Oil Sands Innovation Alliance (COSIA). Working together drives everyone up the technology curve exponentially faster.

Canadian Natural is also a supporter of the US\$20 million NRG COSIA Carbon XPRIZE, a global competition to identify new technologies that transform CO₂ emissions from industrial facilities into valuable and usable products. The governments of Canada and Alberta, together with industry partners and the Shepard Energy Centre (a joint venture of ENMAX and Capital Power), have invested in the development of the Alberta Carbon Conversion Technology Centre (ACCTC). NRG COSIA Carbon XPRIZE finalists will test their technologies at the ACCTC — one of the few places in the world where carbon conversion technologies can be tested on a large, commercial scale.

Delivering results

With our significant investments in technology and innovation,



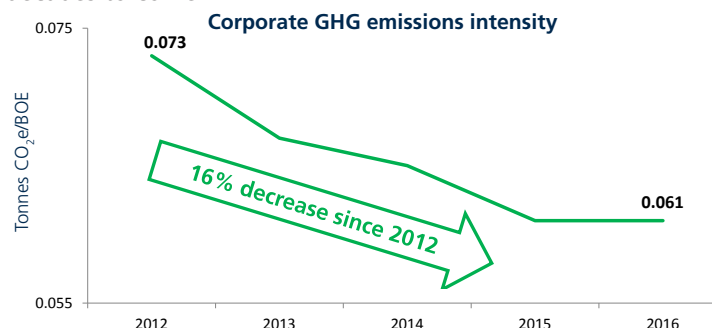
Septimus natural gas plant, British Columbia

**18.4 MILLION TONNES
OF CO₂e CONSERVED
IN THE LAST FIVE YEARS**

**75% DECREASE
IN WATER USE INTENSITY
AT PAW SINCE 2008**

**8% REDUCTION
IN NUMBER OF SPILLS
ACROSS OUR OPERATIONS**

meaningful results are being achieved today that will also translate into long-term positive environmental impacts for decades to come.



- 16 per cent reduction in our corporate GHG emissions intensity over the last five years.
- 7 per cent reduction in direct GHG emissions in North America Exploration and Production (NA E&P) and 4 per cent in our International operations from 2015 to 2016, while direct GHG emissions at Horizon remained the same.
- 65 per cent reduction in venting in our Alberta heavy oil operations from 2012 to 2016.

Highlights of 2016 programs driving GHG reductions:

Natural gas conservation projects. Since 2012, Canadian Natural has invested \$95 million to reduce natural gas venting in our heavy oil operations, conserving more than 18.4 million tonnes of carbon dioxide equivalent (CO₂e) — same as removing 780,000 passenger vehicles from the road every year.

Effective compressor management. We reduced venting in our heavy oil operations through efficient management of more than 1,000 compressors used for gas conservation, early tie-in of multi-well pads where solution gas pipelines are installed at the time of drilling, continuous improvement in facility design and the dedication of our staff to improve processes during periods of low field activity.

Carbon capture and sequestration (CCS). Canadian Natural is leading the oil and natural gas industry in CSS projects.

- At Horizon, we have been adding CO₂ to tailings since 2009 to enhance tailings performance. Read our Advancing Innovation section on page 16 for more information.
- We capture CO₂ at our Hays Gas Plant in southeast Alberta for re-use/sequestration in our nearby Enchant enhanced oil recovery (EOR) operations.
- We are also a 50 per cent partner in the North West Redwater Sturgeon Refinery, currently under construction and expected to capture 1.2 million tonnes of CO₂ annually for EOR.

WATER

Managing water use efficiently while protecting water source quality is also part of our commitment to responsible operations.

Canadian Natural's water management strategies are based on maximizing water recycle and storage, using saline water and applying technology to reduce fresh water use. To do this, we follow comprehensive industry operating practices and government regulations during water sourcing and disposal.

Highlights of our 2016 water management strategies:

- Maintained high produced water recycle rates (90-99 per cent) at our larger thermal in situ operations. We continued to reduce fresh water use through increased produced water recycle rates of 96.2 per cent from 93.6 per cent in 2015 at our Primrose and Wolf Lake (PAW) operations, and 94.5 per cent from 93.8 per cent at Kirby South.
- Decreased fresh water use intensity by 75 per cent since 2008 at PAW. Significant investments have been made to enhance steam generation efficiency and develop saline water sources.
- Increased produced water recycling rate by 10 per cent at Horizon, from 81 per cent in 2015 to 90.3 per cent.

ABANDONMENT, DECOMMISSIONING AND RECLAMATION

Canadian Natural develops every project with a vision and plan to ensure that the land used in our operations is returned to a healthy ecosystem once our activities are complete.

Highlights of 2016 decommissioning and reclamation projects:

- Highest recorded number of reclamation certificates: 604 submitted, and 1,046 received representing 2,329 hectares (ha) of land reclaimed in NA E&P. We have reclaimed 5,537 ha since 2010.
- Abandoned and started reclamation work on 406 inactive wells in NA E&P.
- 314 ha reclaimed to date at PAW since 2000, with more than 500,000 tree and shrub seedlings planted.
- 378 ha reclaimed at Horizon since operations began in 2009, including more than 630,000 trees planted.

Our environmental closure program coordinates our activities so that our facilities, pipelines and wells are taken out of service in a safe and environmentally sound manner. We strategically group our sites by area-based projects, allowing us to reclaim larger contiguous areas of land more cost-effectively. In this way, we coordinate remediation (removal of old equipment and soil clean-up), abandonment and discontinuation (suspension and capping of wells and pipelines), and accelerate reclamation times, returning the sites to forests, agriculture, wetlands or recreational and municipal land.

Our area-based approach drives innovation into our land management practices, such as the use of water-jet cutting for pipeline abandonment, and the construction of lightweight panels designed to protect seedlings while reclaiming native prairie revegetation.

We also participate in ongoing research and technology programs to learn more about diverse eco-regions and continuously improve how we manage each area.

Extensive reclamation research at Horizon will enhance future reclamation and promote the re-establishment of native forest. We continue to study the landscape, including vegetation and soil types, to implement best practices and improve reclamation techniques.



Abandonment and reclamation work in Stettler, Alberta

Waste management

A comprehensive waste management approach is also part of our systems for environmental protection. Our corporate waste management plans focus on minimizing waste through process optimization and technological innovation, and reducing our footprint through recycling, re-use and process improvements.

Canadian Natural is one of the few producers with its own infrastructure for sand handling, water treatment and oil processing. At our heavy oil operations, for example, we have several processing plants, as well as sand, waste and water disposal facilities. In 2016, we also built a landfill close to our Woodenhouse heavy oil operations. The integration of our facilities will not only reduce transportation distances, but also improve management of our environmental liabilities and costs.

BIODIVERSITY AND WILDLIFE

Our EMS includes specific criteria to ensure biodiversity is considered in all operations. We strive to protect habitats and promote a healthy coexistence with wildlife that live in or utilize the areas where we operate. For that purpose, we fund research to improve land reclamation practices that support biodiversity and also conduct wildlife monitoring programs. Results of these studies are incorporated into our wildlife management strategies at our oil sands operations. We also have programs in place to minimize habituation of local wildlife at our operations.

