### Table All.7.1 Financial Statements of Galati Financial Plan (Case IA2)

- ^ 1911 - 1 1 1 1 1 1 1 이야할 할 때 1일을 위해 도 없는 [세호 전, 전 등 뒤 등] 등]	Financial Statements of S.C. APATERM S.A.	(million ROL)	205 200 200 200 200 200 200 200 200 200	15,ରଓଖି 13,ରଓଖି 15,ରଓଖି 15,ରେଖି 15,ରଓଖି 15,ରେଖି 15,ର	189,320   233,455   233,455   233,455   233,455   233,455   233,455   233,455   235,456   233,455   235,175   194,245   100,048   59,301	38.822 A8.776 50.339 70,348 81.809 33.754 93	34271 35700 8 30277 9 3777 3577 357	4 2005 2006 2007 2008 2010 2011 2012 2013 2014 2015 2016 2011 2014 2015 2014 2015 2014 2016 2010 2021 2022 2024 2025 2024 2021 2020	140,868 140,86	29,003 46,614 60,299 56114 51,666 46,911 41,856 36,472 30,739 24,633 18,130 11,585 5,962 1,929 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-25.386 11.202 42.714 42.714 42.714 42.714 42.714 27.714 27.714 27.718 15.803 -13.867 -50.455 -81.967	38.901 58	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2.2.3.M 45.3.3.5 64.386 73.02.1 77.770 173.82.5 84.2.08 83.942 100.045 100.045 82.138 25.589 83.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	32.501 36	lecture formation formation formation formation formation formation for the state of the state o	2005 2006 2007 2008 2009 2010 2010 2017 2019 2019 2014 2015 2016 2017 2018 2019 1019 1012 2018 2018 2019 2019 2019 2019 2019 2019 2019 2019	418,367 439,918 443,845 457,1611 470,876 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002 485,002	18.535 22.549 28.732 31.087 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626 35,626	0 140,006 140,	81 573-912 590.3221 607.263 624.261 642.831 661.497 66	-448 198 208 668 658 658 658 658 568 568 568 748 19 48 -12.48 -12.48 -12.48 -12.48 -12.48 -12.48 -12.48 -12.48 -12.48	39% 158% 200% 194% 188% 188% 188% 188% 188% 188% 189% 193% 48% 00% 00% 00% 00% 00% 00% 00% 00% 00% 0	Cumulative Working Capital	20.0%	Oun. W.C.	10,0%	 The second secon
	ACCOUNT (Million ROL)  Signature (Million ROL)	million ROL)	1.05,128 205,282 215,846 226,854 23	15,638 15,838 15,638 140,868 140,868 140,868	189,339 233,455 233,455	48,776 59,339 70,348 18,535 22,549 26,732	33,211 55,760 62,492 54,187 90,977 134,593	2002 2008	140,868 140,868 140,868 140,868 58,901	29,000 46,614 40,299 56,114 52,964 35,353 21,668 25,852	-25,386 11,202 42,714 42,714	58,901 58,901 58,901 58,901 86,479 105,456 120,283 127,468	0 0 0 0 27,578 48,555 64,382 68,588	77,378 46,555 64,387 64,566	26.424 85.325 144.227 203.128		2005 2006 2007 2008	418,367 430,918 443,845 457,161	18,535 22,549 26,732	140,868 140,868	573,912 590,321 607,263 624,761 (-25,386 11,202 42,714	-4.4% 1.9% 7.0% 6.8%	994 1584 2054 2008	The second secon				





(3)

### Table All.7.1 Financial Statements of Galati Financial Plan (Case IA2)

12.00.00   12.00.00	1. Financial Statements	OTSIC, AMALERM S.A. (Million ROL)  2 John 2002 Mar 2004 Soot 2004 2004 2004 2004 2017 2012 2014 2015 2016 2017 2014 2019 2021 2022 2021 2022 2021 2024 2024 2024
Control   Cont	Revenue (A)	193-128, 202-282, 213-846, 226-842, 128-315, 250-260, 250-240, 250-
Column   C	Operation and maintenance ( ) evelopidasse fee (C)	15 638 1 15
Column   C	Lease fee daloulation base	180 338 [ 233 455] [ 2
Comparison   Com	Profit before tax (3 = A-B-C)	59.339 70.348 81.809 93.754 93.754 93.754 93.754 93.754 93.754 93.755 93.755 93.755 93.755 93.755 93.755 93.755
Color Severege Account (million R)   1909	Corporate tax ( $E = 0.38 * D$ ) Profit effer tax ( $E = 0 - E$ )	18,535 22,549 26,732 3:087 35,626 35,
Control   Cont	Working capital ( $G = F$ ) Cumulative WC, ( $H = \Sigma G$ )	33.211 55.700 82.492 113.500 149.205 144.833 [20.459] 256.045 [256.459] 256.045 [257.304] 562.305 [368.501] 478.201 56.305 [475.501] 577.305 [257.305] 567.305 [257.305] 567.305 [475.501] 577.3
Column   C		(million ROL.)
Comparison   Com	0002	COUNT
13   15   15   15   15   15   15   15		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Column   C		0 0 -2552 -14:02 52.964 35.354 35.369 35.369 35.369 35.369 50.311 45.497 51.289 51.387 63.937 70.401 75.309 80.344 81.367
Column   C		-25.366, 11.202, 42.714, 42.71
Control   Cont		86 전을 130 등 450 [1233조건177] 전용 1213구 : 256 전기 141 [22] 25 유로리 1-141 (22) 121 (23) 142 (24) 153 (25) 143 (25) 1
15   15   15   15   15   15   15   15		288.341 400.246 425.674 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Column   C		2848.341 400 246 8460 424 444 27518 4555 64 3847 64566 73 023; 72,720 73 84 208 43 542 7100 048 145,204 145,000 86 100 10 10 10 10 10 10 10 10 10 10 10 10
Formation   Form	Vorking capital of the year (T op-S) Completion acclude capital	0 -5566, -25911 38301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301 58301
The State Guarantee (million ROL)	(U = 2 T)	0 -5566 -32.478 76.424 85.223 144.227 203 128
Colored Colo	. Criteria for State	intee (million ROL)
A. Phene   Control   Con	Ī	2017 2018 2018 2018 2018 2018 2018 2018 2018
Column   C		0 0 0 0 0 0 0 0 0 0 14.675 IR.555 22.549 26.732 31.087 35.626 35.
390 Ref.   31114   332 Ref.   392 Sef.   393 Sef.   3		0 0 0 C 140,868 140,86
Section   Continued without   Continued with		37.7.14 382.855 334.351 406 181 573.312 590.321 602.856 524.751 681.897 661.89
State Cuberrate   000   000   000   1.5 km   0.5 km   0	-	000 14N 66K -4M 19N 700 000 14N 66K -4M 19N 66K -4M 19
Out Section         1.200,000         Cumulative Working Capital         25.0%         Orderia for the State Guarantine           1.400,000         1.200,000         20.0%         1.50%         20.0%           1.00 ov.         1.00 ov.         1.00 ov.         1.50%           1.00 ov.         1.00 ov.         1.00 ov.         1.50%           1.00 ov.         1.00 ov.         1.00 ov.         1.00%           1.21 v.         4.00,000         1.20%         1.00%           1.22 v.         4.00,000         1.20%         1.00%           1.22 v.         200,000         1.20%         1.00%	State Guarantee	30% 00% 14% 66% 99% 154% 205% 200% 194% 184% 184% 184% 184% 184% 184% 184% 18
(v) 100 0v 1.200,000 1.200	Parameter Input Section	Cumulativa Working Capitai
1,200,000 1,000,000 22.15 800,000 600,000 1,473 401,000 0 14.70		0.007.004.1
22.15 800,000 (APATERN) 640,000 (APATERN) 7.05 (CITY)	3	1,200,000
14.7% 4(0,000) 200,000 (CITY) (CITY)	ப	NOO,000
200,000 0	Ļ	000000
	J	200,000 (CITY)
	J	

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## Table All.7.2 Financial Statements of Galati Financial Plan (Case IIA2)

