

JOINT
REPORT
2018

ON OCCUPATIONAL
HEALTH, SAFETY AND
ENVIRONMENTAL
PROTECTION



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1. Introducing the Unipetrol Group

The Group is engaged in refinery and petrochemical production and sales in the Czech Republic and Central Europe. Companies of the group mainly produce and sell refinery products, chemical and petrochemical products, polymers, fertilizers and special chemicals. The group operates its own transportation services and finances its own research and development. Unipetrol is a leading refinery and petrochemical company in the Czech Republic and a chief player in Central and Eastern Europe. The group focuses on three strategic business segments:

- ▶ refining crude oil and wholesale of refinery products
- ▶ petrochemical and agrochemical production
- ▶ motor fuel retail

Unipetrol is the 100 % owner of the following companies:

- ▶ Unipetrol RPA – manufacturer and vendor of refinery, petrochemical and agrochemical products, the largest crude oil processor in the Czech Republic for a wide range of products with a total annual capacity of 8.7 million tonnes. Benzina petrol stations network is a registered branch of Unipetrol RPA.
- ▶ Unipetrol Doprava – a provider of professional railway transport for chemical, petrochemical and other products, and related services.
- ▶ Paramo – the largest manufacturer of bitumen, lubricants, fuel oil and other refinery products.
- ▶ Spolana – a part of the Unipetrol Group since 2016 and manufacturer of polyvinyl chloride, caprolactam, sulfuric acid and ammonium sulphate.

The Unipetrol Group's main products are refinery and petrochemical products.

Refinery products: petrol, diesel, light heating oil, aviation fuel, LPG, asphalts, naphtha, lubrication and heating oils.

Petrochemical products: ethylene, propylene, C₄ fraction, benzene, high-density polyethylene, polypropylene and PVC.

Agrochemical products: ammonia, highly conductive carbon black, caprolactam, sulfuric acid, oleum and ammonium sulphate.

2. Important milestones of the Unipetrol Group in 2018

The following can be considered the most important events of 2018 at the Unipetrol Group in terms of protecting the environment and occupational health and safety:

- ▶ Construction of a new power generating plant at the steam cracker unit in the petrochemical section of the production site.
- ▶ Permanent operation of a wastewater treatment plant (ČOV) at the Kralupy refinery.
- ▶ Installation of technology to reduce nitrogen oxide emissions (DeNO_x) at the T700 heating plant.
- ▶ Installation of technology to reduce emissions of sulphur oxides (DeSO_x) at the T700 heating plant.
- ▶ Installation of technology to reduce vanadium content in wastewater.
- ▶ Operation of both the Litvínov and Kralupy refineries in accordance with BAT requirements.
- ▶ Launch of the ZERO electronic system for recording, reporting, managing and archiving emergencies and findings as an effective means of supporting the process of continuous improvement in fire prevention and occupational health and safety. It is planned for use throughout the entire Group.
- ▶ ZERO software applications (improving registration, response and measures) for central records of field inspections and incidents at Unipetrol RPA, whose future use throughout the entire Group is being considered.
- ▶ Cessation of the Rafinérie registered branch as a result of its full incorporation on 1 January 2019 into the Unipetrol RPA organizational structure.
- ▶ Revitalization of the fuel terminal at Paramo Pardubice, which followed the construction of an additive unit for distributing premium fuels and the construction of a new recuperative unit.
- ▶ Installation of low emission burners in the boiler room (boiler K9) at Paramo Kolín.
- ▶ Installation of floating roofs in the MEK/T storage tanks at Paramo Kolín.
- ▶ Commencement of construction of a new energy centre at Spolana.

3. Role of employees

Unipetrol Group employees play a key role in protecting the environment and activities associated with occupational health and safety and fire prevention. The individual companies have therefore implemented an effective training system for all employees. Training and education of employees are part of the established management system, which is subject to regular review, evaluation and completion under ISO 9001, 14001, 50001 and OHSAS 18001 standards.

All employees are actively and continuously engaged in environmentally sound practices in order to protect the environment.

Thorough training applies to both the Group's employees and employees of external companies working at the production sites of the Group. The obligation to comply with environmentally sound practices, fire prevention and occupational health and safety principles are included in agreements with individual contractors.

Employee education is also improved through their familiarization with policies, operational regulations, organizational and management standards in the areas of environmental protection, safety and health protection, fire protection, environmental aspects of their activities, and objectives and programmes defined for and applicable to their workplace.

The active role of employees is also supported by a recently introduced IDEA platform that encourages the Group's employees to forward their own ideas to help meet and improve the Unipetrol Group's objectives, including those in the area of the HSEQ.

4. Communication with the public

The following are the main tools used to communicate with the public:

- ▶ Social responsibility (CSR) principles applied by Unipetrol Group companies across cities and their larger urban zones.
- ▶ Participation of Unipetrol Group company management representatives at the public meetings of neighbouring municipal councils to provide information about the company's effect on the surrounding environment.
- ▶ Meetings with the mayors of the region to acquaint participants with all activities, including environmental protection, and information about the occurrence of non-standard operating situations.
- ▶ Green line operation, internal communication sources (printed media, intranet, e-mail communication).
- ▶ Online connection of the company's alarm system at Chempark Záluží to the Police of the Czech Republic and the Litvínov and Most Municipal Police.
- ▶ Emergency SMS messages via an information channel for the towns of Most and Litvínov.
- ▶ Alerts, warning signal and sound systems at production sites and their surroundings.
- ▶ Discussing the Responsible Care programme implementation report with the representatives of trade unions and local and regional authorities.
- ▶ Public information provided via the Most and Kralupy nad Vltavou Ecological Centre.
- ▶ Cross-border cooperation with Saxony through the Ecological Centre.
- ▶ Internet and social networks: Facebook, Twitter, Instagram, YouTube.
- ▶ Interactive and educational programmes for primary and secondary school students (for example, Path to the Secret of Oil).

5. Integrated management systems policy

In 2017, Unipetrol top management approved an Integrated Management System policy based on the core values of the Unipetrol Group and the PKN Orlen Group called **Responsibility – Development – People – Energy – Reliability**. In line with the strategic focus of the Groups' companies, the policy includes commitments in the fields of occupational health and safety, environmental protection, quality, and energy management.

The Integrated Management System policy is published on individual company websites.

6. Integrated management systems

Established management systems are an important factor in environmental protection, product quality, occupational health and safety, fire protection and the prevention of major accidents. Unipetrol Group companies have certified Quality Management System (QMS), Environmental Management System (EMS) and Health and Safety Management System (HSMS) in place as a guarantee of systemic access for the customer and their needs, product quality and service delivery, environmental protection and occupational health and safety. Since 2016, some of the companies have implemented and certified the

Energy Management System (EnMS) and thereby declared their commitment to optimize energy use, while also meeting the legal requirements of the Energy Management Act.

The above management systems are certified according to international standards ISO 14001, OHSAS 18001, ISO 9001 and ISO 50001.

In May and June of 2018, a supervisory audit of QMS, EMS, HSMS and EnMS management systems was conducted at Unipetrol, Unipetrol RPA (including the Benzina and Rafinérie registered branches and Polymer Institute Brno), Unipetrol Doprava and Petrotrans (note: only the EnMS at the Polymer Institute Brno). This audit included the transition to the revised ISO 9001: 2015 and ISO 14001: 2015 standards. The Lloyd's Register Quality Assurance certification organization has confirmed compliance with both revised and existing system standards. A recertification audit was conducted at the Polymer Institute Brno branch with the transition to the new ISO 9001: 2015 standard in September 2018. The audit was conducted by CQS – an association of certification companies for Certified Quality Systems and IQ Net – an International Certification Network.

In May 2018, Paramo successfully passed a recertification audit with the transition to the new ISO 9001:2015 and ISO 14001:2015 standards by Lloyd's Register Quality Assurance. The company has three certified management systems – EMS, HSMS and QMS.

In June 2018, Spolana successfully passed the QMS, EMS, HSMS and EnMS recertification audit conducted by TÜV Rheinland Česká Republika s.r.o.

Unipetrol RPA has a certified sustainability system for producing motor fuels with biofuels (ISCC). The latest audit, which verified compliance with the system requirements, was conducted in December 2018 by TÜV SÜD Czech s.r.o.

Unipetrol Doprava has implemented a Safety and Quality Assessment System for Logistics Service Providers (SQAS). The system was successfully recertified in October 2018.

Certified/verified Unipetrol Group management systems in 2018

Company	ISO 9001	ISO 14001	OHSAS 18001	ISO 50001	SQAS	RC	ISCC
Unipetrol	●	●	●	●		●	
Unipetrol RPA (incl. Benzina and Rafinérie registered branches)	●	●	●	●		●	●
Unipetrol RPA – PIB registered branch	●			●			
Unipetrol Doprava	●	●	●	●	●	●	
Paramo	●	●	●				
Spolana	●	●	●	●		●	

Certificates are published on individual company websites.

7. Responsible Care

The Responsible Care (hereinafter R.C.) programme is a voluntary, worldwide initiative of the chemical industry aimed at promoting the industry's sustainable development by improving safety at facilities and during product transport and protecting human health and the environment. The programme represents a long-term strategy coordinated by the International Council of Chemical Associations (ICCA) and in Europe by the European Chemical Industry Council (CEPIC). The contribution of the R.C. programme to sustainable development was acknowledged by a United Nations Environment award presented at the World Summit in Johannesburg.

