

Waste

Most production waste is generated during well drilling and operation, and its respective level depends primarily on the volume of drilling work. The main types of waste are drilling mud and waste drilling fluids, which under environmental hazard classification criteria belong to the hazard classes IV (low hazard) and V (non-hazardous), and are subject to disposal¹. The total amount of waste generated in 2017 stood at 1,434.0 thousand tonnes, of which 1,297.3 thousand tonnes (90.5%) constituted hazard class IV and V waste.

In 2015-2017 the Company made the transition to the concept of pit-free drilling, whereby drilling waste generated is not stored on drilling platforms, but is instead allocated for use or decontamination. Consequently, the volume of waste generated during the year is compatible with the total volume of waste used, decontaminated, and transferred to third-party organizations.

The increase in generated waste in 2017 (by 38.8%) was attributable to a rise in volumes of drilling work

(including horizontal well drilling, which requires drilling fluid to be replaced more frequently), the application of new regulations for accounting for drilling waste at LUKOIL-Western Siberia, and also significant volumes of disassembling and construction work carried out at LUKOIL-Nizhegorodnefteorgsintez and an increase in the sale of non-fuel goods (packaging and other household waste) in cafes and stores located at filling stations.

GENERATION OF HAZARD CLASS I-V WASTE AND WASTE-HANDLING AT LUKOIL GROUP SUBSIDIARIES IN RUSSIA, thousand tonnes

| | 2015 | 2016 | 2017 |
|--|---------|---------|---------|
| Waste generation, total | 1,015.7 | 1,032.9 | 1,434.0 |
| Amount of waste that was used, neutralized and transferred for use/neutralization by dedicated organizations, and buried | 956.5 | 1,115.1 | 1,395.7 |
| Annual volumes of waste disposal to new waste generation | 0.9 | 1.1 | 1.0 |
| Amount of waste at year-end | 911.9 | 765.1 | 807.7 |

Note. Data on the volume of waste generated in 2017 are shown without rocky material produced during the excavation of oil wells at Yareganeft (fifth hazard class). Due to changes in the legislation covering waste-handling, since 2017 this waste has been accounted as storage waste and included in the balance sheet of waste generated at LUKOIL-Komi, where it will remain until it is utilized during the remediation stage.

MAIN TYPES OF WASTE FROM PRODUCTION ACTIVITY AND WASTE-HANDLING TECHNIQUES OF LUKOIL GROUP SUBSIDIARIES IN RUSSIA

| Activity | Type of waste | Waste-handling technique |
|--|--|--|
| Production of crude oil and natural gas | Drilling waste | Waste is recycled by dedicated contracting organizations. |
| | Rocky material produced during underground mining | When developing oil fields using mining methods (in the Komi Republic), rocky material is brought to the surface and piled in waste heaps – it is not subject to decontamination. |
| | Oil-contaminated waste | Oil-contaminated waste at oil and gas production subsidiaries primarily comprises oil-contaminated soil and sludge from tank and pipeline purging operations. LUKOIL uses tried-and-tested disposal (microbiological destruction) and decontamination (thermal treatment) techniques. |
| Oil and gas refining | Oil-contaminated waste | Oil-contaminated waste at oil and gas refineries mainly comprises sludge from tank and pipeline purging operations, oil/petroleum products entrapped in process water, etc. Disposal methods include slop oil being fed back into the technological process, and sludge being decontaminated at dedicated processing facilities. |
| | Silt from biological treatment facilities | Forms during the treatment process that removes organic compounds from water used for production and service water. Excessive biosilt is regularly removed from treatment facilities, then dried, and sometimes used in other operations (for example as fertilizer). |
| Production and distribution of electricity, gas, and water | Sludge produced during the chemical treatment of water | This waste is deposited in landfills. |

¹ Hereinafter the term "disposal" is used within the meaning "use, neutralisation, and transfer to specialised organizations for processing and disposal."

The Company disposes waste accumulated in the pre-privatization period at LUKOIL Group subsidiaries in Russia from its own funds. Measures taken in 2017 allowed us to reduce the total amount of such waste by 41.1 thousand tonnes compared to

2016 (to 304.5 thousand tonnes as at 31 December 2017).

We pay close scrutiny to the quality of waste disposal work performed by contractors, and monitor their activities under the contracts concluded. We check waste-handling techniques, the

condition of the production control system, and ensure that sufficient resources are available to perform contractual obligations. Cooperation between subsidiaries and contractors to improve the quality of their output is constantly expanding.

Land remediation

Oil and gas production activity is unavoidably tied to the acquisition of land, and can lead to the contamination of soil, as well as a deterioration in the habitats of plants and animals. Each year, measures are taken under the Environmental Safety Program to remediate contaminated land.

Our longstanding working relationship with the UNDP/Global Environmental Facility (UNDP-GEF) and the Ministry of Natural Resources and Environment of the Russian Federation has enabled us to choose efficient remediation

techniques for the natural restoration of biodiversity, including:

- the dredging of wetlands: a less impactful method for removing surface contamination that does not disturb native vegetation sprouts
- active adsorption of oil on flooded areas
- microbiological methods of soil bioremediation, using biological substances
- melioration and agricultural methods for oil stripping
- a two-tier system for protecting water courses during the remediation of coastal land

- a rotary cultivation system used in difficult-to-traverse swampy areas

LUKOIL-Komi has stepped up its remediation activity on disturbed land: work is being performed to eliminate three sludge pools that do not conform with current requirements in the Usinsk District, with a total area of seven hectares. Work is planned by 2019 to liquidate an additional 14 completed sludge pits at the Usinskoye and Vozeiskoye fields.

REMEDICATION OF DISTURBED AND OIL-CONTAMINATED LAND BY LUKOIL GROUP SUBSIDIARIES IN RUSSIA

| | 2015 | 2016 | 2017 |
|--|--------------------|----------------------|----------------------|
| Area of remediated land, hectares | 3,527.7 | 8,409.5 ² | 9,197.3 ³ |
| including oil-contaminated land, hectares | 165.8 ⁴ | 98.3 ⁴ | 93.3 |
| Contaminated land on the balance sheet of subsidiaries at year-end, hectares | 138.1 | 78.0 | 59.7 |



ENVIRONMENTAL PROJECTS IN ROMANIA

A joint five-year project between the Rotary Club and PETROTEL-LUKOIL S.A. on the landscaping of a former landfill in the city of Ploiesti (Romania) was completed in 2017. The partners of the project comprised the Mayor's Office of Ploiesti, the National Forestry Agency Romsilva, the Prahova Administration, and the Prahova Educational Inspectorate.

² The level of remediation rose in 2016 to ensure prompt compliance with changes to regional Russian law.

³ In 2017 the Area of remediated land indicator included actually remediated land, as well as undamaged land returned to the land fund after the end of production.

⁴ The data were adjusted based on the results of the recalculation.