17,440   1	13,602   13,602   13,603   1	449 117 449 119 449 11	13,5529 13,552	13,639 115,639 115,639 115,639 115,639 117,117,117,117,117,117,117,117,117,117	13,653,8 11,713,113,113,113,113,113,113,113,113,1	11,5482 115 117,173 117 117,173 117 117,173 117 117,173 117 117,449 117 117,44	117,449 44,538 44,538 47,447 117,1173 87,540 98,540	11,7449 11,744	117,449 117,44
0 22,578 27,495 23,578 27,495 23,578 27,495 23,578 27,495 23,578 27,495 23,578 27,495 23,578 27,495 27,578	102,072   103,222   117,173   117,173   103,523   117,173   117,	117,173 117,174 117,17	2017 2017	117,173 117,173 117,173 117,173 117,173 117,173 117,173 117,174 117	17,177 17,175 17,175 17,175 17,284 17,784 17,784 17,784 17,784 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,901 18,900 18	1117.173 44.327 72.647 1778.1439 1778.1439 1778.1439 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.901 18.9002	17.17.17.17.17.17.17.17.17.17.17.17.17.1	117.17.17.17.17.17.17.17.17.17.17.17.17.	117.77 11
23,376 24,701  23,466 21,749  0 117,449  117,449	19,2,672   257,973   27,647   72,647	2007 2014 20220 548,502 201140 683,797 2017 2014 2015 117,449 117,449 117,449 38,501 38,501 38,501 18,431 16,281 12,321 18,431 16,281 12,321 18,501 18,501 18,501 11,520 118,500 119,489 11,520 118,500 119,489 11,520 118,500 119,489 11,520 118,501 58,501	314,2647 314,2647 314,206 34,977 34,977 34,977 34,977 37,223 37,223 37,223 37,223 37,223 37,223 48,500 48,500 44,526	984.385 984.385 984.385 984.385 0 58.5019 98.500 98.500 98.500 98.500 98.500 98.500 98.500 98.500 98.500	992.344 992.344 1172 660 58.348 58.341 58.901 58.901 58.901 755.425 44.526	78.7.447 78.7.449 78.7.449 56.501 58.501 58.501 58.501 58.501 58.501 58.501 58.501 58.501 58.501 60 60 60 60 60 60 60 60 60 60	200279 117,449 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279 10,50279	999,2647 999,2647 999,27 99,37	2007 2007 2007 2007 2007 2007 2007 2007
Second Continuo ROL	2008 2009 2010 2011 34,500 117,449 117,449 117,449 34,501 34,501 34,501 35,401 34,501 30,995 28,427 25,114 24,879 27,503 30,401 35,401 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,901 36,	2013 2014 2015 117,440 117,440 117,440 58,001 18,401 15,401 18,443 14,750 15,878 40,104 40,780 17,840 58,001 18,801 12,821 58,001 18,801 18,801 115,201 18,901 115,201	2017 2017 34,970 34,970 3,000 3,000 3,000 3,000 3,000 3,000 3,000 4,	2018 28.546 0 58.546 0 58.546	2027/ 28.301 28.301 28.301 28.301 28.301 28.301 28.301 28.301 28.301 28.301 48.502 44.526	7077 117 449 56,901 0	20225 2025 2025 2025 2025 2025 2025 202	2027 38,546 0 38,546 0 38,940 1,000 93,000 1,000 1,0	7077 7029 7,7449 117,449 6,941 34,901 6,941 34,901 6,9543 58,548 6,951 58,951 6,951 58,951 6,951 58,951 6,951 58,951 6,951 58,951 6,951 58,951 6,951 58,951 6,951 58,951 6,951 6,951 6,951
Construction   Cons	117,449 117,449 117,449 117,449 13,44	117.449 117.44	2017 24,500 24,500 24,500 27,283 37,283 37,283 37,283 48,500 48,500 48,500 48,500	117 (4.99 117 (4.99	2027/ 28.301 28.301 28.301 28.301 28.301 28.301 28.301 28.301 28.301 48.502 445.002	117,449 56,501 5	28,901 58,901 58,901 58,901 58,901 58,901 1,031 445 11	2027 245,002 24,500 24,500 24,500 25,600 25,	2
22.557 86.522 (20.236 148.274 127.702 2.646 0.55.001 35.00	117,449 117,449 117,449 117,449 13,540 13,540 13,540 13,540 13,541 14,541 15,541 14,54	117,449 117,449 117,449 58,901 18,401 58,900 58,901 58,900 58,901 58,900 58,901 58,900 58,901 58,900	58,901 58,900 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	117 (44) 58,300 58,340 0 58,34	36,201 36,201 36,201 36,201 36,301 36,901 36,901 36,901 36,901 46,506 44,526	117,449 56,491 0 0 0 0,548 56,901 86,901 86,901 96,901 96,001 96,	58,901 58,901 58,901 58,901 58,901 58,901 58,901 58,901 60 60 60 60 60 60 60 60 60 60 60 60 60	117 449 56,501 56,50	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
22.557 86.502 120.236 148.274 1777 -0.4.610 1770 2 27.388 911 0.0 0 0 0 1.771 -0.4.610 1770 2 27.388 911 0.0 0 0 1.771 -0.4.610 1770 2 27.388 911 0.0 0 0 0 1.771 -0.4.610 17.1402 2 77.388 911 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	24,509 36,901 34,901 34,901 34,501 32,448 20,509 30,995 31,47 20,114 32,449 20,500 32,440 30,500 32,440 30,500 32,440 32,500 32,	18.4901 38.901 38.901 18.401 1	94,900 94,910 94,910 94,910 94,901 94,901 96,901 96,5002 46,5002 44,526	28.546 0 28.546 0 85.546 0 85.000 0 85.000 0 85.000 0 85.000 778.000 44.526 44.526	58,901 58,304 58,304 58,301 58,301 58,301 58,301 7,302 7,302 48,502 44,526	56,967 56,967	58,901 58,901 58,901 58,901 1031 445 11	28,961 28,566 28,569 28,569 20,000 20,000 20,000 46,500 46,526 46,526	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
22.557 86.502 120,236 148,274 127,702 20,509 28,502 148,274 127,702 20,509 28,502 148,274 127,702 20,509 28,502 148,274 127,702 20,509 28,503 148,274 127,702 20,509 28,503 148,274 127,703 28,503 148,574 127,703 28,503 148,574 127,703 20,509 28,503 178,704 128,50	24,879 27,555 30,401 35,454 18,261 18,251 18,251 18,251 58,301 58,301 18,391 10,041 102,715 105,861 108,391 41,100 43,114 46,662 18,901 41,140 45,814 48,602 142,693 58,901 38,501 38,901 38,901 38,901 216,119 275,521 378,922 299,824 2008 275,021 378,922 299,824 445,161 470,679 465,002 445,002	44,104 44,704 47,870 10,261 15,261 12,921 10,267 13,830 13,830 110,267 13,830 13,830 10,267 13,830 10,267 13,830 10,267 19,430 10,267 19,430 10,107 19,430 10,107 19,107 10,107	54,970 50,901 50,901 50,902	58,548 -58,548 98,900 98,000 98,000 98,000 1,34,000 1,34,000 1,34,000 1,44,528	58,545 58,561 58,901 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58,548 58,901 58,901 58,901 58,901 58,901 58,902	58,501 58,501 58,501 58,501 101,445,11	38.5% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
22.672 201.839 280.350 345.872 297.972 -24.599 -2.446 75.189 289.341 400.786 492.475 4172.81 55.401 75.189 289.341 400.786 492.475 4172.81 55.401 75.189 289.341 400.786 492.475 4172.81 75.448 86.824 75.189 289.341 400.786 492.875 42.3576 16.547 77.933 75.189 289.341 400.786 492.875 42.3576 16.547 77.933 75.189 289.341 400.786 492.875 42.3460 16.547 77.933 75.189 289.341 400.786 492.875 42.3460 16.547 77.933 75.189 289.341 400.786 493.873 42.34337 42.9337 75.189 289.341 47337 42.9337 42.93318 75.189 289.341 47337 47397 4739.873	16,261   16,261   16,261   16,261   16,261   16,261   16,361   1	10,261   12,921   12,921   13,021   13,021   13,021   13,031   1	-17,688 90.184 90.184 97,283 37,283 37,283 58,501 44,526	-58,548 58,901 58,901 58,901 59,000 -34,009 -44,526 44,526	-58,545 58,901 58,901 0 0 0 0 0 0 0 0 2027 735,409 485,602 44,526	58,548 - 58,901 54,901 54,901 54,901 54,901 54,901 54,901 54,901 54,901 54,900	-58,548 58,901 58,901 58,901 1,031,445 1,031,445 485,002	-58,548 - 58,901 - 54,502 - 54	
75.1199 289.331 400.786 482.473 477.273 75.444 86.524 75.1199 288.341 400.786 482.406 423.676 0 0 15.69 72.676 0 0 0 -3.340 -15.347 35.97 27.933 0 0 0 -3.340 -15.347 35.97 27.933 20.04.7 371.714 382.845 384.251 400.181 418.367 400.918 0 0 0 0 23.376 27.439 0 0 0 0 23.376 27.439 0 0 0 0 23.376 27.439 0 0 0 0 23.376 27.4349	100 Cat   102,713   105,5461   106,5496	115,267 118,300 119,400 56,300 60,029 60,581 56,301 58,901 58,901 58,901 58,901 58,901 417,672 2074 2016 445,502 44,526 44,526	990.1844 37.283 37.283 38.501 653.203 44.526	58,900 51,000 51,000 51,000 51,000 61,500	58,901 0 0 0 0 0 0 0 0 0 0 0 0 2027 48,5002 44,526	58.901 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	58,901 0 0 0 58,901 1 031 445 1	28.901 93.000 -34.009 1 056.249 1 1	1-1
73.199 283,34 400,36 443,246 423,676 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	41,46 43,814 46,682 49,093 41,40 43,814 46,682 49,093 38,901 38,901 38,901 -34,099 216,119 27,621 313,922 298,824 2008 2009 2010 2011 457,18 470,676 463,002 485,002	55.360 60.029 60.581 36,005 60.029 60.581 36,001 36,901 36,901 417,072 476,526 45,502 485,002 44,526 44,526 44,526	37,283 37,283 38,500 653,233 44,526	95,000 95,000 -54,000 778,000 701.9 201.9 201.9 445,002 445,002 445,002 445,002	28.901 59.90 725.829 858.72 485.002 485.00 44.526 44.52	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	56,901 56,901 7025 485,002	93,000 -34,009 1 056,248 1 1 2677 445,502	58.90 1.174.07 2029 485,00
10   10   10   10   10   10   10   10	41,140 45,814 46,002 142,093 56,901 38,001 38,901 -34,099 216,119 273,021 378,922 298,824 2008 2099 2010 2011 457,16 470,676 465,002 495,002	56,305 60,025 60,591 56,505 58,901 58,901 417,622 43,502 44,526 44,526 44,526	37.283 38.901 653.233 485,002 44,526	93,000 -34,099 58,90 678,006 736,99 -695,002 485,00 44,528 44,53	58,901 58,90 735,409 854,74 485,002 485,00 44,526 44,52	58,901 59 913.642 972 2023 20,	58,901 1,031,445 2025 485,002	93,000 -34,099 1 056,248 1 2027 445,002; 44,526	58.90 2029 485,00
Guarantee (million ROL)  Solven 371,714 32,202 2002  Solven 0 0 0 0 0 23,378 27,434  0 0 0 0 0 23,378 27,434  0 0 0 0 0 17,449 117,449	58.901 58.901 58.901 -34.059 216.119 275.021 388.922 239.874 2 2008 2009 2010 2011 457.181 470.878 463.002 445.002 445.002	58,901 58,901 58,901 41,7,020 44,526 44,526	58.301 653.233 445.26	-34,099 -701.9 -405,002 -44,528	58,901 795,439 485,002 44,526	58,901 59 913.642 972 2023 20, 485,002 485,	56,201 1 031 445 1 2025 485,002	-34,009 1 056 248 11 455,002 44,528	
Cuarantee (million ROL)  Stood 2001 2002 2002 2004 300,007 371,714 382,805 394,351 400,101 418,397 400,919 0 0 0 0 23,578 27,439 0 0 0 0 0 17,449 117,449	216.119 275.021 3181.922 209.874 2008 2009 2010 2017 457.161 470.876 465.002 445.002	41747) 476.526 535,430 2013 2014 2015 485,022 485,022 44,528	7017 485,002 44,526	774.036 2019 485.002 44,528	795.439 485,002 44,526	2023 20 485,002 485,	2025 485,002	2027 485,002 44,528	
Guarantee (million ROL)         2002         2002         2003         2004         2008         20	2008 2009 2010 2011 437,161 470,876 445,002 445,002	2013 2014 2015 485,002 485,002 485,002 445,002 44,526	2017 485,002 44,526	2019 485,002 44,528	2027 485,002 44,526	2023 485,002	2025 485,002	2027 485,002 44,526	L-L
2000         2001         2002         2003         2004 <th< td=""><td>2008 2009 2010 2011 457,161 470,876 485,002 485,002</td><td>2013 2014 2015 485,002 485,002 485,002 44,528 44,520 44,528</td><td>2017 485,002 44,526</td><td>2019 485,002 44,528</td><td>2027 485,002 44,526</td><td>2023</td><td>2025 485,002</td><td>2027 465,002 44,528</td><td>L-L</td></th<>	2008 2009 2010 2011 457,161 470,876 485,002 485,002	2013 2014 2015 485,002 485,002 485,002 44,528 44,520 44,528	2017 485,002 44,526	2019 485,002 44,528	2027 485,002 44,526	2023	2025 485,002	2027 465,002 44,528	L-L
971,714 382,865 394,551 406,181 418,397 430,918 0 0 0 23,376 27,434 0 0 0 117,449 117,449	457,161 470,876 485,002 485,002	485,002 485,002 485,002 44,528	485,002	485,002 4	485,002	485,002	485,002	465,002	
0 0 0 23,378 27,434		44,526 44,526 44,528	44,526	44,526	44,526	_	_	44,526	
0 117,449	35,631 39,987 44,526 44,526				_	5 44,526 44,526	44,526		
	117,449 117,449 117,449	117,449 117,449 117,449 117,449 117,449	449 117,449	9 117,449 117,449	117,449 117,449	9 117,449 117,449	117,449	117,449 117,449 11	117,449 117,449
371,714 382,865 394,351 406,181 559,392 575,801	610,241 628,311 646,977 646,977	646,977 646,977 646,977 646	646,977	646,977	776,927	646,977	646,977	646,977 646,977 64	716,949 776,949
0 0 0 3345 16,147 -24,599 -2,646 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16,261 16,261 16,261 16,261 16	16.261 16.261 15.261 12.921	114 -17,688 -39,641	1 -58,548 -58,548 -0.04	58,548 -58,548	-58.548 -6	-58,548 -	-58,548 -58,548 -5	-58,548 -58,548
00 00 188 40% A1% 0.1%	12.3% 11.9% 11.6% 11.6%	11.6% 11.6% 11.0%	6.3%	60	000	860	100	0.0%	
	Comulative Working Capital			4 6 6 6 6 6	and the state of t				
7.300,000	WALL OF STREET	14.0%			והייםומני,םוניים	A/A/JUGE	***************************************	-	
50.00		12.0%		1					
		10.0%	,0					7	
1,000,000		8.0%	20						*
800,000		(APATERM)   6.0%	,0						
90.0%		Cum. W.C. 4.0%	$\perp$			1			
4.0%		(crrv) 2.0%	<b>\</b>				1 N		
			4			_			
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# Table All.7.2 Financial Statements of Galati Financial Plan (Case IIA2)

117 173 44 526 72 647 -58,548 58.401 117 444 117 449 117 449 117,449 117,449 646 977 PO25 2026 2027 2024 2024 44.526 77.647 58.548 54.901 ō 3 44,526 క 15.638 112.173 137.173 117.173 117.173 117.173 44.526 44.526 44.526 44.526 44.526 77.647 77.647 77.647 77.647 78.1436 825.945 78.647 915.013 9595.591 78.1436 915.945 876.487 915.013 9595.591 58.548 58.403 0 :17.449 117.4 Ġ. -58.548 58.401 17 444 58,40 44.526 646,977 00% 14 58,548 117 449 44,526 646.977 100 485,002 Ą, , P 15 038 17 644 -58.548 54.503 44,526 646,977 646,977 646,977 646,977 646,977 646,977 646,977 646,977 646,977 646,977 646,977 -58 54B 485,002 50 9 11/2 -58.54B 2023 2023 117 444 485,002; 44.526 -58 54R 000 3.50 C. N. Orizera for the State, Quarantee. Sig. 96,757 105,222 117,173 -58.548 58.401 117 449 44,528 -58 54× 58,901 50 50.3 485 002 Sty. CW/ 85% -58,548 5x 401 -5H 54R 1/4 000 2011 2018 2019 2020 2021 117 445 117,449 44,526 58.901 485,002 Ş. Vo. 58.548 - 58 54R -106,86 44,526 6 0 A 85 002 n<sub>lik</sub> 58.548 117 449 117 449 -58 548 ó Say. 485,002 44,526 58.50 000,0 0.07 84. 39.643 44,526 3. 4. 10 × 10 × 485,002 -39 nd1 2.45 747. 117449 58 401 44,526 -2 7 634 30 208 -17 8XB 485.002 442 117 449 58,901 6,939 58.401 10 44.526 100 106.45 7 14.0% 12.0% 10.0% 6.0% 4,0% 2.0% 8.0% 0.0% 1103 44,526 20% 117449 12,921 58,901 166 09 50.35 2 421 117 449 ----Cum. W.C. (APATERM) 43.768 44.520 16,281 60 029 16.241 11.85 54 MC 47. A. A. -CLM. W.C. (CITY) 17 449 40.104 1,65 18.443 44,526 56 345 16,261 1 241 \$H301 38.864 44.526 11.6% -200,000, 124 - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, - 50, -52 975 2.55 1.7.44 18,26 16 24 , 34, x1, 30,404 117 449 11.6 44,526 118,089 158,076 202,602 247,127 192,872 257,813 330,540 403,208 18,261 2.54 300.887 371,714 382,845 394,351 406,181 559,392 375,801 592,743 610,241 428,311 646,977 646,977 14041 16.241 117 444 1164 58,901 28,147 30,401 16.261 38.401 (Q\* 4) 44.526 Cumulative Working Capital 25 B.38 ₹ = 17 449 30,995 16.261 43.814 39.987 ē. 200 33,886 12.3 1:7 449 24.879 16.261 58.501 100° F 35,831 11 24: 15.638 32,758 31,448 51,310 82.458 134.537 12 85 16.261 31.448 18.261 2 38 624 Š 72,195 27,434 44.761 51,010 83,228 Į. -2.646 58 90 \* 27,434 1 15.638 0 27 433 2.84 (million ROL) 15,638 23,576 62 041 23,576 38 466 23,576 38 466 58.901 17.402 201.83y 280,550 345,972 297,972 -24,599 18 547 5. 3 4 1 -24 549 1614! 4 0 6 148.274 127.702, 15 147 Financial Statements of S.C. APATERM S.A. (million ROL) 288,341 400,788 494,245 0 0 1569 Criteria for State Guarantee (million ROL) 3 340 0 8.4 0.85 1,400,000 1,200,000 000,000 S40.1-200,000 000,008,1 000'009" 000,000,1 800,000 100,000 120,236 100 382,865 Account ( 86.502 000 600 22.557 52,632 75,189 60 9.0% 4.0% 50.03 50.03 50.03 50.03 28.1% Galati City Sewerage Parameter Input Section Subsidy from city/intate budget imporate tax (E ± 0.34 = D) officiation fax (F = 0 = 5.) Criteria for subardy Javal (279° Criteria for State Guarantee Ratio of Sewerage Charge to Income (%) Coverage to depreciation (N) Tens tem calculation base Cumulative womang capital Averaged ontena values for hang capital of the year Gorborate tax from S.C. APATERM S.A. (W=E) Revenue from Inase fen Coverage to interest (%) evenue front lease ten Working capital (G # F) Total current revenue Subsuch (Z=1+K+R-M) ivestment cost (Q) Mignest subsidy ratio Averaged profit rate 0 = A-8-C AII-7-6

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Table All.7.3 Financial Statements of Galati Financial Plan (Case IIIB1)

1985   1985	Financial Statements	of S.C.	APATERM	ωH	A (million		7007	200%	500%	2010	2011 20	107 2013	2014	2013	2010	7017	2018	7019	20%	2021	7022	2073	NC0.	7075	707#	7027	8202	7024
Column   C	1		l	-	à	2	200/	2 4	2							24 C/2		25 C/3	15 A. C.	1			•		1	1		10 S
Column   C	_	2	00000000		4	015 470	47015	47.015	47 015	ä	- 83	1 13		140	- 33	47.015	47,015	47 015	47.015	8	- 83	, i		- 33	- 63	- 33	- 88	47.015
1985   1985					8	900	8	18.366	22.459	726	8	3 _		31	3	26.728	26.726	26.726	26.726	1	1	1	1	1	3	1	a a	26,726
Column   C										800						16 156	10,136		10,156									16,136
Column   C					<b>11.4</b>	, ,				304		1 1	LJ	<u>i                                     </u>	l J	076,401 £27,771	119,125 194,363			i J		l						230,838 176,631
10   10   10   10   10   10   10   10		Account	(millio	ROL)																								
1.00   1.00		1 2007	2002	200	20%	Н	Н	2008	200s	Ц		2	Н	2015		2017	3018	2013	2020	1051	7.027	Н	L	ш	I. I	Н	8202	5202
1,000,000   2,000	3 · 3 · 3 · 3	: :	0	0					47,015	015					1	47 015	47,015	47,015	47,015		1							47.015
2.005    2.000   2.0		1.2	00	L			i		30,901	3,4	t					38,901	108,80	100,30	58.901				l			==	§ 0	26. O
10   10   10   10   10   10   10   10	22. 22. 22. 22. 22. 22. 22. 22. 22. 22.	201,839	120,236 14	1,771	1	L	<u> </u>		42,58)	30 3			1'	L		13,484		11,836		<b></b>					ļ.			11 886 0 886
10   10   10   10   10   10   10   10	75.14	288 341	400 788 4	0 475	- 1	. 1	- 1	- 1	- 1	1901	- 1-	8 5			- 1	58 901 86 184	28.90 26.55 55.55	54 55 54 55 56 56 56 56 56 56 56 56 56 56 56 56 5	58.90 59.90	<u>8</u> 8		6 g	_Ŀ.	- 1				54 50 100 HZ
10   10   10   10   10   10   10   10	-	288,341	400,786	14	ļ			1	1	0 0	1	0 12	<b>L</b> _	8	L.	37.783	17.75	000's	00	00	00	00		00	00		<b>0</b> 0	00
Columbia	٤	288 341		1.1	14	1-4	ш		4.1,814	1,082	ш	95 52.0	П	Ş	ш	37,283	17.73	93 000	ö	0	0	0	0	o	ш	93,000	0	٥
Colorante (million ROU)   Colorante (milli			4.2						28,96	9							58,901	8 8			8 8	•	8 5	8 8	· · · · · · · · · · · · · · · · · · ·			58,901
100   100	State Gua	rantee (	million	(J0	1			J :	4		4				4	4 '					1	, ,	1					
1   1   1   1   1   1   1   1   1   1	2002	7,000/	2002	1.44	Н.	<del>)  </del>				2/0	27 //	200	Н.	1-1-	<b></b>	٦Ìà	2011	2 8	H	2 8		Н.		H-15:	_	-1-		20274
10   10   10   10   10   10   10   10		0			-				8,535	8	2	8		<u></u>		8	0.136	8		8								\$E 01
360,000   360,			0	0						20.			- 5			47,015	47,015	47,015	47,015		·							47,015
Col.	360,88	371,714									•,	· · ·				542,173	542.173											12,173
CON			000		`			`	16 5%	60%		$\mathbb{L}$		~		97.7	30,73 4,73	2.2%	2.2%	7.7	ப	2 2	-11		1.1	4	11	2.7%
1.400,000 1.200,000 1.200,000 1.200,000 1.200,000 1.200,000 1.23s 1.000,000 1.07s 1.00s 1.			<b>%</b>	\$80						13.8%	]		13			7.5%	398	8	*60	8	\$00	60	-60	80	300	6	*60	60
	[tj   LJ L-J L-J	िरहरूर हो हो हो	1,400 1,200 800 800 600 600 200 200	0000				lattiva W.	reine Ca				-Cum, W.C (APATE:	<b>S</b>	8 8 8 8 8 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0	70%	1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1		150 st. 150 st	Same Same Same Same Same Same Same Same	802		4,				

