



SAFETY REPORT OF UNIPETROL RPA, s.r.o.

Information to Employees According to Article (4) § 11 Act No 59/2006 of Czech Act Coll.

Approved by:

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1 Introduction

SAFETY REPORT (updated edition) was elaborated within time period 2014 - 2015 by UNIPETROL SERVICES, s.r.o. in cooperation with employees of UNIPETROL RPA, s.r.o. and expert company TLP, spol. s r.o., which processed Assessment of Major-Accident Hazards for UNIPETROL RPA, s.r.o., and which is an inseparable part of the safety documents. Updated Safety Report was brought up to date in compliance with Act No 59/2006 of Czech Act Coll. (Major Hazard Accident Prevention Act) and conclusions made within the Report on Safety Report Review, which shall be done each five years. The update particularly included but was not limited to the new Assessment of Major-Accident Hazards, implementation of organizational changes within company, changes to internal and external regulations applied on the operator of an establishment and modification of Human Factor Reliability Analysis according to requirements set by Methodology ZP 24/2007 from Ministry of Environment.

The **Safety Report was approved** by decision of Regional Authority of Ústí Region with specified **effectivity since March 5, 2016**. On the Assessment of Major-Accident Hazards internationally recognized method was applied (see Safety Report). All information and data are presented within the Safety Report in the simplest way (pure texts, tables, schemes, pictures, maps, references to Annexes). All information and data compiled in the Safety Report were split into public part and part protected by statute of "specific facts" according to Crisis Act (Act No 240/2000 of Czech Act Coll.). The part of Safety Report marked "specific facts" lays down detail data on technologies, which could be misused by unauthorized personnel, and which could not be made public in order to protect UNIPETROL RPA, s.r.o. interests.

This information according to article (4) § 11 of Act No 59/2006 of Czech Act Coll., replaces Information according to article (4) § 11 of Act No 59/2006 of Czech Act Coll., from April 1, 2008.

2 Safety Report Summary

The Safety Report is split into six parts, and each part is focused on specific information required by Ministry of Environment Decree on Details of Major Accident Prevention System. As the most important part of the Safety Report we could consider Part III – **Assessment of Major-accident Hazards**, which selects major-accident hazards within the company, analyses probability of major accidents on selected major-accident hazards, assesses their consequences and sets their acceptability with regard to the societal risk.

Part I of the Safety Report (hereinafter "SR") sets basic information on the establishment, data on carried out activities within the establishment and employees.

Part II of the SR states description and informational data about our company. This part is split into two parts, of which one part is facilitated in the regime of "specific facts" and is not made public. Part II focuses on division of the establishment, states list and quantity of dangerous substances present in the establishment/installations and details on used technologies (specific facts), and states activities and processes connected with major-accident hazards. Part II also specifies internally and externally provided services and information on the environment.

Part III of the SR describes major-accident hazards and their selection for Quantitative Risk Analysis (QRA). The selection was carried out according to the Guidelines for Quantitative Risk Assessment - CPR 18E (Purple Book). Used method takes into account characteristics and quantity of a dangerous substance present in an installation as well as the process conditions. On this framework Major-accident Hazards were selected (individual installations/equipment) for the Quantitative Risk Assessment (QRA). **QRA was applied on 19 Major-accident Hazards**, as cited in the Table 1: Selected Major-accident Hazards.

Description of selected Major-accident Hazards and their parameters and other relevant information is done in the article No 6.5 of the Assessment of Major-accident Hazards, which is set in more detail in the Annex II marked as "specific facts".

Part III of the Safety Report describes procedures and outcomes concerning identification of the initial events, scenarios of major accidents, their causes and consequences and selection of the representative scenarios. Representative initial Events for the purposes of the Assessment of Major-accident Hazards were chosen in compliance with recommendation in expert literature CPR 18E (Purple Book).