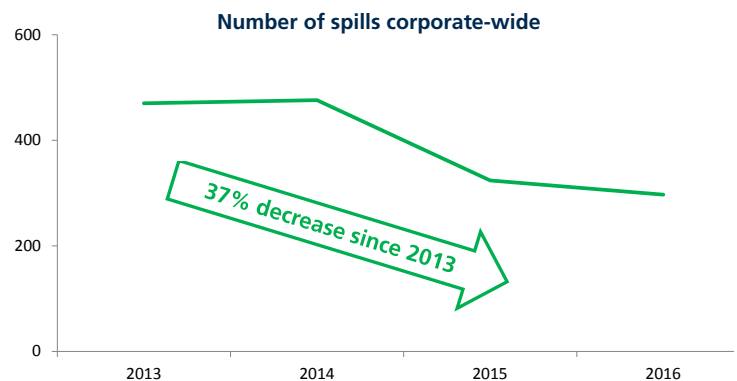
Some of our 2016 projects included:

- Developing strategies for caribou recovery, a species at risk. We continue to support caribou research and collaborative action through our work with industry and government to restore caribou habitat. This work focuses primarily on restoring linear corridors such as legacy seismic lines, and includes a caribou habitat restoration initiative of over 200 km of seismic lines within the Cold Lake Caribou Range. In British Columbia, we are a funding partner in the caribou maternal penning project led by the West Moberly and Sauteau First Nations, to reduce predation on newborn calves.

- We participate in extensive research to learn more about wildlife in the oil sands region and how we can reduce interactions with bears, foxes, wolves, moose, coyotes and other species. For example, Canadian Natural and other oil sands operators supported the Wildlife Habitat Effectiveness and Connectivity Project (WHEC) to learn about wildlife movement in river valleys.

SPILL PREVENTION AND REDUCTION

In 2016, we reduced our total corporate number of spills by 8 per cent from 2015. The positive trend shows a 37 per cent reduction in the number of spills since 2013. This is the result of our integrated Safety, Asset Integrity and Environmental Management Systems, including our spill prevention program, ongoing training and awareness of environmental processes.



MARINE ENVIRONMENT PROTECTION

Canadian Natural Resources International (CNRI) has an integrated Safety, Health and Environmental Management System (SHEMS) in place. The SHEMS is based on the same principles as our North American operations, structured to meet stringent operating standards and local regulatory requirements, to ensure asset integrity and marine environment protection.

Highlights of 2016 performance at CNRI:

- Completion of a major oil spill exercise involving the UK Government appointed Secretary of State's Representative for Maritime Salvage and other agencies. All operators of UK Offshore Oil and Gas installations are required to hold this major exercise every three years to test their Emergency Response preparedness and response in the event of an oil spill.
- Completion of the annual ISO14001 Surveillance Audit with no major issues identified.

Audits and Inspections

Inspections conducted on Murchison, Ninian Central, Banff and Tiffany platforms by the regulator — Department for Business, Energy and Industrial Strategy (BEIS) — during 2016 pointed out minor observations, which have been addressed together with the ISO 14001 findings as part of a joint action plan.

Our UK offshore installations operate within the regulatory compliance limit for oil discharge to the sea and average oil in water content. In Offshore Africa, each installation operates within its produced water limits (we apply the same North Sea standards to maintain high performance and consistency).

ENVIRONMENT HIGHLIGHTS

PRIORITIES IN 2016

ACHIEVEMENTS IN 2016

PRIORITIES IN 2017

Environmental Management System (EMS)

- Achieve continuous improvement within EMS key areas of air, water and land.
- Continue emphasis on reducing reportable incidents.

- Developed an enhanced EMS document control system in North American operations.
- Completed annual ISO14001 Surveillance Audit at CNRI with no major issues identified.
- 8% reduction in number of spills company-wide.
- Strong environmental performance during the Horizon Turnaround resulted in no offsite effects and all reportable incidents closed by AER.

- Manage continuous improvement in air emissions, water use and land activities.
- Continue reducing reportable incidents through increased awareness and enhanced reporting standards.

Regulatory

- Maintain a high compliance rate in all operations.
- Complete revision of Ninian Central and Ninian North platforms Oil Pollution Emergency Plans (OPEPs).
- Continue the implementation of the Environmentally Critical Elements (ECE) project across our CNRI operations.

- Maintained compliance performance above industry average across our operations.
- Continued to improve compliance tracking and reporting systems, and provided additional training in the use of online reporting tools.
- All revised OPEPs for UK operations were approved, including the Murchison Dismantling OPEP.
- UK's Maintenance Management System (MMS) has been enhanced to include management of critical equipment.

- Improve data collection and incident management system to maintain high compliance rates company-wide.
- Submit Ninian North decommissioning program to the regulator and initiate public consultation.

Reducing emissions

- Continue to reduce GHG emissions through application of innovation and technology.
- Achieve mechanical completion of the hydrogen/CO₂ capture plant at Horizon.

- 16% reduction in corporate GHG emissions intensity over the last five years (5% reduction from 2015).
- 65% reduction in venting volumes since 2012 in heavy oil operations.
- Conserved 2.4 MT CO₂e through natural gas solution conservation projects in NA E&P.
- CO₂ capture plant is operational, recovering 50 tonne/hour of CO₂.

- Reduce methane emissions and improve data systems to help identify further emission reduction opportunities.
- Capture CO₂ from Horizon's hydrogen plants and sequester into the tailings pond.
- Monitor efficiencies during Horizon plant expansions to seek more GHG reduction opportunities.

Water use

- Continue to improve fresh water use efficiency across our operations.
- Maintain high water recycling rates in thermal in situ and Horizon operations.

- 10% increase in Horizon's produced water recycle rates and 20% decrease in water intake from the Athabasca River compared to 2015.
- 75% overall reduction in fresh water use intensity at Primrose and Wolf Lake thermal operations since 2008.

- Maintain high recycle rates across our thermal and Horizon operations.
- Continue to reduce water intake from the Athabasca River.
- Assess water use improvements with non-segregated tailings (NST) production at Horizon.

Abandonment and reclamation

- Completion of reclamation earthwork on abandonment and reclamation program.
- Implement learnings from 2015 into 2016 programs for greater efficiencies.
- Remove topsides and other modules from Murchison platform for transport and recycling.

- Highest recorded number of reclamation certificates submitted (604) and received (1,046).
- Reclaimed total of 2,407 ha (NA E&P and Horizon).
- Abandoned 406 inactive wells and decommissioned 17 facilities.
- Murchison platform topsides were safely and successfully removed.

- Continue integrated abandonment and reclamation programs in southern Alberta and northeast British Columbia.
- Continue reclamation on previous year's abandonment and reclamation programs.
- Complete Murchison platform jacket removal and recycling, and advance abandonment of subsea wells.