Table All.7.3 Financial Statements of Galati Financial Plan (Case IIIB1)

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Revenue, (A)  Operation and maintenance (B)  Leveled leave fee, (C)  Revenue, the Color of the C	7000 7001 2002	2002 20	2002 2005	2005 2006 69 649 73 315	2007	300% X 014	11	89.379	2011 R9 379			20 11	379 84379	379 84379	711 24 374	1 .	- 1 (		11		702 a	1 1		Re 3.741	3.1	200
Operation and maintenance (B) [Landed laste for (C) [State-Intenation State Profit before sax (D = A-B-C) Profit after to (E = 0.38 * D) Profit after to (E = 0.38 * D) Profit after to (E = E) Working capital (G = F)							ı	į		ı	ı					į	ı	ı				ı	L			
(Satestine, California), para- Front before tak (0 = A-B-C) Corporate (ax (E = 0.18 * 0) Profit after tax (E = 0 - E) Working, capital (G = F)	-		5.4	15,638 15,638 47,015 47,015	l	ı	15.638	z, 2	<b>.</b>	15,638 1,47,015 4	15,638 15	15.638 15. 47.015 47	15,638 15,6 47,015 47,0	l	38 15.538 15 47.015	38 15,638	ı	15,638	5 47015	8, 15,058 5, 47,015	15.638	47015	15.638	15,638	15,638	15,638
Pront before tax (0 = A-8-C) Copporate *xx (E = 0.18 * D) Profit after *xx (E = D = E) Working capital (G = F)			*	46.425 17.44	V 3 - 10 X5.6			ľ			1	1		L 1			100	13	57.62	١.,	1	- 1	15.2	16.72	159.62	19.6
Profit after tax (F = D = E) (Working capital (G = F)			- 4	7,036 10,6	10,662 14,435 4,052 5,485	15 18,366 5.979		× = .	26,726 10.156	26,726 24	26.726 26 10.156 10	26.726 26.	26.726 26.7 10.156 10.3	26.726 26.726 10.156 10.156	26 26.726 56 10.156	26 26,726 56 10,156		26.726	26.726	6 26.726	26 728 10.156	26.726	26,726	10,156	26.726	26,726
Cumulative W.C. Time S.G.			2 2/ 4	1	1	1	27,724	6 23	1		1					. I		1		1	1	1			1009	1
2. Galati City Sewerage	age Account (million	lion ROL)	1		d 1	1 1	1 1		1	) I	ł I	1	1	ł	, ,	, 1	ł 1		1 !							
Year	2002 1001 2002	Si	2004 20	2005 2006	2002	2008	12004	0102	1100	7:00	2013 20	20 14 20	2015 2016	102 91	7 2018	6102 8	2020	1702 1	2022	2023	ri60	2025	70.76	15.	107.1	202
Revenue from lease tee (t = C)		6	6	47015 47015	5:5 47 615	15 47015		47.015	47.015								1							47.015	47015	470.5
Depreciation (J.) Dayment of interest (K)	000	0 177:	C 58.	58.901 58.901 17.402 27.968	38,901 36,180		36.90	58,901	25,114			58,901 58, 14 780 10	58,901 58.5 10 878 6	58,901 58,901	101 58,901	101 58,901 54 0		01, 58,901		58.50		58.901		58,90	58.903 C	
Prote (L = 1-0-K)	0 46 502 120 22	148.274	-8,461 -29	-29,288 -39,8	ľ	56 -45.555 0		-40,033.	-37 000	Ι.	og o	Ι'	400	826 - 15,464	164 - 13,040	7	5885 - 13886 0	0 - 1 . 38e	35 - 11,846 0	8 -1; 884 0	A -11 R86	988 11- 1	11,030	- 1,886	038.1.1	-11 886
Subsidy from city/state hudger (N)	201 839			45 K3 67 7AM	384 845	X6.695	Re nu									=									11,686	
Depreciation (O = 1)	0 0 0	0		ı		L	Š	£.	06		58 901 58	Š.	80	901 58	-	3	10,8801	8	10,8401	1 54 901	13.401	58.901	58.901	100 Hz	58.401	18 401
Investment cost (C)	75 1897 288 3411 400 786 497 475 417 213	494.246 425	1	0 0 0	300 /5 00	0000	0 701	200	£ 8	0	0 2/0/2	30	0 - 0	\$	0 0	000.88	1	5	1 -			1			0	
Payment of principal (R)	0	1 569 7		16 547 27 933	중.		43 H	46 96		_1	365	929	<del>-</del> -l:	51.722 37.2	2	i_		ō,	0.0	0	0 0	000	0	0 00	ं ं	
Applications (S = Q + K) Working capital of the year	75 189 288 3411 400 286	1 415 815 433	9 200	27.3	33 23 25	4 4	45.814	44 50%	142 593	62626	on and	5	1	3	_	000 PK   PC/		1	. <b>I</b>			1.	1	1	1	
S-d= t)	0 0	-3,340	-16,147 58	58,901 58,901	106,901	106.86	198,501	58,901	-34,099	58.901 5	58.901 58	58,901 58	58,901 58,901	35 	106.82	34,099	108,86 99	58,90	106.86	100 M	58 50	58.90 1	106.80	-04.099	58.901	58,901
(U = N T)	0 0	-3340	-19487 39	39.415 98.316	316 157.218	18, 216 119	275 021	333.922	299,824 3	358 725, 41	417,627 476.	-82	535 430 594.331	331 653.233	712	134 978	038 736.937	795	8391 854 740	0 913 642	2 972 543	10.0	1 0 c c c c c c c c c c c c c c c c c c	49.	11.1	0.602.44
3. Criteria for State Guarantee (million ROL)	Guarantee (millio	n ROL)																		- 1				Ì		
Year	2002 2001 2002		}-1	H	ч	-	}-1	2010			2	H	}t	_	1000	8 2019	2020	12021		- 1	-70	l - f	⊢+-	70.77	REOL	2024
Ceneral Revenue (=V.) Corporate tax from S.C.	380 887 371 714 382.865	1384.35	406.18: 418.35	5.357 430.918	918 443.845	45 457.161	470.876		485.002	485,002 48	485,002; 485	485.062 485	485,002 485,002	002 485.002					200,684 20	22: 485 002		485.002	5	480.002	700.084	500
APATERM S.A. (W=E)	0	0	0	2,674 4,0	4,052 5,485	85 6 979	8.535	10.156	10,156	10,156	10,156	10,156 10	10,156 10.	156 10.	56	156	156 10.15	. o.	156 10,156	ec: 50 56	951.01	951'0.	10 156	3 0	10 156	85 D
Revenue from lease fee (X=t)	0		C 4	47,015 47,015	015 47.015	15 470'5	5 47,015	47,015	47,015	47,015 4	47.055	47,015 47	47,015 47,	47,015 47.0	47,015 47,015	47	015 47,015	4	015 47,01	470.5	5 47 015	5 47,015	3 47015	47 015	47,015	47015
Total current revenue								-	4 674	24, 674			120 171 549	549 12% 569 139	27: 674 57:	273 542 173	•	3	173 549 173	(3) 542 173	27: 247	3 542 173	542 173	542 173	542.173	542 :73
**************************************	00,507	04.000, 204.201	16:47 45	•			5 86 BUS		200									=					-	13.886	11.886	11,836
Cotema for subsidy level (7.1Y)	00%1 00	180	11	1 _ L		$_{1-1}$	$1_{-1}$		16.05	60	\$ 0 9	Ш	\$		Ш	1 1	`	28 7.28	7.7%	3.75	42.6	327	17.	ζ.	2.2%	275
Cinteria for State Guarantee (1/K+R1/Y)	000 000	180	507	7.38	11 61 15 14	14 64	14.25	13.8%	13.8%	13.8%	13.85	13.8%	13.23	- 3	7.57	3.5%	100 100	]	500 500	00	400	60	100	ડ	100	60
		00,000 000,000 000,000 000,000 000,000 000,000 000,000 000,000 000,000 000,000		N.	11 ) :		Workink C.	lating 6			Oun. W.	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	0.44 1 1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		74,	945		for the	Search Cons	O Goacontees	30,	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1 1/2			

# Table All.7.4 Financial Statements of Galati Financial Plan (Case IVB1)

Finded Statement of S.C. Antitor A.D.		15,638 15,638 79,745 7,5047	H K	20224 11 204.005 11 1.839 10 1.839 11 2.839 11 2.835 11 2	2.453.002 2.453.002 3.1.918 5.79.745 7.97.745 1.118 1.118	
Financial Statements of SCA APTENS & Amilian ROLL   Financial Statements of Galaxi Financial Plan (Case NB1)		١-١	<del></del> }	<del></del>	3	
Table All 7.4 Financial Statements of SC. APTEM S. (million ROLL)  Table All 7.4 Financial Statements of Science and Science a			2 A			1.5
Table All 7.4 Financial Statements of Calabat Financial Plane (Case IVB1)   Table All 7.4 Financial Statements of Calabat Financial Plane (Case IVB1)   Table All 7.4 Financial Statements of Calabat Financial Plane (Case IVB1)   Table All 7.4 Financial Plane (Case IVB1)   Table All 7.		21 T	7. %			8.8%
Table All 7.4 Financial Statements of Calatt Financial Plan (Case IVB1)  Table All 7.4 Financial Statements of Calatt Financial Plan (Case IVB1)  Table All 7.4 Financial Statements of Case IVB1  Table All 7.4 Financial Statements of		91- 1				
Table All.7.4 Financial Statements of Schrift Francial Statements of Galatti Financial Stateme		21-71	7.8			
Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Plan (Casa)   Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Statements of S.C. ADJ TESM S.A. (milling ROL)   Table All 7.4 Financial Statements of Galati Financial Statements of Gala		¥[_``]		<del></del>		
Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Plan (Casa)   Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Statements of S.C. ADJ TESM S.A. (milling ROL)   Table All 7.4 Financial Statements of Galati Financial Statements of Gala		2 - 7	[2 2]			To star
Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Plan (Casa)   Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Statements of S.C. ADJ TESM S.A. (milling ROL)   Table All 7.4 Financial Statements of Galati Financial Statements of Gala	£	<u>``</u>  ````				S cha
Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Plan (Casa)   Table All 7.4 Financial Statements of Galati Financial Statements of Galati Financial Statements of S.C. ADJ TESM S.A. (milling ROL)   Table All 7.4 Financial Statements of Galati Financial Statements of Gala	NE NE		2 2			3/4
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	Sase	¥[~ • ]	3.129 136,413 222.568		114 0 1	
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	an (c		3,129 134,485 219,438		- 17	3
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	<u> </u>	15,638	3,129 132,577 2,16,309			
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	an Ci	-1	- 21			%0.0% %0.0% %0.0%
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	Fin	15,836 79,745 740,8 740,8	3,129 128,741 2,10,050	2015 28,901 27,518 27,518 19,745 19,745 28,901 12,1970 63,077 63,072 63,072 83,072		
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	alati	<u> </u>	]≃ %		79,74 1,918 79,745 79,745 14,1% 17,8%	m. W.C. TY)
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	ઉ	19,638 47,034 17,739	11,010 124,905 203,792		485,002 6,740 67,034 67,034 67,034 13,5%	
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	nts (	15.638 15.638 32.275 32.518	20 161 118,136 192,781		2012 445,002 12,357 52,275 549,634 52,775 9,5% 8,3%	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. Financial Statements of S.C. APATERN S.A. (million ROL)   1. 10.00   1. 10	eme	15,538 15,538 10,504 16,905	27 582 105,799 172,620	201/ 58.501 1.887 1.887 27.402 0 0 0 0 11.111 19.500 12.814 10.5,814 10.5,814 10.5,814 10.5,814	2017 485.002 16,905 40,307 7.4% 7.4%	
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Table All.7.5 Cost Benefit Stream for Galati WWTP Project

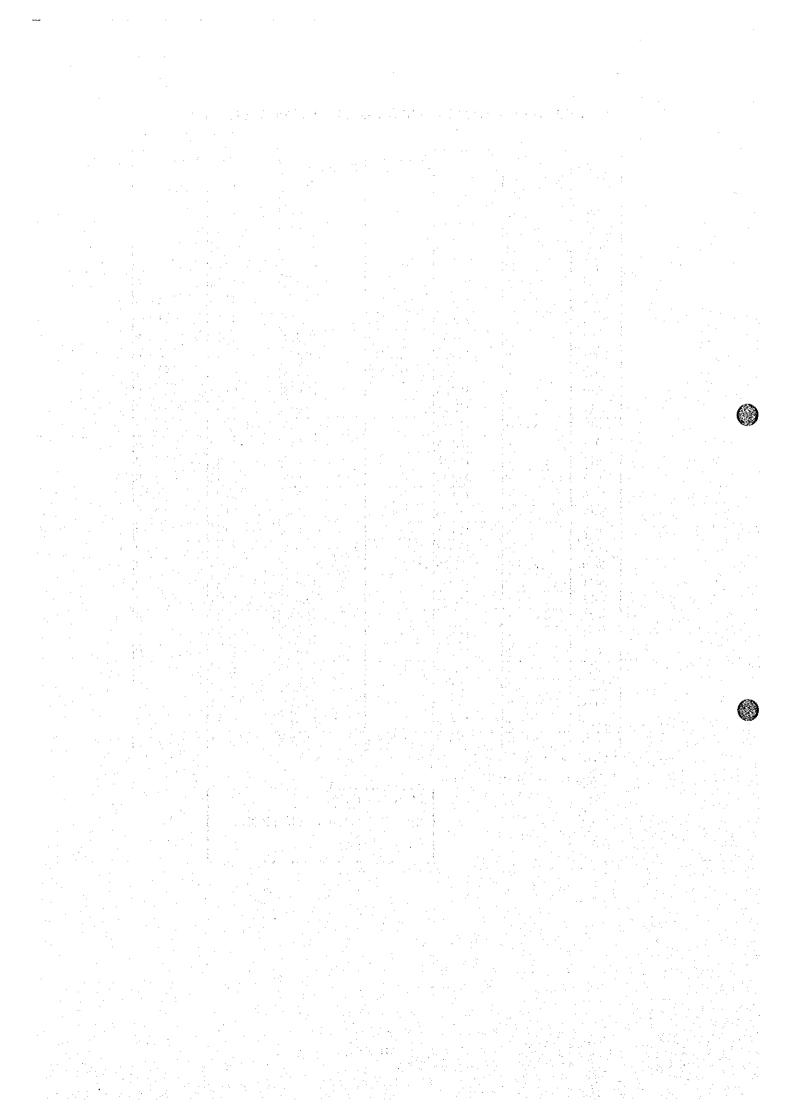
(Unit: million ROL)