The national version of the R.C. programme initiative was officially launched in October 1994 by the Minister of Industry and Trade (SCHP ČR) and the President of the Association of Chemical Industry of the Czech Republic. Since 2008, the programme has met the conditions of the Responsible Care Global Charter.

Authorization to use the Responsible Care programme logo has been regularly granted to UNIPETROL, a.s. and Unipetrol Doprava on the basis of successful public defence in 2017. After renewing the membership of Unipetrol RPA in SCHP CR, this company's right to use the RC logo was also defended in 2017. The three companies may use the Responsible Care logo until 2021, when they will again publicly defend their right.

Paramo is no longer a member of the Chemical Industry Association of the Czech Republic and therefore does not make use of the authorization, although it continues to fulfil its principles.

In 2018, Spolana defended the right to use the RC logo for the ninth time.

8. Compliance with environmental protection regulations

A consistent attempt to comply with environmental protection regulations is also indicated by the few instances of partial violations of environmental law requirements because of non-standard operating conditions. The operating conditions and emission limits stipulated in the integrated permits for all Unipetrol RPA facilities were met during 2018. In 2018, Unipetrol RPA was fined CZK 30 000 for exceeding the emission limit for solid pollutants from the K1 and K2 boilers of the power generating plant at the steam cracker unit in 2016. In 2018, no breaches of air and waste legal requirements occurred. All activities at Paramo in 2018 were conducted in full compliance with environmental protection legislation—without any penalty.

9. Integrated pollution prevention

The obligations of selected industrial enterprises in the area of integrated pollution prevention (IPPC) are regulated by Act No. 76/2002, as amended. All Unipetrol RPA production units, including the refineries at Litvínov and Kralupy nad Vltavou, fall under the IPPC Act and have valid integrated permits issued by the regional authorities of the Ústí nad Labem and Central Bohemia Regions. These permits are continually updated in accordance with the requirements of the amended laws and fulfilment of term conditions, implementation of investment projects, changes in technological equipment or changes in the substances used.

During 2018, a total of 15 amendments to the integrated permits for Unipetrol RPA were issued. The amendments concerned:

- ▶ A permit for operating new sulphur (DeSOx) reduction technology, to be installed at the T700 heating plant in 2019.
- ▶ Drawing on the financial reserve for the reclamation/reconstruction project of the distribution pit in Kopisty.
- ▶ A permit for operating a new wastewater discharge facility.
- ▶ Increasing the maximum permitted production capacity of polypropylene.
- ▶ Final Implementation of the Best Available Techniques (BAT) according to the European Commission Implementing Decision 2014/738 / EU for the Litvínov and Kralupy Refineries.
- ▶ Approving the updated operating rules and emergency plans for individual facilities.
- ▶ Changes to monitoring pollutants released into the air.
- ▶ Changes in the conditions for discharging wastewater.
- ▶ Updating the equipment descriptions of individual production plants because of approved changes planned at the given facilities.

In 2018, preparation of materials commenced for the review of the binding conditions stipulated by the integrated permit, as required by the BAT conclusions, for a) large combustion plants and b) the production of large quantities of organic chemicals published in the previous year. These served as a basis for the review of the binding operating conditions. Compliance with the best available techniques (BAT) was thus achieved by two facilities. Through a technical working group established by the Ministry of Industry and Trade of the Czech Republic, Unipetrol RPA prepared a document on the best available techniques for cleaning gases generated by the chemical industry. It collected data in 2018 from relevant facilities during the preparation of this document. The required data was also provided by Unipetrol RPA. Projects to meet the BAT conclusions for the mineral oil and gas refining sector were completed during the year, and the BAT requirements for refineries were met as of October 2018.

All technologies operated by Paramo have valid integrated permits. A joint, integrated permit for power engineering and asphalt, fuel and oil operation issued by the Regional Authority of the Pardubice Region was obtained by HS Pardubice. In 2018, two updates to the integrated permit were issued that abolished the listed stationary source of bitumen varnishes and diluted bitumen and approved the operating rules for air pollution sources (xylene handling and revitalization of the fuel terminal). HS Kolín obtained one integrated permit issued by the Regional Authority of the Central Bohemia Region. In 2018, the integrated permit was updated once (extension of wastewater discharge in the recipient permit—to the end of 2022).

A total of four integrated plant operation permits were issued to Spolana. In 2018, the Regional Authority issued three amendments to the integrated permits. The amendments concerned warehousing of packaged granular ammonium sulphate, bottling of sulphur from automobile tanks and the temporary connection of sludge beds.

10. Overview of valid integrated operating permits

Production unit	Integrated permit – (issuer)
Unipetrol RPA	
Production of polypropylene and polyethylene	Regional Authority of the Ústí Region
Steam cracker	Regional Authority of the Ústí Region
Production of ammonia	Regional Authority of the Ústí Region
Mazut gasification plant	Regional Authority of the Ústí Region
Energy services unit	Regional Authority of the Ústí Region
Production of dicyclopentadiene and non-hydrogenated C9 fraction	Regional Authority of the Ústí Region
Litvínov refinery	Regional Authority of the Ústí Region
Kralupy nad Vltavou refinery	Regional Authority of the Central Bohemia Region
Paramo	
Refinery plant, Cost Centre Pardubice	Regional Authority of the Pardubice Region
Cost Centre Kolín	Regional Authority of the Central Bohemia Region
Spolana	
Energetic materials and toxic waste landfill	Regional Authority of the Central Bohemia Region
Production of chlorine and sodium amalgam by electrolysis	Regional Authority of the Central Bohemia Region
Production of polyvinyl chloride (PVC)	Regional Authority of the Central Bohemia Region
Production of caprolactam and sulphuric acid	Regional Authority of the Central Bohemia Region

11. Emissions into the environment

Pollutant emissions into the environment stabilized over the past five years at the levels determined by substantial green investments made in the previous decade. Individual emissions into the environment are listed in the following chapters.

11.1 Wastewater discharge

At Unipetrol RPA, the amount of pollutants in waste water in the NL (suspended solids) indicator increased slightly compared to 2017. The increase was mainly a result of shutting down settling lagoons in order to repair their discharge facilities, and shutting down the biological sewage treatment plant sedimentation tank to repair the sludge raking equipment. The amount of pollution in the BSK5 indicator corresponds to the amount before the incident at the steam cracker in 2015. The decrease between 2015 and 2016 was caused by limited production due to this event.

The waste water treatment plant at the Kralupy refinery underwent extensive refurbishment in the 2013–2015. In 2016–2017, the treatment plant commenced a two-year trial operation, and from 1 January 2018, it commenced permanent operation. We are now monitoring the level of reduction in discharged pollution.

The amount of pollution discharged at Spolana is steady, except for mercury, whose quantity has been drastically reduced, and nitrogen compounds, whose volume has increased.

The rate of transferred waste water pollution at Paramo has not changed significantly over the years. Pollution at HS Pardubice in terms of the CHSK parameters and petroleum substances increased slightly in connection with intensified groundwater pumping by the HOPV system (into the sewerage system). Waste water pollution at HS Kolín (recipient Hluboký potok) is steady.

The balance of indicators for waste water pollution for the Benzina registered branch cannot be published because the monitored parameters in the petrol station network are not consistent and cannot be interpreted in the overview. In the overall evaluation of individual petrol stations, none of the monitored parameters exceed the “m” value.

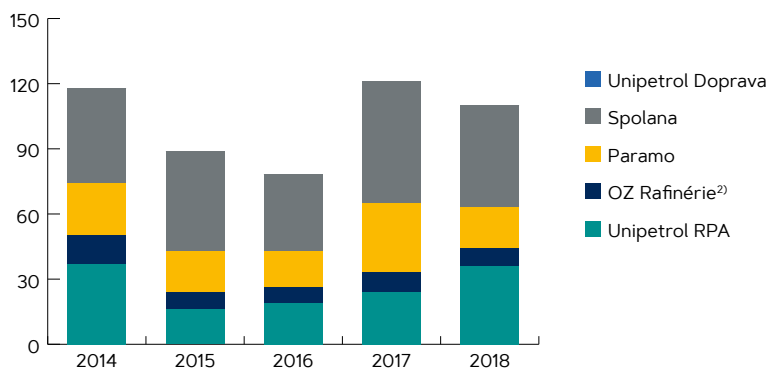
The pollutants contained in waste water from Unipetrol Doprava is directly proportional to the amount of cleaning equipment containing harmful substances.

Pollutants discharged via wastewater by the Group (t/year)¹

Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	BSK ₅ (Biochemical oxygen demand)	37	16	19	24	36
OZ Rafinérie ²⁾	BSK ₅ (Biochemical oxygen demand)	13	8	7	9	8
Paramo	BSK ₅ (Biochemical oxygen demand)	24	19	17	32	19
Spolana	BSK ₅ (Biochemical oxygen demand)	44	46	35	56	47
Unipetrol Doprava	BSK ₅ (Biochemical oxygen demand)	0	0	0	0	0
Unipetrol Group	BSK₅ (Biochemical oxygen demand)	118	89	78	121	110

¹⁾ OZ Benzina is not extensively monitored, and representative data cannot be evaluated.