Wildlife management

- Continue to evaluate wildlife deterrent system options for the tailings pond.
- Continue focus on training to prevent wildlife habituation at Horizon.
- Continue to monitor and measure the effectiveness of our reclamation work for wildlife habitat restoration.

- Enhanced monitoring and assessment of bird activity for continuous improvement of our deterrent systems.
- Implemented an enhanced and comprehensive wildlife management and monitoring program that is achieving reductions in wildlife interactions.
- Delivered training sessions for operations and security staff.
- Conducted analysis of wildlife presence and monitoring of wildlife on reclaimed landscape.

- Increase tailings pond coverage through the installation of floating radar controlled deterrents (a first in the oil sands).
- Continue focus on programs to prevent wildlife habituation at our operations.
- Incorporate results of wildlife monitoring into mitigation program and assess wildlife population changes.

Research and Development

- Continue reclamation research at thermal in situ and Horizon operations.
- Continue fisheries and ecosystem establishment research at Horizon Lake.

- Ongoing research to re-establish native forest.
- Partnered with Petroleum Technology Alliance of Canada, Alberta Energy Regulator, and Alberta Environment and Parks on native prairie project to streamline risk assessment work.
- Ongoing vegetation trials to study plant growth at Horizon.

- Complete region specific framework for risk assessments on native prairie sites.
- Conduct field revegetation trial in NST to determine whole plant effects.

Collaborative work

- Continue collaborating with COSIA to accelerate the pace of environmental performance improvement.
- Continue to work with regulators, government and industry to advance environmental frameworks.

- Led 11 partnered and 36 single participant projects, and participated in another 35 projects at COSIA. Research shared with COSIA to date:
 - \$59.9 million tailings technology
 - \$58.3 million water technology
 - \$29.9 million GHG technology
 - \$17.8 million reclamation technology
- Continued to advance evolving policy and regulations, including the implementation of the Alberta Climate Leadership Plan for the oil and gas sector.

- Continue collaborating with COSIA to accelerate the pace of environmental performance improvement.
- Work with government, regulators and industry to develop and implement policies and guidelines to enhance environmental performance of oil and natural gas operations.

ADVANCING INNOVATION

Canadian Natural has a track record of investing in technology and innovation that leads to more effective, efficient and sustainable operations.



Canadian Natural has been the top Research and Development (R&D) investor for the crude oil and natural gas sector in Canada for a number of years. Our commitment to R&D and technologies investment continued in 2016.

Being innovative has always been part of doing it right at Canadian Natural, as is working together through collaborations and partnerships with industry, academia and government. Leveraging technology and innovation increases resource recovery and improves environmental performance, delivering operational and cost efficiencies.

Our approach to R&D and innovation is part of our continuous improvement philosophy, extending from technology development to commercialization. A dedicated Technology & Innovation team supports technology development efforts across the Company, focusing on increasing technology adoption, strengthening our internal expertise, and coordinating resources and investments.

Improving oil recovery reduces environmental footprint

At Canadian Natural, improving oil production goes hand in hand with reducing our footprint on the land. Enhancing oil and water separation processes across our operations is improving our waste management practices.

Research and applied technology are the foundation of our Pelican Lake operations, where we have pioneered polymer flooding to increase reservoir recovery. Since our first polymer flooding pilot project in 2005, ongoing field trials and research help us understand the impacts of water quality on injection wells and continuously improve polymer flood performance. At this operation, oil is brought to the surface as an emulsion of oil, water, sand, gas and other solubles. These components are stored in large vessels and they settle out in layers based on their densities. We have recently implemented an automated process that measures densities in a more consistent and accurate way. Better detection of separation levels leads to cleaner water (reducing water treatment required for recycle into the polymer system), less waste and more effective cost management.

At our heavy oil operations, we also need to separate the produced emulsion into clean oil and water streams prior to safe disposal and containment into caverns (deep formations beneath

the surface). Oil and water separation research resulted in a new process that is now improving oil recovery from the water, reducing sand handling and improving disposal by extending the life of sand disposal caverns.

Enhancing water quality supports increased production

Water quality is also a focus in our thermal operations to maintain high recycle rates. A shift in steaming strategies at our Primrose/Wolf Lake thermal operations prompted significant enhancements to water handling. When Canadian Natural moved from cyclic steam stimulation (CSS) to a steamflood (SF) strategy across some Primrose areas, we needed to expand our water treatment capabilities at our Wolf Lake water processing plant. CSS was the initial recovery process, and SF is the follow-up process to continue production.

The conversion from CSS into SF involved a lot of hard work and innovation. SF involves a constant steaming strategy (similar to steam-assisted gravity drainage), which results in more water produced from the reservoir than with CSS. The produced water is treated for re-use as boiler feed for steam generation. To develop a comprehensive plan for increasing water treatment capacity at our existing plant, Canadian Natural drew on the skills and expertise from our teams and, as a result, our water treatment plant set a new record for produced water volume in 2016. Construction will continue into 2017 and once finished, we expect to add 15,000 m³/d of produced water capacity, as well as an additional 18,800 bbl/d of oil processing capacity.

New Internal Pipeline Cutter for pipeline abandonments

Technology plays an important part of ensuring safe, effective and efficient operations at Canadian Natural, which facilitated the creation of a Three Wheel Internal Pipeline Cutter (IPC) tool. The IPC tool is used to cut pipeline risers on inactive well sites and pipeline right-of-ways without ground disturbance during pipeline abandonment activities. The novelty of the new design is in the ability to lower the IPC tool inside the pipe to cut inaccessible pipes with three wheels from the inside out. Use of the IPC can be 20 per cent of the cost for riser sites in shallow gas locations in Southern Alberta and Saskatchewan. Savings could be larger in remote areas, providing a portable solution that eliminates the need to mobilize heavy equipment for abandonment activities.

Read more innovation stories on our [website](#).

ADVANCING TAILINGS MANAGEMENT TECHNOLOGIES

Our tailings management technologies are the result of extensive research that can be applied at commercial scale. This research has led to an investment of \$1.9 billion to date in tailings research, technologies and project construction at Horizon.

We are advancing our tailings management processes by focusing on the future. Canadian Natural has taken significant steps to manage tailings, so that the environmental footprint is minimized and reclamation is completed as quickly as possible. Our tailings management strategies align with regulatory requirements based on two key aspects: 1) creating a solid landform that fits within the local landscape, and 2) supporting productive wetlands and boreal forest habitat.

To do this, we are proactively managing the fines before they become part of the fluid tailings by using a Non-Segregating Tailings (NST) process that includes CO₂ injection. These processes combined are the foundation of our tailings management plan. They enhance fines capture and accelerate tailings dewatering, while recovering warm water that is re-used in the bitumen production process.

We continued to make significant progress during 2016:

- increased fines capture and decreased fluid tailings production, which is expected to continue improving as we ramp up NST deployment performance;
- further decreased fines going to the tailings pond as a result of selective lower fines mining practices;
- through a number of initiatives, we increased water recycling by 10 per cent from 2015, reducing our water intake from the Athabasca River;
- reduced GHG emissions due to the increase in warm process water recycling during the NST process, as the water does not

need to be re-heated;

- Horizon's new CO₂ capture plant will recover 50 tonne/hour of CO₂ that will be injected in the tailings; and,
- initiated research and engineering of NST reclamation, planting vegetation directly into the NST to determine plant growth.