					•	IIIIIIIII KOL)
	Projec		Economic	Benefit - Cost	Discounted o	ash flow**
Year	Investment	O&M cost	benefit	(C-A-B)	Cost	Benefit
	cost* (A)	(B)	(C)			170110111
2000	73,986	0		-73,986	73,986	0
2001	283,728	0		-283,728	257,935	0
2002	394,374	0		-394,374	325,929	0
2003	486,338	0		-486,338	365,393	0
2004	418,863	. 0		-418,863	286,089	0
2005	0	15,638	665,212	649,574	9,710	413,044
2006	0	15,638	665,212	649,574	8,827	375,495
2007	0	15,638	665,212	649,574	8,025	341,359
2008	0	15,638	665,212	649,574	7,295	310,326
2009	0	15,638	665,212	649,574	6,632	282,115
2010	0	15,638		-15,638	6,029	0
2011	0	15,638		-15,638	5,481	0
2012	380,808	15,638		-396,446	126,320	0
2013	0	15,638		-15,638	4,530	0
2014	0	15,638		-15,638	4,118	0
2015	0	15,638	,	-15,638	3,744	0
2016	0	15,638		-15,638	3,403	0
2017	0	15,638		-15,638	3,094	0
2018	0	15,638		-15,638	2,813	. 0
2019	0	15,638		-15,638	2,557	: <b>0</b>
2020	380,808	15,638	: ' '	-396,446	58,929	0
2021	0	15,638		-15,638	2,113	0
2022	0	15,638		-15,638	1,921	0
2023	0	15,638		-15,638	1,746	0
2024	0	15,638		-15,638	1,588	. 0
2025	0	15,638		-15,638	1,443	0
2026	0	15,638		-15,638	1,312	0
2027	0	15,638		-15,638	1,193	0
2028	380,808	15,638		-396,446	27,491	0
2029	0	15,638		-15,638		0
Total	2,799,713	390,950	3,326,060	135,397	1,610,631	1,722,339
• ~	sion factor =	0.001	<del></del>			

<sup>\*</sup> Conversion factor = 0.984

<sup>\*\*</sup> Discount rate = 10.0 %

EIRR=	13.1%
NPV =	111,708 million ROL
B/C =	1.07



### APPENDIX 8 ENVIRONMENTAL IMPACT ASSESSMENT SURVEY

### 1. INTRODUCTION

### 1.1 THE OBJECTIVE AND SCOPE OF THE STUDY

According to "Scope of Work for the Feasibility Study on Wastewater Treatment Along the Danube River Downstream Reach in Romanian" agreed upon between Ministry of Public Works and Territorial Planning (hereafter called as MPWTP) and Japan International Cooperation Agency (hereafter called as JICA), Environmental Impact Assessment (hereafter called as EIA) would be carried out based on the Romanian regulations as a part of the Feasibility Study on Wastewater Treatment along the Danube River Downstream Reach in Romanian. The objectives of the EIA are as follows:

- (1) To review the existing environmental conditions in EIA study area;
- (2) To assess environmental impacts of the proposed projects, and
- (3) To propose countermeasures for mitigating impacts and environmental monitoring plan.

The Environmental Impact Assessment areas cover three cities, which are Braila, Galati and Tulcea.

### 1.2 EIA SITUATION IN ROMANIA

The methodology for EIA is outlined in "Official Order of Romania, No. 125/1996," issued by MWFEP. The application procedures for EIA are prescribed under "Permitting Procedures for Economic and Social Activities Having an Environmental Impact According to the Environmental Protection Law No.137/1995, April 11th, 1996," by MWFEP.

The Order No.125 sets out the typical contents of an environmental assessment as follows:

- (1) Introduction, methodology and goals;
- (2) Engineering baseline including function of the project;
- (3) Environmental baseline, including;
  - geology
  - soils
  - water resources
  - climatic data
  - aquatic and terrestrial ecology, including flora, fauna, aquatic habitats and deltas
  - socio-economic and cultural issues including the protection of historic buildings
  - health, pollution and microclimatic issues, and
  - noise, transport and affected population
- (4) Pollution issues, including water pollution/water quality, air pollution, noise and vibration, radiation, waste management, and toxic/dangerous substance management;
- (5) Environmental impact. This comprises two categories, initial study and monitoring study, which address, water impact, air impact, flora and fauna, soil and subsoil

- (6) Mitigation/reduction or elimination of impact, and
- (7) Evaluation of final impact and conclusion.

According to the Law, the wastewater treatment plant development and improvement program is required to submit the EIA to the local regulatory agencies for review and public debate. The comments made thereon are then incorporated in the EIA report, which is submitted to MWFEP for final approval.

Two steps are generally taken for the assessment; Initial Environmental Examination (IEE) and EIA. Although there are no IEE national guidelines at present, the IEE is basically designed as a means of reviewing the environmental integrity of projects to determine whether EIA-level studies must be performed. In this sense the IEE is used for project screening to determine which environmental impact items require a full-scale EIA.

In accordance with Law 137/1995 and other relevant regulations, EIA shall be carried out only be certified Natural or Legal Persons. The analysis of samples for EIA shall be completed only by specialized laboratories using adequate equipment and methodologies in conformity with the existing norms and regulations.

### THE REGULATIONS USED IN EIA STUDY 1.3

The regulations used in EIA study are showed as follows:

- (1) Environmental Protection Law, No. 137/1995;
- (2) The Order of Ministry of Water, Forests and Environmental Protection (MWFEP), No. 125/1996 - EIA; (3) The Water Law, No. 107/1996; the latest the latest and the lat
- (4) NTPA 001 Load Limits of Pollutants in Waste Water Discharged in Water Resources;
- (5) NTPA 002 Quality Indicators of Waste Water Discharged into Sewage Systems;
- (6) STAS 4706/1988 Surface Waters (Categories and Quality Condition);
- (7) STAS 1342/1991 Standard for Drinking Water Quality;
- (8) The Order of MWFEP, No. 756/1997 Environmental Protection for Soil Pollution;
- (9) The Order of MWFEP, No. 462/1993 Maximum Concentrations of Effluents Pollutants Emitted into the Atmosphere Given for Emissions Levels;
- (10) STAS 12574/1987 Maximum Allowable Concentrations for Air Pollutants in Human Settlements:
- (11) The Governmental Decree, No. 71/1996 Fire Precaution;
- (12) The Order of Health Ministry, No. 1935/1996 Hygiene at Working Places;
- (13) The Work Protection Law, No. 90/1996;
- (14) The Order of Health Ministry, No. 536/1997 Noise Admissible Level at the Limit of the Developed Location;
- (15) STAS 12025/2-81 Vibration Standard, and
- (16) STAS 10009/1988 Urban Noise Standard.

### EIA IMPLEMENTING ORGANIZATION AND SPECIALISTS

Research and Development National Institute for Environmental Protection (hereafter called as ICIM Bucharest) which is selected as the implementing organization for EIA is certified by MWFEP for performing EIA with the certificate R-EIM-1-764 (be valid from Jan. 28, 1999 to Jan. 28, 2001) for transportation, power supply, civil and hydrotechnics constructions, waste management, tourism, industrial activities, water and wastewater treatment.

Address: Spl. Independentei nr. 194, sector 6, cod 77703, Bucharest 78, Romania

Tel: 40-(0) 1-637-3060 Fax: 40-(0) 1- 312-1393

The EIA survey works is performed by the following specialists:

- Team Leader for all the three projects Dr. Alexei Atudorei
- Team Leader for each city

Tulcea – Mr. Gabriela Pietrareanu Galati – Mr. Mihaela Chiarescu Braila – Dr. Vasile Calin

- Five experts for each city (sewerage, hydrologist, geologist, ecologist and sociologist)

### 2. EIA FOR GALATI WWTP PROJECT

The present environmental situations and the potential impacts on the environment after the construction of WWTP are defined and the results and possibilities to reduce or remove the environment impacts are shown in following paragraphs.

### 2.1 DESCRIPTION OF PROPOSED PROJECTS IN THE FEASIBILITY STUDY (F/S)

The details of proposed WWTP in F/S Study are summarized in Table All.8.1.

Table All.8.1 Summary of proposed WWTP in Galati City

Item	Description of Proposed WWTP
1. Location	The proposed WWTP site with about 25 hectares is located on the north side of the railway lines at the northern-eastern part of the City about 4 kn downstream from the center of the City (Figure All.8.1).
2. Capacity etc.	Service population in the year 2010: 377,000 (Total population: 400,000)  Design average daily flow: 200,000 m <sup>3</sup> /d  Design maximum daily flow: 235,000 m <sup>3</sup> /d  Design maximum hourly flow: 285,000 m <sup>3</sup> /d
3. Wastewater Characteristics	Design influent quality Design effluent quality Standard of NTPA 001 BOD5: 130 mg/l 18 mg/l 20 mg/l SS: 150 mg/l 22 mg/l 60 mg/l T-N: 20 mg/l 10 mg/l
	T-N: 20 mg/l 10 mg/l 1 mg/l
4. Treatment Method	Treatment method: Conventional activated sludge process Treatment-process flow diagram: Wastewater Flow
	Influent Bar Scree Pump Grit Chamber
	in the second control of the second control
	Primary Clarifiers, Aeration Tank and Final Clarifiers  Oil Traps
	Wa Washa Flam
	Wet Weather Flow Effluent Chlorine
	Contact Tanks  Danube
	Discharge Pumps
	Tackbook and made and
	Sludge Flow
	Raw Sludge  Gravity Thickeners  Anaerobic Digesters  Mechanical Dewatering
	Digesters
5. Sludge Production and Disposal	Dewatered sludge production: 108 m <sup>3</sup> /d (39,420 m <sup>3</sup> /year) or: 21.6 ton/d (7,884 ton/year) Disposal method: landfill at Galati Solid Waste Disposal Site
6. Life of Facilities	The lift of facilities:  Machinery and equipment – 30 years  Civil facilities – 50 years

### 2.2 DESCRIPTION OF THE ENVIRONMENT

### 2.2.1 CLIMATE, AIR QUALITY (ODOR), NOISE AND VIBRATIONS

### (1) Climate

The climate characteristics are summarized in Table AH.8.2.

Table All.8.2 Summary of climate characteristics in Galati

Item	Description	
1. Climate	The climate of Galati city belongs to the continental cli	mate sector.
2. Temperature	The average annual temperature in Galati City:	10.5°C
	The average monthly temperature in July (the hottest m	onth): 22.6°C
	The average monthly temperature in Jan. (the coldest m	onth): - 3.1℃
3. Freezing Day	The average number of freezing day	91.3 days
	The average number of snowing day: days	41.3
4. Precipitation	The average annual precipitation:	426 mm
	The average monthly precipitation in June (the max. n	month): 62.1
	The average monthly precipitation in Feb. (the min. m	eonth): 23.1
5. Wind	The average annual frequency:	NE - 19.8%
	The control of the state of the state of	N - 16.1%
		SW - 14.7%
		S - 10.0%
	The average annual velocity:	2.4 - 5.3 m/s

Source: Galati City and ICIM

### (2) Air Pollution (Odor)

The most important sources of air pollution are: the transportation equipment (road traffic) which issues 66% of the air pollutants (out of which 98% belongs to SIDEX SA), electrical and heat power plants with a total of 23% and SIDEX SA with a pollutant issue of about 11%.

Regarding odor, the results of measurements in/around proposed WWTP site are presented in Table All.8.3. The locations of sampling points are shown in Fig. All.8.1, and the samples are taken at 2.5 m above the ground level.

Table All.8.3 Some results of air pollution measurements in the WWTP site (July 1999)

Parameter	Boundary fence	50m from boundary fence	150 m from boundary fence	Limits for 30 minutes sampling period according to RS 12574/1987
H <sub>2</sub> S (mg/m <sup>3</sup> )	0.0006	0.0004	0.0003	0.015
NH <sub>3</sub> (mg/m <sup>3</sup> )	0.018	0.012	0.010	0.3
Odor Level	1	1	1	5

Source: ICIM

The results of survey show that hydrogen sulfide and ammonia concentrations as well as the odor level in/around proposed WWTP site are keeping at a relatively low level.

### (3) Traffic, Noise and Vibration

As the proposed plant land is located in the sparsely developed area, therefore, no severe traffic congestion, noise and vibration problems are expected during the plant construction.

### 2.2.2 GEOLOGY AND TOPOGRAPHY

### (1) Geology and Topography

Galati City is located in the eastern extremity of the country, on Covurlui plain, on the left bank of the Danube River, 7 km downstream of Danube-Siret junction and 150 km upstream the Danube discharging into Black Sea. The topography of the area is dominated by plains (69%) which belong to Romanian Plain (the City is located at a joint point of five geographical units: the Danube floodplain, the old Macin Mountains, the Baraganu Plain, the Low Siret Plain and the Covurlui Plain).

WWTP is planned to be located to the northern-eastern zone of Galati town in the close vicinity of pump station, on the north side of the railway lines. Presently available land for the Galati WWTP is a farmland of about 25 ha area. This land area is considered sufficient to provide all the facilities required for the preliminary, primary and secondary treatment. There will be a space for any future plant expansion facilities.

The surrounding areas of the plant site are agricultural lands and presently neither residences nor major structure exists within 300 m from the site.

### (2) Seismology

Galati town belongs to a seismic macro-zone of VIII degree according to the Romanian standard STAS 11100/1 – 77. According to the calculation Normative P100-1992, Galati town territory correspond to the calculation seismic zone "C" with a coefficient  $K_s$ =0.2. The corner period is  $T_c$ =1.5s.

### (3) Soil

There are a few types of soil in the area: carbonated chernozem is dominant but there are also colic sands and lacustrine sand depots in the area located between the rivers. There are alluvial soils associated with hidromorphe soils on an important area in the city location, on river meadows. As a rule these soils are frequently subject to gleization being situated in the valleys that are periodically flooded and have the phreatic layer at low depth. Interruption of their solidification process due to the continuous disposal of new sediments at each flood event is another characteristic of these soils. Also they are usually relatively fertile being well supplied with nutrients from the sediments that primary are soil material from the catchment area. The alternatively stratification is the reason for crossion processes probability.

