



CNR International

UK Operations Environmental Performance



Annual Report 2021

SHE-REP-222



CNR International

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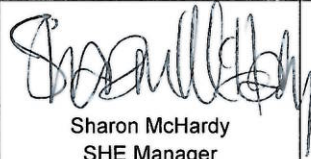

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1 INTRODUCTION

The 1992 OSPAR Convention is the current instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. It combined and up-dated the 1972 Oslo Convention on dumping waste at sea and the 1974 Paris Convention on land-based sources of marine pollution.

Work under the Convention is managed by the OSPAR Commission, made up of representatives of the Governments of fifteen Contracting Parties (including the United Kingdom) and the European Commission, representing the European Community.

The Offshore Oil and Gas Industry Strategy of the OSPAR Commission sets the objectives of preventing and eliminating pollution and taking the necessary measures to protect the maritime area against the adverse effects of offshore activities so as to safeguard human health, and conserving marine ecosystems and, when practicable, restoring marine areas which have been adversely affected.

To implement this Strategy, the OSPAR Commission has adopted Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry. The UK Government has fully adopted this Recommendation, and therefore requires that all Operators controlling the operation of offshore installations on the UK Continental Shelf should have in place an Environmental Management System (EMS) that is designed to achieve:

- the environmental goals of the prevention and elimination of pollution from offshore sources and of the protection and conservation of the maritime area against other adverse effects of offshore activities; and
- continual improvement in environmental performance; and
- more generally, to achieve the objectives of the OSPAR Offshore Strategy.

The OSPAR Recommendation states that Contracting Parties should also encourage Operators to make publicly available an annual statement setting out:

- a brief description of the Environmental Management System;
- the environmental policy of the Operator including environmental goals, objectives and targets set for significant environmental aspects and impacts; and
- a summary of performance in relation to that environmental policy, those goals, objectives and targets, and any relevant legislative requirements.

This report describes CNR International's EMS and Company environmental performance against internal targets and legislative requirements. We welcome any comments and suggestions from members of the public and regulators in relation to this document, which should be sent to:

SHE Manager
CNR International (UK) Ltd
St Magnus House
Guild Street
Aberdeen
AB11 6NJ

2 CNRI'S OPERATIONS

Canadian Natural Resources Limited (CNRL) is an independent oil and gas exploration and production Company with operations in core areas located in Western Canada, the U.K. sector of the North Sea, and offshore West Africa. CNRL's headquarters are in Calgary, Canada, with international operations (CNR International) based in Aberdeen, Scotland.

During 2021, CNR International UK (CNRI's) North Sea operations were focused in the following areas: Ninians and T-Block, decommissioning activities on Banff and Kyle (B&K), Murchison and Ninian Northern. CNRI operates its fields with a majority working interest, which provides a strong basis for future exploitation and exploration in reserves close to existing reservoirs.

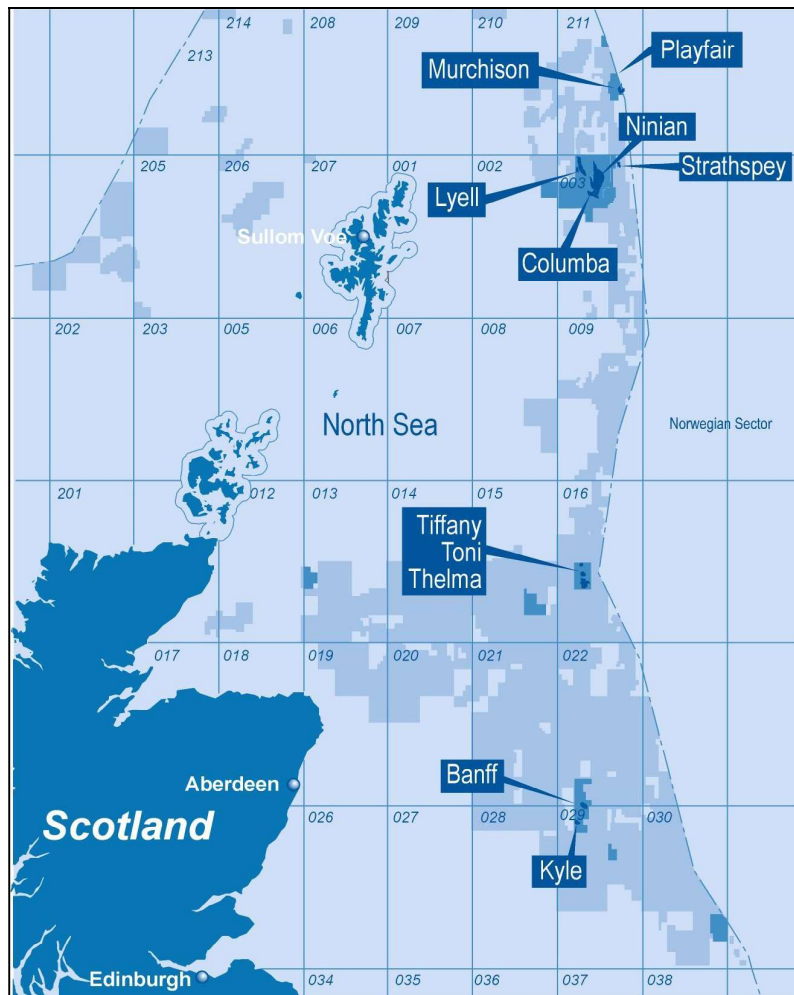


Figure 1 Location of CNRI's operations in the North Sea

Following the decommissioning of the Ninian Northern platform, the **Ninian** Field hub now consist of two fixed platforms (Ninian Central and Ninian Southern) in the Northern North Sea, with the **Columba** field developed as extended reach wells and the **Lyell** and **Strathspey** fields as subsea tie-backs. A third-party subsea tie-back to Ninian Central, Orlando Field, commenced production in March 2019. Crude oil from the Ninian and associated fields is exported through the Ninian Pipeline to the Sullom Voe Terminal.