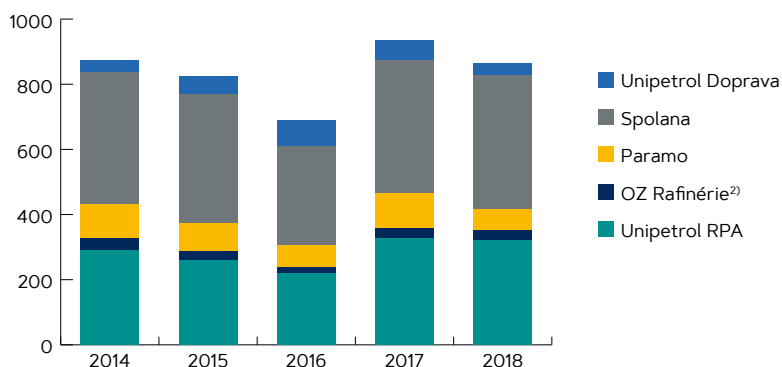
²⁾ Only the Kralupy site. No direct discharge at Litvínov.



Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	CHSK _{Cr} (Chemical oxygen demand)	290	258	220	328	321
OZ Rafinérie ²⁾	CHSK _{Cr} (Chemical oxygen demand)	38	30	18	28	32
Paramo	CHSK _{Cr} (Chemical oxygen demand)	104	84	69	110	62
Spolana	CHSK _{Cr} (Chemical oxygen demand)	403	399	301	407	412
Unipetrol Doprava	CHSK _{Cr} (Chemical oxygen demand)	37	55	82	63	39
Unipetrol Group	CHSK_{Cr} (Chemical oxygen demand)	872	826	690	936	866

¹⁾ OZ Benzina is not extensively monitored, and representative data cannot be evaluated.

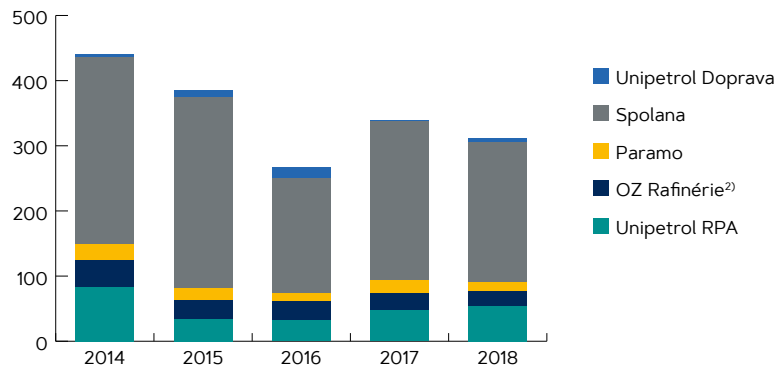
²⁾ Only the Kralupy site. No direct discharge at Litvínov.



Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	NL (Suspended solids)	83	34	32	47	54
OZ Rafinérie ²⁾	NL (Suspended solids)	41	29	29	27	23
Paramo	NL (Suspended solids)	25	18	13	20	13
Spolana	NL (Suspended solids)	286	294	176	244	215
Unipetrol Doprava	NL (Suspended solids)	5.7	10.7	16.7	0.38	7
Unipetrol Group	NL (Suspended solids)	441	386	267	338	312

¹⁾ OZ Benzina is not extensively monitored, and representative data cannot be evaluated.

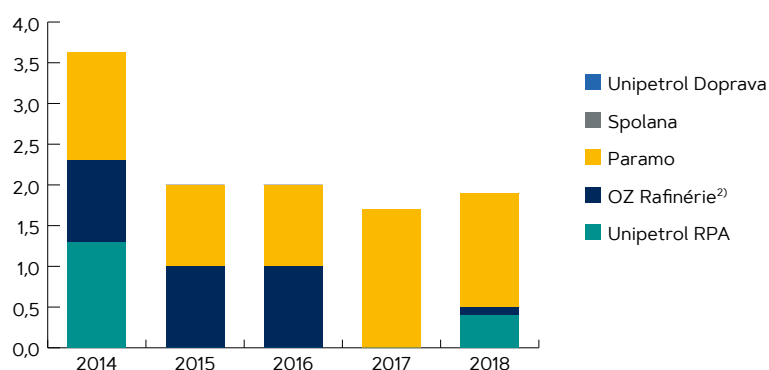
²⁾ Only the Kralupy site. No direct discharge at Litvínov.



Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	Oil substances	1.3	0	0	0	0.4
OZ Rafinérie ²⁾	Oil substances	1	1	1	0	0.1
Paramo	Oil substances	1.33	1	1	1.7	1.4
Spolana	Oil substances	-	-	-	-	-
Unipetrol Doprava	Oil substances	0	0	0	0	0
Unipetrol Group	Oil substances	3.63	2	2	2	1.9

¹⁾ OZ Benzina is not extensively monitored, and representative data cannot be evaluated.

²⁾ Only the Kralupy site. No direct discharge at Litvínov.



11.2 Waste management

The increase in the amount of waste at Unipetrol RPA in 2018 was due to cleaning operations associated with decommissioning petrochemical production. Increased production of hazardous wastes at refineries in recent years is due mainly to the larger volume of spent catalysts and waste oils, which are, however, recyclable and account for about 80 % of the total amount of hazardous waste, while the higher production of hazardous waste at the Kralupy refinery was due to shutdown in 2018. Increased production of hazardous waste at Paramo in 2014 was due to the sale of large quantities of waste slop oils. The sales of waste oils are currently lower than in 2014. The production of waste as a result of investment projects was also minimized.

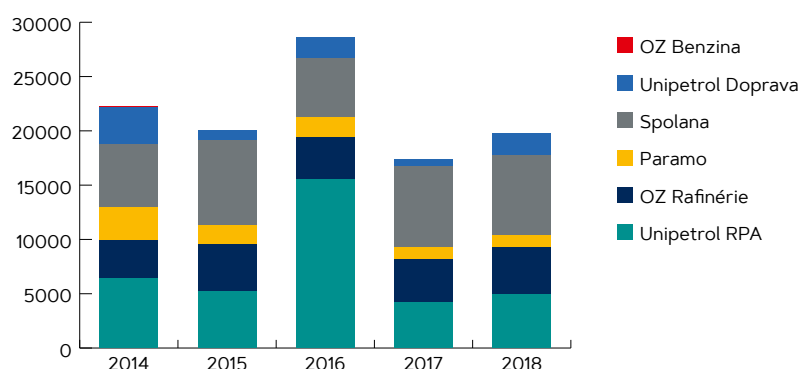
The decline in waste at Unipetrol Doprava is related to the final closure of the rinsing station at Neratovice and the transfer of the rail maintenance section (maintenance of the superstructure, substructure and FM) to Unipetrol RPA.

The increase in hazardous waste production at Spolana is associated with the shutdown of amalgam electrolysis operation.

For the Benzina registered branch, the balance does not include any waste generated by petrol stations, only waste from investment and other contracts. The origin of the remaining waste production are the petrol station tenants as independent business entities.

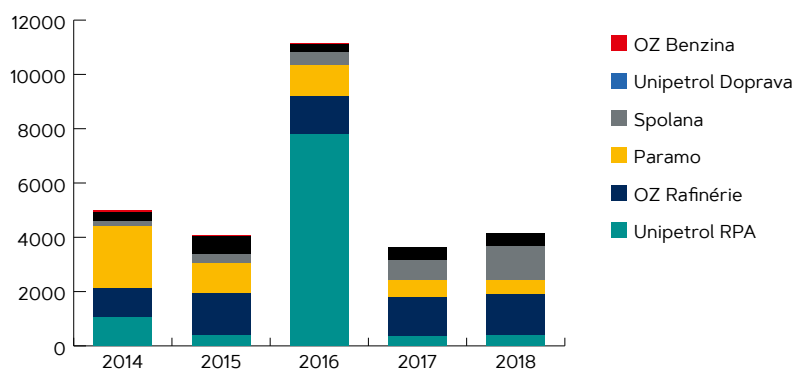
Waste generated by the Group (t/year) — total

Year	2014	2015	2016	2017	2018
Unipetrol RPA	6368	5177	15514	4165	4932
OZ Rafinérie	3565	4336	3928	4003	4409
Paramo	3038	1841	1796	1079	1072
Spolana	5822	7745	5489	7510	7364
Unipetrol Doprava	3394	953	1870	633	1985
OZ Benzina	57	40	52	16	28
Unipetrol Group	22244	20092	28649	17406	19790



Waste generated by the Group (t/year) — only hazardous waste

Year	2014	2015	2016	2017	2018
Unipetrol RPA	1038	389	7787	347	369
OZ Rafinérie	1075	1540	1421	1470	1546
Paramo	2307	1128	1128	591	494
Spolana	160	329	473	759	1285
Unipetrol Doprava	361	654	300	463	443
OZ Benzina	53	36	49	2	7
Unipetrol Group	4994	4076	11158	3632	4144



11.3 Air protection

Total emissions of the OZ Rafinérie plant in 2018 were stable and comparable to 2015. In 2016, production was shut down at both refineries, therefore emissions were lower this year than in 2018. In 2017, total emissions increased because of greater use of the refinery. In 2018, the planned shutdown at the Kralupy refinery also played a role in less emissions. Commencement of dosing the DESOX additive at the Kralupy refinery's fluid cracking unit also had a positive effect.

In 2018, emissions at Unipetrol RPA stabilized, their decrease being the result of investment projects and consistent compliance with operational discipline, resulting in fewer failures.