### 2.2.3 FLORA AND FAUNA

### (1) Terrestrial and Aquatic Vegetation

The Galati city area is located in the steppe zone which is characterized by secondary lawns with Botriochloa ischaemum or Andropogon ischaemum, Poa bulbosa, Artemisia austriaca, Eophobria stepposa, Stipa copillata, Festuca valesiaca. These vegetation types are living only

on small areas, the dominant flora consisting of agricultural vegetation. In the rivers' meadows there are hygrophilias grass associations (Agrostis stolonifera, Agropyron repens, Alopecurus pratensis), poplar trees and willow trees.

The wild graminaceae are predominant species on the natural meadows. Some other floral species such as shepherd's purse, knot grass, whirlwind, bristle grass, dandelion, wormwood etc. could be also found.

Wood vegetation species like sole tree bushes, small wild cherry, small almond tree, and black nut tree could more rarely be met.

Tree vegetation is less represented in this area. There are although some meadow river forests formed primary by willow and poplar and secondary by oak and other species.

Psamophyte vegetation species like camomile and sand willow grow spontaneously on the sand dunes.

Halophyte vegetation well developed in Galati southern zone is the only one capable to grow in the salty soil. It is disposed in circular zones or patches according with the salinization degree and is represented by some small plants with a thick red.

The aquatic vegetation is represented mainly by a large number of floating and submerse species from hydrophyte group as well as by plankton and macrophyte. Along pools and irrigation canals banks grow bulrush, reed, sedge, Dutch rush and so on.

### (2) Terrestrial and Aquatic Fauna

Both sedentary and migratory animals live in the area. The human actions like steppe upturning and realization of irrigation system have been followed by fauna changes:

• some species disappeared;

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- individual number of other species decreased: wolf, wild turkey, pelican;
- some species have migrated to other places;
- other species accommodated to life conditions on irrigation canals or cultivated fields: for instance wild ducks feed with sunflower seeds.

The most numerous mammals are the steppe type ones: ground squirrel, steppe polecat, striped mouse, dear, pheasant, enot dog, scolopendra, field mouse, steppe mouse, rabbit, hamster. Of hunting interest are muskrats that can be found in large number.

Dears, foxes and rabbits could be hunt in the forests. Many water and forest species of birds both sedentary and migratory populate Galati zone.

Around the waters live duck, big geese, seagull, heron, lapwing, white-fronted goose, snipe, moor hen, woodcock, eastern flossy ibis, etc. Swans nestle on the Insula Mica (Small Island) and even on some lakes. Many starlings live in steppe and in some villages. A large part of them migrate in the autumn.

One can meet also quail, partridge, bee eater, sparrow hawk, turtle dove, buzzard, fisher eagle and little owl individuals but not so many of them. Wild cock, crow, magpie, skylark, nightingale, tit and so on live in forests.

The aquatic fauna is dominated by carp and migratory fish in the Danube River (great sturgeon,

mackerel). Local fishes are carp, crucian carp, sheatfish, pike perch, barbel, tench, pike, lake herring, bleak, roach, pope. Among the migratory ones some are of economic importance: sterlet, sturgeon and herring. Population individual number of some fish species like pike, sturgeon, sheatfish and zander has decreased during the last two decades.

### 2.2.4 WATER RESOURCES

### (1) Ground Water

Two aquifer layers could be identified.

- The phreatic layer taking refuge in the sandy level placed at the basis of loessial level. The
  natural water supply source of this layer is the precipitation water infiltrated through the
  loess grains and stored in here due to the impermeable clay layer found underneath at a
  depth around 20 m.
- The aquifer layer of average depth, of ascending type, in the lower sand and gravel level. Its water supply source is the Danube River that influences the underground water regime of the entire Galati town platform zone.

An important general raising of the phreatic layer level from 10 - 11 m to 3 - 4 m under the terrain surface has been registered in this area in the last 10 - 15 years. The phreatic layer contained initially in the sandy level has gradually raised up immersing the lower part of the loessial level.

The cupola hydrostatic level reaches a maximum value during spring and a minimum one in autumn especially in October.

The main causes of hydrostatic level increasing in Galati town area are as it follows:

- 1) raised hydrostatic level in the Low Siret Plain area;
- 2) geological formations of the first aquifer layer are fine and dusty sands the minimum value of their thickness being of 1 m in the Danube flood plain area; these formations reduce very much the hydraulic section of water discharge into the Danube;

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- 3) the permeability coefficient of the same layer is 10<sup>-5</sup> m/s which indicates a medium that permits only a slow water movement;
- 4) the highest values of the hydraulic gradients are 1:100 having direct implications on the water retention;
- 5) underground water retention in cupola form is a phenomenon specific to the large urban settlements located on loessial platform as it is also the case of Galati town;
- 6) leakage from the urban water supply and sewage system;
- 7) existence of buildings and asphalt cover of the streets that hinder the evapo-perspiration process;
- 8) permeability coefficient of the clay dusts that cover the Galati platform area has a small value of 10<sup>-5</sup> m/s which does not permit a rapid drainage of the leakage to the underneath sand level.

It is thought that causes 6) and 7) are the main ones of the raising of hydrostatic level in Galati town area.

The Danube River influences mainly the cupola found in the flood plain zone. Other level increases are not expected but a supplementary water contribution could expand the cupola surface.

Underground water quality in the site as resulting from ICIM measurements performed for this study purpose area is presented in the Annex 3. As it can be seen the parameters analyzed respect the Romanian Standard 1342/91 – "Drinking Water", except: turbidity, color, iron, manganese, aluminum, lead, ammonia, organic substances and all bacteriological parameters.

### (2) Surface Water

### Rivers

The surface water sources are dominated by three big collectors: Siret, Prut and the most important Danube. The Danube River is bounding the county on 20 km, between the junctions with Siret River and Prut River. The multi-yearly medium flow is about 6100 m<sup>3</sup>/s. The maximum volume (34% from yearly volume) in reached on spring and the minimum (18% from yearly volume) on autumn. Considering the necessities the river quality should be in the I category, but because the registered pollutants concentrations the river quality is in the II category.

Siret River is discharging into Danube River just upstream the Galati City, with a multi-yearly medium flow about 230 m<sup>3</sup>/s in that section. The maximum volume (48% from yearly volume) is reached on spring and the minimum (12% from yearly volume) on autumn. Because the registered pollutants concentrations, the river quality is in the II category.

Prut River is discharging into Danube River downstream the Galati City, with a multi-yearly medium flow about 110 m<sup>3</sup>/s in that section. The maximum volume (45% from yearly volume) in reached on spring and the minimum (12% from yearly volume) on autumn. Because the registered pollutants concentrations, the river quality is in the II category.

### Lakes

Brates Lake is the biggest and the most important lake in the area with a surface of about 24 km<sup>2</sup>, between Galati City and Prut river. It is used for fishing and recreational purposes.

### 2.3 IMPACTS ON ENVIRONMENT

### 2.3.1 IMPACTS ON SOCIOECONOMIC CONDITIONS

### (1) Water Rights and Rights of Common

As mentioned in previous section, at present all the wastewater used to be discharged directly into the Danube River through seven wastewater outfalls without any treatment. According to the F/S Study after WWTP being put into operation the existing outfalls will be closed and all of the wastewater will be collected and treated at WWTP, and the pollution load discharged to the Danube River will be reduced obviously. Therefore, the project implementation will not create the impact on the fishing rights.



Before and after the project implementation, there are no changes about the volume of wastewater discharged to the Danube River. Besides this, the intake for water supply system of Galati City is located in the upstream of 8 km from the center of the City, and the nearest intake in the downstream of Galati City is far from WWTP outfall. Therefore, it could be considered that the effect of wastewater on water rights is negligible.

In Galati there is one swimming pool which is located on the left side of the Danube River bank between the sewer outfall No. 4 and No.5, and there is only one unauthorized swimming area on the right side of the Danube River bank in the ferry-boat area. In addition, the inhabitants usually swim along the Danube River bank where are unauthorized areas by the local health authorities. However, as mentioned above in the future the existing outfalls will be closed and all of the wastewater will be collected and treated at WWTP, then discharged at the downstream of the City. It is estimated that the rights of common will be improved by the project implementation.

### (2) Public Health Condition

### Treated Wastewater

The results of wastewater characteristics survey at existing outfalls along the Danube River reach of Galati City revealed that the number of total Coliform Group in raw wastewater, which now is discharged directly into The Danube River, is about  $1 \times 10^6$  no./100ml to  $1 \times 10^8$  no./100ml. While the number of total Coliform Group in The Danube River (1 km downstream from the outfall of proposed WWTP, Aug. 1999) is  $4.3 \times 10^3$  no./100ml to  $4.9 \times 10^3$  no./100ml, which has exceeded the standard ( $1 \times 10^2$  no./100ml, STAS 12585/1987) of water for swimming purposes.

According to the F/S Study after WWTP being put into operation all of the existing outfalls will be closed and all of the wastewater will be collected and treated at WWTP. The number of total Coliform Group in WWTP effluent will be meet the standard ( $1 \times 10^6$  no./100ml, NTPA 001) of wastewater discharged in water resources. Hence, during WWTP operation stage the public health condition will be improved certainly.

### Sludge

The excess sludge generated from WWTP will be transported and disposed at the Solid Waste Disposal Site (SWDS) located in the southwest of the City about 4 km from the center of the City constructed in 1998. The impacts of excess sludge will be discussed in following paragraph.

### (3) Waste

The area of existing SWDS in Galati is about 2 ha. And the capacity is estimated to be about 200,000 m<sup>3</sup>. In addition, the results of wastewater characteristics of leachate from SWDS in Galati indicated that the concentrations of the organic substances (BOD5: 4,135 mg/l, COD<sub>Mn</sub>: 8,780 mg/l), NH<sub>4</sub>-N (635 mg/l) and oil (580 mg/l) have exceeded the standard (NTPA 002/1997) of wastewater discharged into municipal sewage system substantially. Meanwhile, the number of total Coliform Group in the leachate is also relative high (3.5×10<sup>8</sup> no./100ml). All of these may contribute a negative impact on groundwater. Therefore, a new SDWS plan properly designed and managed from the environmental viewpoint, or searching for other disposal routes such as agricultural use or incineration etc. are considered to be necessary, taking into account the groundwater pollution problem and the volume of excess sludge (108

m<sup>3</sup>/d or 21.6 t/d) generated from WWTP.

### (4) Hazards

The results of geological survey indicated that the surface (0 to 1m) at WWTP site is vegetable soil and the bottom (1 to 10 m) is soft plastic black and grey clay, and N-value of WWTP site ranges from 15 to 50. Taking into consideration the WWTP site locates in the seismic region, a careful assismatic structure design will be considered in the planning and design of the wastewater treatment facilities.

Biogas resulting from sludge digester is a potential explosive fuel. So in some conditions there exists the possibility of producing accidents with major effects both on facility operation and maintenance staff (such as burning, different physical or mental injuries sometimes even lethal) and on technological objectives. Receiver water and/or soil and subsoil in the area might be affected by spillage of liquids following the breaking or destruction of technological objectives.

These events may appear in case of the incorrect operation and maintenance of sludge fermentation tanks and/or of biogas tanks.

In addition, the chlorination process is to be carefully controlled, avoiding overdosing of chlorine and by respecting the operation and maintenance instructions.

### 2.3.2 IMPACTS ON NATURAL CONDITIONS

### (1) Topography and Geology

No significant changing of the existing topographic condition in/around the WWTP site is identified. Based on the results of geological survey, soil in the WWTP site may be considered to be soft at some extent for supporting the structures, thus appropriate types of foundation should be considered for the structural plan.

### (2) Groundwater

As shown in Table All.8.4, the results of groundwater survey at/around the SWDS indicated that the number of Coliform Group ranged from  $9.2 \times 10^2$  no./100ml (upstream) to  $1.6 \times 10^4$  no./100ml (downstream), which already exceeded the standard (under 10 no./100ml, STAS 1342/1991) for drinking water, and the groundwater around the SWDS has been polluted at some extent, especially for the Coliform Group. Hence some countermeasures for protecting groundwater from pollution should be considered.

Table All.8.4 Quality parameters of the groundwater in the Galati solid waste disposal site

Parameters	Max.	Upstream	Downstream 1	Downstream 2
[14] [14] [14] [14] [14] [14] [14] [14]	Desirable-	OfSWDS	Of SWDS	Of SWDS
	Max. Permissible			
Color Park Agents	2-2	2.0	2.4	2.9
pH	6.5~7.4-8.5	7.72	7.90	7.70
SS (mg/l)	Taking in the s	12.05	18.30	16.20
Ammonia (mg/l)	0-0.5	0.01	0.01	0.38
Magnesium (mg/l)	50-80	80.15	80.20	87.50

Turbidity	5-10	9.7	28.5	9.4
Total number of bacteria at 37°C UFC/cm <sup>3</sup>	Under 300	Over 300	Over 300	Over 300
Coliform bacteria/100 cm <sup>3</sup>	Under 10	920	16,090	1,609
Fecal Coliforms/100 cm <sup>3</sup>	Under 2	94	1,609	240
Fecal streptococcus/100 cm <sup>3</sup>	Under 2	26	79	33

### (3) Hydrological Situation

According to F/S Study the flow rate (3.3 m<sup>3</sup>/s, maximum hourly flow) of effluent from WWTP is insignificant comparing with the flow rate of the Danube River (1,380 m<sup>3</sup>/s, drought-period flow). The effects of treated wastewater on hydrological situation of Danube River are negligible.

In addition, based on the design effluent flow in F/S Study, the pollutant diffusion and dilution characteristics are analyzed by using "MIKE 11" model, created by Danish Hydraulic Institute-November 1992, Version 3.01. The calculation results indicated that complete mixing is achieved at a distance of 3 km downstream of WWTP outfall in all cases studied here.

### (4) Fauna and Flora

Galati town WWTP is provided to be located on a site used now for agricultural purposes. Obviously the type of land use will be changed so the crop plants and the associated little fauna will disappear.

The disturbance of the biological equilibrium in an aquatic ecosystem depends on the polluting substances nature and their discharged quantities, the frequency they are discharged, their mode to go into the emissary, the way the effluent and the emissary water are mixed, the dilution process, and so on. These factors are determined by a few conditions, some of them concerning the effluent and the others concerning the emissary.

According to the reports about the control sections of Danube River, elaborated by Regia Autonoma Apele Romane on the basis of the performed biological analysis, results that the Danube water quality in these sections is within the  $\beta$ - mesosaprobic category, by the degree of saprobity. The presence of the  $\beta$ - mesosaprobic category biocenosis indicates that the water self-purification process is normal.

From the biological point of view, this area is characterized by a high plants and animals diversity, the number of species being high and the individual number being generally low; the "water blooming" is rarely observed.

In that area there are many species of chlorophyll a, represented by algae, diatoms and macrophyte. The best developing protozoa are the ones sensitive to the organic matters loading (some species of Heliozoa and Suctoria). There are Sponges, Bryozoa, Coelenterata and most of the Gasteropada, Lamellibranchiata, Crustaceans and Insects larvae species, too. Vertebrated species are represented by most of the amphibians and fishes.

The biological indicators in this area belong to Cyanophyta (species of Microcystis, Gloetrichia, Oscillatoria, Nostoc, Aphanizomenon), Diatoms (species of Melosira, Diatoma, Fragilaria, Synedra, Pinnularia, Nitzschia, Surirella, aso.), Rhizopoda (species of Amoeba), Flagellata (Synura uvella and Uroglena volvox), Ciliates (Paramaecium bursaria, Didinium nasutum,

Coleps hirtus, Aspidisca costata, Vorticella campanula aso.), Rotatoria (Brahionus urceus, Monostyla hmaris).