The **T-Block** in the Central North Sea consists of three oil and gas fields **Tiffany**, **Toni** and **Thelma**. The Tiffany Field is developed from a traditional fixed steel jacket platform. Toni and Thelma are developed from subsea templates tied-back to the Tiffany platform. Crude oil from the fields is exported via the Brae/Forties pipeline through the Forties Pipeline System to the INEOS-operated terminal facilities at Cruden Bay.

2.1 DECOMMISSIONING OPERATIONS

The **Murchison Field** is located in the Northern North Sea, close to the UK/Norway boundary. The Murchison platform and associated infrastructure have been decommissioned, with the topsides removal operations completed during Q3 2016 and jacket removal during Q2 2017. The topsides and jacket were transported to shore for dismantling and disposal, which was completed by June 2018, achieving a 96.6% material recycling rate. The final Murchison field reservoir isolation, on subsea well MS/2, was achieved in 2018 and decommissioning of the remaining subsea infrastructure was completed in 2020. The post-decommissioning Environmental Baseline Survey and Clear Seabed Verification scope were completed in June 2021. The final OPRED and OSPAR Close-out reports were submitted in October 2021. The OPRED close out report is out for consultation, with responses expected back by Q2 2022

The **Ninian Northern** platform ceased production in May 2017 followed by well plug and abandonment operations and engineering-down and cleaning of the topsides structure. The platform was down-manned in Q2 2018 and entered an idle phase until 2019/2020. The topsides were removed in August 2020. Removal work scopes commenced in Q3 2021, with the removal of the jacket in April 2022. The post decommissioning Environmental Baseline Survey is scheduled for Q3 2022, with the OPRED close out report expected to be submitted Q2 2023.

The **Banff** and **Kyle** Fields are located in the Central North Sea and were produced via subsea templates to the Petrojarl Banff Floating Production Storage and Offtake vessel (FPSO), which was operated by Teekay Petrojarl Production. Banff and Kyle (B&K) cessation of production (CoP) occurred on 1st of June 2020 with the Banff FPSO and Apollo Spirit Floating Storage Unit (FSO) sailing away in early August 2020. Phase 1 decommissioning programme was completed in 2020, which included flushing and disconnection of all Banff and Kyle pipelines. The Decommissioning Programme for the remaining field infrastructure was approved in November 2021. Works for the decommissioning of the B&K Wells has commenced, with further activities planned for 2022.

Strathspey is a subsea tie-back to Ninian Central, located in the Northern North Sea, close to the UK/Norway boundary. The Cessation of Production Application was accepted by the North Sea Transition Authority (NSTA, previously OGA), in Q1 2022, with CNRI to confirm CoP date. The works for the Decommissioning Programme commenced in Q3 2021. A pre-decommissioning Environmental Baseline survey is due to take place at Strathspey in June 2022. The Decommissioning Programme for Strathspey field is expected to be submitted to the Regulator in 2023.

3 CNRI'S SHE MANAGEMENT SYSTEM

CNRI's integrated Safety, Health and Environmental Management System (SHEMS) scope includes offshore oil and gas exploration, production, drilling and decommissioning activities, and associated onshore support. SHEMS helps CNRI to:

- comply with Safety, Health and Environmental (SHE) legislation and industry standards;
- manage SHE risks in the business; and
- monitor and deliver continuous improvement in SHE performance.

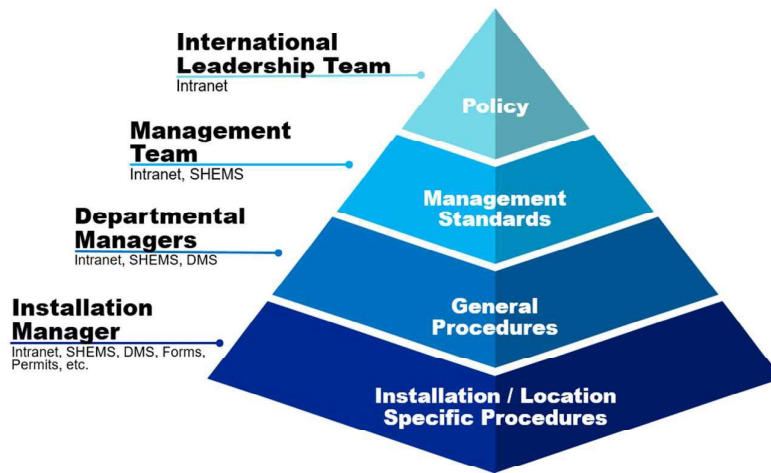
The system structure conforms to the broad principles of the HSE publication Managing for Health and Safety HS(G)65 and meets the requirements of general and offshore installation-related regulations.

In the North Sea, CNRI's directly operated installations (Ninian Central, Ninian Southern and Tiffany) are certified to ISO14001:2015 by ERM CVS, who are UKAS accredited verifiers of management systems. The subsea infrastructure associated with the Banff and Kyle fields are also included in the scope of our EMS certification.