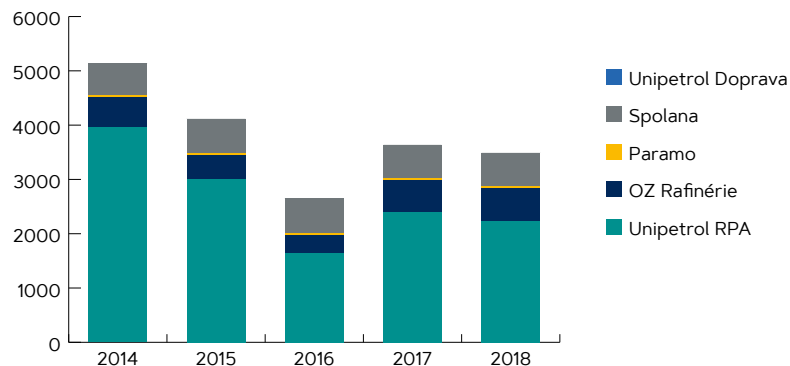
At Paramo, only natural gas was burned in the boiler houses at HS Pardubice and HS Kolín, which in the long-term led to low emissions of sulphur dioxide, solid pollutants and volatile organic compounds. Low emissions from combustion processes have been achieved despite increased oil processing at Kolín. This result was also because of eliminating air pollution sources during fuel operation and limiting the total power input of the boiler room at HS Pardubice, where only the K1 boiler was operated, the K2 boiler was used as a backup source and the K3 boiler was disconnected. In order to meet the new emission limits that will be in effect from 1 January 2020, the existing burners have been replaced with new low-emission burners at the HS Kolín boiler house. The same will be done for RDH (hydrogenate re-distillation) in 2019.

SO₂ emissions decreased at SPOLANA as a result of less coal burnt and more use of the gas boiler during production.

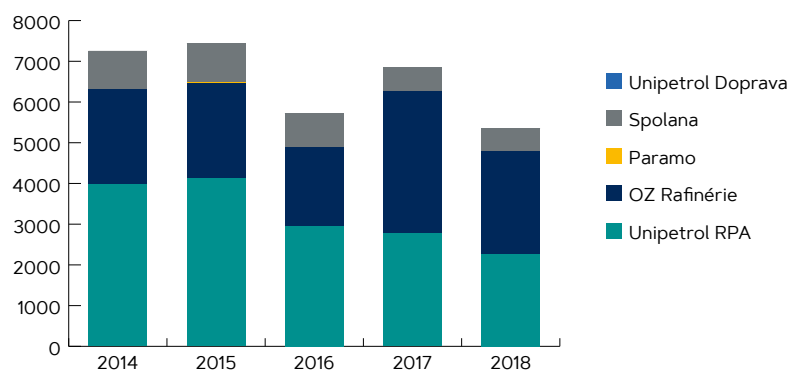
At Unipetrol Doprava, the quantity of VOC used at the cleaning and steaming station for road tankers and rail tankers is around one tonne per year.

Pollutants released into the air by the Group (t/year)

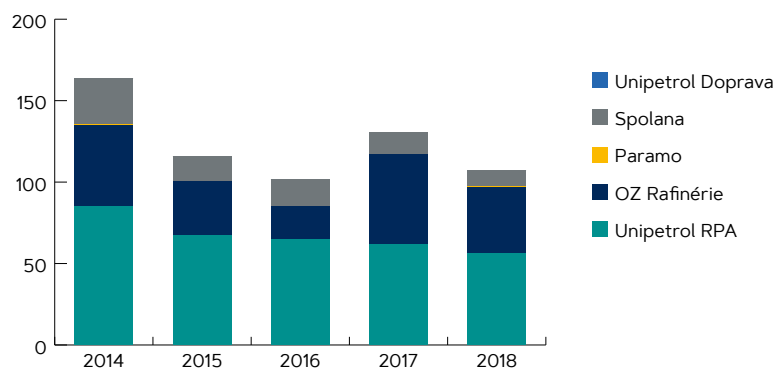
Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	NO _x	3958	3007	1648	2400	2237
OZ Rafinérie	NO _x	563	440	322	582	599
Paramo	NO _x	27	28	36	39	42
Spolana	NO _x	586	642	644	616	609
Unipetrol Doprava	NO _x	0	0	0	0	0
Unipetrol Group	NO _x	5134	4117	2650	3637	3487



Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	SO ₂	3973	4124	2959	2771	2261
OZ Rafinérie	SO ₂	2334	2342	1934	3490	2534
Paramo	SO ₂	0.4	3.0	2.7	1.3	0.4
Spolana	SO ₂	948	978	811	585	557
Unipetrol Doprava	SO ₂	0	0	0	0	0
Unipetrol Group		7255	7447	5707	6847	5352

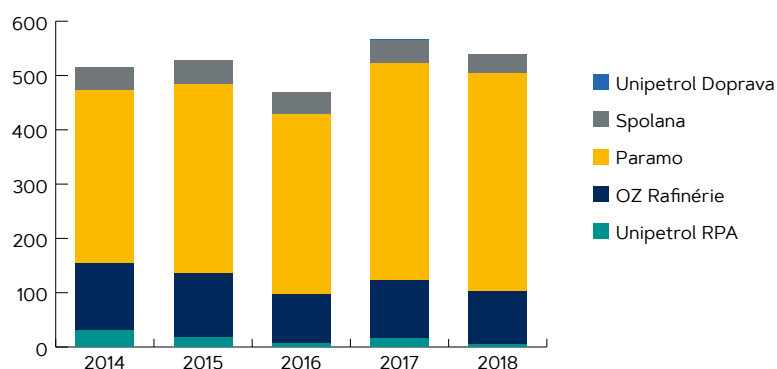


Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	Dust	85	67	65	62	56
OZ Rafinérie	Dust	50	33	20	55	41
Paramo	Dust	0.4	0.4	0.4	0.5	0.5
Spolana	Dust	28	15	16	13	10
Unipetrol Doprava	Dust	0	0	0	0	0
Unipetrol Group		163	115	101	131	108



Company	Indicator	2014	2015	2016	2017	2018
Unipetrol RPA	VOC	31	18	7	15	5
OZ Rafinérie	VOC	124	117	90	107	97
Paramo	VOC ¹⁾	318	349	332	400	402
Spolana	VOC ¹⁾	42	44	40	43	35
Unipetrol Doprava	VOC	1.1	1.0	1.3	1.1	0.9
Unipetrol Group	VOC	516	529	470	566	540

¹⁾ 90 % are fugitive emissions that are reported only on the basis of solvent purchases in a given calendar year.



11.4 CO₂ emissions and emission allowances trading

Regulation of carbon dioxide emissions under the EU scheme for carbon dioxide emission allowances trading (EU ETS).

In the third trading period of 2013–2020, the number of monitored CO₂ sources of emissions significantly increased, and the methods for calculating, monitoring and reporting CO₂ sources of emissions changed. Calculating freely allocated emission allowances has also undergone an important change.

Allowance allocation to Unipetrol Group companies under the 2013–2020 National Allocation Plan and actual CO₂ emissions in 2013–2017

Allocation of allowances (thousand pcs) Real emissions (kt/year)	Unipetrol RPA	OZ Rafinérie ²⁾	Paramo	Spolana	Unipetrol Group
Total allocation for the 2013–2020 period	10 159 ¹⁾	6 494	445	1051	17 333
2013: Actual CO ₂ emissions	3 062	772	47	232	4 113
2014: Actual CO ₂ emissions	3 138	877	37	251	4 303
2015: Actual CO ₂ emissions	2 841	888	36	239	4 004
2016: Actual CO ₂ emissions	2 491	678	37	233	3 439
2017: Actual CO ₂ emissions	3 324	954	42	207	4 527
2018: Actual CO ₂ emissions	3 210	880	43	204	4 337

¹⁾In the 2013–2020 period, the amount of greenhouse gas emissions included in the EU ETS increased significantly. The allocation may see further amendments as a result of changes in operating machinery.

²⁾In 2017, Unipetrol RPA and Česká rafinérská were merged. Up to 31 December 2018, the refineries were registered and kept as the Rafinérie registered branches.

According to the calculated emissions for 2018, the allocated annual amount of allowances at Unipetrol RPA, including refinery units, covered approximately 48 % of annual emissions. 2019 allowances were used to cover the 2018 allowance deficit, and the remaining allowances were purchased.

In November 2018, the Paramo allowance surplus was sold to Unipetrol RPA. In 2018, CO₂ emissions increased slightly. Given the gradual increase of input raw material processing, this trend may also be taken into account for the future.

The decrease in CO₂ emissions in 2016 reported by Česká rafinérská was a consequence of limited operation at the Kralupy refinery and the planned shutdown of the Litvínov refinery. Because the steam cracker unit was used less in 2016, Unipetrol RPA's freely allocated allowances for 2017 were partially reduced. Because the urea production plant was decommissioned, free allocation of Unipetrol RPA's allowances was partially reduced in 2018, however was again increased because steam cracker operation was renewed in 2018.

At Spolana, CO₂ emissions were reduced as a result of lower coal consumption.

11.5 Other greenhouse gases

All companies of the Group operate production facilities in accordance with the Earth's ozone layer protection requirements and in line with existing international agreements. Cooling media have been replaced by more environmentally friendly refills over the past few years.