Specific macroinvertebrates are: worms (Stylaria lacustris, Dendrocoellum lacteum), mollusks (Ancylus fluviatilis, Pisidium cinereum) and insects (Cloeon dipterum, Habrophlebia lauta, Hydropsyche lepida, Potamanthus luteus).

There is an abundant periphyton with many diatoms (Navicula rhynchocephala, Synedra acus, S. ulna, Pinnularia viridis) on the Elodea, Lenma, Ceratophyllum stalks and leaves; there are green algae (Ulothrix zonata, Cladophora crispata, spécies of Closterium), on different objects and plants.

The "water blooming" process is sometimes developed due to the excessive growing of some Cyanophyta species: Oscillatoria agardhii, O. redekei, Microcystis aeruginosa, M. flos-aquae, Aphanizomenon flos-aquae.

A general feature of the organisms that belong to the  $\beta$  - mesosaprobic category is a higher sensitivity to the decrease of the dissolved oxygen concentration, to the pH variation and to the toxic substances generated by the decomposition processes.

Since the WWTP will ensure the effluent quality required by the Romanian Standards it could be appreciate that no negative consequences on the aquatic flora and fauna within Danube River and/or Danube Delta area are to be expected.

### 2.3.3 ENVIRONMENTAL POLLUTION

### (1) Water Pollution

In the period of July 1999 ICIM carried out an industrial wastewater survey and analyzed for the wastewater discharged from more than 13 representatives industrial units. The results (Annex 6 and Annex 7) revealed that the concentrations of toxic materials, which may effect biological process for wastewater treatment, are under the standard of NTPA 002/1997. This can leads the conclusion that industrial wastewater will don't contribute a significant impact on WWTP influent characteristics.

### **Environmental Impact during Construction Period**

During construction period the sanitary wastewater generated from site administration house may affect environment temporarily. Therefore, this part of wastewater should be collected and treated by some appropriate.

During the construction stage, every precaution shall be taken to prevent the spillage of waste form construction sites to the nearby waterways. There will be no major facility applied during construction that may affect the surface or the ground water. Routes, directions and hydraulic conditions of the streams and stormwater drains, presently discharging water to the Danube River, need not to be changed due to the construction works. The construction of all the different elements of the interceptor sewers has no direct impact on the quality of the surface water. There will be no major construction activities in streams or drains, except outfall structures. Although the works in the streams or drains could be minimized to the extent practicable, unavoidable activity may take place in the riverbed during the low-flow season.

The effluent outfall structure should be of such that can divert and disperse surface water flows to prevent erosion and to protect slopes of the riverbank. The structure should be lined and provided with energy dissipaters at discharge points to avoid erosion.

Storm water runoffs from the construction site should be collected and drained through properly designed drainage ditches to the nearby streams or other waterways.

Overall, during the construction period no appreciable adverse impacts to the surface water or ground water in/around the construction site are identified.

### **Environmental Impact during Operation Period**

SS Concentration (mg/l)

SS Load (ton/year)

The quantities of pollutant load reduction by the project implementation are estimated in Table All.8.5 based on the F/S Study. From this table, 8,176 tons of BODs and 9,344 tons of SS per year (in target year, 2010) will be no more discharged into Danube River, so the impacts on the water quality during WWTP operation will be a positive one.

Effluent Characteristics Without Project With Project Reduction Average Flow Rate (m<sup>3</sup>/d) 200,000 200,000 Ó 130 18 112 BOD Concentration (mg/l) 8,176 BOD Load (ton/year) 9,490 1,314 128 22 150

1,606

9,344

10,950

Table All.8.5 Estimated pollutant load generation and reduction (2010)

Moreover, 1,314 tons of BOD5 and 1,606 tons of SS per year (2010) will be discharged into the Danube River with WWTP effluent. In order to assess the impacts of effluent on the receiving water - the Danube River, pollutant concentrations in the mixture formed by the Danube River and WWTP Effluent have been simulated, taking into account river self-purification process and especially phenomena like pollutant diffusion, dilution and dispersion that contribute to this process. The results of simulation are presented in the Table All.8.6, which shown that the maximum concentrations of BOD5 and SS at downstream of complete mixing section (about 3 km downstream from the outfall of proposed WWTP) will be under the Maximum Allowable Concentration (MAC) of second quality category in STAS 4706/1998 (surface water quality).

Table All.8.6 Maximum concentration of pollutant in the mixture

Receive Flow (1	n <sup>3</sup> /s)	Q <sub>min</sub> =1,380		Qavg=6,400	
Effluent Flow (1	m <sup>3</sup> /s)	Q <sub>d</sub> avg=2.31	Q <sub>h max</sub> =3.30	Q <sub>d avg</sub> =2.31	Q <sub>h max</sub> =3.30
Item	MAC for II - Category		centration on the outfa	ne complete mix all of WWTP)	king section (3
BOD (mg/l)	7	6.84	6.85	6.80	6.81
SS (mg/l)	60	60	60	60	60
NH4 (mg/l)	3	2.75	2.79	2.22	2.25

It should be pointed that the total nitrogen and phosphorous concentrations of the effluent exceed the MAVs mentioned in NTPA 001 as shown in Table All.8.1. There are three aspects which must be considered:

- 1) The Danube River has a high capacity of uptaking these elements by dilution (in drought-period the dilution factor is more then 500:1), so the change of water quality is an out of the question issue.
- 2) Dilution principle is accepted in special courses (GD 730/1997, Art.4, para.7)
- 3) Providing denitrification and phosphorous removal unit operations in the treatment process appears to be unrealistic to the following reasons:
- The investment cost will be almost doubled for achieving negligible results as for as environmental protection is concerned;
- Risks to get bad effects on environmental due to complicated operation of denitrification process, and
- The implementation of denitrification and phosphorous removal processes looks too ambitious for not stringent requirements (there is no denitrification process applied in any WWTP in the country, nor in the other riparian countries).

Nevertheless, these steps of treatment are to be considered in the next stage of design.

In conclusion the impact on the water environmental during WWTP operation will be a positive one, if the plant will operate on the designed conditions.

### (2) Soil Pollution

To estimate the concentrations of typical heavy metals in excess sludge from proposed WWTP and to evaluate the concentrations of heavy metals in the soil in/around the WWTP site and sludge disposal site, a survey on soil and sludge from existing WWTP of Roman and Constanta is carried out. The results are summarized in Table AlI.8.7.

Table All.8.7 Summary of heavy metals in soil (Galati) and sludge (Roman and Constanta)

	Soil (Gal	ati) ···			Sludge	in existi	ig WWTF	
Item	WWTP	Sludge Disposal site (Inside)	Sludge Disposal site (outside)	Max. Desirable - Max. Permissible	Min.	Max.	Averag e	Max. Permissible Values of Standard
C <sub>d</sub> (mg/l)	0	3.25	0	1-5	0	0 .	0	10
C, (mg/l)	12.5	140	6	30-300	0	0	0	500
C <sub>u</sub> (mg/l)	3.5	134.25	3	20-250	28	137	66	500
M <sub>n</sub> (mg/l)	210	280	155	900-2,000	: - : : : :	*. 1744 .**	7 - 1 - 1 - 1	* 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
N <sub>i</sub> (mg/i)	11.5	34.25	16.5	20-200	0	0	0	100
P <sub>b</sub> (mg/l)	29.5	180	7.9	20-250	8 :	102	53	300
$Z_n$ (mg/l)	415	580	290	100-700	243	1,600	645	2,000

The analysis results indicated that the concentrations of heavy metals in the soil (WWTP site, solid waste disposal site and agricultural field) and sludge generated in existing WWTP of Roman and Constanta are under the Romania Standard. This creates a possibility to utilize digested and dewatered sludge in agriculture. In present there are not standards concerning the quality of the sludge that could be deposited on the agricultural field as fertilizer, but there is a proposal that will be approved in the near future. The proposal has been taken into

consideration the present study, and all the results obtained from the sludge analysis are compared with the values from the proposal (the proposal is based on EU regulations).

### (3) Offensive Odor

According to the results of measurements for odor in/around the WWTP site as shown in Table AII.8.3, the concentrations of H<sub>2</sub>S (0.0006 mg/m<sup>3</sup>), NH<sub>3</sub> (0.018 mg/m<sup>3</sup>) and odor level (Level 1) on the WWTP boundary fence are under Romania Standard 12574/1987 (H<sub>2</sub>S: 0.015 mg/m<sup>3</sup>, NH<sub>3</sub>: 0.3 mg/m<sup>3</sup> and odor level: Level 5). These results show that hydrogen sulfide and ammonia concentrations as well as the odor level in/around the WWTP site are keeping at a relatively low level.

In WWTP the odor may be emitted from wastewater treatment units, but the majority of it comes from the sludge handling system such as digesters, sludge gas facilities and dewatering equipment. At this stage it is difficult to predict exactly the odor levels in/around Galati WWTP site, however, the survey of odor levels from existing WWTP site in other cities may deserve reference. Table AlI.8.8 presented the results of measurements for odor in/around existing WWTP site.

Table All.8.8 Analysis results of odor in existing WWTP site (July 1999)

City	Parameter	Boundary fence	50m from boundary fence	150 m from boundary fence	Limits for 30 minutes sampling period according to RS 12574/1987
	H <sub>2</sub> S (mg/m <sup>3</sup> )	0.45	0.48	0.42	0.015
Roman	NH3 (mg/m <sup>3</sup> )	0.33	0.35	0.35	0.3
	Odor Level	4	4	4	5
	H <sub>2</sub> S (mg/m <sup>3</sup> )	0.35	0.05	0.033	0.015
Constant a	NH3 (mg/m <sup>3</sup> )	0.3	0.11	0.10	0.3
	Odor Level	4	3	3	5

Source: ICIM

The values in Roman WWTP exceed the Romania Standard and that not only due to the sludge treatment in the plant but also to the activity of a carcass animal disposal factory (animal feeding meal) located near the plant. While there are not other odor sources around Constanta WWTP. Therefore, it is feasible to assess and predict the impacts of odor in Galati WWTP using the results of Constanta WWTP.

According to Table All.8.8, although the concentrations of H<sub>2</sub>S (0.35 mg/m<sup>3</sup>), NH<sub>3</sub> (0.3 mg/m<sup>3</sup>) and odor level (Level 4) on Constanta WWTP boundary fence exceed the Romania Standard, the odor levels at 150 m from boundary fence would generally be within acceptable levels. In addition, considering the facts that the distance from Galati WWTP site to the housing areas is more than 300 m, there are no inhabitants on the leeward of WWTP site, and following countermeasures will be taken, therefore no serious impacts are identified.

1) A particular attention will be given to prevent emission of such odors from dewatering
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- equipment rooms by providing efficient forced ventilation system, and to ensure against the escape of sludge gas from digesters.
- 2) Appropriate type of scrubbers will be provided for the removal of hydrogen sulfide from the digester gas. In addition, a waste gas burner for the digester gas control system will prevent any direct emission of sludge gas into the atmosphere. All the waste gas will be burned.

### 2.4 RECOMMENDATIONS FOR MITIGATING ACTIONS AND MONITORING PLAN

### 2.4.1 GROUNDWATER AND WASTE

- It is necessary to plan and construct a new solid waste disposal site, considering the groundwater pollution problem and the capacity of existing SWDS as well as the volume of excess sludge generated from Galati WWTP.
- 2) Groundwater insulation-type landfill disposal plant is recommended to protect groundwater from polluting. In this case it is recommended to install the leachate collecting system and to discharge leachate after to be treated, especially disinfection treatment.
- 3) The groundwater quality (at least Cl<sup>-</sup>, COD<sub>Mn</sub>, Coliform Group and typical heavy metals) should be checked 2 to 4 times per year in order to understand the change of groundwater quality.
- 4) With the background that an increase in agricultural utilization and incineration and a reduction of landfill for sewage sludge is forecast, it will be recommended to consider incineration or the utilization of sewage sludge in agriculture. In this case the load limiting values of EU Sewage Sludge Directive can be applied as alternative to sewage sludge limiting values in order to maintain the soil limiting values of heavy metals.
- 5) The characteristics (Cd, Cr, Cu, Pb, Hg, Ni and Zn) of dewatered sludge from WWTP should be checked at least 4 times per year.

### 2.4.2 WATER POLLUTION AND PUBLIC HEALTH CONDITION

- 1) It is recommended to establish a monitoring system to check the water quality of Danube River at main swimming area, intake for water supply as well as the downstream and upstream reaches of WWTP outfall.
- 2) The detail plan (such as monitoring point, analysis items and sampling frequency etc.) should be made in cooperation with the Galati Municipality.

### 3. ANNEXES

### 3.1 REFERENCIES

- [1] EPA Tulcea, Report on the State of Environment in the County of Tulcea, 1995
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### 3.2 **ABBERVIATIONS**

ÁF = Average Flow = Agentia de Protectia Mediului **APM** BOD = Biochemical Oxygen Demand = Compania Nationala "Apele Romane" (National Company "Romania **CNAR** Waters") DAF = Daily Average Flow = Daily Maximum Flow **DMF** DSP = Directia de Sanatate Publica (Public Health Directorate) EEA = European Environment Agency **EPA** = Environmental Protection Agency GD = Government Decision ICIM = Institutul National de Cercetare Dezvoltare pentru Protectia Mediului Bucuresti (Research and Development National Institute for Environmental Protection) JICA = Japan International Cooperation Agency

MAC = Maximum Allowable Concentration

= Multi-annual Average Flow MAF = Maximum Allowable Value MAV

MO = Ministerial Order

MWFEP = Ministry of Water Forest and Environmental Protection

NCS = National Commission for Statistics

**NMVOC** = NON Methane Volatile Organic Compound

NTPA = Norme tehnice pentru protectia apei :

= Societate pe Actiuni (Economic Unit by Shares) SA

SC = Societate Comerciala (Commercial Unit)

SC ACET SA = Societatea Comerciala Apa Canal Tulcea

SS = Suspended Solids

STP = Standard Temperature Pressure

SWDS = Solid Waste Disposal Site

T-N = Total Nitrogen

TNWP = Technical works for Water Protection)

T-P = Total Phosphorous

VOC = Volatile Organic Compound

WWTP = Wastewater Treatment Plant

### 3.3 RESULTS OF SURVEY

Results of EIA survey, such as soil, sludge, groundwater, leachate from existing solid disposal site, industrial wastewater and air, are summarized in Table All.8.9 to All.8.15.