Table 1: Selected Major-accident Hazards

| ZR | Zdroj rizika – Umístěná látka |
|------------|--|
| 2/01, 02 | Loading of Tank Cars (20 t) – Ethylene |
| 2/04 | Tank TK101 (Ethylene) |
| 2/08 | Tank TK301 – C ₄ fraction |
| 2/09 | Tank TK401 – LPG |
| 2/12+3b/82 | Pipeline DN 200 from tank TK 201 to tank H01 – Propylene |
| 2/13+3b/73 | Pipeline DN 150 from tank H01 to tank TK 201 – Propylene |
| 2/14+3b/78 | Pipeline DN 250 from tank TK 101 to PE and building No 7422 (Ethylene) |
| 3a/34 | Purifying Ethylene – Ethylene |
| 3a/36 | Reactor C4001 – Ethylene |
| 3a/94 | RTC - Loading – Ammonia |
| 3b/04 | RTC - Unloading – Propylene |
| 3b/05 | RTC - Unloading – Butene |
| 3b/06 | RTC - Unloading – LPG |
| 3c/02 | Splitting Row 1a – C ₂ fraction |
| 3c/04 | Splitting of C ₃ fraction a) – Propylene |
| 3c/06 | Propylene Circle a) – Propylene |
| 3c/17–28 | Pipeline DN 300/350 from C303 – to ČeR DN 300/350 – Hydrogen Sulfide |
| 3c/30–36 | Pipeline DN 250 from building No 7422 to Ethylbenzene Production Unit – Ethylene |
| VH/06 | Pressure Drum (1x) – Chlorine |

Part III of the SR describes as well assessment of consequences concerning selected major accident scenarios including criteria used for numerical expression of such consequences. Effects, version 4.0 and 8.1.8, as a software tool was used for consequence modelling (product of TNO Company from the Netherlands) as well as procedures set by expert literature. From the calculations, which were **focused on assessment of consequences to life, consequences of blast wave and consequences of thermal radiation outside the company's premises is clear**, that the most hazardous areas concerning the selected major-accident hazards are: **Low Temperature Tank Farm, Ethylene Production Unit, RTC loaded with ammonia and a pressure drum with chlorine in Dolní Jiřetín (Water Supply Section)**.

Consequences to livestock (no consequences due to industrial character of the surroundings) and environment are described as well. For the purposes of Assessment of Consequences to Environment **representative substances were chosen from substances dangerous to environment** – which could potentially damage environment (Hazard Category E1 and E2 in compliance with Directive (EC) No 1272/2008 = CLP). Here are the representatives:

- Ammonia – RTC loaded with ammonia ZR 3a/94.
- Naphthalene Concentrate – tank H07, building No 8826 – ZR 3b/71.
- Pyrolysis Fuel Oil – tanks FB 1402 A/B, building No 9811 – ZR 3b/15.

According to the carried out assessment of the major-accident hazards to environment is clear, that **they do not represent a major or serious hazard to environment**.

Within conclusion of the Part III of the SR Human Reliability Analysis is done in connection with selected Major-accident Hazards. This part is protected by the institute of „specific facts “. Positions ensuring operation of selected Major-accident Hazards are analysed.

From the calculations made within the Part III of the SR it is clear, that **selected Major-accident Hazards within UNIPETROL RPA, s.r.o., which were analysed, exhibit acceptable societal risk.**

Part IV of the SR is focused on description of Major Accident Prevention System. Set preventive measures, duties and responsibilities of employees and head employees are contained:

- in Job Descriptions according to the internal Directive 920 (Description of Job Functions),
- in Work Rules, Rules of Organization and other organizational and management internal regulations, in contracts on services,
- operational documents (Operational Manuals, Handling Rules, Work Procedures) elaborated according to internal Directive 842 (Operational and Technical Regulations), Directive 845 (Handling Rules) and Directive 824 (Working, Laboratory and Calibration Procedures),
- emergency documents (emergency cards, emergency plans and evacuation plans, emergency instructions) according to the Directive 430 (Accident Prevention and Crisis Management) and Directive 434 (Production Units Emergency Plans),
- in organizational and management standards concerning occupational health and safety according to the Directive 401 (Basic Regulation in the Field of Occupational Health and Safety and Safety of Technical Equipment), Fire Safety according to the Directive 403 (Fire Safety Basic Regulation) and major accident prevention according to the Directive 405 (Basic Regulation for the Field of Major Accident Prevention and Crisis Management).