3.1 SHE MANAGEMENT SYSTEM STRUCTURE

The SHE Management System implemented on CNRI's offshore installations and within the onshore support organisation can be represented as a pyramid consisting of four levels:

- Policy
- Management Standards
- General Procedures
- Installation/Location Specific Procedures



3.2 SHE POLICY

CNRI takes all reasonable precautions to achieve the goal of harm-free operations. Our SHE Policy is a public commitment to conducting business in a manner that protects the health and safety of people and preserves the integrity of the environment within which CNRI operates. CNRI's SHE Policy is embedded in CNRI's Corporate Statements on Environmental Protection (see below), Health and Safety, and Asset Integrity Management.



**CORPORATE STATEMENT ON
ENVIRONMENTAL MANAGEMENT**

Environmental stewardship is a fundamental value of Canadian Natural Resources Limited (Canadian Natural). The Company recognizes that every employee and contractor has a vital role to play in identifying, minimizing and mitigating environmental impacts from our operations to improve environmental performance. Canadian Natural's commitment to responsible environmental management will be incorporated into business activities through the following guiding principles:

- Ensure all employees and others engaged on Canadian Natural's behalf are aware of the commitment to improve environmental performance of Canadian Natural's operations;
- Provide strong leadership and promote a participative culture to proactively identify, assess and manage environmental risks and associated impacts;
- Strive to reduce the impacts of our activities through adaptive management while considering social and economic factors;
- Reduce the environmental footprint of our activities by continually improving energy efficiency, managing greenhouse gases, air emissions, water use and other resources; reduce and recycle waste materials and preserve and restore natural biodiversity through closure planning and reclamation;
- Identify significant changes affecting environmental management systems, listen to and respond appropriately to stakeholder issues and concerns and provide a mechanism for feedback;
- Ensure that effective emergency response measures are in place and provide prompt, effective and efficient response to any emergency situation;
- Investigate environmental incidents effectively to prevent recurrence, and communicate and implement lessons learned across all parts of the organization, including those from the experiences of others;
- Engage and communicate with the public regarding Canadian Natural activities;
- Manage tailings and mine waste structures, including water retention structures, safely and responsibly from design to closure; and
- Ensure that Canadian Natural operations comply with government regulations, industry guidelines and company policies and procedures concerning environmental management.

Canadian Natural's Management is responsible for developing specific operational procedures and standards that are consistent with this policy and are accountable for the maintenance, regular review and interpretation of this policy. Canadian Natural expects its suppliers, partners and business associates to have compatible environmental procedures and values.

Canadian Natural's Management is committed to achieving continual improvement in environmental performance through annual environmental objectives, targets, monitoring and measurement. Performance is reviewed and corporate status reports are presented regularly to Management and the Board of Directors.



Tim McKay
President



Darren Fichter
Chief Operating Officer
Exploration & Production



Scott Stauth
Chief Operating Officer
Oil Sands



3.3 SHE MANAGEMENT STANDARDS

Ten Management Standards support CNRI's SHE Policy. These describe the expectations and requirements for performance in relation to key aspects of SHE management. They allow for some flexibility in terms of SHEMS implementation, so that different parts of the Company can meet these expectations in different ways, depending on their particular legal and other business drivers.

The ten Management Standards are:

1. Leadership and Commitment
2. Performance Management
3. Managing SHE Risks
4. Competence and Personal Development
5. Communication and involvement
6. Working with Third Parties
7. Change Management
8. Information and Documentation
9. Emergency Preparedness
10. Incident Reporting, Investigation and Analysis

3.4 GENERAL AND INSTALLATION SPECIFIC PROCEDURES

General Procedures support specific Management Standards and, where a documented procedure is required, these describe the arrangements in place to meet the appropriate standard, for example incident investigation or oil spill response. These procedures are intended to provide consistency across the organisation: they are applicable to any operation and are generally not specific to any one location or installation.

Installation and location specific procedures are specific to an operation or activity; they define the arrangements that CNRI has determined are required to conform to General Procedures and thus meet the spirit and intent of the Management Standards.

4 CNRI'S SIGNIFICANT ENVIRONMENTAL ASPECTS

CNRI's SHE Management System requires identification of the elements of activities that can interact with and therefore have an effect on the environment (called 'aspects' in ISO14001 standard terminology). This is to ensure that controls to minimise any potential negative environmental effects can be implemented.

In common with most offshore oil and gas Operators, CNRI has identified the following significant environmental aspects of its operations:

- Atmospheric emissions, in particular of carbon dioxide;
- Oil discharged to the marine environment;
- Solid waste generation and disposal;
- Chemical use and discharge; and
- Accidental releases (oil and chemical).

CNRI regularly monitors and reports its performance in terms of environmental emissions and discharges as required by UK legislation and the internal SHE Management System. This information is reported via the Environmental Emissions Monitoring System (EEMS), which is a database of environmental information that is accessible by Oil and Gas Operators and by the regulator BEIS (Department of Business, Energy and Industrial Strategy). We also regularly report our SHE performance via monthly and quarterly internal reports, annual SHE performance review and contribute to Canadian Natural's corporate annual Stewardship Report to Stakeholders (available via www.cnrl.com).

5 ENVIRONMENTAL PERFORMANCE

The environmental performance charts below have been compiled using EEMS data to ensure consistency of reporting, apart from the CO₂ Emissions, which uses verified Emissions Trading Scheme data.