Max. Desirable (MD) - Max. Permissible (MP) 100-1,000 900 - 2,000 100 - 700 20 - 200 30-300 20 - 250 20-250 Average 0.65 8.04 323 355 407 Ę 7 7 4 8 429.20 134.25 34.25 500 Max. 8.49 3.25 475 580 40 80 Xii. 7.42 143 155 7.5 205 5,5 0 0 0 Tulcea Sludge Disposal Site (Outside) 20.95 15.25 312 12.5 355 280 7.8 3.5 ጜ 0 Tulcea Sludge Disposal Site (Inside) 21.75 168.8 40.25 7.89 1.75 465 8 548 65 3 Tulcea WWTP 21.25 7 94 8.25 365 143 205 ~ 0 0 5 Galati Sludge Disposal Site (Outside) 8.18 16.5 16.4 230 155 290 7.9 Ó φ Galani WWTP Galari WWTP Galahi Siudge No.1 (Free Pumping Station Disposal Site Zone) No.3 Area (Inside) 134.25 429.2 1500 34.25 8 42 3.25 ₹ 5 280 580 8 Galati 14.25 8.02 10.21 208 13,8 17.5 254 380 2.8 Ö 11.48 12.5 7.42 8 210 11.5 29.5 415 3.5 0 Summary of Analysis Results for Soil Braila Sludge ( Disposal Site 1 (Outside) 10.4 170 380 210 8.01 δ, 0 Braila Sludge Disposal Site (Inside) 40.75 24.75 8.49 44.6 82.6 89 1.5 8.9 475 420 Braila WWTP 21.18 5.75 270 8,2 246 435 0 ^ 0 R.S. 7184/13-79 R.S. 7184/7-87 Analysis Method AAS Method AAS Method AAS Method AAS Method Total hydrocarbons in oil (ppm) (R.S. 7877/87 AAS Method AAS Method AAS Method Electrical Conductivity (µS/cm) Table All.8.9 Parameters Manganese - Mn (ppm) Chromium - Cr (ppm) Cadmium - Cd (ppm) Copper - Cu (ppm) lickel - Ni (ppm) cad - Pb (ppm) Sinc - Zn (ppm)

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	Ror	Roman Wastewater Treatment Plant	tment Plant		Const	Constanta Wastewater Treatment Plant	atment Plant					
Parameters	Crude Sludge from Mechanical System	Crude Sludge from Biological System (Activited Sludge)	Digested Sludge	Dowatored Sludge	Crude Sludge from Mechanical System	Crude Sludge from Biological System (Activited Sludge)	Digested Sludge	Dewatered Sludge	Min.	Mux	Average	Max. Permissible Values Proposed in Romania Sundard 1988 (MP)
Ho	6.22	6.41	6.67	6.75	6.8	6.5	7.5	6:39	. 6.22	7.5	6.73	
Total Nitrogen (% of weight rel. to TS)	2.68	2.41	1.71	1.52	5.73	4.93	2.29	2.18	1.52	5.73	2.93	
Total Phosphorus (% of weight rel. to TS)	1.08	1.06	0.51	0.36	2.03	1.33	0.67	0.58	0.36	2.03	0.95	•
Water content (105 C) (% of weight)	91,25	99.55	95.24	74.24	89.2	95,53	68.66	58.48	58.48	68.66	87.92	
Solids - TS (% of weight)	8.75	0.45	4.76	25.76	10.8	4.47	11.0	41.52	0.11	41.52	12.08	
Organic Substances (550 C) (% of weight rel. to TS)	64.96	65.27	55.96	25.73	72.47	70.52	48.66	21.26	21.26	72.47	53.10	
Mineral Substances (550 C) (% of weight rel. to TS)	35.04	34.73	44.04	74.27	27.53	29.48	51.34	78.74	27.53	78.74	46.90	
Cadmium - Cd (mg/kg TS)	0	0	0	0	0	0	0	0	0	0	0	01
Chromium - Cr (mg/kg TS)	0	0	0	0	, 0	0	0	0	0	0	0	200
Coppor - Cu (mg/kg TS)	60.37	28.09	32.24	88.05	137.41	58.34	48.18	71.42	28	137	99	200
Nickel - Ni (mg/kg TS)	0	0	0	0	0	0	0	0	0	0	0	100
Lead - Pb (mg/kg TS)	48.45	12.7	8,45	80.82	93.31	43.31	38.54	101.52	8	102	53	300
Zinc - Zn (mg/kg TS)	666.75	243.4	247.2	1.157.23	1007.64	307.69	294.64	1,600,35	243	1.600	645	2.000
Calorific Value (kJ/g TS)	17.2	16.8	. 16.2		18.7	19.2	17.3	•	16	. 61	8	

Table All.8.11 Summary of Analysis Results for Groundwater

and the control of		200				1000							
			Hradin					Calati					1000
Parumeters	WWTP Uprurenm	WWTP	Sludge Duposal site Opatrean	Studge Deponsi ate Downstream 1	Studge Disposal aits Downstream 2	wwrp Uparream	WWTP Downstoan	Studge Duposid nie Upetreun	Nudgo Durponut nte Downstream 1	Shidge Disposal nue Downstream 2	Controlled Landfill Unwrenn	Controlled Lindship Downstream	Milk. Destrated (MD) - Max. Permusible (MP)
Aspect	Clear supernatura, high		Clear	Clear supernatant	Cleur supematant	Turbid rupematurt, yellow red	Turbid supernature, yelllow -red	Clent	Opalescent	Opalescent	Clear	Cheir maperialant; yellow -red sodiment	
with the state of	Translitor of the Control	D. S. C. Carlonard	1.2	10		\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	45.02	\$61	2.43	28.2	5:0	33	2.2
Curbidity (grade SiO.)	•		4.44	9.	535	t	r	٤.	30.05	9			2.2
Seconded solids (moddm <sup>3</sup> )	151.560	11.580	34.55	46	115.15	118.55	121	12.05	£.81	16.2	32	333	
pH at 20°C (units)	6.93	7.7	7.74	7.X	7.2x	7.42	7.53	7.72	7.9	7.7	7.68	2,75	6.5~7.4.X.S
Conductivity ( u. Nom)	2,306	1,802	XX6.6	1,369.50	1,250.10	1207.14	1,225,36	X05.6	814.5	1,253	11/2	χζζ	1000: 0001
Total sulphudes - upitated sample (as H <sub>2</sub> S) (mg/dm <sup>3</sup> )	136,3270	861				20'0	\$0'0	•	•		•	7.82	0-0.1
Carbon Dioxide (mol/trn <sup>3</sup> )	23.6	10.25	2.45	3.6	2.02	17.32	17.6	2.24	2,2	1.76	1.0	2,95	
Temperature (C)	92	16	17	16	12	18	18	12	16	16	11		22/normal
CATIONS													
Caloum - Cu (mo/dm)	33.00	157.11	46.1	76.15	70.61	X5.26	XX.17	47.45	48.1	60.12	20 04	100.7	100 - 180
Magnesium - Mofmo/dm <sup>3</sup> )	<b>\$</b>	111	\$4.6%	1092	284	65.23	65.6	54.08	80.2	87.5	10.23	20.73	S0 - K0
Sodium and Potamium - Na + K (mg/dm <sup>3</sup> )	262.1	209.12	169.2	202.8	169.7	149.3	149.3	67.2	X9	239	165.2	170,46	
Iron - Fe (me/dm²)	1.404.10.0.0	×	0.2X	6	¥	**	3	0.0%	0.09	0.08	38.0	20.0	0.1-0.3
Manganese Ma (mg/dm²)	24.00 00.12	}_	0.105	0.176	0.144	<b>X</b> 0	6466	0.025	0.036	0.026	0.04×	1.2	0.05 - 0.3
(Aluminum – Al (mg/dm²)	1.072/0.04	0.792 / 0.152	0.064	960.0	960.0	0.243	2420	0.0%	0.12	0.0K	0.084	0.7n	0.05 - 0.2
Copper - Cu (mg/din²)	1.759/0-	0.325/0=	٥	0.003	0	0	0	0	٥	0	0	2012	0.05 - 0.1
Chremain - Cr (mg/dm²)	0.148/0	0.045/0=	0	0.005	900'0	100'0	0.002	200.0	0.002	0.009	0	0.104	9.05
Zine - Zn (me/dm³)	0.320 / 0.192 =	0.256 / 0.154 =	0.352	0.4KK	0.K	0.457	0,469	0.5	0.52	79'0	0.0%	217.0	5.7
Nickel - Ni (mg/dm³)	0.764 / 0.032 *	0.724/0=	o	220.0	0	0	0	0.003	0.003	0.004	0	03470	0.1
Cadminm - Cd (mg/dm <sup>3</sup> )	0.000047200	0.019 / 0.004 =	0	0.004	0.003	0.002	0.004	0.002	200'0	0.000х	¢	0.013	0.005
(Lend - Pb (mg/dm²)	- Jed'0/pc1'0	0.451/0=	0.02	0.025	0.035	r,09T	0.062	0.024	0.046	0.014	0	0.000	0.05
Ammonia – NH, (mg/dm)	***	₹.	0.07	0.13	0.16		<b>4.14</b>	0.01	0.01	0.38	0.45	04.65 SS	0-0,5
ANIONS and OTHER ITEMS													
Nitrites - NO. (mg/dm³)	0.00%	0.1	0.04	0.1	0.04	0	0	0.005	0.00%	0.05	0.03	0.037	6.0.3
Nitrates - NO <sub>1</sub> (mg/dm²)	5.37	0	1.72	5.3	1.74	1,44	1,84	4.15	3.07	31.16	25.	1.36	45
Chlorides - Cl. (mg/dm²)	205.6	150.7	58.5	166.62	5x.5	163	163.07	76.K3	ېخ	110	76.2	76.22	250 - 400
Biourbonates - HCO's (mg/dm³)	1,586.50	793.26	625.45	707.X	5.XZ9	738.34	744,44	512.57	518.67	549.18	417.00	427.14	
Carbonates - CO2, (mg/dm3)	0	. 0	0	0	0	0	0	٥	0	0	٥	0	
Sulphates - SO2, (mg/dm²)	116.25	66088	108.35	161,43	109.1	\$2.50	6	57.75	57.R	3%8	\$0.09	\$0.08	200 - 400
Total phosphates - PO? (mg/dm?)	0.347.0.005 =	3.14/0.46=	0.03	0.185	0.04	0.0%	0.098	9.0X	0.0x	0.00K	0.00.5	0.1x	0.1 - 0.5
Ovanide - CN (mg/dm²)	· · · · · · · · · · · · · · · · · · ·	0	0	o	0	0	0	0	0	0		9	0.01
Organic Substances - KMnO, (mg/dm²)	7.152 42.00.7	## TT 17 .	10.12		\$6.02	413	200	3.05	4.12	6.23	X.Y.		10 - 12
Oil and greate (mg/dm)	4.87	4.05	1.05	1.2	1.9	1.93	2.93	1.72	×	X0.7	0.07	10.3	
Phenois (mg/dm²)	Te	0.25	. 0	0	0	0	0	٥	0	0	0	0.015	0 001
Alkalinity-permanent "p" (mval/dm")	0.0	. 0	. 0	0	. 0	. 0	. 0	0	0	٥	٥	c	
Alkalinity - total "m" (mval/dm")	520/36	13	10.25	11.6	10.3	121	12.2	8.4	8.5	٥	\$X,0	7	
Aoidity (mvnl/dm²)	0	0	0	0	0	.io	0	0	0	0	3	0	
Disselved solids at 105 °C (mg/dm²)	1,005.56	13294	761.3	1,056.45	866	861.57	1,98	8.009 8.009	602	1,192.50	590.12	593.16	nen. 100/mah. 800 - enn. 70/max. 1200
Hardness - total (German degrees)	989	45.84	19.04	30.5	30.55	26.95	27.44	25.1.	. 252	28.6	x,9a	1X.2	20 - 30
BACTERIA				A COLOR OF THE	A CONTRACTOR OF THE SECOND SEC	A Company of the Company	1.0		-		_		
Total number of bacteria at 37°C UPC / em?	Die sein	DO: Jane	Day Jane	085 Sec	Care Janes	202 3700	GS 48%	Dog savo	JOE 4440	004.4	Of 1670	1898-100m	under 300
Probable number of coliform bacteria /100 cm	950,00	£	<b>3</b> 00 T	24.000	2,75	ge() e	age St	Q.	16,000	200	(§	54,280	mider 10
Probable number of coliform-thermotolerabil hacters (facel coliforms) / 100 cm²	36,296		n	D.T	1.	240	ar:	*	200T	Ř	11 53 5	ž	under 2
Probable number of feed streptococcus/100 cm <sup>3</sup>	9330	34,400	4	e		8		**	ę		Crv.	37,240	under2
* A manual Committee Commi													

Agrated Sample/Supernaturt of Sample

. Agrated Sample/Supernaturt of Sample
. means the parameters analysed not respect the Romaniun Standard 1342/1991

