HAZARDOUS CHEMICAL SUBSTANCES AND PREPARATIONS – TYPES, QUANTITIES AND CURRENT STATUS OF THEIR STORAGE IN THE REPUBLIC OF BULGARIA

Hristova K.G.
Vladimirov L.

University of Ruse
Vladimirov L., e–mail: lvvladimirov@uni–use.bg

Abstract: To be defined the basic definitions and existing regulations in Republic of Bulgaria under the Seveso II Directive 96/82/EC and Regulation (EC) 1907/2006 of the European Parliament in the field of hazardous chemical substances and preparations to prohibit or restrict their marketing and use and to prevent major accidents and limit their consequences thereof. To clarify the current situation regarding the type, quantity and pattern of storage of hazardous chemical substances and preparations.

Keywords: environment, hazardous chemical substances, safety.

Major accidents accompany the development of the chemical industry worldwide. In the seventies of the XX– th century in Europe occurred a number of major accidents such as that in Fliksbaro city, Britain in 1974 and in the town of Seveso, Italy in 1976. In the emergency in Fliksbaro, an explosion in a plant for the production of synthetic chemical fibers causes the death of 28 workers, the destruction of the plant and significant off–site damage. In the town of Seveso in a breakdown as a result of an out of control chemical reaction in a pharamaceutical company, there has been a large–scale environmental pollution by dioxins.

A major accident in a factory for the manufacture of carbide in Bhopal, India in 1984 causes the deaths of 2,500 people after the release of methyl isocyanate. In November 1986 in Basel, Switzerland a breakdown leads to catastrophic pollution of the Rhine with mercury, organophosphate pesticides and other chemicals.

For the purpose of prevention as early as in 1982 was adopted Directive 82/501/EES first – known as the Seveso I Directive (Council Directive 82/501/EEC on the major–accident hazards of certain industrial activities, OJ No L 230 of 5 August 1982).

On 9 December 1996 was adopted a new Directive 96/82/EC on the control of major accident hazards – known as the Seveso II Directive.

On Decembre 16, 2003 Directive 96/82/EC was complemented by Directive 2003/105/EC (Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC).

The requirements of the Seveso II Directive have been transposed into Bulgarian legislation in Law on Environmental Protection (LEP) – Chapter Seven: " Prevention and limitation of industrial pollution", Section I: "Prevention of major accidents" and „Ordinance on the prevention of major accidents involving dangerous substances and limitation of their consequences" (State Gazette, issue 39/12.05.2006).

"REACH" is the short name of the Regulation (EC) № 1907/2006 of the European Parliament and of the Council from 18 December 2006 concerning registration, evaluation, authorisation and restriction of the chemical substances, which comes into force on June 1, 2007 and replaces a number of European directives and regulations, creating a single system for managing chemical substances.

Any substance that poses a threat to human health and / or environment may be restricted for use. Restrictions can range from a total ban to a ban on distribution to the mass consumer and be applied to any substance, including those for which no registration is required. This part of REACH is " inherited " from the provisions of Directive 76/769/EEC relating to the restrictions on the marketing and use of certain dangerous substances and preparations.

According to the Glossary for REACH, " substance" means a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any supplement necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition, and " preparation" means a mixture or solution composed of two or more substances.

According to the requirements of the Regulation, potentially dangerous industrial sites must develop "Risk Assessment" and "Safety Report". The latter contains a safety assessment of the substance, made out for all substances which must be registered if they are produced or imported in quantities of 1 tonnes or more per year.The reporting requirements for chemical safety are described in Annex I of the Regulation. The information includes data relating to the hazard of the substance, the exposure arising from the manufacture or import, the identified uses of the substance, operational conditions and arrangements for risk management, applied or recommended to the users down the chain, which have to be taken into account.

In article 1 of the existing in the Republic of Bulgaria “Ordinance on hazardous chemical substances and preparations”, subject to prohibition or restrictions on the marketing and use (change of the title in State Newspaper, issue 62 from 2004), in force from 01.01.2003, are determined the hazardous chemical substances and preparations, whose trading and use are prohibited or restricted to protect human health and the environment. In an annex is a list of 54 hazardous chemical substances and preparations: carcinogenic substances – category 1 and 2; mutagenic substances – category 1 and 2; substances toxic to reproduction – category 1 and 2; aromatic amines.

Companies are responsible for gathering information on the properties and uses of substances which they manufacture or import in quantities of one or more than one tonne per year. According the hazard category they fall into: enterprises with high risk potential (EHRP) or enterprises with low risk potential (ELRP).

The list below summarizes the types of toxic, inflammable and explosive materials that are produced and / or stored on the territory of the Republic of Bulgaria in quantities above 1 tonne. It is assumed that this is the amount of dangerous chemical that in case of technological disaster creates an outbreak of mass destruction. The summerised data is from the checks made in 2010 by heads of the district departments of “Civil Defence” in the enterprises with high risk potential.

