

3 Component task 3 - Setting up a database on potential water hazards and drawing up an assessment logarithm

Using an acquisition matrix with the aid of which 15 enterprises in each of the three countries concerned were examined, local experts developed a model of potentially hazardous industrial activities to obtain an overview of and evaluate the existing hazard potential in the Neman/Nemunas catchment area. The Water Risk Index Method 1 was used to conduct the assessment. Despite the fact that this method only provides a rough estimate of the accident potential, it is a useful tool for categorising the risk potential and identifying enterprises with a high risk potential. Using the criterion “WRI > 5” to define enterprises with a high risk potential, Belarus identified one large enterprise, Lithuania six and the Russian Federation (Kaliningrad Region) two enterprises as having a high risk potential. The purpose of identifying enterprises posing potential water hazards is to draw up regional alarm plans and permanently to improve accident prevention in the Neman/Nemunas catchment area.

The WRI Method is a useful tool for estimating the hazard potential with a view to establishing priorities. This method was developed by the German Federal Environmental Agency and kindly provided for the project.

It should be borne in mind that this method is designed only to provide a rough estimate of the hazard potential posed exclusively by substances hazardous to water. It does not measure the scope or standard of the security and preventive measures and is based on the worst-case scenario, i.e., a major accident is possible despite preventive measures.

An analysis of the safety precautions (see Annex 6) shows that general and organisational aspects of accident prevention such as fire safety instructions and availability of trained personnel and equipment for emergencies, emergency response plans (internal and external emergency plans, fire emergency plans, plans for improving fire safety and accident prevention) have been addressed and implemented in an acceptable manner. Technical accident prevention measures (e.g., technical safety precautions such as overfill protection, flood retention space/ catchwater spaces, cutoff systems) are not always satisfactory. A more detailed examination using the checklist method developed by the Federal Environmental Agency (<http://www.umweltbundesamt.de/anlagen/Checklistenmethode/index.html>) or some other suitable method is recommended.

Selected results are shown in the following tables.

Table 3: Enterprises in the Republic of Belarus (selected data)

¹ The WRI is the decadic logarithm of the sum of the water hazard class 3 equivalent of substances hazardous to water that are permanently present on the enterprise premises.

Location	Enterprise/ installation	Products/ Branch	Endangered by Floods, Flood frequency	height difference to water level	distance in m	river	hazardous substances	hazardous substances (t)	Estimated risk class according WRC	WRC ₃ (kg)	W.R.I.
Grodno	Grodno Asot	car chemicals, Tenside, fertilizers Polyamide - products, Polyethylene, Ammoniac				Neman	car chemicals; Tenside, fertilizers Polyamide -products, Polyethylene, Ammoniac, Carpolactam, Methanol		1,2,3	4064920	6,6
Grodno	Gas filling station PRUP "GrodnoObiGas"	Gas	low 1x in 7-8 a	1/1/1	5700/700/1100	Losvka/ Lososna/ Neman	liquid gas	22775 cbm	0	22775	4,4
Grodno (village Goshka)	GUKPP "GrodnoVodoKanal"	waterworks	medium, 1x in 5a	1/1,5/1,3	200/6800/4200	Losvka/ Lososna/ Neman	Chlorine	9	3	9000	4,0
Grodno	"GrodnoChimVolokno"	chemicals, syntetic fibres	none	9/6,6/6	4200/3300/2000	Losvka/ Lososna/ Neman	Dinil (Diphenyl -(8004-13-5)	80	2	8000	3,9
Volkovysk	Meat Production Kombinat Volkovysk AG	meat	none	2/3,5	1000/ 6500	Volkobyja/ Ross	Ammoniac	50	2	5000	3,7
Grodno	Meat Production Kombinat Grodno AG	meat	none	2,2/5/5	800/ 6200/ 4200	Losvka/ Lososna/ Neman	Ammoniac	40	2	4000	3,6
Lida	"Lakokraska" AG	colors, varnish	none	1,3	2500	Lideja	Phthalsäure-anhydrid, Orthoxylol	100; 20	1, 2	3000	3,5
Lida	"Meat Production Kombinat Lida" AG	food	none	1,1	3000	Lideja	Ammoniac	30	2	3000	3,5
Slonim	"Meat Production Kombinat Slonim" AG	food	none	2	3000	Issa	Ammoniac	30	2	3000	3,5
Lida	Gas filling station PRUP "GrodnoObiGas"	Gas	medium 1x in 5a	0,8	600	Lideja	liquid gas	2300cbm	0	2300	3,4
Grodno	GRUPP "Gronitex"		keine	6,5/6/6	4500/4000/1500	Losvka/ Lososna/ Neman	Chlorine	2	3	2000	3,3
Volkovysk	Bellact AG	milk products, concentrates	low, (1x/10a)	0,75/1,8	400/ 5000	Volkobyja/ Ross	Ammoniac	17,5	2	1750	3,2
Grodno county	CPK "Oktober Grodno"	food	mittel, 1x in 5a	1/0,9/1	9000/2000/4500	Losvka/ Lososna/ Neman	Ammoniac	9	2	900	3,0
Lida	"Brewery Lida" AG	Nahrungsmittel	low, 1x in 10a	1	900	Lideja	Ammoniac	9	2	900	3,0
Grodno	GTO UP Mjasomoltorg	trade of milk and meat	none	7,5/6/6	5000/2600/500	Losvka/ Lososna/ Neman	Ammoniac	7	2	700	2,8
Grodno	Gormolkombinat AG	milk	none				Ammoniac	3	2	300	2,5