As part of our strong commitment to continuous improvement, we investigate new ideas and build on lessons learned. Our plan includes what we learned from our processes, and the technologies developed by our peers and shared through Canada's Oil Sands Innovation Alliance (COSIA).

Applied Process Innovation Centre (APIC)

With ongoing research being an important piece of our tailings management strategy, Canadian Natural built and commissioned the Applied Process Innovation Centre (APIC) at the Horizon site. APIC provides a dedicated work space to investigate and accelerate the application of technologies to commercial scale. It also facilitates direct collaboration with industry peers that can complete targeted tailings research with samples from their operations at our facility.

Some of our new in-house studies underway at APIC include a project to quantify CO₂ sequestration in the tailings pond. CO₂ creates a chemical reaction that allows the solids in the tailings pond to settle quicker and release clearer water for recycling.

Throughout tailings research, planning and execution efforts, Canadian Natural has regularly engaged with stakeholders, in particular neighbouring communities, and we will continue to do so. Building on the foundation of our tailings management plan and our research, we strive to continue to optimize resource recovery and reclaim the landscape.



Thickeners at Horizon NST production plant during construction of the unit



MURCHISON DECOMMISSIONING

Heavy lift companies dismantling and removing modules from the topside of Murchison platform (middle)

After 300 million barrels of oil produced over a 35-year period, the last well at the Murchison platform in the North Sea was shut down in 2014. This platform was once taller than a 60-storey building and had a crew of 192 people.

Murchison is the first platform that Canadian Natural has taken out of service and we are now in the final stages of decommissioning. Throughout all phases of this project we have worked to ensure the safety of employees and contractors, the integrity of our facilities and environmental stewardship through the integration of our Management Systems.

The first step was to conduct a full assessment to assure the UK government that the platform was no longer profitable and all methods to increase production had been exhausted. We also submitted a full decommissioning plan along with an Environmental Impact Assessment to ensure the work was carried out with minimal impact on the environment.

In the summer of 2016, we completed the removal of the platform topsides with two heavy lift vessels, working simultaneously at times. Before any platform modules could be lifted, all piping, cables and steelwork were cut and removed. Detailed job descriptions and Safety Management System tools — including observation programs and daily toolbox talks, as well as an effective permit to work — were

essential elements in managing the work activities safely. In addition, we focused on having highly-trained crews with previous decommissioning experience to do the job right. To prevent any potential hydrocarbon releases, all piping was cleaned and Emergency Response plans were in place.

Another major milestone achieved was the successful removal of the 26,000-ton jacket in 2017. The jacket was cut and removed with the use of new technology for subsea cutting and lifting, that was designed and manufactured specifically for this job. We have also initiated plugging and abandonment of subsea wells, and removal of any historic debris from the seabed — all this work will be carried out by a remotely operated vehicle (ROV).

The platform jacket was scheduled to be taken to a dismantling yard in Norway. The remaining work on the decommissioning project focuses on the onshore disposal of the removed structures, with the goal of recycling more than 97% of the equipment. Final surveys will be undertaken to ensure environmental protection, with full completion targeted for 2018.

The Project Team is now taking the lessons learned on the Murchison Project and applying them to future platform decommissioning projects.

Left: Inspection crew during Murchison platform decommissioning. Right: Jacket removal during final stages of decommissioning.





JOINING FORCES TO HELP FORT MCMURRAY

Group of Horizon's firefighters

Canadian Natural played a key role in the safe evacuation of Fort McMurray during the wildfires in May 2016. Our Horizon operation located just north of Fort McMurray welcomed all, from families to children (and even pets), regardless of their affiliation to the company, providing safe accommodations, meals and medical attention.

"We received over 3,500 people, and also flew 2,700 evacuees, to either Edmonton or Calgary with the assistance of our Horizon Aerodrome staff and our carrier, Canadian North. We did everything we could to look after all the people who were coming to our site." - Chad Beaton, Manager of Facilities and Services at Horizon.

Among the evacuees, we transported one of our employees' pregnant wife, to safely give birth in Edmonton, and reunited three young children with their parents.

Because our operations were not at risk from fire or smoke, our Emergency Operations Centre concentrated primarily on assisting the influx of evacuees and firefighting support. Canadian Natural employees played a major role in helping each other and the communities where we work that were affected by the wildfires.

Helping our neighbours

Horizon's staff rolled up their sleeves to direct people where to go, load buses, assist mobility-impaired evacuees and provide rides. They also gave up their camp rooms to families, helped out moms and their children with extra pillows and bottles of milk warmed for babies, and assembled kennels for dogs and cats. Horizon camp kitchens remained open all night to feed people as they arrived on site.

We also provided support to neighbouring Indigenous communities. Our Horizon medical facilities remained available to Fort McKay community members when the hospital in Fort McMurray was closed. We facilitated the delivery of supplies to Chipewyan Prairie Dene First Nation, remained on call to support Conklin and worked to ensure Indigenous peoples at the evacuation center in Lac La Biche received the support that they needed.

"The community of Fort McKay was able to sustain itself and continue to provide for the evacuees it housed in large part from working closely with your organizations. It was clear to us that your staff's focus was to ensure everyone's safety

without considerations of cost." - Fort McKay's Chief, Jim Boucher, open Thank-You letter to industry.

Horizon also worked with municipal, provincial and federal governments to open up Horizon's landfill to the local community. We were able to receive several days of waste at our landfill from the Regional Municipality of Wood Buffalo and other operators in the area. This made the response to the fires safer for responders and allowed our fellow operators to minimize wildlife exposure to their sites.

Horizon staff fighting the fire in Fort McMurray

While all the activity to support evacuees was taking place at our camps, Horizon helped out in another crucial way by providing immediate firefighter support. Members from our Emergency Services team joined the crews from the municipality and industry partners to protect and save the vast majority of the city. During the first days of the response effort, Canadian Natural sent two crews of five firefighters for each day and night shift, while other firefighters remained on site, as per our safety procedures.

"To see how all the different crews came together to help Fort McMurray from the fires was very impressive." - Bob Slade, Horizon's Fire Chief and Superintendent of Emergency Services.

Assistance from other areas

With the health and safety of our employees and their families guiding our hearts and efforts, Canadian Natural staff from other Canadian and International offices quickly offered their help. In addition to cash donations, our staff from Kirby South and heavy oil operations in northeast Alberta assisted evacuees who were fleeing south. They deployed a fuel truck to supply stranded motorists and delivered essentials including food and water.

Also, a group of 40 employees from our Information Systems team lent a hand building a website providing essential steps for evacuees to take, including accommodation matching and important updates on financial assistance.