List of manufactured and/or stored toxic, inflammable and/or explosive materials in the territory of the Republic of Bulgaria in quantities above 1 ton:

1. Ammonia. 2. Acetone. 3. Nitric acid. 4. Ammonium Chilena – stabilized. 5. Arsenic. 6. Ammonite. 7. Barium chloride. 8. Butanol. 9. Bitumen. 10. Carbon disulfide. 11. Hydrogen peroxide. 12. Primer, paint, turpentine. 13. Glycerin. 14. Dichloroethane. 15. Ethyl alcohol. 16. Ethyl acetate. 17. Isopropanol. 18. Isocyanate. 19. Calcium carbide. 20. Calcium hydroxide. 21. Calcium oxide. 22. Mineral oils. 23. Petroleum. 24. Sodium hydroxide. 25. Sodium cyanide. 26. Sodium hydrosulphite. 27. Acetic acid. 28. Oleum. 29. Natural Gas. 30. Plastics and rubber. 31. Picrates. 32. Propane. 33. Propane–butane. 34. Polyurethane. 35. Polyol. 36. Polypropylene glycol methyl ether. 37. Polyamide. 38. PVC–plasticizer. 39. Spirit. 40. Hydrochloric acid. 41. Sulfuric acid. 42. Sulfur dioxide. 43. Toluene. 44. Trinitro–toluene. 45. Liquid fuels. 46. Phosphoric acid. 47. Phenol–formaldehyde resin. 48. Hydrofluoric acid. 49. Ferric chloride–liquid,40%. 50. Phthalic anhydride. 51. Hexane. 52. Chlorine. 53. Chlorinated paraffin. 54. Bleach.

Aggregated data from conducted in 2008–2011, the checks at the level of Regional offices "Civil Defence" in enterprises with high risk potential, located on the territory of 12 of the 28 districts are presented in Table 1.

Table 1. Aggregated data from enterprises with high risk potential, located on the territory of 12 of the 28 districts

Municipality	Name of substance	Quantity of substances, ton	Hazard Class	Type of Hazard	Method of Storage	Date of last inspection
Burgas	Ammonia	641,5	Tox./Fire haz./Expl.	Toxic gases	Barrels	10.07.2008
	Chlorine	8	– ‖ –	– ‖ –	Barrels, steel bottles	10.07.2008
	Acetone	20	– ‖ –	– ‖ –	Tanks – 18 m^3	03.12.2008
	Trinitrate toluene	270	– ‖ –	– ‖ –	Polyethylene bags, paper	29.10.2008
	Gasoline	122/ 158 m3	– ‖ –	– ‖ –	cartons Tanks	24.10.2008
	Diesel	570/ 195 м3	– ‖ –	– ‖ –	Tanks	11.09.2008
Varna	Ammonia	811	Tox./Fire haz./Expl.	Toxic gases	Refrigeration installa	24.04.2010
	Petroleum products	23830	Fire haz./Expl.	Hydrocarbon, CO, CO2 Arse nic oxides	tions; spheres Tanks	16.09.2010
	Arsenic	6,725	Toxic		Containers	23.03.2010
Veliko Tarnovo	Ammonia	33	Tox./Fire haz./Expl.	Toxic gases	Refrigeration installa	20.04.2010
	Chlorine	16	– ‖ –	– ‖ –	tions	20.04.2010
	Sulfur dioxide	100	Toxic	– ‖ –	Installa	20.04.2010
	Hydrochloric	152,8	– ‖ –	– ‖ –	tions Storage	22.06.2010

	acid	728,5	– ‖ –		Storages;	09.06.2010
	Sulfuric acid	510	Fire hazard	– ‖ –	installa tions	28.05.2009
	Polythene				Containers;	
	Acetylene				Installa	
	paints and			– ‖ –	tions	
	thinners	30	– ‖ –	– ‖ –	Special	10.06.2009
	n–Hexane	954	Toxic		storage	04.06.2009
	Sodium			– ‖ –		
	hydroxide	400	– ‖ –		No data	28.06.2010
	Carbon				Storages	
	disulfide				Under water	
Gabrovo	Acetone	158	Tox./Fire hazard	Toxic gases	Metal and plastic bottles	05.05.2010
	n–Hexane	30	– ‖ –	– ‖ –	Metal tank	06.10.2010
	Sulfuric acid	14,3	– ‖ –	– ‖ –	Tanks	18.11.2010
	Hydrochloric acid	10,9	– ‖ –	– ‖ –	– ‖ –	21.07.2010
Kardzhali	Sodium cyanide	50	Toxic	Hydrogen cyani	Metal bottles	19.10.2010
	Chlorine	2,5	– ‖ –	de	Metal tanks	25.11.2010
				Chlorine	Steel bottles	
	Sulfuric acid	2600	– ‖ –		Tanks	17.11.2010
				Sulfur oxides		
	Oleum	40	– ‖ –	– ‖ –	Volume tanks	17.11.2010
Lovech	Chlorine	6,4	Toxic	Chlorine, hydro	Metal tanks	29.09.2010
	Ammonia	8	Tox./Expl.	gen chlori de	Refrigeration	07.09.2010
				Toxic gases	installations	
	Liquid fuels	105	Tox./Fire haz./Expl.	– ‖ –	Metal tanks	2008
	Natural Gas	45000	– ‖ –	– ‖ –	– ‖ –	22.10.2010
Montana	Ammonia	22,5	Tox./Fire haz./Expl.	Chlorine, hydrogen chlori	Refrigeration installa tions	08.06.2010
	Chlorine	1,4	– ‖ –	de		10.06.2010
				Sulfur oxides	Barrels x	
	Sulfuric acid	38	– ‖ –	Toxic gases	400кg	04.06.2010
				– ‖ –	Tanks	
	Hydrochloric acid	8,4	Corrosive	– ‖ –	– ‖ –	08.08.2010
	Sodium hydroxide	8,3	– ‖ –		Sacks	08.06.2010