5.1 ATMOSPHERIC EMISSIONS

The majority of power generated on CNRI's offshore installations is from gas-fired turbines, with diesel utilised as a stand-by fuel. Diesel is also used in discrete applications such as fire-pumps, emergency generators and cranes. CNRI continues to look at emissions reduction opportunities identified in installation specific energy assessments, as well as emissions reduction opportunities identified by both onshore and offshore personnel.

CNRI is a member of the UK Emissions Trading Scheme, which seeks to reduce CO₂ emissions using a 'cap and trade' scheme. During 2021, emissions of CO₂ from CNRI installations decreased to 0.59 million tonnes (Figure 2), compared to 0.76 million tonnes in 2020 and compared to 0.97 million tonnes in 2019. The decrease in emissions was a result of operational optimisation on all assets, and the rotor refurbishment, and switch to single turbine operations on NCP.

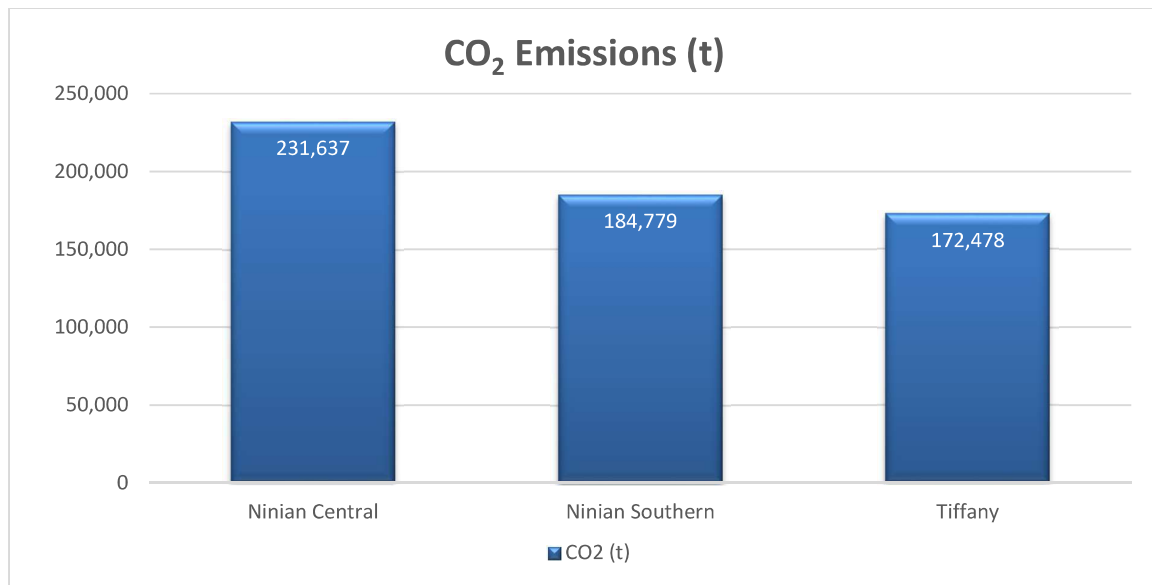


Figure 2 Total carbon dioxide emissions in 2020

CNRI restricts the flaring of gas wherever possible by using it in a variety of ways: produced gas is used for fuel, used for artificial lift to production wells, and exported as sales gas. Installations need to maintain a minimum level of flaring for safety reasons.

The amount of gas flared in 2021 and associated CO₂ emissions were again lower than in 2020. A total of 0.15 million tonnes of CO₂ were emitted (Figure 3), compared with 0.21 million in 2020 and 0.36 million tonnes in 2019. The main reductions were associated with the nitrogen LP flare purge replacement on NCP.

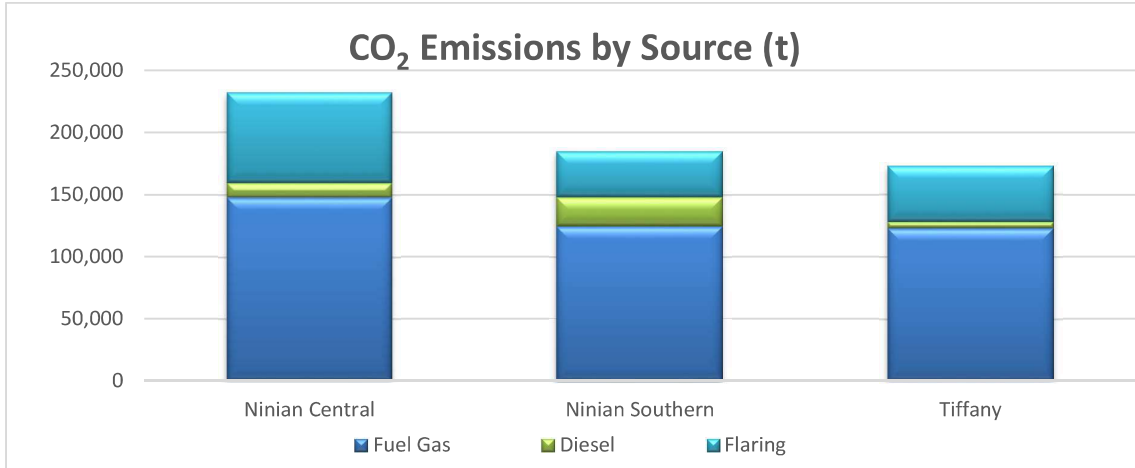


Figure 3 Sources of carbon dioxide emitted during 2021

In addition to CO₂, a range of other atmospheric emissions are regulated under the Pollution Prevention and Control (PPC) Regulations. Figure 4 shows our performance in 2021. The majority of these emissions are derived from power generation on the installations.

