

ANNEX 9-2: NON-RADIOACTIVE WASTE WATERS, TEST PROTOCOLS 2012

TABLE 1: WASTE WATERS – FLOW NO 1, FLOW NO 3 AND FLOW NO 4 OF KOZLODUY NPP

No	Indicator	Unit measure	Individual emission limit (IEL) #	Test results (value, indefiniteness)				
				Flow No 1		Flow No 3		Flow No 4
				Protocols dated February 2012	Protocols dated September 2012	Protocols dated February 2012	Protocols dated September 2012	Protocols dated February 2012
1.	Active reaction pH	-	6,0-8,5	7,42 ± 0,15	8,09 ± 0,02	7,36 ± 0,15	7,95 ± 0,02	7,51 ± 0,15
2.	Non-dissolved substances	mg/dm ³	50	28,0 ± 1,8	13,0 ± 0,8	20,0 ± 1,3	18,0 ± 1,2	30,0 ± 1,9
3.	Chloric ions	mg/dm ³	300	23,4 ± 1,1	23,8 ± 0,8	19,8 ± 0,9	20,1 ± 0,7	23,8 ± 1,1
4.	Iron	mg/dm ³	1,5	0,290 ± 0,04	<0.05			
5.	Total phosphorus (as PO ₄)	mg/dm ³	2	0,534 ± 0,016	0,160 ± 0,008	0,347 ± 0,010	0,113 ± 0,006	1,43 ± 0,04
6.	HPC (bromate)	mgO ₂ /dm ³	70	10,6 ± 0,6	8,60 ± 0,14	7,60 ± 0,43	4,70 ± 0,08	8,50 ± 0,48
7.	BPC ₅	mgO ₂ /dm ³	15	4,45 ± 0,53	3,76 ± 0,34	3,18 ± 0,38		
8.	a – Synthetic surface active substances	mg/dm ³	1	0,059 ± 0,007	0,186 ± 0,015	0,033 ± 0,004	0,375 ± 0,029	0,021 ± 0,002
9.	Total nitrogen	mg/dm ³	15	5,57 ± 0,51	2,14 ± 0,28	3,09 ± 0,28	1,84 ± 0,25	10,1 ± 0,9
10.	Total β activeness	mBq/dm ³	750	105 ± 2,3	106 ± 23	111 ± 23	126 ± 29	164 ± 29
11.	Manganese	mg/dm ³	0,3	0,0126 ± 0,0004		0,0050 ± 0,0004		
12.	Nickel	mg/dm ³	0,2	0,0085 ± 0,0004		0,0058 ± 0,0004		
13.	Zinc	mg/dm ³	5	0,020 ± 0,002		0,013 ± 0,002		
14.	Cobalt	mg/dm ³	0,1	<0,001		<0,001		
15.	Boron	mg/dm ³	not allowed	<0,05	<0,05	<0,05	<0,05	
16.	Petroleum products	mg/dm ³	5	<0,100	0,200 ± 0,018	<0,100	<0,100	0,100 ± 0,015

Key: # - in accordance with Permit No 13750001/ 20.04.2007 for the inflow of waste waters.

Note: The protocols from RL – Vratsa are as follows:

- For flow No 1: No 27-2/01.02.2011, No 602-1/29.09.2011, No 602-2/29.09.2011
- For flow No 3: No 27-1/01.02.2011, No 602-1/29.09.2011, No 602-2/29.09.2011
- For flow No 4: No 27-3/01.02.2011