With the mass evacuation of almost 90,000 people coming on the heels of an already challenging year for the energy industry, the wildfires that spread into Fort McMurray tested the resolve of these hard-working communities. In the face of such adversity, oil and natural gas operators, residents and communities rallied together to do what they do best — help one another.

WORKING TOGETHER WITH COMMUNITIES

Canadian Natural works with local communities and stakeholders to build long-term relationships based on mutual respect.

Horizon staff with Fort McKay First Nation trappers and Elders during site visit

The last two years have been challenging for the oil and natural gas sector, made difficult by cost escalation, low commodity prices, and fundamental changes to the global industry. Therefore, working with local stakeholders has become even more important.

As members of the community, Canadian Natural's teams continue to focus on improving the way we do business, to be more effective and efficient in support of a long-term, sustainable industry. We recognize the importance of creating shared value by strengthening collaboration that leads to positive, lasting impacts. To this end, we continue working together with communities to identify opportunities for community investment, education and training, employment and business development.

ENGAGING STAKEHOLDERS

Stakeholder engagement at Canadian Natural is a two-way communication process that aims to integrate community needs into project design and implementation. We are committed to doing this in a responsible and meaningful way. We work with a broad group of stakeholders across our operations in Canada, the UK and Africa — this includes over 35,000 landowners, 160 municipalities and more than 55 Indigenous communities in Western Canada, as well as industry, governments, regulators and non-governmental groups.

Highlights of our 2016 stakeholder engagement process:

- Engaged with communities regarding more than 180 projects and development plans.
- Met with more than 40 municipalities in Alberta and Saskatchewan to discuss activity levels in our local operations and industry challenges.
- Connected with over 1,000 landowners.

Living and working in communities where we operate

Our teams work hard to build and maintain positive relationships. Fundamental to our approach are dedicated, and mostly field-based, stakeholder relations professionals who live and work in the communities where we operate. They connect regularly with stakeholders to provide updates, seek input regarding development plans, help identify opportunities and find solutions to help address potential environmental and social concerns. Their work is incorporated into our annual plans in support of the strategic priorities identified in each operating area. They also follow-up on our commitments and report back to communities.

Working with Indigenous communities

We value our Indigenous neighbours and meet regularly with elders to discuss issues that matter to them — from operational updates to environmental programs, regulatory applications and opportunities for participation in energy development. Meetings in 2016, included:

- Horizon site visits for First Nations and Métis Advisory Committees in the Regional Municipality of Wood Buffalo (RMWB), tours of our tailings research facility and the Wāpan Sākahikan (Horizon Lake) stakeholder pavilion. We consult regularly with these committees and incorporate their input into our tailings, reclamation and wildlife management plans.
- Participated in or supported nearly 200 community events, including Indigenous events such as Treaty Days and Elders gatherings. For example, we attend weekly lunches organized by Cold Lake First Nations, which are valuable opportunities to visit with elders, building mutual understanding and trust.

Participating in stakeholder synergy groups

We meet regularly with stakeholders — local governments, counties, rural municipalities, landowners, regulators and industry — to identify and discuss community concerns such as industry activity levels, taxes, road use and compliance. Some synergy groups we participate in are the Vulcan Areas Public and Petroleum Association (VAPPA), West Central Stakeholder Association, Lakeland Industry and Community Association (LICA) and Beaver River Watershed Alliance.

INVESTING IN COMMUNITIES

Canadian Natural supports local development initiatives that add to the quality of life and well-being in the communities where we operate. We work together with communities to prioritize those projects that promote long-term local economic growth and prosperity.

In 2016, Canadian Natural's community investments totaled \$9.1 million including corporate sponsorships and donations, employee giving and corporate matching, in-kind donations and funding for community-based development projects. Our in-kind donations included \$2 million in support to Fort McMurray through fire response and assistance to evacuees.

Our community investment programs mainly focus on health and wellness, education and training, social programs, cultural events, and traditional practices.

**\$9.1 MILLION
INVESTED IN
THE COMMUNITY**

**\$320 MILLION
AWARDED TO
INDIGENOUS BUSINESSES**

Highlights of 2016 community investments:

- Supported hospitals, wellness programs and youth sports initiatives across our operating areas.
- Connected a local health center and a public school in Côte d'Ivoire (CDI) to the electricity grid. Natural gas from our Espoir operations is the main source of local power for electricity in Abidjan, the commercial centre of CDI where Canadian Natural also has an office.
- The Slave Lake Legacy Centre opened its doors in 2016 — this is a new multi-purpose family oriented space funded by Canadian Natural, industry and government.



CNRI funded the connection of Adjue's local school to the National Electricity Network, also providing power to the house of the school teacher

Employees making a difference

Canadian Natural's employees lead by example. Their generosity remained strong through challenging times when communities needed them most. The 2016 United Way campaigns in Calgary, Horizon, and Grand Prairie offices together raised over \$1.6 million in combined employee giving and corporate matching.

Our employees also became the largest team of blood donors in Alberta and Northwest Territories, donating 888 units of blood to the Partners for Life program from Canadian Blood Services.

Our Corporate Matching Donation programs are other examples of employee-driven initiatives providing direct funding to local agencies identified by our staff in the field and in the UK. These programs raised over \$300,000 through employee giving, corporate matching and contributions from local businesses in 2016, and assisted 25 local organizations across Canada, the UK and Africa. Recipients included the Fort St. John Hospital Foundation and the Child Development Centre in British Columbia, the Bonnyville Health Foundation and Camp Tamarack

in Alberta, Friends of Roxburghe House and Alzheimer's Scotland in the UK, and the Notre Dame Des Sources Orphanage in CDI.

For more on our community investment and employee-led initiatives visit our [website](#).

Partnerships that promote health and wellness

Canadian Natural has a five-year, \$250,000 commitment to The APPLE Schools Foundation, which funds schools across northern Alberta to foster healthy school communities. This partnership contributes to the expansion of this program into remote northern school areas, many of which are First Nation or Métis communities. The program annually reaches more than 16,500 children in 63 Alberta schools.

Work has started at the Fort McKay School and the Athabasca Delta Community School (Fort Chipewyan), as well as three other communities in the RMWB. At the Fort McKay School, students are incorporating more fresh fruits and vegetables into their diets and their physical activity levels are increasing. Athabasca Delta Community School is the most northern community in the RMWB with only winter road access, making it difficult to obtain fresh vegetables and fruits economically. The project works with parents, students and staff to help identify their biggest priorities and how to create a healthy environment in their isolated community. All elementary schools in the Fort McMurray Catholic and Public School Divisions are also APPLE Schools.

The Northern Lights Health Foundation and Canadian Natural have a long-standing partnership to support health and wellness in the RMWB. Over the years, we have provided medical equipment, health programs and revitalized health service spaces to support both urban and rural communities. Most recently, Canadian Natural pledged \$625,000 over five years to support two important projects: the renovation of the Continuing Care floor of the Northern Lights Health Centre in Fort McMurray for long-term residents' care, and the refurbishment of the community clinic in Conklin.