12. Management of primary raw materials and energy sources

To conserve primary raw materials and energy sources, the Unipetrol Group follows the principles of sustainable development and focuses its basic strategies on innovative approaches that lead to minimizing energy and material use, promoting continuous improvement in environmental performance and increasing energy efficiency. Companies of the Group that have successfully implemented energy management system certification in accordance with ISO 50001 have committed themselves to these principles under the framework of the Energy Policy. At some of the Group's companies, energy audits have been conducted in order to achieve additional energy savings.

At Unipetrol RPA, investment projects are being prepared and implemented on an ongoing basis in order to reduce consumption of energy and raw materials and production of waste and waste water. In our investment and optimization projects, energy and water consumption are key parameters in their evaluation and approval by investment commissions. Unipetrol RPA focuses its projects on implementing modern and efficient equipment.

A key petrochemical project in 2018 and the following years will be the construction, commencement and stabilization of a new energy source for the steam cracker. The new gas heating plant will significantly contribute to efficient use of fuel and also notably reduce emissions of discharged substances in compliance with the law. The feedstock quality optimization project is also continuing, and together with additional development of the APC system, will significantly contribute to reducing energy consumption.

Development of the Advanced Process Control (APC) is also ongoing. In 2018, the APC system was stabilized at Kralupy's fluid catalytic cracking (FCC) unit. Other key projects were prepared under the APC for the T700 heating plant and the 2304 HRPO/AGO (atmospheric gas oil hydrogenation) unit. The APC for the T700 will focus on optimizing the combustion process. Use of brown coal energy will be improved, and combustion efficiency will be monitored.

Unipetrol RPA focuses on reducing energy losses from pipelines. A top priority programme for 2017–2019 called Zero Tolerance saw more than CZK 63 million invested in 2018. Ongoing activities include extensive replacement and monitoring of pipeline insulation, removal of leaks and loose seals and systematic verification condensate trap operation. These activities are common to all Unipetrol Group sites, namely Litvínov, Kralupy nad Vltavou, Neratovice, Pardubice and Kolín.

Important future activities include defining strategies for operating energy sources, their sizes and compliance with all legislation. In 2017, construction of a new steam cracker boiler plant commenced. The new facility will significantly contribute to meeting all legal requirements and contribute to improving the efficiency of steam consumed during the production of monomers. Completion is scheduled for April 2021. The key task for 2019 will be completion of the Feasibility Study, which was tendered in 2018, for a new energy source at Chempark Záluží.

For optimum consumption and energy use, completion of the EnMS Visual MESA project will be an important step. This system will enable optimum use of energy and other media across the entire Chempark Záluží site, including energy generation at the T700 and consumption by all production units, i.e. refinery, petrochemical and agrochemical plants. In 2018, data was forwarded to the contractor and creation of the model commenced, to be completed in 2019.

In refinery processes, great emphasis is placed on optimum use of capacity, which positively affects energy use during production. In this area, projects aimed at increasing the reliability of equipment are continuing. Economic evaluation of using laser flue gas analysis in projects that optimize furnace combustion is underway. This process will make it possible to use fuel optimally and improve control of emissions. An extensive modernization programme is also underway with the aim of deeper crude oil processing in favour of lighter products, especially fuel. A pre-flash column project is currently underway and will significantly impact energy consumption while allowing more efficient crude oil processing. A project for vacuum distillation is also being prepared to improve use of the feed oil. Feasibility studies are conducted before these projects are implemented and completed.

The Benzina registered branch focuses mainly on water, electricity and gas consumption at petrol stations. Since 2017, energy consumption has been monitored regularly. Since 2018, media consumption meters (electricity, water, gas) have been installed on an ongoing basis at selected petrol stations under the Energy Management System. The aim of the project is to evaluate and optimize energy consumption at individual petrol stations through online monitoring. Based on this data,

opportunities for reducing consumption will be compared and evaluated. The use of electricity is also being optimized at petrol stations through the introduction of low-energy appliances and technologies (LEDs).

At the Polymer Institute Brno registered branch, energy use has been reduced by installing new equipment. In 2018, a new tube extruder, foil blower and twin-screw extruder were installed. Replacement of the Visko single-screw extruder was postponed to January 2019. Also in 2019, a building in the middle of the site will be thermally insulated, which includes replacing old windows with new, plastic windows. The main project of 2019 in the city of Brno is the reconstruction and conversion of the steam pipeline into a hot water pipeline. This will also affect our plant in the replacement of the old finned tube radiators for new heating elements and expected energy savings in the transition from a steam pipeline to a hot water pipeline at the plant.

In order to reduce energy use, Paramo has been implementing long-term projects that reduce steam consumption for heating products and pumping routes (using heat from its own steam produced by an incinerator to operate the asphalt plant). Sections of steam pipeline routes are being optimized (reducing heat loss in pipelines) and thermal insulation is being installed at selected tanks. Much attention is also being given to insulation under the Zero Tolerance project by detecting steam leaks and missing or damaged insulation.

In order to reduce electricity consumption, new feed pumps were installed at Paramo (at the boiler plant in Kolín in 2016 and at the boiler plant in Pardubice in 2018).

Several investments were made at Spolana in 2018 to increase energy efficiency and economy. The primary energy sources subject to improvement are mainly heat, electricity, compressed air, nitrogen and water. Replacing compressed air compressors with more efficient units has significantly reduced power consumption. Spolana also improved the distribution of compressed air. Last year, after exploring the network in the commercial zone and at Chemopark, redundant distribution pipelines were shut down. In order to reduce the use of heat energy, Spolana completed preparing investments in 2018 into new energy sources and heating non-production facilities. These investments are currently underway and will significantly reduce CO₂ and NO_x emissions, reduce the amount of heat generated for its own use and chemical technology operations, and reduce losses in a historically oversized network that is either being optimized or decommissioned. The flow-through cooling of turbo-generators using water from the Labe River will also be decommissioned.

Also in relation to these investments, Spolana launched a comprehensive revitalization of the steam pipeline insulation at the plants processing materials for a study into assessing energy, aiming to achieve perfect condition of steam route insulation in terms of heat loss by 2022.

As part of modernizing the sulphuric acid facility at the caprolactam plant, preparation of the sulphuric acid reconstruction concept is ongoing. Reduced consumption of primary resources, especially water and natural gas, is expected once the plant is put into operation.

In energy management, Unipetrol Doprava focuses mainly on optimizing fuel consumption, electricity and steam for technology and heating.

An important aspect is modernizing the locomotive park, which is part of the company's strategy. In 2017, the purchase of seven new locomotives (diesel and electric) was approved, three of which were taken over in the same year: two for diesel power transmission and one for electric power transmission. Four additional locomotives were handed over in 2018: two Bizon diesel locomotives and two Vectron multi-system electric locomotives. In addition to the expected fuel and electricity savings, the new locomotives also help reduce emissions.

Technological equipment and procedures are also being modified on an ongoing basis. Since 2016, sidings have been technically modified, e.g. photocells have been installed at the lighting towers of the siding yard. Controls for heating building No. 6419 were installed. In 2019, improvements planned for the Unipetrol RPA Litvínov site include replacing the siding lighting with energy-saving luminaires, changing the heating system, installing heating control and thermally insulating buildings. The time needed for steaming and cleaning railcars has been reduced, and the plan also includes completing insulation of the steam station's technology.

Water consumption by the Group (mil. m³/year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	18	17	14	18	18
OZ Rafinérie Kralupy	3	3	2	2	2
Paramo	0.3	0.3	0.3	0.4	0.4
Spolana	19	19	16	16	16
Unipetrol Group	40	39	32	36	36

The positive trend is mainly because of specific energy consumption as a result of using production capacities. This always has a positive impact on the use of energy and raw materials, and it is therefore more appropriate to monitor the energy consumption coefficient in tonnes of oil equivalent (TOE) per tonne of production per year:

Energy consumption by the Group (thous.TJ/year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	8	9	8	9	9
OZ Rafinérie Kralupy	17	17	14	17	17
Paramo	1	1	1	1	1
Spolana	4	4	3	3	3
Unipetrol Group	30	31	26	30	30

Specific energy consumption by the Group (TOE/t of production per year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	0.145	0.189	0.291	0.141	0.143
OZ Rafinérie Litvínov	0.043	0.047	0.050	0.045	0.045
OZ Rafinérie Kralupy	0.055	0.054	0.062	0.050	0.057
Paramo HS Pardubice	0.124	0.133	0.147	0.135	0.123
Paramo HS Kolín	0.184	0.225	0.240	0.290	0.317
Spolana	0.176	0.165	0.156	0.147	0.117

13. Environmental investments

Environmental investments are defined as investment projects directly triggered by environmental legislation and are closely linked to the application of integrated pollution prevention in practice or have a significant, positive environmental impact.

In 2018, the following environmental investments were made in the group.

OZ Rafinérie

Investment projects in environmental protection valued at CZK 38.07 million were implemented by OZ Rafinérie. The most important were:

- ▶ Reconstruction of sewerage and sloping systems at the Litvínov refinery.
- ▶ Reconstruction of the restraint system on track 69.
- ▶ Repair of storage tanks storage yards at the Kralupy refinery.
- ▶ Completion of installation and renewal of continuous emission measurements at both refineries.

Unipetrol RPA

Unipetrol RPA implemented investment projects in environmental protection valued at CZK 458 264 million. The most important were:

- ▶ Ongoing installation of DeSOx technology at the T700 heating plant.
- ▶ Ongoing installation of DeNOx technology at the T700 heating plant.
- ▶ Measures to meet the vanadium limit in wastewater.
- ▶ Construction of a new steam cracker boiler plant.