Table 4: Enterprises in the Republic of Lithuania (selected data)

Nr	Common data			Endangered by Floods, Flood frequency	height difference to water level	distance in m	river	data of hazard potential			elaboration fo water risk index			
	Location	Enterprise/ installation						Products/ Branch	hazardous substances (t)	date of foundation	Pipelines	waste water treatment	Estimated risk class according WRC	WRC ₃ (%)
1	Jonava	Achema AG, Taurostos Str. 26, LT-5005 Jonava	none	3 m	400	Neris	production of fertilizers	Ammoniac-560000, Sulphuric acid-150, Sodium hydroxide,-230, none conc. nitric acid-1170000	1964; reconst.	existing	existing	2, 1, 1, 1,	67703800	7,8
2	Jonava	GAG „Ave Matroks“, Ioralaukjo Str.1/38, LT-5005 Jonava	none	3 m	1200	Nemunus	trade with petroleum products	benzine - 49990, gasoil-70000, lubrications - 450	2003	existing		3, 2, 1	56995420	7,8
3	Kedainaj	Lukoil Zhiboukju Str.22, LT-5030 Kedainaj	none	2 m	600	Dotnuwele (Newezhis)	trade with petroleum products	Benzine - 38000, Gasoil -5000	2000	existing	existing	3	38000000	7,6
4	Kedainaj	GAG „Lifosa“ Jutkischkio Str. 50, LT-5030 Kedainaj	none	2 m	1200	Newezhis	production of fertilizers	Sulphuric acid - 1068000, Ammoniac - 161920, Phosphoric acid - 387500	1963; reconst.	existing	existing	1, 2, 1	16247000	7,2
5	Elektranj	Letuwos Elektrines Elektrines Str. 21, LT-4061 Elektranj	none		0	Strewa	power station					0	549000	5,7
6	Vevejrai	GAG Agrokonzermias Maurutschju , Kreis Prenjai	none		7500	Iesja (Nemunus)	trade with chemicals	Karbomid, Ammonia nitrate	2003	none	none	1	500000	5,7
7	Kaischadoris	GAG Vilnjaus agrochemia, Pramones Str. 1 Kaischadoris	none	1 m	800/20000	Lomena/ Neris	trade with chemicals	Pesticides - 11, fertilizers - 680	1992	none	none	3,1	17800	4,3
1	Kaunas	Kauno Wandjanis Aukschaitshju Str. 43, LT-3000 Kaunas	none	5 m	1000	Nemunus	Wasser-versorgung und Abwasser-reinigung	BDS-157, N - 61, P -617, Schwermetalle (Zn-665)	1999	none	existing	0	0	
2	Alitus	Dzukios Wandjanis Pulko Str. 75, LT-4580 Alitus	none	45 m	700-900	Nemunus	Wasser-versorgung und Abwasser-reinigung	BDS-41,1, N-32,2, P-6,07, Schwermetalle-2,02	2000; reconst.		existing	0	0	
3	Vilnius	Vilnjaus Wandjanis Dominikonu Str.11, LT-2600 Vilnius	none		0	Neris	Wasser-versorgung und Abwasser-reinigung	BDS, N, P, heavy metals			existing	0	0	
4	Kedainjai	Kedajno Wandjanis Dotnuvos Str. 5, LT-5030 Kedainjai	none	10 m	1500	Newezhis	water works, waste water treatment	BDS-15,N-33,P-5, heavy metals (Cr-0,04, Zn-0,08, Cu-0,01)	1996	none	existing	0	0	
5	Kaunas	GAG Kauno termofikazine elektrine ul. Tajkos 147 LT-3031 Kaynac	none	5 m	5000	Nemunus	power station		1972; reconst.	none	existing	2	0	
6	Kaunas	Kauno Schwara, Lapez	none	10 m	1500	Neris	collecting, transport and recycling of waste	Filtrate -14000 cbm	1973	none		0	0	
7	Kedainjaj	Zabelischkjo zawartinas, Zabelischke, Kreis Kedainjaj	none	12 m	4	Newezhis	collecting, transport and recycling of waste		1990	none	existing	0	0	
8	Schakai	GAG Ljakeschai, Siridai, Kreis Schakai			6	Nemunus	animal husbandry (pigs)	Ammoniac	2003; reconst.		existing	2	0	