Duties and responsibilities of contractor employees and visitors in those fields cited hereinbefore are set in Directive 402 (Safety Rules in Chempark Záluží), which is available on intranet and company internet web presentation.

Part V of the SR describes **preventive safety measures** for elimination or mitigation of major accidents.

Safety devices/equipment/installations with regard to major-accident prevention include but are not limited to:

- control systems including back-up systems and locking devices,
- systems of fire and explosion protection,
- equipment limiting loss of primary containment of dangerous substances,
- alarm systems including gas detection systems,
- emergency pits and adequate pumping devices,
- remotely controlled valves, safety valves, membranes, backflow preventers,
- level, temperature and pressure measuring and control, inert atmosphere,
- field burners,
- CCTV,
- access control system at site.

Except of safety devices providing accident prevention other measures are implemented decreasing the probability of major accident occurrence and limiting consequences include but are not limited to:

- regulations framework,
- measures to protect tank farms with dangerous substances,
- quick shut-down and other emergency procedures,
- preventive maintenance and repair of equipment,
- safety zone around the company premises.

Fire safety devices include e.g. smoke flaps, fireproof or smoke-tight doors, fire or evacuation lifts, emergency lighting, safety and alarm devices, systems and elements increasing fire resistance of load bearing structures or fire retardants, water and steam curtains, fireproof screens and plugs etc.

The most important intervention team for intervention and consequence management of major accidents is Company Fire Brigade (UNIPETROL RPA, s.r.o. Fire Brigade), which is furnished for all types of accidents and incidents. It is a professional fire brigade with needed equipment and non-stop operation 24/7. Control room of the fire brigade includes also civil protection panel, if needed instructions are handed over to intervention unit of a security agency.

Part V of the SR describes in detail warning and alarm systems. Concerning communication devices, dispatching system MODIS A30, is mentioned. Concerning warning and alarm system especially „Warning and Alarm System of Petrochemical Site is mentioned “ (SVV) for the case of hydrocarbons leakage/release and Warning and Alarm System at the borders of the Zone of Emergency Planning. Since 2005 the premises are equipped with an alarm sound system (intelligent horns), where direct input of spoken word in real time is enabled in order to hand over supplemental instructions and information. The alarm sound system has three control stations (company’s dispatching, Fire Brigade control room, control room of product pipelines). All those systems provide alarm and warning not only to employees, but also to public within the Zone of Emergency Planning (e.g. road, tram and railway traffic around the premises). These systems significantly mitigate consequences of possible major accidents as information to interested/potentially affected are handed over in a timely manner and avoid entrance of the Zone of Emergency Planning after accident and rise of alarm. Such devices are periodically tested.

3 Conclusion

Overall, from the point of view of the operator of an establishment with dangerous substances and with regard to content of the Safety Report, it could be stated, that implemented integrated management system (including Major Accident Prevention System), carried out Assessment of Major-accident Hazards, set and implemented preventive measures, ensured intervention powers and devices are adequate to identified Major-accident Hazards and assessment of societal risk acceptability have significant influence on reduction of probability of major accidents occurrence and in case of their occurrence on mitigation of their consequences.

An inseparable part of Major Accident Prevention System forms each employee of the company. Each employee ensures accomplishment of the system by the following way. She/he matches qualification criteria, has appropriate competence and medical fitness, follows set valid procedures and obeys valid internal regulations, in case of indisposition or detected non-compliance notifies them, carries out work in a safe manner, insists on safe work performance from his/her colleagues and contractors.

Major Accident Prevention System accomplishment means employees protection as well as protection of the company including company’s reputation!