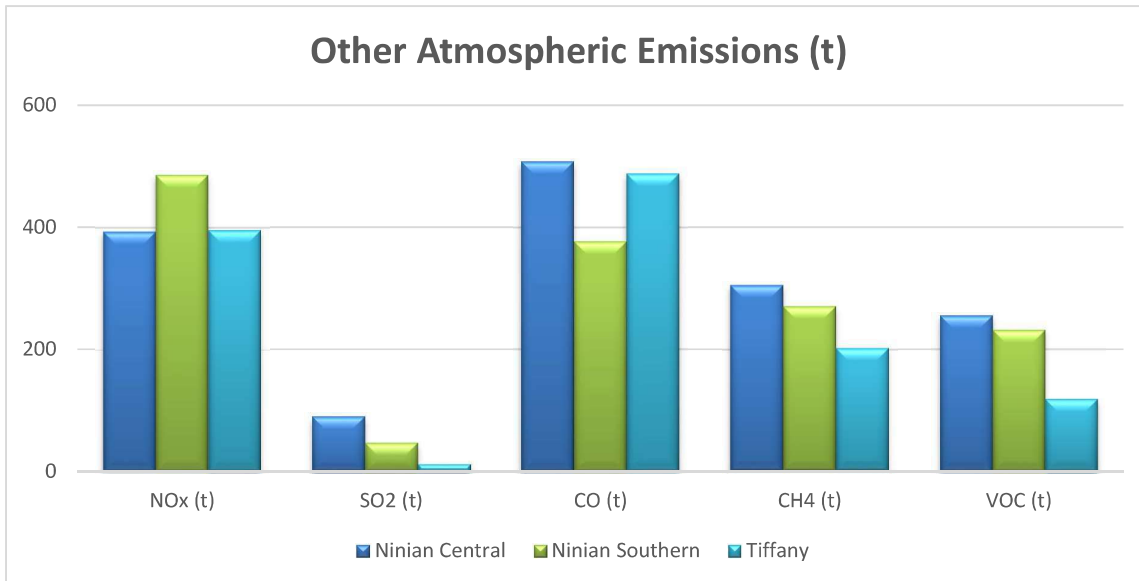


Figure 4 Other atmospheric emissions during 2021

5.2 OIL DISCHARGED IN PRODUCED WATER

Oil and gas reservoirs have a natural water layer (called formation water) that, being denser, lies under the hydrocarbons. As reservoirs become depleted of oil and gas, inhibited seawater can be injected into the reservoirs to support hydrocarbon recovery. Both formation and injected waters are eventually produced along with the hydrocarbons and, as an oilfield matures, the volume of produced water tends to increase as the reservoir fills with injected seawater. The 'water cut' or amount of water in produced fluids from wells on mature assets can be >95% by volume compared with the oil content.

On CNRI's offshore installations, produced water is separated from hydrocarbons in gravity separators and treated to remove as much oil as possible before it is discharged to sea. Because produced water contains traces of oil, its discharge to sea is strictly controlled by the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005, which define the average oil content of the water that may be discharged and limits the total amount of oil that may be discharged.

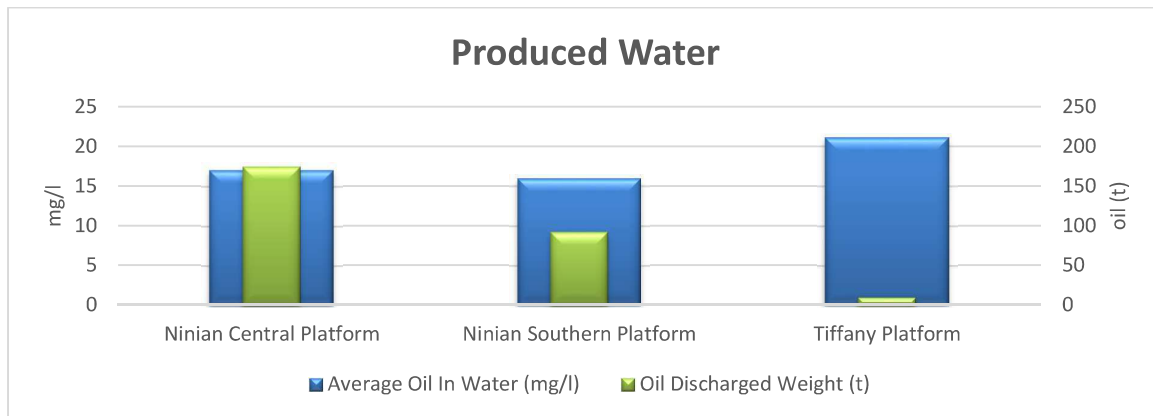


Figure 5 Average oil in water quality and oil discharged in 2021

Average quality of produced water discharged in 2021 across all CNRI UK assets was 16.91 mg/l with no significant changes to the 2020 (18.51mg/l) and 2019 (17.94 mg/l). A total of 16.38 million cubic metres of produced water was discharged in 2021, a decrease when compared to the previous two years. Hence the total amount of oil discharged in produced water (277 tonnes) also decreased when compared to 2020. Produced water quality on each platform over the year was well below the legal limit of 30 mg/l for the monthly average set by the Regulator.

5.3 SOLID WASTE GENERATION AND DISPOSAL

CNRI has a duty to ensure that the segregation, transportation and eventual disposal of waste generated during operations is managed in accordance with legislative requirements. The Environmental Protection Act 1990 introduced the 'Duty of Care' with which all waste producers must comply. Hazardous waste that might be harmful to human health or the environment (also known as Hazardous or Special Waste) is governed by specific legislation, which includes strict handling and disposal requirements.