A number of other measures with a positive impact on the environment were implemented as a part of the operational costs for maintaining equipment.

Paramo

Paramo implemented investment projects in environmental protection valued at CZK 33.5 million. The most important were:

- ▶ Revitalization of the fuel terminal – construction of a new recuperation unit and additive unit (HS Pardubice – fuel operation).
- ▶ Installation of internal floating roofs in MEK and toluene storage tanks – BAT requirement (HS Kolín, RP operation – paraffin solvent).
- ▶ Installation of low-emission burners for the K9 boiler (HS Kolín, energetics operation).

Spolana

Spolana implemented investment projects in environmental protection valued at CZK 186.4 million. The most important were:

- ▶ Commencement of construction of a new energy centre.
- ▶ Ongoing reduction of trichlorethylene emissions .
- ▶ Replacement of the sieve belt filter press at the wastewater treatment plant.

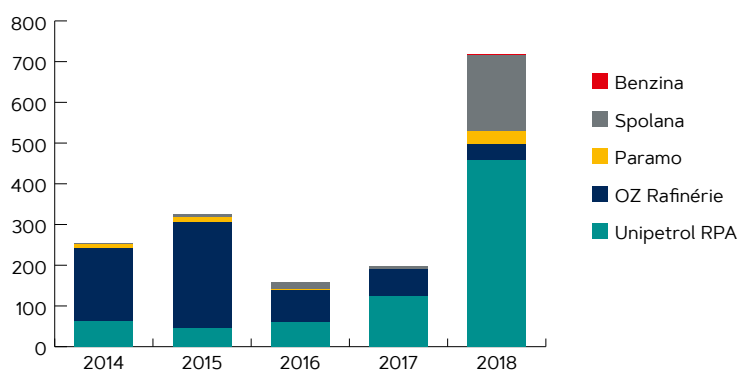
OZ Benzina

Benzina implemented investment projects in environmental protection valued at CZK 1688 thousand. The investments mainly focused on:

- ▶ New water connections and abolishing individual drinking water supplies.
- ▶ Sewer connections.
- ▶ Reconstruction of the wastewater treatment plant.
- ▶ Installation of water treatment plants.

Investment costs for environmental protection at the Group (mil. CZK/year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	63	46	59	124	458
OZ Rafinérie	177	258	81	64	38
Paramo	10	14	2	0.4	34
Spolana	4	7	16	8	186
Benzina	2	1	0.3	0.1	2
Unipetrol Group	256	326	158	196	718



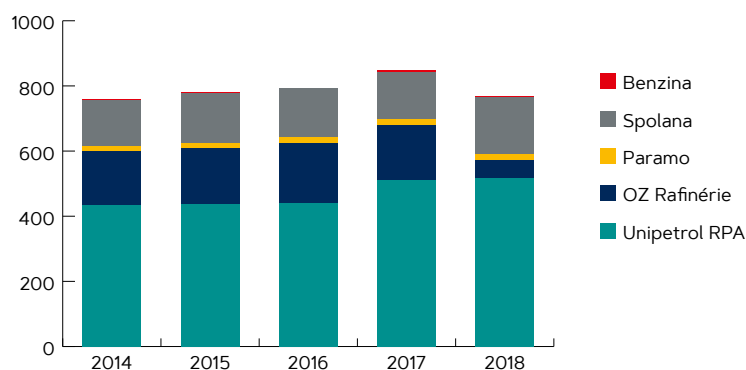
14. Environmental operating costs

Costs associated with operating installations for air protection, wastewater treatment, waste management, environmental management systems, emissions monitoring, evaluation of environmental impact (EIA process), integrated pollution prevention and other related environmental activities are called environmental operating costs.

Recently installed modern technologies with a high degree of raw material conversion, reduced amounts of waste and high energy efficiency have resulted in an overall reduction in environmental operating costs compared to the previous decade. Total environmental operating costs have more or less been stable in the past decade.

Environmental protection operating costs at the Group (CZK mil. per year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	433	437	439	512	516
OZ Rafinérie	168	170	187	168	55
Paramo	13	18	17	17	20
Spolana	143	153	148	145	172
Benzina	3	3	3	4	4
Unipetrol Group	760	781	794	846	767

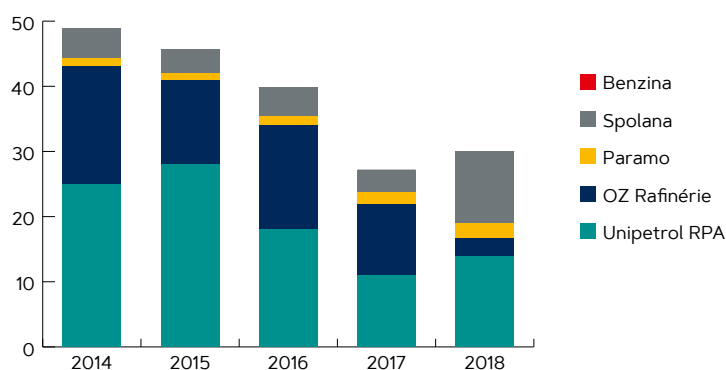


15. Total costs for environmental protection

The total environmental protection costs for the Unipetrol Group include environmental investment costs, environmental protection operating costs, costs for repairing previous environmental damage, expenses for air pollution, wastewater discharge, waste disposal in landfill, provisioning for landfill reclamation, and compensation for damage to forests by pollution.

Fees and payments for environmental pollution at the Group in 2014–2018 (mil. CZK/year)

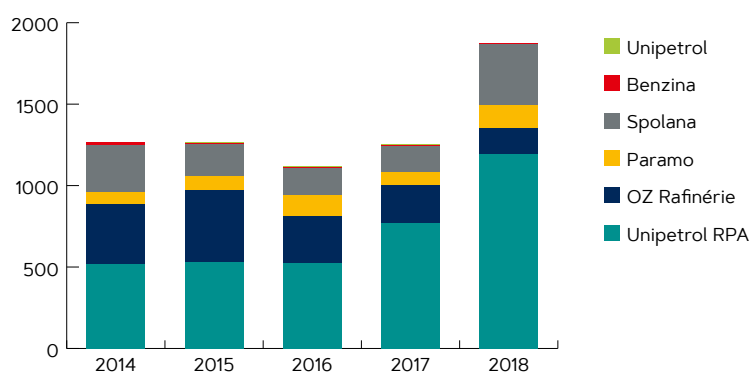
Year	2014	2015	2016	2017	2018
Unipetrol RPA	25	28	18	11	14
OZ Rafinérie	18	13	16	11	3
Paramo	1	1	2	2	2
Spolana	5	4	4	4	11
Benzina	0	0	0	0	0
Unipetrol Group	49	46	40	28	30



The total costs for environmental protection at the group in 2018 reached approximately CZK 1.9 billion.

Total investment costs for environmental protection at the Group (mil. CZK/year)

Year	2014	2015	2016	2017	2018
Unipetrol RPA	521	532	524	771	1192
OZ Rafinérie	363	442	284	233	158
Paramo	79	80	129	79	146
Spolana	285	197	170	158	370
Benzina	18	10	7	9	7
Unipetrol	1	1	1	1	1
Unipetrol Group	1267	1262	1115	1251	1874



16. Remediating old environmental burdens

Based on the decision of the Government of the Czech Republic related to privatization, Unipetrol Group companies entered into the following agreements to solve ecological commitments sustained before privatization (Ecological Agreement):

- 1) Ecological Agreement No. 14/94, as amended by amendment No. 3 on 25 January 2005, concluded with Unipetrol.
- 2) Ecological Agreement No. 32/94, as amended by amendment No. 1 on 4 July 2001, concluded with Unipetrol.
- 3) Ecological Agreement No. 39/94, as amended by amendment No. 2 on 4 July 2001, concluded with Paramo.
- 4) Ecological Agreement No. 58/94, as amended by amendment No. 4 on 27 June 2016, concluded with Paramo.
- 5) Ecological Agreement No. 184/97, as amended by amendment No. 7 on 18 January 2007, concluded with Benzina.
- 6) Ecological Agreement No. 33/94, including amendments No.1 to No. 4, concluded with Spolana.

Under these Ecological Agreements, remedial works are at different stages of completion. **A current overview is given in the table below:**

Litvínov

Location	Current status	Next stage
Růžodol lagoons	Post-remediation monitoring after oil sludge was removed. All recovered sludge is used for energy.	Remediation project documentation for contractor selection, contractor selection.
The works complex	Contamination clouds Nos. 1, 2c, 3, 6 and 10 remediated and handed over. Remedial works have not been completed on contamination clouds Nos. 2, 4, 5, 7, 9 and 11.	Selection of remediation contractor for KM 2a, 11 and 7b, completion of remediation, commencement of post-remedial monitoring.
Uhlodehta landfill	Remediation project documentation.	Updated risk analysis.
Solid industrial waste landfill	Remediation project documentation.	Updated risk analysis.
Lime sludge landfill II.	Remediation project documentation.	Updated risk analysis.
Lime sludge landfill at the siding	Remediation project documentation.	Updated risk analysis.
Ash dump south foreland	Partially re-cultivated. Preparing remediation of areas not yet remediated.	Updated risk analysis.
Fly-ash dump	Partially re-cultivated. Preparing remediation of areas not yet remediated.	Preparatory work and subsequent implementation of the project— construction and operation of the hydraulic protection system at the K4a landfill. Updated risk analysis.
Contamination cloud No. 13	Protective remediation pumping conducted at the expense of the acquirer (UNIPETROL, a.s.).	Remediation feasibility study.
'Nová voda střed' reservoir pumping	Protective remediation pumping.	Selection of a new contractor and subsequent protective remediation pumping.
Růžodol drain pumping Contamination cloud No.12	Shutdown of protective remediation pumping.	Selection of a new contractor and commencement of protective remediation pumping.