Table 5: Enterprises in the Russian Federation

Nr	Location	Enterprise/ installation	Products/ Branch	Endangered by Floods, Flood frequency	height difference to water level	distance in m	river	hazardous substances (t)	WRK (Reihenfolge wie vorher)	Äquivalent der WRK ₃ (kg)	W.R.I.
2	Neman, ul. Podgornaja 3	paper and pulp Kombinat Neman GmbH	paper and pulp	extrem flood 10,2 m above sea level (max in last 20 year - 10,37 m)	Height above sea level of enterprise area 9,3-11,65 m	0- 50 m	Neman	Sulphur 1000, Chlorine – 280, Sulphurous Anhydrit in bisulfittic solution -85,5; Sodium hydroxide (techn.) – 350 (in translation to 100% NaOH) - 4200; liquid ammonia 25% - 100 (in translation to 100% NH3) – 4000; Sulphuric acid (in translation to 100% SO2) - 1,7;	1,2,1,1,2,2	730655	5,9
1	Sowetsk, Zawodskoj per.2	Paper and pulp enterprice Sowjetsk AG	paper and pulp	Während des Frühjahrshochwasser kann der Pegel bis 8 m steigen, was zur Überflutung der ufernahen Werksbereiche führt. Hatsrophale Überschwemmungen wurden noch nicht beobachtet. Der Flussbesitz im Bereich des Werkes eine Tiefe von 4 m und eine Breite von 220 m.	Das Werksgelände befindet sich zwischen 8,5 und 9,5 über dem Meeresspiegel (Baltische System)	0- 50 m, Das Werksgelände erstreckt sich 2,5 km entlang des Flusses.	Neman	H ₂ SO ₃ (in translation to 100% SO ₂) - 1,7; Chlorine – 180; liquid ammonia 25% (in translation to 100% NH ₃) – 80 (20); Sodium hydroxide (techn.) – 350 (in translation to 100% NaOH) – 182,7; Sulphuric acid (in translation to 100% SO ₂) - 1,7;	1,2,2,1,1,1,2,2	622929	5,8