The offshore industry as a whole recycles a large proportion of its waste and CNRI works closely with its waste management contractor to identify recycling routes to maximise recycling. CNRI currently recycles metal, wood, paper and cardboard, glass, plastics, aluminium cans and empty oil/chemical drums. CNRI is also working to reduce the volume of waste generated offshore, especially of hazardous wastes such as oil-contaminated rags and other similar items. CNRI's waste management contractor conducts regular random skip audits and provides monthly lists of 'observations' which allow focus on improvements in offshore waste management.

Operational waste excludes all drilling-related waste (i.e. drill cuttings and tank washings) and decommissioning waste.

In 2021 862 tonnes of solid operational waste (Figure 6) were generated (compared with 836 tonnes in 2020, and 1,385 tonnes in 2019). CNRI has worked closely with the waste contractor to identify opportunities for reducing our environmental footprint. Diverting wastes from landfill was a key metric introduced in 2018, and a total of 92% of the waste generated in 2021 was routed to recycling, waste to energy and reuse. The amount of waste sent to landfill was 20 tonnes, down from 80 tonnes last year and a further 28 tonnes were routed to other disposal routes (for example incineration of clinical wastes).

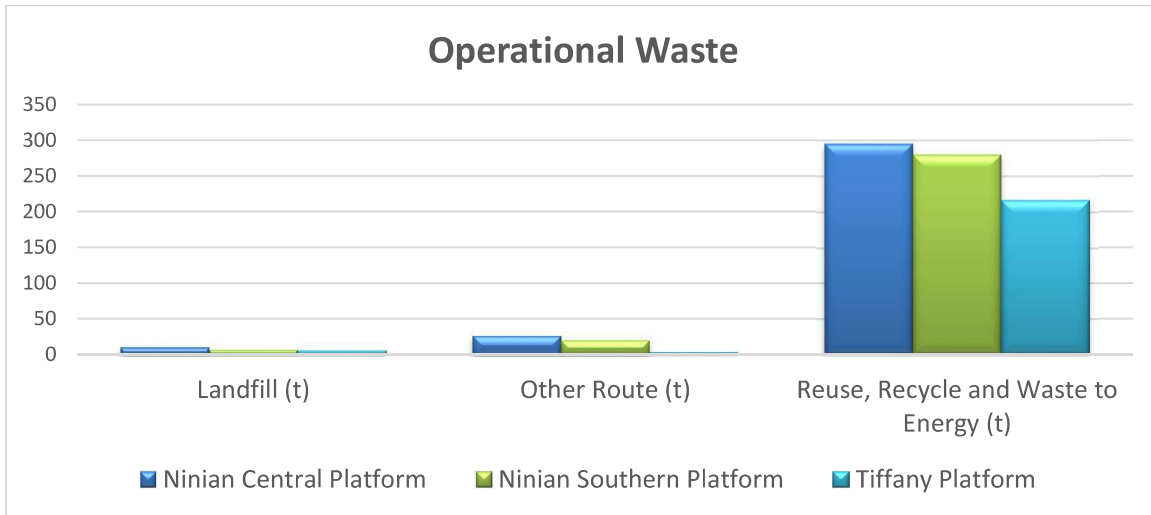


Figure 6 Operational waste generated and disposed of during 2021

Drilling waste is primarily made up of drill cuttings and tank washings. In 2021 no drilling waste were sent to shore for disposal as cutting reinjection facilities are present on both the Ninian Central and Ninian South Platforms. The decommissioning activities described above (Ninian North) resulted in waste processing during 2021, however the final waste generated during will be reported when activities have completed in 2022.

5.4 CHEMICAL USE AND DISCHARGE INTO THE MARINE ENVIRONMENT

All chemicals used offshore during oil and gas production must be approved by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), and their use and discharge is controlled under the Offshore Chemicals Regulations 2002. Each chemical used must be risk assessed by the Operator as part of the permitting process, and any chemical which has particular hazardous properties (such as low biodegradability or high toxicity) requires additional justification for its use.

Production chemicals have a number of functions, including corrosion, scale and hydrogen sulphide inhibitors and biocides to prevent microbial souring of reservoirs. Also deoilers and demulsifiers to help to separate oil from produced water. When compared to 2020, the total amounts of production chemicals used during 2021 (Figure 7) decreased by 3% and discharges decreased by 9%. Optimisation of production chemical usage continues.