Kralupy nad Vltavou

Location	Current status	Next stage
The works complex	Updated risk analysis (AAR).	Final survey and remediation project documentation.
Nelahozeves landfill	Remediation implementation and project documentation.	Remediation of pollution.
The works complex — contamination cloud E	Checking remediation project documentation for contractor selection.	Remediation of pollution.
"Gudrony" (acid tar waste from crude oil refining)	Feasibility study.	Remediation of pollution.

Benzina [Distribution Warehouses (DW) and main PS (Petrol Stations)]

Location	Current status	Next stage
ČS Ostrava-Muglinov	Remediation project documentation for contractor selection.	Remediation of pollution.
Točník DW	Remediation project documentation for contractor selection.	Remediation of pollution.
Liberec-Rochlice DW	Remediation project documentation for contractor selection.	Protective remediation pumping. Remediation of pollution.
Šumperk DW	Final survey and processing remediation project documentation.	Remediation of pollution.
Bartošovice DW	Remediation of pollution.	Post-remediation monitoring.
Pardubice Chrudimská PS	Remediation of pollution.	Post-remediation monitoring.
Přelouč PS	Remediation of pollution.	Post-remediation monitoring.
Nový Bohumín DW	Remediation of pollution.	Post-remediation monitoring.

Paramo Pardubice

Location	Current status	Next stage
Časy	Protective remediation pumping and monitoring, remediation project documentation for contractor selection.	Contractor selection and Remediation of pollution.
Hlavečník	Protective pumping of precipitation water.	Protective pumping of precipitation water.
Surroundings of the main works — LIDL	Contract ended in May 2018.	
Surroundings of the main works – U Trojice	Remedial pumping of bores and drains and monitoring.	Remedial pumping and monitoring.
The main works — stage 1A	Demolition of building structures and tanks, securing building statics and technological structures, extraction of contaminated soils.	Remediation of pollution.
Nová Ves	Processing of post-remedial monitoring project.	Contractor selection and launch of post-remedial monitoring.

Paramo Kolín

Location	Current status	Next stage
The works complex and sludge lagoons	Processing of final remediation report.	Updated risk analysis.

Spolana

Location	Current status	Next stage
Toxic waste landfill remediation	Remediation completed.	Remediation completed.
Remediation of objects contaminated with dioxins	Remediation completed.	Remediation completed.
Remediation of old amalgam electrolysis	Remediation completed.	Post-remediation monitoring.
Ground water remediation at petrochemistry	Tender procedure cancelled.	Decisive update of risk analysis, new decision, project.
'Starý závod' (Old works) Ground water remediation	Feasibility Study.	Decisive update of risk analysis, new decision, project.
Remediation of mercury contamination along the Labe riverbanks	Call for tender.	Remediation of pollution.

Summary of Financial Guarantees of the Ministry of Finance of the Czech Republic and Drawing of Funds by the Unipetrol Group as at 31. December 2018 (mil. CZK incl. VAT)

	Unipetrol RPA Litvínov	Unipetrol RPA Kralupy	Paramo Kolín	Paramo Pardubice	Benzina registered branch	Spolana	Group total
Financial guarantees of the MF of CR	6 012.0	4 243.9	1 906.6	1 241.5	1 349.2	8 159.1	22 912.3
Costs paid by the MF of CR in 2018	29.9	0.6	2.4	88.1	12.7	2.2	136.0
Costs paid by the MF of CR from commencement of work	4 285.6	52.4	1 900.2	633.2	497.7	5 598.9	12 968.0
Expected costs of future work	2 482.6	787.9	0.8	2 669.3	901.7	2 552.3	9 401.6
Total (estimated) cost of remediation	6 768.2	840.3	1 901.0	3 302.5	1 399.4	8 158.2	22 369.6

17. Chemical safety

All of the Group's companies manufacture or use chemicals and mixtures in accordance with the applicable Chemical Act and Regulation (EC) No. 1907/2006 (REACH). They classify their marketed chemical products in accordance with Regulation (EC) No. 1272/2008 (CLP), and for those with hazardous properties, they process safety data sheets, which are then provided free of charge to all customers. In accordance with the REACH regulation, the safety data sheets of manufactured and purchased hazardous chemicals and mixtures are available to all employees at Unipetrol RPA via the intranet computer network. The CASES system for maintaining records of chemicals and updating safety data sheets is currently being introduced. For now, it is available to staff in trial mode.

The Group concentrates on ongoing communication in the supply and demand chain in order to implement measures to protect employee health and the environment when hazardous chemicals are used directly or contained in mixtures. It monitors and applies any changes because of updated processes associated with registering and classifying chemical substances and updates these changes in its safety data sheets.

All of the Group's companies continuously monitor the handling of chemical substances and mixtures, from raw materials to finished products, and ensure compliance with applicable laws. The companies conduct internal and external testing and subsequently issue legal statements specifying the use of selected products, for example, when they are in contact with food or drinking water or used for medical purposes, etc. Through established customer services, the companies provide detailed information about the characteristics of the products in relation to their specific use.

The Group's companies are subject to international inspection by the UN Organization for the Prohibition of Chemical Weapons (OPCW), which promotes and verifies compliance with the Chemical Weapons Convention. All previous verifications carried out by government authorities and international inspections at the Group's companies have shown full observance of the Convention. An international inspection by the OPCW took place at the Litvínov refinery on 4 and 5 June 2018. No serious deficiencies were found during the inspection.

In accordance with the current legislation, PARAMO implemented the necessary registration of substances and isolated intermediates in due course. In 2017, registered substances and intermediates were updated in cooperation with the CONCAWE organization according to the REACH regulation, including a complete update of the Lubricating Oil Substances dossier, of which PARAMO is the main registrant in the EU market. At the end of 2017, an inspection by ČIŽP OI HK and KHS was conducted at Paramo to examine fulfilment of the obligations set out in the exposure scenarios and the obligations arising from the Chemicals Act and REACH regulation. The inspection found no legal errors.

In August 2014, Spolana applied under Article 56 of Regulation (EC) No 1907/2006 REACH to the European Chemicals Agency (ECHA) for authorization to use trichlorethylene in the production of caprolactam. The authorization was granted and is valid until 21 April 2020. In order to ensure the use of trichlorethylene after this date, an application for a review of the authorization was submitted in 2018 to the European Chemicals Agency under REACH. The decision is expected at the end of 2019.

The Group's companies continuously comply with the REACH regulation requirement that specifies keeping the registration dossier up to date and must therefore ensure that their IUCLID software application, which processes the technical documentation for both registered and notified substances, complies with the latest version published on the ECHA website.

18. Occupational safety and health protection and fire protection

The Unipetrol Group considers occupational health and safety and fire protection one of the fundamental values of its policy.

In 2017, systematic steps were taken to apply a unified system of occupational health and safety management and fire protection at the Unipetrol Group. The result is a standardized approach to recently introduced processes and a plan to gradually unify the safety requirements applied in each company of the Group. An integral part of these steps is standardizing the requirements in the entire PKN Orlen Group. In 2017, a unified system of requirements was applied in relation to controlling risks during excavation work, investigating incidents, work at heights and in confined spaces.

The Group has established a unified system for monitoring selected performance indicators, defining the target values for 2018. Monitoring selected performance indicators in process safety continued (according to ANSI/API Recommended Practice 754, Process Safety Performance Indicators for the Refining and Petrochemical Industries). In 2018, only six events were classified as a Tier 1 Process Safety Event (T-1 PSE) across the Group. The Unipetrol Group met target values, and the resulting values are listed in the table overview below.

In 2018, Spolana commenced reconstructing selected social facilities. Reconstruction will continue in 2019.

Unipetrol Group	2018 Target	Resulting value
TRR: Number of accidents with subsequent absence per million hours worked	1.8	1.35
PSE – Tier 1: Number of process events per million hours worked	1.0	0.37

19. Prevention and personal protective equipment

Prevention in occupational safety is ensured by employees qualified in risk assessment who conduct inspections at individual workplaces. Personal protective equipment is issued to company employees according to the identified hazards and assessment of possible risks to life and health.

20. Quality of the work environment

According to work categories, work conditions at Unipetrol Group companies are regularly checked by measuring the environmental factors at work, especially the exposure of employees to noise, chemicals and dust.

21. Health care and prevention

Unipetrol Group companies have concluded agreements with physicians to provide occupational health services. Preventive medical examinations are conducted in compliance with the relevant laws and internal regulations.

22. Prevention of major accidents

The Group's companies undertake to prevent major accidents in the long term. The basis for preventing accidents is reliable and trouble-free operation of production facilities. The facilities are designed, operated, inspected and maintained in accordance with Czech law and internal regulations. Some of the regulations contain requirements beyond the law and are based on the best practices of the Group's companies.