"Canadian Natural's support has been instrumental in providing necessary funds for public health services in Wood Buffalo's outlying communities; bringing the first ever CT Scanner to the region and now providing residents of Continuing Care with a space they can be proud to call home," said Susanne Chaffey, Executive Director of the Health Foundation.

SUPPORTING EDUCATION AND TRAINING

Canadian Natural supports education and training programs designed to train and employ local people in the oil and natural gas industry.

In 2016, we hired 205 university and college students for summer/co-operative work terms. Likewise, through our Canadian Natural Building Futures Scholarship that aids students enrolled in industry-related disciplines, we awarded \$90,000 to 122 students, including Indigenous scholarships. Also, we continue to support stay-in-school programs in several Treaty 8 and northeast British Columbia communities.



Bradley Tofsrud (photo), a student from Lakeland College (Vermilion Campus), received our 2016 annual Leif Pederson Spirit Award. The St. Albert office has been awarding this scholarship since 2012, in memory of Leif Pederson, who passed away. Lief was a Canadian Natural operator and the son of another employee. As a graduate of Lakeland, this award honors his memory as someone who was always positive and willing to help others.

"Canadian Natural's contribution plays a leading role in helping more students take charge of their education and achieve their goals," said Shauna Zack, Lakeland College Alumni & Donor Relations Officer.

Highlights of 2016 investments in careers, trades and apprenticeship programs:

- \$7 million over five years to the University of Calgary's 'Canadian Natural Resources Limited Engineering Complex,' which officially opened in 2016.
- \$500,000 over five years to fund the Oil Sands Power and Process Engineering Lab at Keyano College in Fort McMurray.
- Partnered with 'Careers: the Next Generation' and offered internships to nine high school students who gained experience at our Grand Prairie and Fairview, Alberta field operations.
- Provided work placement opportunities and mentorship for three students at CNRI through the Robert Gordon University and University of Aberdeen scholarship programs.
- Supported the Northeast Alberta Apprenticeship Initiative (NEAAI) by participating in Steering Committee Meetings, through the "Walk with Us" initiative for job search assistance to Indigenous people, and the "Tiny Homes" project for employment opportunities. The NEAAI is a partnership between First Nations, industry, post-secondary institutions and government to increase the number of skilled Indigenous tradespeople in Alberta.

ENHANCING LOCAL BUSINESS DEVELOPMENT

Canadian Natural promotes local and regional business opportunities through the procurement of goods and services for our operations. In so doing, Canadian Natural prioritizes the hiring of qualified local employees and suppliers so the communities where we operate can benefit from our activities. We also work with local businesses and contractors to increase social and

economic participation of residents and Indigenous communities. We work closely with the more than 55 Indigenous communities near our operations in Western Canada to enhance business and capacity-building opportunities, and to assist in the pre-qualification process. Canadian Natural awarded more than \$320 million in contracts to Indigenous businesses and contractors in 2016.

We continue to work with companies and businesses from First Nations and Métis communities to enhance local business development and identify opportunities for economic participation in our oil and natural gas developments. For example, during our new landfill construction at our heavy oil operations, three quarters of the workers employed by Canadian Natural were local Bigstone First Nations members, and today, 80 per cent of operational employees at the landfill are Bigstone members.

Working together, sharing the same values

Acden was founded in 1994 by former Athabasca Chipewyan First Nation (ACFN) Chief Tony Mercredi, who recognized the potential for economic development through the shared development of resources in the oil sands. Acden started as Denesoline Environment with a labour services waste management contract and 10 employees, and has grown to be one of Canada's largest Aboriginal corporations, with 18 companies and over 3,000 employees.

Acden's companies provide services for the planning, construction, maintenance and reclamation of Alberta's oil sands. "Our focus is on creating and maintaining gainful employment, and providing economic benefit for the ACFN by providing safe, high quality and innovative services", said Mitch Mercredi, Acden's Business Development Manager. "Doing this while respecting our shared environment is of the outmost importance to Acden. Our growth is tied to the expansion of our clients' sites and their projects."

Worker safety and service quality are guaranteed through their ISO 9001:2008 and ISO 14001:2004 certifications. And Acden's LEED® Gold corporate headquarters also represents their values through its design — creating a space for sustainable development, establishing a local presence within the community and bringing staff together under one roof.

Acden's first contract with Canadian Natural was a site wide waste contract in 2005. Currently, we are working with three Acden businesses. "Working with Canadian Natural not only has a positive impact on our business but directly impacts our ownership, the ACFN," said Garry K. Flett, Acden's President and Chief Executive Officer.

Another important commitment shared by Canadian Natural and Acden is investing in the social and economic development of the communities where our employees live and work. Acden's culture is rooted in a strong tradition of coming together for what matters, particularly in the areas of environment, education and community development. Efforts are concentrated in the Regional Municipality of Wood Buffalo and in Fort Chipewyan, where the majority of the ACFN membership resides.

WORKING TOGETHER WITH COMMUNITIES HIGHLIGHTS

PRIORITIES IN 2016

Engaging Stakeholders

- Manage action plans for operating communities to continue to provide proactive, strategic community engagement.
- Maintain timely, accurate and relevant communication with stakeholders.

Community Investment

- Invest in priority funding areas: education, health and wellness, sports, recreation and cultural programs.
- Continue to improve community investment tracking and reporting of commitments with operating communities.

Education and Training

- Continue to support significant education and training initiatives aligned with future employment opportunities in the oil and natural gas industry.

Business Development

- Enhance opportunities for economic participation by Indigenous communities in our regional oil and natural gas operations.
- Enhance tracking of business spend with Indigenous businesses and contractors.

ACHIEVEMENTS IN 2016

- Engaged regularly with stakeholders across our operating areas to identify opportunities for mutual benefit.
- Continued to work with governments, municipalities, environmental groups and other stakeholders to maintain efficient and sustainable operations that make a positive impact in the communities.

- Focused on targeted investments based on community priorities.
- Provided \$9.1 million in community investment, including \$2 million of in-kind support to Fort McMurray through fire response and assistance to 3,500 evacuees.
- Long-term commitment to the Northern Lights Regional Health Centre and The APPLE School Foundation.
- Supported projects to connect local Côte d'Ivoire villages to the electricity grid.
- Improved tracking and reporting by operating area/community.

- Invested in education and training programs that support local employment.
- 122 students in our operating areas, including Indigenous communities, received Canadian Natural Building Futures Scholarships to support their career goals.
- Provided career path and employment opportunity information to communities.

- Awarded over \$320 million in contracts to Indigenous businesses and contractors.
- Continued to identify opportunities to enhance Indigenous participation in our projects.
- Enhanced tracking and reporting by operating area, increasing knowledge about local contractors where we source locally whenever possible.

PRIORITIES IN 2017

- Continue to improve community engagement with operating communities through action plans for all districts.
- Strengthen relationships with local stakeholders through continued engagement.

- Invest in priority funding areas: education, health and wellness, sports, recreation, social and cultural programs.

- Support education and training initiatives aligned with future employment opportunities in the oil and natural gas industry.

