

## APPENDIX 2. ENVIRONMENTAL INDICATORS

	Production			Transportation			Refining		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
<b>Greenhouse gas (GHG) emissions</b>									
Direct GHG emissions (CO <sub>2</sub> , mln tonnes)	2.5	2.3	2.0	2.4	2.7	2.1	4.4	4.8	4.6
GHG emission intensity (CO <sub>2</sub> tonnes per 1,000 tonnes of HCs)	101	93	87	-	-	-	-	-	-
<b>APG flaring</b>									
Flaring (CO <sub>2</sub> , mln tonnes)	0.3	0.2	0.13	-	-	-	-	-	-
Flared gas per unit of produced RWC (tonnes per 1,000 tonnes of produced RWC)	6.0	2.95	2.2	-	-	-	-	-	-
Flaring (mln m <sup>3</sup> )	0.15	0.08	0.06	-	-	-	-	-	-
<b>Energy intensity</b>									
Energy consumption (mln GJ)	55.2	55.5	48.2	55.6	66.0	44.6	56.8	61.3	63.8
<b>Pollutant emissions</b>									
Sulfur oxides (SO <sub>x</sub> ) (thousand tonnes of SO <sub>2</sub> )	6.7	4.8	5.6	0.2	0.2	0.3	6.5	7.2	6.9
Nitrogen oxides (NO <sub>x</sub> ) (thous. tonnes of NO <sub>2</sub> )	4.8	5.3	5.4	5.5	6.2	5.6	5.9	6.9	6.7
<b>Spills</b>									
Unauthorized incuts – volume (thous. tonnes)	-	-	-	-	-	-	-	-	-
Unauthorized incuts – quantity	-	-	-	1	2	-	-	-	-
Oil spills – volume (onshore) (thous. tonnes)	0.78	0.65	0.29	0.005	-	-	0.063	-	-
<b>Water</b>									
Total water intake (mln m <sup>3</sup> )	52.2	52.4	47.7	25.3	24.9	22.7	16.2	16.2	15.4
Water discharge (mln m <sup>3</sup> )	1.1	0.9	0.7	1.0	1.0	0.8	8.8	9.2	9.2
<b>Waste</b>									
Hazardous (thous. tonnes)	220.6	846.4	824.9	2.9	46.6	40.3	39.1	62.2	128.5
Non-hazardous (thous. tonnes)	5.9	12.6	28.8	5.2	4.9	6.8	8.0	7.3	1.9
Total waste (thous. tonnes)	226.5	859	853.7	8.1	51.5	47.1	47.1	69.5	130.4*
* of them drill cuttings, onshore (thous. tonnes)	174.2	193.2	178.7	-	-	-	-	-	-
* of them drill cuttings, offshore (thous. tonnes)	2.2	0	0	-	-	-	-	-	-

\* The main reason for the growth of waste in the oil refining business is the start of the implementation of the Tazalyk project at the Atyrau refinery due to an increase in the utilization of oil sludge from cleaning tanks and an increase in waste from dismantling mechanical treatment facilities.

## ENVIRONMENTAL PROTECTION COSTS

## GRI 103-3

	Costs	2018		2019		2020	
		mln KZT	mln USD	mln KZT	mln USD	mln KZT	mln USD
<b>1</b>	<b>Costs associated with waste, emissions and pollutant discharge handling, total</b>	<b>11,844.6</b>	<b>34.3</b>	<b>14,847.3</b>	<b>38.79</b>	<b>18,312.1</b>	<b>43.0</b>
1.1	Waste treatment and disposal	5,833.9	16.9	9,733.2	25.43	13,190.3	30.9
1.2	Purification of emissions and pollutant discharges	4,531.5	13.1	3,177.6	8.3	4,787.9	11.2
1.3	Costs of development and approval of GHG emission document packages	104.4	0.3	101.9	0.27	149.3	0.4
1.4	Environmental liability insurance	58.6	0.2	118.2	0.31	125.1	0.3
1.5	Costs of elimination of environmental damage, including spill response costs	1,278.8	3.7	1,460.7	3.8	0.3	0.001
1.6	Costs of environmental compensatory measures	34.3	0.1	255.7	0.7	59.2	0.1
<b>2</b>	<b>Investments in prevention of environmental impact and environmental management, total</b>	<b>1,035.8</b>	<b>3</b>	<b>1,198.1</b>	<b>3.1</b>	<b>21,535.3</b>	<b>50.5</b>
2.1	Employee training and education personnel	58.6	0.17	18.8	0.5	9.3	0.02
2.2	External certification and environmental management system development	47.8	0.14	43.4	0.1	24.1	0.06
2.3	Personnel for general environmental management activities	2.6	0.008	196.7	0.5	2.0	0.005
2.4	Research and development	548.5	1.6	366.0	1.0	820.5	1.93
2.5	Additional expenses on introduction of cleaner technologies	158.4	0.5	123.5	0.3	20,665.4	48.49
2.6	Additional expenses on "green purchasing"	2.3	0.007	360.3	0.9	7.2	0.02
2.7	Other environmental management costs	217.6	0.6	89.4	0.2	6.8	0.02

## ENVIRONMENTAL PAYMENTS (REGULATORY)

	2018		2019		2020	
	KZT million	mln USD	KZT million	mln USD	KZT million	mln USD
Air emissions from APG flaring	1,998	5.8	1,054	2.7	1,170	2.7
Air emissions (other than APG flaring)	1,258	3.6	1,584	4.1	1,843	4.3
Water pollution	30	0.1	63	0.2	102	0.2
Waste disposal	258	0.7	131	0.3	109	0.3

## LOCATION AND SCALE OF PRODUCTION OPERATIONS IN RELATION TO KEY BIODIVERSITY AREAS

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Site	Location	Key biodiversity areas (KBA)	Location in relation to KBA	Contract territory (sq. km)	Impact mitigation plan
Kansu	Karakiya District Mangistau region	Kenderli-Kayasan Nature Conservation Area and Ustyurt Nature Reserve	Located in the nature conservation area and near the reserve	4,374.6	Decision is made to exit the Project
Samtyr	South-east of Mangistau region	Kenderli-Kayasan Nature Conservation Area and Ustyurt Nature Reserve	Located next to a reserve	10,396.9	Exploratory design stage
Urikhtau	Mugalzhar District of Aktobe Region	Kokzhide-Kumzhargan Local State Nature Reserve	Covers part of the territory	239.9	Hydrogeological monitoring
Alibekmola and Kozhasay	Mugalzhar District of Aktobe Region	Kokzhide Sands Kokzhide underground water	Located in close proximity	156.5	Hydrogeological monitoring
Zhambyl	Kazakhstan Sector of the Caspian Sea, Atyrau District	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea, Novinsky nature reserve	Located in the nature conservation area and covers part of the territory	1,935.2	Regular environmental monitoring, restrictions on offshore oil operations
Isatay	Central area of the KSCS, north Mangistau region	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea	Located in the nature conservation area	1,060.0	Seasonal baseline environmental studies, regular environmental monitoring
Satpayev	North-west of Kazakhstan Sector of the Caspian Sea, Atyrau District	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea	Located in the nature conservation area	1,481.0	Procedures to return the territory and surrender the Contract have started