Production plants are equipped with control systems that signal deviations from standard operating parameters. Some plants performing hazardous operations are equipped with automatic unit shutdown systems in the event that specified operating parameters are exceeded. Depending on the type of hazardous substances, plants are equipped with modern detection systems (detection of flames, smoke or release of hazardous substances) connected to signalling panels in their control rooms and the operation centres of the fire rescue service. Stationary and semi-stationary extinguishing systems and fire monitors are installed at the production plants.

Regular internal audits of safety and accident risk assessment are conducted at all companies of the Group. Government technical supervisory bodies also conduct regular external audits and inspections. These bodies include, for example, Czech Environmental Inspectorate (ČIŽP), Regional Labour Inspectorate (OIP), Fire Rescue Brigade (HZS), Regional Hygiene Station (KHS), professional organizations of the CR, insurance brokers, insurers and foreign reinsurers. The recommendations and findings of these audits are incorporated into the respective implementation plans.

An important component of preventing serious accidents is the regular training and education of employees. The functionality of the serious accident prevention system is tested throughout the year through simulations of both emergency and crisis situations. Testing is conducted by operation plant employees in cooperation with its own and external operational divisions. They include emergency exercises at individual plants and comprehensive emergency exercises performed in cooperation with companies managing the industrial premises or businesses in their neighbourhood. The emergency exercises at the companies of the Unipetrol Group are carried out according to a clear plan. The exercises serve as practical training for employees in order to adequately respond to potential disasters. Their aim is also to verify the strength of emergency plans and procedures and improve the knowledge of all participants. If an exercise reveals deficiencies, sufficient corrective measures are adopted from the exercise's evaluation, including deadlines for removing these deficiencies and designating personnel responsible for implementing measures.

Risk management of major accidents includes liability insurance in accordance with Act No. 224/2015 Coll., on the prevention of major accidents, as amended.

The degree of safety at the Group's companies is significantly affected by new investments into production facilities. Potential operational risks are addressed already at the project stage through generally accepted methods of major accident risk assessment. Each new facility is always equipped with the most modern safety systems that meet the legal requirements of the Czech Republic and the European Union.

Production Group companies have their own fire rescue services, with top-level equipment and training that enables them to carry out highly specialized intervention in accidents associated with the release of hazardous substances. The Kralupy refinery unit employs the services of the Synthos Kralupy nad Vltavou fire departments.

Most manufacturing companies in the Group have a "B" classification, which means they are subject to the strictest controls stipulated in the Act 224/2015 Coll., on the prevention of major accidents, as amended, in the handling of selected hazardous chemical substances/mixtures.

Overview of the categorization of companies into groups according to Act No. 224/2015, as amended, and the condition identified in the Safety Report of 31 December 2018.

Company	Object	Groups	Safety report
Unipetrol RPA	Unipetrol RPA	B	Approved by the decision of the Regional Authority of the Ústí Region.
	Litvínov refinery unit	B	Became a part of Unipetrol RPA in Litvínov, update by 30 June 2019, then submitted for approval to the Regional Authority of the Ústí Region.
	Kralupy refinery unit	B	The update is undergoing approval at the Regional Authority of the Ústí Region.
	Benzina registered branch	-	Not subject to Act No. 224/2015 Coll. Reports on non-inclusion according to the law were updated and submitted to the relevant Regional Authorities.
Unipetrol Doprava	Operating department, Pardubice facility, Semtín, Railway facility Pardubice	B	Approved by the decision of the Regional Authority of the Ústí Region.
	Operating department, Pardubice facility, Semtín, Railway siding Semtín	B	Approved by the decision of the Regional Authority of the Ústí Region.
	Operating department, Railway siding Litvínov	B	Approved by the decision of the Regional Authority of the Ústí Region.
	Operating department, Kralupy facility, Neratovice, Railway facility Kralupy	B	Approved by the decision of the Regional Authority of the Central Bohemia Region.
	Operating department, Kralupy facility, Neratovice, Railway facility Neratovice	B	Approved by the decision of the Regional Authority of the Central Bohemia Region.
Paramo	Cost Centre Kolín	B	The update is undergoing approval at the Regional Authority of the Pardubice Region.
	Kolín Cost Centre	-	Not subject to Act No. 224/2015 Coll. Report on non-inclusion according to the Act was updated and submitted to the Regional Authority.
Spolana	Spolana	B	The update is undergoing approval at the Regional Authority of the Central Bohemia Region.

23. Serious accidents

In 2018, an emergency occurred at one of the objects of the Unipetrol Group subject to Act No. 224/2015 Coll., on the prevention of major accidents, and was subsequently categorized as a major accident. On 22 March 2018, petrol vapours that had accumulated inside and outside the 4701 ST4/1 tank exploded at the Kralupy Refinery Road Distribution Centre. Despite the fact that, according to the results of investigation by the Czech Police, the primary cause of this emergency was not an operator error, Unipetrol RPA implemented measures to eliminate similar events in the future.

Other operational accidents that occurred during the year were contained by employees or through intervention by the company's fire brigades. These situations were adequately rectified, and measures were taken to prevent them from recurring. The effects of small operating accidents did not spread beyond the territories of the Group's companies.

24. Transportation Information and Accident System TRINS

The Transport Information and Accident System (TRINS) is a system that helps deal with accidents when hazardous substances are transported. TRINS was created by the Association of Chemical Industry of the Czech Republic under the Responsible Care programme in 1996 in an agreement between the Association and the Headquarters of the Fire and Rescue Service of the CR and has been incorporated as one of the support schemes in the Integrated Rescue System of the CR. TRINS is similar, for example, to the British CHEMSAFE system, or to the German TUIS, which served as models in creating TRINS. Similar systems have also been implemented in the Slovak Republic (DINS) and Hungary (VERIK) and have been operating for a long time in many other EU countries.

TRINS centres (in cooperation with the Fire and Rescue Services of the Czech Republic) provide urgent consultations concerning information about chemical substances and products, their safe transportation and storage, and practical experience with the handling and disposal of hazardous materials and emergency situations associated with their transport. TRINS centres also provide practical assistance in eliminating emergency situations, including removing subsequent environmental damage.

Currently, 22 TRINS regional centres are active in the Czech Republic. The centres are provided by 35 companies operating in the chemical industry. Unipetrol Group companies are founding members of TRINS. Unipetrol RPA also acts as the system's national coordination centre.

The names of Unipetrol Group companies (UNIPETROL, a.s., UNIPETROL RPA, s.r.o., UNIPETROL RPA – BENZINA, registered branch, UNIPETROL RPA – RAFINÉRIE, registered branch, UNIPETROL RPA – POLYMERE INSTITUTE BRNO, registered branch, UNIPETROL DOPRAVA, s.r.o., PARAMO, a.s., SPOLANA s.r.o.) are also given in this report in simplified form (Unipetrol, Unipetrol RPA, Benzina / Benzina registered branch, Polymer Institute Brno / PIB, Unipetrol Doprava, Paramo, Spolana).

List of abbreviations used:

ACHV – Chemical production site

APC – Adaptive Process Control

BAT – Best Available Techniques

BČOV 0150 – biological wastewater treatment plant

BSK₅ – biochemical oxygen demand

BZ – Safety report

CASEC – Chemical Abstract Substances Evidence Centre

CEFIC – The European Chemical Industry Council

CHSK – Chemical oxygen demand
CLP – Classification, Labelling and Packaging of Substances and Mixtures – European Parliament Regulation
CO₂ – carbon dioxide
CONCAWE – CONservation of Clean Air and Water in Europe
ČIŽP (OI) – CEI – Czech Environmental Inspectorate (Regional Inspectorate)
ČOV – Wastewater Treatment Plant
ČS – Petrol station
DeSOx – technology for reducing sulphur oxide emissions
DeNOx – technology for reducing nitrogen oxide emissions
DS – Distribution warehouse
EIA – Environmental Impact Assessment
ECHA – European Chemicals Agency
EJ – Steam cracker
EnMS – Energy Management System
EMS – Environmental Management System
EU ETS – EU Emissions trading System
FCC – Fluid Catalytic Cracking Unit
FM – Facility management
HOPV – Hydrogeological protection of groundwater
HRPO – hydrogenation of gas oil
HS – Cost Centre
HSMS – Health and Safety Management System
HZS – Fire Rescue Brigade
ICCA – International Council of Chemical Associations
IP – Integrated permit
IPPC – Integrated pollution Prevention and Control
ISCC – International Sustainability & Carbon Certification
KHS – Regional Hygiene Station
LPG – Liquefied Petroleum Gas
MESA – Management of Energy System Application
MEK – Methyl ethyl ketone
MF ČR – Ministry of Finance of the Czech Republic
NL – suspended solids
NO_x – nitrogen oxides
OIP – Regional Labour Inspectorate
OPCW - Organisation for the Prohibition of Chemical Weapons
OZ – Registered branch
QMS – Quality Management System
PVC – Polyvinyl chloride
REACH – Registration, Evaluation and Authorization of Chemicals – EU regulation
RC – Responsible Care
RP – Paraffin solvent
SCHP ČR – Association of Chemical Industry of the Czech Republic
SO₂ – Sulphur dioxide
SQAS – Safety and Quality Assessment System

TOE – tonne of oil equivalent

TRINS – Transportation information and accident system

VISUAL MESA – name of application (Management of Energy System Application)

VOC – volatile organic compound

ZERO – software application for central records of inspections and accidents at Unipetrol RPA

ŽP – Environment