- Enhance the opportunities for economic participation by Indigenous communities in our operations.
- Continue to improve tracking system of business spend with Indigenous businesses and contractors.



Canadian Natural employees volunteering for the United Way

PERFORMANCE DATA

EMPLOYMENT

DISTRIBUTION OF CANADIAN NATURAL EMPLOYEES

Number of employees	2013	2014	2015	2016
North America Exploration and Production	3,875	4,751	4,513	4,210
Horizon Oil Sands Mining	2,336	2,486	2,651	2,667
International Exploration and Production	410	420	404	393
TOTAL	6,621	7,657	7,568	7,270

Exposure hours (millions) — based on a 12-hour shift	2013	2014	2015	2016
North America Exploration and Production	52.10	59.14	40.70	34.83
Horizon Oil Sands Mining	18.75	23.08	29.44	28.98
International Exploration and Production	4.69	4.77	5.78	4.29
TOTAL	75.54	86.99	75.92	68.10

SAFETY

Total Recordable Injury Frequency (TRIF) per 200,000 hours worked (employees and contractors)	2013	2014	2015	2016
North America Exploration and Production	0.54	0.61	0.44	0.44
Horizon Oil Sands Mining	1.61	0.81	0.57	0.49
International Exploration and Production	1.36	1.84	1.45	1.12
Corporate	0.86	0.73	0.57	0.50

Lost Time Incident (LTI) frequency per 200,000 exposure hours	2013	2014	2015	2016
Corporate	0.10	0.11	0.05 ¹	0.06

(1) Restated due to discrepancy in previous report.

Fatalities – Employees	2013	2014	2015	2016
North America Exploration and Production	0	0	0	0
Horizon Oil Sands Mining	0	1	0	0
International Exploration and Production	0	0	0	0

Fatalities – Contractors	2013	2014	2015	2016
North America Exploration and Production	0	0	0	0
Horizon Oil Sands Mining	0	0	0	0
International Exploration and Production	0	0	0	0

Regulatory inspections compliance (% satisfactory)	2013	2014	2015	2016
Alberta	89.7	87.4	83.6	84.7
British Columbia	76.6	88.2	81.5	89.7

ENVIRONMENT LAND

Well abandonment and reclamation	2013	2014	2015	2016
North America Exploration and Production				
Number of active operated wells	36,092	42,279 ¹	52,149 ¹	50,736
Number of inactive operated wells ²	13,580	16,459	18,480	21,433
Number of wells abandoned	460	545	519	406
Number of reclamation certificates submitted	334	337	357	604
Hectares reclaimed (reclamation certifications received) ³	490	760	477	2,329
Horizon Oil Sands Mining				
Hectares reclaimed	6.7	30	68	78

(1) Increase in active operated wells in 2014 and 2015 as a result of asset acquisitions.

(2) We use the Alberta Energy Regulator definition for inactive well sites.

(3) We have reclaimed 5,537 hectares since 2010.

Facility decommissioning, North America Exploration and Production	2013	2014	2015	2016
Number of facilities removed	20	25	32	17
Number of site remediations projects completed and ready for reclamation	0	6	12	12
Number of ongoing remediation projects	190	204	172	131

WATER

Total water withdrawal from source (m³), North America Exploration and Production	2013	2014	2015	2016
Fresh water - total	5,904,805	5,419,975	6,594,280	7,786,485
Surface water	NR	NR	2,531,127	3,619,139
Ground water	NR	NR	4,063,153	4,167,346 ¹
Saline water (non-potable)	8,727,913	10,582,587	8,108,546	8,574,991 ¹
Produced water recycled ²	17,567,432	21,596,165	26,863,473	28,872,346

NR = Not Reported (new breakdown initiated in 2015 to better address the Global Reporting Initiative (GRI) standards).

(1) 2016 increase in fresh ground and saline water volumes partly due to new reporting in British Columbia.

(2) For major thermal (Kirby South and Primose/Wolf Lake) and polymer flood (Pelican Lake) operations only.

Total water withdrawal from source (m³), Horizon	2013	2014	2015	2016
Fresh water (surface water - Athabasca River) ¹	18,222,541	21,409,907	22,762,471	17,837,887
Saline water (ground water, non-potable) ²	462,934	797,719	1,147,240	986,002

(1) Fresh water withdrawals remain well below authorized withdrawal limits.

(2) Saline water is a byproduct of our mining operations and used for depressurization; it is later added into the tailings pond for subsequent recycling.

Total water discharge (tonnes), International Exploration and Production	2013	2014	2015	2016
North Sea	29,092,883	20,609,657	18,633,813	21,231,547
Offshore Africa	2,105,733	1,841,600	1,703,342	1,622,168

Oil in water content (mg/l), International Exploration and Production	2013	2014	2015	2016
North Sea ¹	14.66	15.81	15.56	16.65
Offshore Africa	16.62	13.47	11.57	14.29

(1) Oil in water content remains well below regulatory requirement of <30 mg/l.

SPILLS

Number of reportable spills ¹	2013	2014	2015	2016
North America Exploration and Production	331	376	273	241
Horizon Oil Sands Mining	126 ²	84 ²	39	42
International Exploration and Production	13	16	12	14

(1) Reported to regulatory agency, according to jurisdictional requirements, including oil, produced water and refined products.

(2) Majority are from tailings lines and consisted of water, sand, silt, and trace oil – in contained areas.

Volume spilled (m³) ¹	2013	2014	2015	2016
North America Exploration and Production	3,597	3,151	1,459	1,998
Horizon Oil Sands Mining	6,731 ²	3,690 ²	20,111 ³	2,749
International Exploration and Production	2	0.3	12	0.79

(1) Reported to regulatory agency, according to jurisdictional requirements, including oil, produced water and refined products.

(2) Majority are from tailings lines and consisted of water, sand, silt, and trace oil – in contained areas.

(3) One fresh water release accounted for most of the volume (18,760 m³); this release was effectively contained and pumped back into our bitumen extraction process.

Number of spills and leaks/production (MMBOE)	2013	2014	2015	2016
North America Exploration and Production	1.71	1.60	1.10	1.06
Horizon Oil Sands Mining	3.44 ¹	2.07 ¹	0.85	0.92
International Exploration and Production	0.67	0.94	0.47	0.46

(1) Majority are from tailings lines and consisted of water, sand, silt, and trace oil – in contained areas.

PERFORMANCE DATA (Continued)

Volume spilled or leaked/production (m³/MMBOE)	2013	2014	2015	2016
North America Exploration and Production	18.5	13.4	5.9	8.8
Horizon Oil Sands Mining ¹	183.7 ¹	91.0 ¹	440.6 ²	60.0
International Exploration and Production	0.10	0.02	0.46	0.03

(1) Majority are from tailings lines and consisted of water, sand, silt, and trace oil – in contained areas.

(2) Includes fresh water release of 18,760 m³ that was effectively contained and pumped back into our bitumen extraction process.