Pleven	Ammonia	28	Corrosive/toxic	Toxic gases	Refrigeration	22.06.2010
				– ‖ –	installa	
	Sulfuric acid	63,8	– ‖ –	– ‖ –	tions	28.06.2010
	Hydrochloric	30	– ‖ –		Tanks	03.09.2010
	acid			– ‖ –	– ‖ –	
	Acetic acid	9	– ‖ –	– ‖ –		03.09.2010
	Hexane	9,7/120м3	Explosive		– ‖ –	15.09.2010
		8,6/20		– ‖ –	– ‖ –	
	Sodium	м3	Corrosive			28.06.2010
	hydroxide	2205		– ‖ –	– ‖ –	
	Liquid fuels		Tox./Fire			28.06.2010
			haz./Expl.		– ‖ –	
Stara	Ammonia	60	Corrosive/toxic	Toxic gases	Tanks	11.02.2011
Zagora					Refrigeration	
				– ‖ –	installa	
	Sulfuric acid	295	– ‖ –	– ‖ –	tions	27.05.2011
	Hexane	26,7	Explosive	– ‖ –	Tanks	04.05.2011
	n–Hexane	11,2	– ‖ –	– ‖ –	Metal tanks	04.05.2011
	Sodium	143	Corrosive		– ‖ –	10.05.2011
	hydroxide				– ‖ –	
Rousse	Acetone	47,2	Tox./Fire	Toxic gases	Tanks	09.2010
			hazard	– ‖ –		
	Ammonia	18,5		– ‖ –	Tanks	09.2010
	Sodium	94,65	Corrosive/toxic		Refrigeration	09.2010
	hydroxide		Corrosive	– ‖ –	installa	
	Propane	105			tions	09.2010
	butane		Fire hazard		Tanks	
Smolyan	Acetone	6	Tox./fire	Toxic gases	Tanks	30.12.2010
			hazard	– ‖ –		
	Ammonia	3			Tanks	30.12.2010
			Corrosive/toxic		Refrigeration	
				– ‖ –	installa	
	Sodium	2,6	Toxic		tions	30.12.2010
	cyanide				Storage	
Shumen	Ammonia	30,6	Corrosive/toxic	Toxic gases	Tanks	23.09.2010
					Refrigera	
			Toxic	– ‖ –	tion installa	
	Chlorine	2,3	Corrosive/toxic	– ‖ –	tions	30.09.2010
	Hydrochloric	9			Barrels	17.09.2010
	acid		Fire hazard	– ‖ –	Metal tank	
	Propane	33,7				17.09.2010
	butane		Tox./fire	– ‖ –	Metal tanks	
	Nitric acid	22	hazard	– ‖ –		02.06.2010
	n–Hexane	50	Explosive		Metal tanks	29.09.2010
			Corrosive/toxic	– ‖ –	Tanks and	
	Oleum	52			installation	02.06.2010
					Metal tank	

Conclusion

1. Hazardous chemical substances and mixtures are carriers of risk to humans and the environment, especially in technological disaster.

2. In the Republic of Bulgaria hazardous industrial sites that produce and / or store hazardous chemical substances and mixtures in quantities over 1 tonne, creating a risk of an outbreak of mass destruction in technological disaster.

3. In the Republic of Bulgaria there and observe regulations under the Seveso II Directive 96/82/EC and Regulation (EC) 1907/2006 of the European Parliament in the field of hazardous chemical substances and mixtures.

References

1. Regulation (EC) 1907/2006 of the European Parliament and of the Council of 18.12.2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

2. Act on Protection against Harmful Impact of Chemical Substances and mixtures (State Gazette, issue 10/ 4.02.2000). 3. Law of environmental protection (Promulgated SG. 91 of 25.09.2002).

4. Ordinance to prevent major accidents involving dangerous substances and limit their consequences (State Gazette, issue 39/12.05.2006).

5. Ordinance on the manner of chemical substances and mixtures (State Gazette, issue 43/7.06.2011).