TABLE 2: WASTE WATERS – HOT CHANNEL 1 AND HOT CHANNEL 2 OF KOZLODUY NPP

No	Indicator	Unit measure	IEL #	Test results (value, indefiniteness)			
				Hot channel 1		Hot channel 2	
				Protocols dated February 2012	Protocols dated September 2012	Protocols dated February 2012	Protocols dated September 2012
1.	Active reaction pH	-	6,0-9,0	7,48 ± 0,15	7,99 ± 0,02	7,38 ± 0,15	8,03 ± 0,02
2.	Non-dissolved substances	mg/dm ³	100	19,0 ± 1,2	13,0 ± 0,8	17,0 ± 1,1	10,0 ± 0,6
3.	Iron	mg/dm ³	5	0,435 ± 0,006	<0,05	0,426 ± 0,006	<0,05
4.	HPC (bromate)	mg/dm ³	100	9,50 ± 0,60	6,00 ± 0,10	7,60 ± 0,45	5,30 ± 0,08
5.	Total nitrogen	mg/dm ³	15	2,43 ± 0,22	1,75 ± 0,23	2,39 ± 0,22	1,68 ± 0,22
6.	Total β activeness	mBq/dm ³	750	110 ± 22	86 ± 18	105 ± 23	90 ± 18
7.	Zinc	mg/dm ³	10	0,010 ± 0,002		0,010 ± 0,002	
8.	Cobalt	mg/dm ³	0,5	<0,001		<0,001	
9.	Boron	mg/dm ³	1	<0,05	<0,05	<0,05	<0,05
10.	Residual chlorine	mg/dm ³	0,1	0,10 ± 0,01	<0,01	0,09 ± 0,01	0,07 ± 0,01
11.	Petroleum products	mg/dm ³	0,5	<0,100	0,100 ± 0,016	0,100 ± 0,015	<0,100

Key: # - in accordance with Permit No 03120003/ 15.12.2007 for inflow of waste waters.

Note: The protocols of RL – Vratsa are as follows: For HF 1: No 28-2/01.02.2011, No 601-1/29.09.2011, No 601-2/29.09.2011; For HF 2: No 28-1/01.02.2011, No 601-1/29.09.2011, No 601-2/29.09.2011

2012

TABLE 3: WASTE WATERS - FLOW NO 1 AND FLOW NO 3 OF KOZLODUY NPP

No	Indicator	Unit measure	IEL #	Test results (value, indefiniteness)			
				Flow No 1		Flow No 3	
				Protocols dated January 2012	Protocols dated October 2012	Protocols dated January 2012	Protocols dated October 2012
1.	Active reaction pH	-	6,0-8,5	7,92 ± 0,02	7,15 ± 0,05	8,22 ± 0,02	7,67 ± 0,05
2.	Non-dissolved substances	mg/dm ³	50	21,0 ± 1,3	20,0 ± 1,3	23,0 ± 1,5	33,0 ± 2,1
3.	Chlorides	mg/dm ³	300	30,5 ± 1,0	33,3 ± 0,8	24,8 ± 0,8	36,1 ± 0,9
4.	Iron - total	mg/dm ³	1,5	0,119 ± 0,010	0,025 ± 0,002		
5.	Total phosphorus (as PO ₄)	mg/dm ³	2	0,653 ± 0,032	0,243 ± 0,011	0,350 ± 0,017	1,04 ± 0,05
6.	HPC	mgO ₂ /dm ³	70	11,6 ± 0,2	9,80 ± 0,32	14,9 ± 0,2	11,8 ± 0,4
7.	BPC ₅	mgO ₂ /dm ³	15	5,00 ± 0,45	3,70 ± 0,38		
8.	Total nitrogen	mg/dm ³	15	5,36 ± 0,72	2,76 ± 0,17	3,17 ± 0,42	4,15 ± 0,25
9.	Anion active detergents	mg/dm ³	1	0,071 ± 0,006	0,041 ± 0,003	<0,040*	0,093 ± 0,007
10.	Petroleum products	mg/dm ³	5	<1,00*	<2,00*	<1,00*	<2,00*
11.	Total β activeness	mBq/dm ³	750	77 ± 22	85 ± 17	84 ± 19	129 ± 24
12.	Boron	mg/dm ³	not allowed	<0,05*	<0,05*	<0,05*	<0,05*
13.	Manganese	mg/dm ³	0,3	0,0196 ± 0,0011	0,0080 ± 0,0004	0,0027 ± 0,0002	0,0015 ± 0,0001
14.	Nickel	mg/dm ³	0,2	0,0012 ± 0,0001	0,0012 ± 0,0001	0,0012 ± 0,0001	0,0013 ± 0,0001
15.	Zinc	mg/dm ³	5	0,0193 ± 0,0011	0,0327 ± 0,0016	0,0136 ± 0,0007	0,0201 ± 0,0011
16.	Cobalt	mg/dm ³	0,1	0,00023 ± 0,00001	0,00020 ± 0,00001	0,00019 ± 0,00001	0,00019 ± 0,00001