Number of leaks/1,000 km pipeline	2013	2014	2015	2016
North America Exploration and Production	1.42	1.94	1.79	1.60

WASTE

Weight of waste	2013	2014	2015 ²	2016
North America Exploration and Production				
<i>Hazardous waste total (tonnes)</i> ¹	76,264	50,258	56,945	61,727
Off-site disposal (third-party)				
Measured by volume (m³)	NR	NR	39,101	42,687
Measured by weight (tonnes)	NR	NR	1,304	983
<i>Non-hazardous waste total (tonnes)</i> ¹	713,747	925,169	1,787,763	1,778,053
On-site disposal (owned)				
Measured by volume (m³)	NR	NR	594,242	723,148
Measured by weight (tonnes)	NR	NR	-	19,600
Off-site disposal (third-party)				
Measured by volume (m³)	NR	NR	137,536	88,317
Measured by weight (tonnes)	NR	NR	746,442	603,739
Horizon Oil Sands Mining ³				
<i>Hazardous waste total (tonnes)</i> ¹	535	947	544	1,320
Off-site disposal (third-party)				
Measured by volume (m³)	NR	NR	48	928
Measured by weight (tonnes)	NR	NR	476	0
<i>Non-hazardous waste total (tonnes)</i> ¹	8,680	10,898	26,157	23,915
On-site disposal (owned)				
Measured by weight (tonnes)	NR	NR	18,035	14,408
Off-site disposal (third-party)				
Measured by volume (m³)	NR	NR	920	1,463
Measured by weight (tonnes)	NR	NR	6,814	7,425
International Exploration and Production ⁴				
<i>Hazardous waste total (tonnes)</i> ¹	190	871	1,082 ⁵	125
Measured by volume (m³)	NR	NR	194	14
Measured by weight (tonnes)	NR	NR	582	110
<i>Non-hazardous waste total (tonnes)</i> ¹	1,494	1,294	5,812 ⁶	9,670 ⁶
Measured by volume (m³)	NR	NR	253	21
Measured by weight (tonnes)	NR	NR	5,198	9,647

NR = not reported (new breakdown initiated in 2015 to better address GRI standards).

Hazardous waste includes streams such as tank clean out fluids and sludge, wastewater treatment and solids, filter cake, spent lubricating oil and filters and other substances. Non-hazardous waste includes oilfield waste such as hydrocarbon and salt impacted soils, drilling waste and produced sand.

(1) Totals include fluid and solid waste based on a conversion of all volumes to tonnes.

(2) NA E&P and Horizon numbers have been revised after improvements to our tracking system and reporting changes to better align with the GRI standards.

(3) Horizon data includes waste sent to recycling facilities, including empty containers, lube oil, batteries, filters, tires, scrap metal and other miscellaneous recyclables, in the following amounts: 4,669 tonnes and 112 m³ in 2015; 5,000 tonnes and 65 m³ in 2016. During the Fort McMurray wildfires in May 2016, approximately 127 tonnes of solid waste were diverted to our Horizon landfill that are not included in the total reported because it was not Canadian Natural generated waste.

(4) All CNRI waste is disposed of/treated at third-party facilities. Ninian South has a dedicated drill cuttings re-injection well, therefore no drilling waste is sent to shore.

(5) Approximately 44% of the hazardous waste generated in 2015 was associated with the Murchison decommissioning project.

(6) Increase in non-hazardous waste is related to Murchison's decommissioning work scope (3,576 tonnes of scrap metal were recycled onshore in 2015, and 8,628 tonnes in 2016).

AIR AND GHG EMISSIONS

The Company's GHG emission estimates are prepared internally using reported production volumes and generic emission factors. Only a portion of the estimated emissions have been verified externally.

Direct GHG emissions from fuel consumption (million tonnes CO ₂ e)	2013	2014	2015	2016
North America Exploration and Production	6.82	7.65	7.44	8.70
Horizon Oil Sands Mining	2.28	2.27	2.31	2.16
International Exploration and Production	1.27	1.12	1.21	1.17
Indirect GHG emissions (million tonnes CO ₂ e)	2013	2014	2015	2016
North America Exploration and Production				
Electricity consumption (TWh)	1.70	2.26	2.46	2.44
Indirect GHG emissions ¹	1.17	1.52	1.47	1.50
Horizon Oil Sands Mining				
Electricity consumption (TWh)	0.11	0.24	0.40	0.45
Indirect GHG emissions ¹	0.08	0.18	0.30	0.29

(1) Does not include GHG emissions generated from cogeneration plants (included as direct emissions).

Direct GHG emissions (million tonnes CO ₂ e) ¹	2013	2014	2015	2016
North America Exploration and Production	11.75	14.14	13.75	12.84
Horizon Oil Sands Mining	3.75	3.69	3.92	3.91
International Exploration and Production	1.62	1.61	2.11	2.03

(1) Includes total direct emissions from combustion, flaring, formation CO₂, and other venting and fugitive leaks from equipment.

EMISSIONS INTENSITY

Direct GHG emissions intensity (tonnes CO ₂ e/BOE) ¹	2013	2014	2015	2016
North America Exploration and Production	0.061	0.060	0.056	0.057
Horizon Oil Sands Mining	0.094	0.084	0.080	0.079
International Exploration and Production	0.084	0.094	0.082	0.067
Corporate	0.067	0.065	0.061	0.061

(1) Includes total direct emissions from combustion, flaring, formation CO₂, and other venting and fugitive leaks from equipment.

FLARING AND VENTING

Total natural gas flared (10 ³ m ³)	2013	2014	2015	2016
North America Exploration and Production	131,006	132,917	81,947	95,217
Horizon Oil Sands Mining	45,593 ¹	32,942	46,238 ¹	27,267
International Exploration and Production	307,482	188,073	354,775	296,339

(1) Restated due to new calculation methodology.

Total natural gas vented (10 ³ m ³)	2013	2014	2015	2016
North America Exploration and Production	238,746	259,283	190,301	126,898

NOx emissions (tonnes)	2013	2014	2015	2016
North America Exploration and Production	36,035	46,178 ¹	52,288 ¹	56,231 ¹
Horizon Oil Sands Mining	3,935	4,696	5,954	6,662
International Exploration and Production ²	3,184	2,186	2,349	2,732

(1) Increase in emissions due to natural gas asset acquisitions.

(2) UK only.

SOx emissions (tonnes)	2013	2014	2015	2016
North America Exploration and Production	6,132	5,567	5,633	5,994
Horizon Oil Sands Mining	4,060	2,993	3,968	3,409
International Exploration and Production ¹	263	260	210	246

(1) UK only.



COVER PHOTO: Dunvengan plant, Fairview operations, Alberta. Erik Lovmo.

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Our 2016 Report to Stakeholders includes consolidated social, economic and environmental disclosures from the Global Reporting Initiative (GRI) Sustainability Reporting Standards and the Oil and Gas Sector Supplement. For additional GRI disclosures, a GRI content index and more information on sustainability reporting, please refer to the Corporate Responsibility section of our website at www.cnrl.com.

**We welcome your comments and suggestions on this report.
Canadian Natural produces a separate Annual Report, which is also available online.**



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