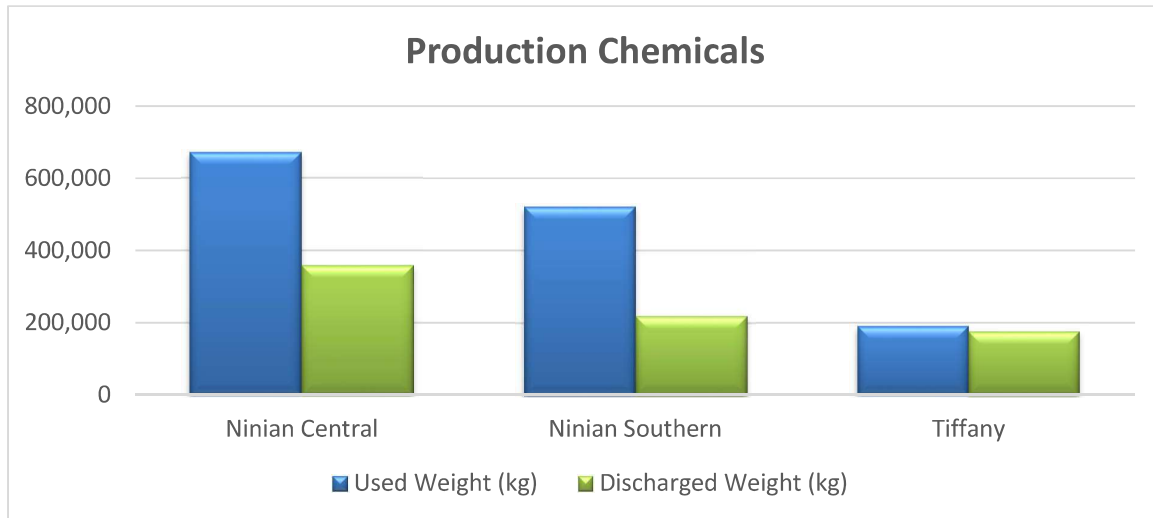


Figure 7 Production chemical usage and discharge during 2021

A wide range of chemical products are used during drilling operations, including complex fluids known as drilling muds, which are used to cool and lubricate the drill bit, to remove rock cuttings from the well bore, to prevent the hole from collapsing, to cement casings and clean wells. Chemicals are also used during intervention and workover operations, including during emergencies, for example to prevent losses of drilling fluids to the formation.

The chemicals used and discharged during drilling and intervention operations are a reflection of activity during the year.

The drilling programme for 2021 was dominated by platform drilling, therefore there were no discharge of chemicals from drilling activities during the year. As well as platform intervention operations, two well interventions were performed by the Well Enhancer, resulting in the use and discharge of chemicals as shown below.

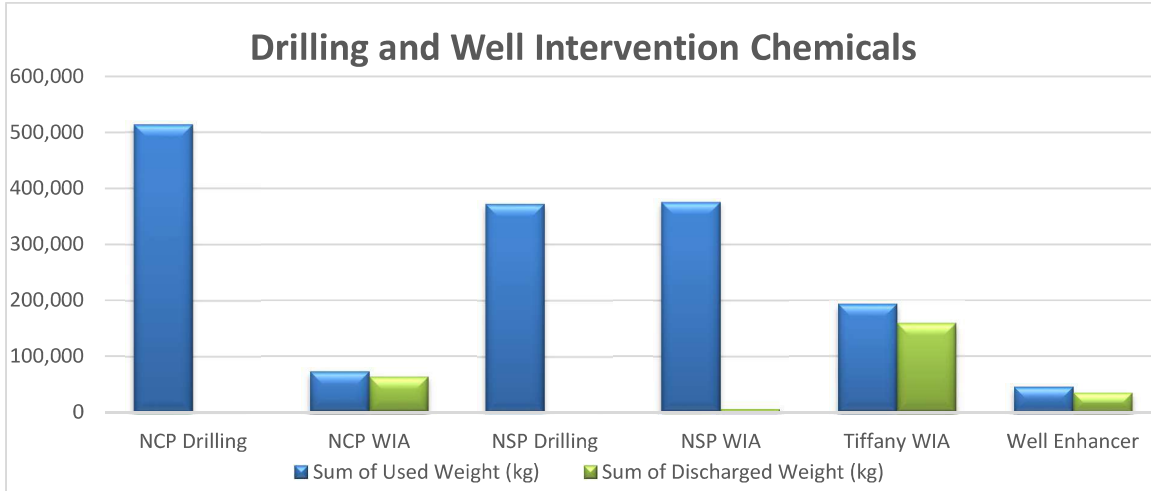


Figure 8 Drilling and Well Intervention chemical usage during 2021

During 2021 there was a single pipeline operation which resulted in the use and discharge of 0.5t of chemicals.

The figure below shows the total use and discharge of chemicals during 2021.

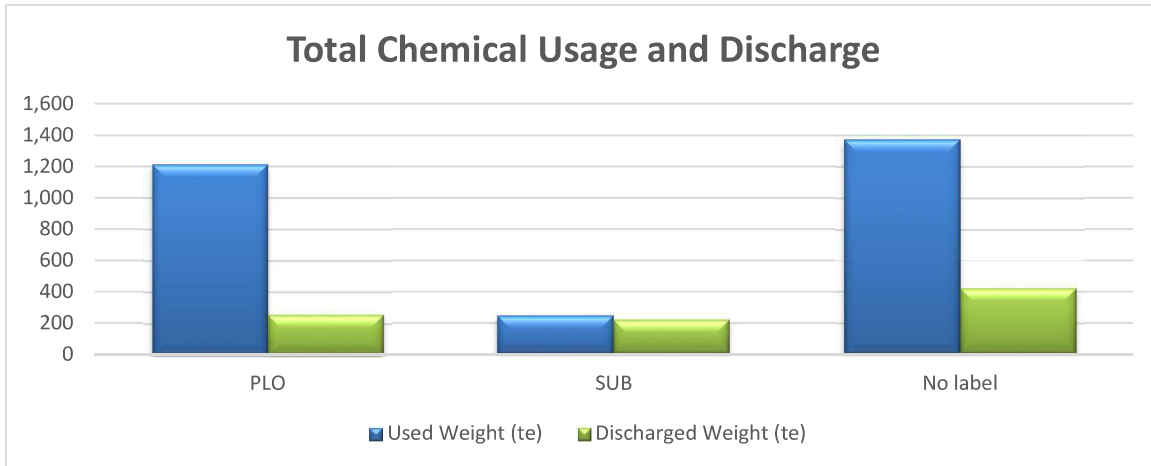


Figure 10 CNRI's chemical usage by CEFAS label during 2021 (all operations)

5.5 ACCIDENTAL RELEASES AND PERMIT NON-CONFORMANCES

All discharges of oil to sea, other than those regulated under an OPPC Permit, must be reported to the relevant authorities, regardless of volume. These reports are made on a PON1 (Petroleum Operations Notice 1) form, and include notification of accidental releases of oils and chemicals to sea.