Key:

* - lower than the threshold of quantitative definition of the method

- in accordance with the Permit for use of water sites for inflow of waste waters into surface water sites No 13750001/ 20.04.2007

Note: The protocols from RL – Vratsa are as follows: For flow No 1 and flow No 3 :No 06-0014/31.01.2012, No 06-0015/19.01.2012, No 07-0035 / 19.01.2012, No 06-0406/12.10.2012, No 06-0407/05.10.2012, No 07-1135/11.10.2012

TABLE 4: WASTE WATERS – HOT CHANNEL 1 AND HOT CHANNEL 2 OF KOZLODUY NPP

No	Indicator	Unit measure	IEL #	Test results (value, indefiniteness)		
				Hot channel 1		Hot channel 2
				Protocols dated January 2012	Protocols dated October 2012	Protocols dated January 2012
1.	Active reaction pH	-	6,0-9,0	7,73 ± 0,02	7,62 ± 0,05	7,71 ± 0,02
2.	Non-dissolved substances	mg/dm ³	100	13,0 ± 0,8	17,0 ± 1,1	15,0 ± 1,0
3.	Iron - total	mg/dm ³	5	0,139 ± 0,011	0,049 ± 0,003	0,083 ± 0,007
4.	HPC (bromate)	mg/dm ³	100	6,80 ± 0,11	6,50 ± 0,21	6,50 ± 0,10
5.	Total nitrogen	mg/dm ³	15	2,39 ± 0,32	1,03 ± 0,06	2,33 ± 0,31
6.	Total β activeness	mBq/dm ³	750	90 ± 21	111 ± 22	86 ± 25
7.	Zinc	mg/dm ³	10	0,0089 ± 0,0004	0,038 ± 0,002	0,0050 ± 0,0003
8.	Cobalt	mg/dm ³	0,5	0,00019 ± 0,00001	0,00018 ± 0,00001	0,00020 ± 0,00001
9.	Boron	mg/dm ³	1		<0,05*	
10.	Residual chlorine	mg/dm ³	0,1	<0,01*	0,07 ± 0,01	<0,01*
11.	Petroleum products	mg/dm ³	0,5	<0,01*	<0,1*	<0,01*
12.	Temperature	°C			23,0 ± 0,1	

Key:

* - lower than the threshold of quantitative definition of the method

- in accordance with the Permit for use of water sites for inflow of waste waters into surface water sites No 13120037/ 22.11.2010

Note: The protocols from the Regional Environment and Water Inspectorate – Vratsa are as follows:

- For HC 1: No 01-85/27.02.2012, No 06-0016/31.01.2012, No 06-0017/19.01.2012, No 07-0036/ 19.01.2012, No 06-0408/12.10.2012, No 06-0409/05.10.2012, No 07-1134/11.10.2012, No 01-1485/26.10.2012
- For HC 2: No 01-85/27.02.2012, No 06-0016/31.01.2012, No 06-0017/19.01.2012, No 07-0036/ 19.01.2012

Conclusion: It is evident from the 2012 protocols provided that **there are no** excesses of the IEL in Flow 5-HC-1 and Flow 6-HC-2 of the indicators tested by RL - Vratsa.