CNRI takes its responsibility to prevent accidental discharges of oil and chemicals to sea very seriously. Procedures are in place to prevent spills (during chemical or diesel handling for example) and our Integrity Management System is designed to ensure that hydrocarbons remain securely within the process system on all installations.

CNRI investigates all accidental releases to sea and permit non-conformances to ensure that lessons are learned and actions are identified and implemented to prevent reoccurrence. Government approved Oil Pollution Emergency Plans (OPEPs) are in place for all offshore installations and CNRI is a member of Oil Spill Response Limited, the world’s largest spill response organisation.

A total of 6 accidental releases were reported in 2021, of which 3 were oil spills and 3 were chemical spills. In total, 0.74 tonnes of oil were spilled to sea during 2021, compared with 0.61 tonnes in 2020 and 0.016 tonnes in 2019. A total of 1.6 tonnes of chemicals spilled to the sea in 2021, compared to 9.57 tonnes in 2020 and 5.8 tonnes in 2019.

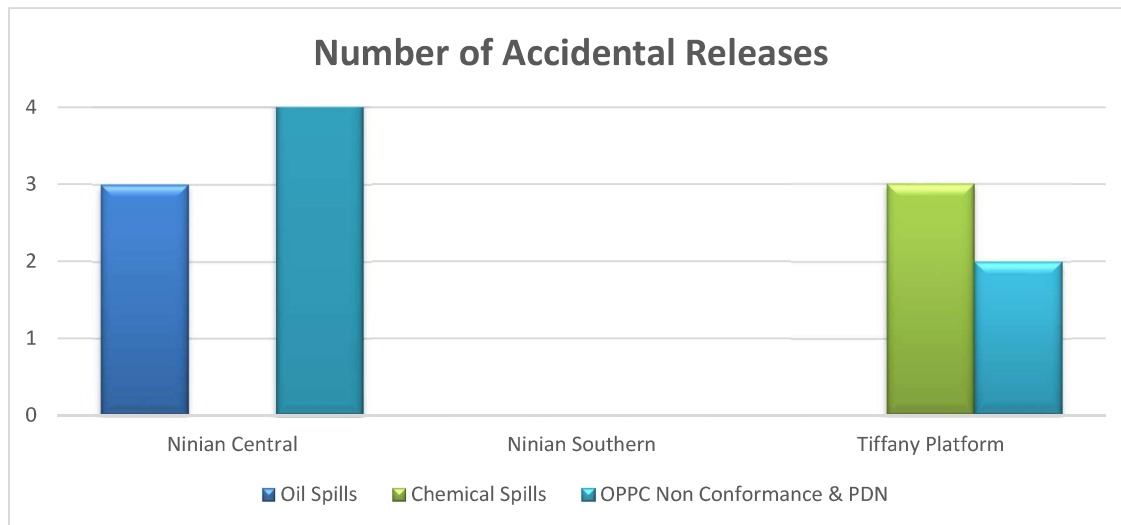


Figure 9 Oil and chemical spills during 2020

2 PON1 Permitted Discharge Notifications were related to produced water separation issues resulting in abnormal sheens or ‘out of spec’ water quality, compared to 4 in 2020. 3 of the Permitted Discharge Notification were coupled with OPPC non-compliances due to an intermittent separation issue encountered on Ninian Central.

CNRI submitted 14 non-compliances related to Oil Discharge Permits issued under the Oil Pollution Prevention and Control (OPPC) Regulations in 2021, which is a reduction from 16 in 2020.

6 2021 ENVIRONMENTAL TARGETS

CNRI develops an annual SHE Improvement Programme for all of its operations. This programme includes targets for a series of leading and lagging performance indicators and sets out the means by which these are to be achieved, as well as improving Company SHE performance in general.

For 2021, four specific environmental targets were set, based on the historical performance of CNRI's operations in both UK and West Africa:

- To have fewer than 0.26 reportable spills per million barrels of oil equivalent production (BOE)
- To spill less than 0.03 tonnes of oil per million BOE
- To achieve an average oil in produced water concentration of < 20 mg/l
- To emit no more than 0.055 tonnes of carbon dioxide per BOE

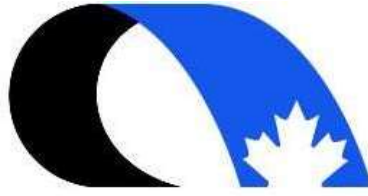
How did we perform against these targets?

- ✓ Reported 0.12 oil spills per million BOE
- ✓ Spilled 0.03 tonnes of oil per million BOE
- ✓ Achieved average oil in produced water concentration of 16.91 mg/l
- ✓ Emitted 0.054 tonnes of carbon dioxide per BOE

2021 was a successful year, with reductions across the board in line with the KPI targets.

The 2022 SHE Improvement Programme for the UKCS includes key performance indicators for oil discharged in produced water, the number and volume of reportable spills and leaks. Performance against these targets will be reported in the 2022 Environmental Performance Annual Report.





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