Table All. 8.11 Summary of Analysis Results for Groundwater

		,											
			Rrath					Calan				May all a second	7.00
Purameters	WWTP Upstreum	WWTP Downstream	Sindge Disposal	•	Stidge Disposal Shidge Disposid	WWTP Upereum	WWTP Downstream	Shidge Disposal	Sindre Disposal ate Downstream 1	Sindre Disposal Sindre bisposal site Downstream 1	Candida Candida Proteata	Controlled Landfill	Alax Permasable - Max Permasable - MP:
Aspect	Clear supermatent, high Clear supermatent, bigh consists of an investigation of an investigation of	(') ear sugar malaon, buth	Clear supernatant	Clear supernatant	lear supernatant Clear supernatan	Turhid supericated, yellkwy-red	Turbid superintaid, yelllow-red	Clear	Opalescent	Chalescent	Section of the sectio	To ment and another sections.	
Colour	1.0	24	3		\$3	\$5.58	25.53*	, vo.;	2.13	\$ .	- -		2.5
Turbidity (grade SiO, )			151	e e	25.5	23.04	E.	t.	88.82	87	-		3.5
Suspended solids (mg/dm²)	151,560	11,580	34.55	56	115.15	\$5.81;	121	12.05	18.3	10.2	Ş	55	
pH at 10°C (units)	16.0	72X	2,34	<b>x</b> t-	X.	<b>3</b> 72	3.50	7.72	1.9	1.1	Ne.	1.	0.5 C 7 A - N S
Conductivity ( a Norn)	2,306	30%,1	886.0	1,369.50	1,25010	1207.14	1,225.30	4.40x	V ::  X	1,253	77	×.	10001 3000
Total sulphides - agitated sample (as 14,8) (mg/dm <sup>1</sup> )	136.32 / 0 =	¥				0.04	0.05	,		,		XX4	10-0
Carbon Dioxade (mg/dm²)	27.6	10.25	2.45	30	2.64	17.32	17.0	2.24	2.2	1.0	÷	25.0	
Temperature (**)	16	01	:2	16	1.7	81	×l	1.7	c.	6.	1_		22aionnal
CATTONS													
Cateurn + Ca (ing/din.)	217.42	157.11	40.)	76.15	ام عر د	N5.26	XX.17	47.48	48.1	n0 12	0.00	7.97	100 - 1NO
(Magnesium – Mg(mg/dm³)		121	S4.68		863	05.25	450	\$615	803	***	5.0	Č.	۶۰ کې
Sodium and Polasmum - Na + K (mg/dm)	262.1	209.12	169.2	202.K	109.7	149.3	1493	67.2	No.	230	. yv.:	vd 0∠1	
Iron - Fe (mydm )	- 05:070[P053	* 15°0.00%	0.2K	£23	3,48	9.	34.6	X0 0	0.0%	0.08	\$8.8	133	0.1 - 0.3
Mangarese - Mn (mg/dm²)	24.00/ 0.32	1.792 / 0.144 =	0.105	0.176	0 144	9£0	6.4.4	9369	0.030	0.026	0 f-lN		0.08-03
Ahrmanan - Al (mg/dm²)	1.072 / 0.04 =	0.792 / 0.152 =	0.004	960.0	0 000	63.20	27,75	0.0x	210	0 0N	D PN.1	-	0.65.02
Copper - Cu (mg/dm²)	1.759 / 0 =	0.32570	0	6.00.0	0	0	0	0	c	0		370	0.65.01
Chromiun – Cr (mg/dm²)	0.148/0	0.04570	0	0.005	900 0	100.0	200.0	0.002	0.002	C.00%		5377	56.0
Zinc Zin (mg/dm²)	0.320 / 0.192 =	0.256 / 0.154	0.352	0.488	0.8	0,457	0.469	0.5	0.52	0.00	5.68		1.5
Nickel - Ni (mg/din³)	0.764 / 0.032 =		0	520.0	0	0	0	6.003	0.003	0000			0.1
(Cadmiun + Cd (mg/din")	0-0577-0-90 <del>6-</del> *	0.019 / 0.004 = 1	0	0.004	£00.0	0.002	0.004	0.002	0.002	N0000 0	4,	X013	0.004
Lead – Ph $(mg/dm^3)$	- 360 0 / BS CU	0.451 / 0 =	0.02	0.025	0.035	1800	290.0	0.024	0.646	0.01.1	50		0.05
Ammonia - NH, fing/dm?)	498	¥	0.07	£1 0	0.16	÷	e i	0.0:	0.01	0,7s	£ :		0.05
ANIONS and OTHER ITEMS													
Nimtes - NO- (my/dtn ¹)	0.00×	. 1.0	0.04	0.1	0.04	c	0	0.005	0.06N	400	() A	21	1.0 - F
Nutrates - NO, (mg/dm.)	5.37	0	5.7	5.3	1.74	1.44	. ×.	4.15	3.67	31.10	3	1,61	÷
Chlorides - C! (mg/dm²)	205.6	150.7	58.5	160.62	5.X.5	163	163.07	76.N3	×	011	; ;	27	250-400
Bicarbenates - HCO', (my/dm*)	1,5x6.50	793.26	625.45	X.707.	62X.5	738.34	744.44	512.57	5,8,67	S.(0).8	10 L (1)	11,21	
Carbonates - CO', (mg/dm')	0	0	0	0	0	0	0	0	0	0	0		
Sulphates - SO? (ing/dm)	116.25	- AC 04	108.35	161.43	1001	720	0	8038	X7.X	××.	- <b>V</b> 0.05	6.2	200 - 400
Total phosphates - PO'4 (ing/dm))	0.34/0.005	3.14/046*	0.03	0.185	0.04	0.0X	N60.0	NO:0	0.0x	300 O	Viii-Q	<u>x</u>   2	\$0.10
Cynude - CN (mg/dm²)	0	0	0	0	o	0	0	0	0 5	0	= 1	Section of the section of	0.61
Organic Nubstances - KMINO <sub>3</sub> (figeration)	EO V		100.12	F -	0	00 - C	101		2 2	30.	100	100 m	*
Observed Consideral		44.9	ē, c	·	C	c	C	0	0	C	=	SS SC \$1000 S S S	0.001
Altahada nemanen "n" (moatilen")	O	0	٥	0	0	0	0	0	0	C	=	-	
Albelings - total "m" (monydem")	550 / 26	5	10.25	11.6	10.3		5:51	4.X	8.8	2	SSC		
Acidity (myal/glm")	0	0	0	0	0	0	0	O	0	S	-:		
Disselved solids at 105 °C (mg/dm²).	0000000	1359.60	761.3	1,056.45	Non	361.57	£9X	600 x	200	1,19250	\$1100		men it of smark, deeles sum.
Pfartness - total (Gennan degrees)	*22	\$2 CP	19.04	S26.5	30.55	20.95	27.44	182	1 5%5	a NG	i.	7 X	30.30
RACTERIA				_				-	_				
(Petal number of buctons at 3770 UEC / em.	C0469400	Over 1990	OMC=340	300 mags	000 #882	30£ ====================================	GOV JONE	- 504 Jane	SWEE SUA	CON POSA	(KS) 1836	PAR GODG	under 300
Probable number of coliforn partern /100 cm	8X8)'#2#	222	T,000	24.000	\$,00	T6,020	34,0%0	920	16,090	\$6043	, (AP)	5 - 5 ( CO) - 1 - 1	under 10
Probable number of conform-thermotelerabil bacteria (feed coliforms) / 160 cm²	8. Å	••	<b>5</b> \$	50.1	ħ.	240	R	8	₹9.H	20	ě.		Saidel 2
Probable miniber of focal streim-occus/100 cm	w5e	\$4.800	b	æ		8	3	24	22	31	12	)	taider 2

Probable monber of food groundwavecounting on \$200.

\* Activated Numple/Supprincipant of Sample 

\*\* The supple Su

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Table All.8.12 Summary of Analysis Results for Leachate from Existing Solid Disposal Site

Parameters	Bråila Solid Waste Disposal Site	Galati Solid Waste Disposal Site	Tulcea Solid Waste Disposal Site	Constanta Solid Waste Disposal Site	NTPA 002
pH at 20°C (units)	8.22	8.3	8.18	8.12	6,5 - 8,5
BOD <sub>5</sub> (mg/dm <sup>3</sup> )	3,824	4.135	3,465	2,988	300
COD <sub>Cr</sub> (mg/dm3)	7,742	8.780	7.440	6,770	500
Chlorides (Cl') (mg/dm³)	4,220	4,608	3,162	2,020	<del>.</del>
SS (mg/dm³)	684	768	625	468	300
(NH <sub>4</sub> – N) (mg/dm <sup>3</sup> )	592	635	590	548	30
Total Nitrogen (mg/dm³)	7.36	756	722	677	
Total Phosphorus (mg/dm³)	4.3	5	4.25	3.8	5.0
$H_2S + S^{-2} \text{ (mg/dm}^3\text{)}$	18.8	22.4	16.3	11.08	0.5
Sulphates $(SO_4^2)$ (mg/dm $^3$ )	20.6	31	28	24	400
Total Coliform Group (no./100 ml)	3.48×10 <sup>8</sup>	$3.48 \times 10^{8}$	5.42×10 <sup>8</sup>	3,48×10 <sup>6</sup>	
Fecal Coliform Bacteria (no/100 ml)	1.41×10 <sup>8</sup>	1.72×10 <sup>8</sup>	1.75×10 <sup>8</sup>	1.61×10 <sup>5</sup>	•
Fecal Streptococcus Group (no./100 ml)	1.61×10 <sup>6</sup>	1.75×10 <sup>6</sup>	1.41×10 <sup>6</sup>	5.42×10 <sup>5</sup>	
Arsenic (As) (mg/dm³)	0	0	· · 0	0	_
Lead (Pb) (mg/dm³)	0.265	0.322	0.135	0.085	0.5
Cadmium (Cd) (mg/dm³)	0.042	0.047	0.042	0.033	0.1
Total Chromium (mg/dm³)	0	0.075	0	0	Cr <sup>3+</sup> 1.0/Cr <sup>6+</sup> 0.1
Copper (Cu) (mg/dm³)	0.142	0.185	0.022	0.014	0.1
Nickel (Ni) (mg/dm³)	0.136	0.149	0.013	0.11	1
Zinc (Zn) (mg/dm³)	0.41	0.5	0.316	0.225	1
Manganese (Mn) (mg/dm³)	0.14	0.18	0.08	0.06	1
Cyanide (mg/dm³)	0	0	0	0	0.5
Oil and Grease (mg/dm3)	528	580	462	278	20
Phenois (mg/dm³)	1.32	1.48	1.16	0.88	30

: means the parameters analyzed not respect the Romanian Standard NTPA 002/1997-Quality Indicators of Waste Water Discharged into Municipal Sewage Systems

Table All.8.12 Summary of Analysis Results for Leachate from Existing Solid Disposal Site

	hosai oiic	************************	EARLESS SALTANASIA DE SER PER ENTRE		getien in de meeting van het meet in de meeting van de
Parameters	Braila Solid Waste Disposal Site	Galati Solid Waste Disposal Site	Tulcea Solid Waste Disposal Site	Constanta Solid Waste Disposal Site	NTPA 6-2
pH at 20 C (units)	8.22	8,3	8,18	8.12	6.5 - 8.5
BOD: (mg/dm²)	3.824	4.135	3,465	2,988	300
COD <sub>cr</sub> (mg/dm3)	7.742	8.780	7,440	6.770	500
Chlorides (CF) (mg/dm³)	4,220	4,608	3,162	2,020	-
SS (mg/dm³)	684	768	625	468	300
(NH <sub>4</sub> – N) (mg/dm³)	592	635	590	548	30
Total Nitrogen (mg/dm³)	7.36	756	722	677	-
Total Phosphorus (mg/dm³)	4.3	5	4.25	3.8	5.0
$H_2S + S^{-2}$ (mg/dm <sup>3</sup> )	18.8	22.4	16.3	11:08	0.5
Sulphates (SO <sub>4</sub> <sup>2</sup> ) (mg/dm <sup>3</sup> )	20,6	31	28	24	400
Total Coliform Group (no./100 ml)	$3.48 \times 10^{8}$	3.48×10 <sup>8</sup>	5.42 × 10 <sup>8</sup>	$3.48 \times 10^{6}$	-
Fecal Coliform Bacteria (no./100 ml)	1.41×10 <sup>8</sup>	1.72×10 <sup>8</sup>	1.75×10 <sup>8</sup>	1.61×10 <sup>5</sup>	_
Fecal Streptococcus Group (no./100 ml)	1.61×10 <sup>6</sup>	1.75×10 <sup>6</sup>	1.41×10 <sup>6</sup>	$5.42 \times 10^5$	-
Arsenic (As) (mg/dm³)	0	0	0	0	-
Lead (Pb) (mg/dm³)	0,265	0.322	0.135	0.085	0.5
Cadmium (Cd) (mg/dm³)	0.042	0.047	0.042	0.033	0.1
Total Chromium (mg/dm³)	0	0.075	0	0	Cr3+1.0/Cr6+0.1
Copper (Cu) (mg/dm³)	0.142	0.185	0.022	0.014	0.1
Nickel (Ni) (mg/dm³)	0.136	0.149	0.013	0.11	1
Zinc (Zn) (mg/dm³)	0.41	0.5	0.316	0.225	1
Manganese (Mn) (mg/dm³)	0.14	0.18	0.08	0.06	1
Cyanide (mg/dm³)	0	0	0	0	0.5
Oil and Grease (mg/dm3)	528	580	462	278	20
Phenols (mg/dm³)	1.32	1.48	1.16	0.88	30

: means the parameters analyzed not respect the Romanian Standard NTPA 002/1997-Quality Indicators of Waste Water Discharged into Municipal Sewage Systems

Table All. 8.13 Summary of Analysis Results for Industrial Wastewater in Galati (1)

2000								,					
Parimeters	S.C. Coca (	S.C. Coca Cola S.A. (Soft Drinking Factory)	inking Factory)	S.C. MAR	S.C. MARTENS S.A. (Brewery Factory)	very Factory)	S.C. INTP	S.C. INTFOR S.A. (Plate Iron Factory)	on Factory)				NTPA 002
	99/7/77 9:00	99/7/7 12:00	99/7/7 15:00	00:6 1/1/66	99/7/7 12:00	99/7/7 15:00	99/7/7 9:00	99/7/7 12:00	99/7/7 15:00	Min.	Max.	Average	
Water Temperature (°C)	31.5	ŝ	32	31.5	32	25	29	29	26	25	32	29	40
pH at 20°C (units)	1672	25.0	20'00	8.07	\$411	5.7	79.7	6.8	7.4	6.8	11.75	6.x	6.5 - 8.5
BOD <sub>s</sub> (mg/dm³)	180.8	9'06	156.2	22.6	388	885	8,4	10.1	13.4	8.4	SKK	162	300
COD <sub>Cr</sub> (mg/dm3)	387.6	271.7	356.4	. 40	673	1,470	28.1	23.4	35.6	23.4	1,470	365	500
COD <sub>No.</sub> (my/dm3)	220.9	111.9	340	28	416	611.7	11.7	14,4	19.4	11.7	612	197	•
Chlorides (CI') (mg/dm³)	276.5	78	70.9	68	71	102.8	46.1	46.1	71.9	46.1	277	36	
SS (ms/dm²)	42.6	101.6	62.2	12	20	510	24.4	59.6	26.6	11.6	\$10	101	300
$(NH_a - N) (m\kappa/dm^3)$	6.0	2.1	0.5	6.0	4.1	2.88	5.75	2.1	3.25	0.3	5.75	73	30
Total Nitrogen (mg/dm²)	5.88	19.04	5.88	4.76	5,04	49.73	12.04	6.44	7.84	4.76	49.73	8.	,
Total Phosphorus (mg/dm³)	. 0.68	3		0.05	1.77	1.75	0.32	0.34	0.32	0.05			5
$H_2S + S^2 (mg/dm^3)$	0.05	0	0.04	0	0.01	10'0	0	0	0.	0	0.05	0	0.5
Sulphates (SO <sub>4</sub> <sup>2</sup> ) (mg/dm³)	93.1	7.5		5.53	18	51	50.3	210.2	54	50.3	210.2	83	400
Total Coliform Group (no./100 ml)	1.7×10¹	   1.4×10 <sup>7</sup>	3.3×10	9.2×10³	2.3×10¹	5.4×10 <sup>7</sup>	5.4 × 10 <sup>3</sup>	3.5×10*	1.6×104	1.7×10 <sup>1</sup>	5,4×10	7.6×10°	•
Fecal Coliform Bacteria (no./100 ml)	0	1.1×10°	<u>`</u>	1.8×10²	0	1.6×10°	3.5×10°	2.8×10	1.4×10	0	1,6×10 <sup>6</sup>	3.0×10	•
Fecal Streptococcus Group (no./100 ml)	3,4×10²	3.5×10³	1.7×10	1.7×101	1.1×10	3.5×10³	1.6×104	1.1×103	1.1×10³	1,7×10 <sup>1</sup>	3.5×10°	4.3×10°	•
Amenic (As) (mg/dm³)	0		0	0	0	0	0.	0	0	. 0	0	0.00	
Load (Pb) (mg/dm³)	0.013	0.013	0.011	800.0	0.01	0,007	. 0	0	0	. 0	0.013	0.01	0.5
Cadmium (Cd) (mg/dm³)	0 8	0	0	0	0	0	0	0	0	0.	0	0.00	0.1
Total Chromium (mg/dm³)	0	0	0	0	0	0	0	0.055	0	0.	0.055	0.01	Cr**1.0/Cr6**0.1
Copper (Cu) (mg/dm³)	0.071	0.03	0.06	0.04	0.052	0.03	0.029	0,03	0.022	0.022	0.071	0.0	0.1
Nickel (Ni) (mg/dm³)	. <b>0</b> .	0	0	0	0	0	0	0	0	0	0	0	
Zinc (Zn) (mg/dm³)	0,26	0.48	0.32	0.33	0.81	0.46	0.36	0.33	. 0.36	0.26	0.81	0.41	
Manganese (Mn) (mg/dm³)	0.04	.0.05	0.03	0.03	0.03	0.03	0.00	0.51	0.12	0.03	0.51	0.10	1
Cyanide (mg/dm³)	0	0	0	0	0	0	0	0	0	0	0 .	0	0.5
Phenols (mg/dm³)	0	0	0	0	٥	0	0	0	0	0	a	0.00	30
Oil and Greave (mg/dm <sup>3</sup> )	2.6	12.4	16.6	1.2	6.2	88	8:0	0.4	8:0	0.4	16.6	\$.5	20
Detergents (my/dm³)	0.06	0.16	0.06	0.01	0.03	0.12	0	0.01	0	0	0.16	0,1	30
: means the parameters analyzed not respect the Romanian Standard NTPA 002/1997- Quality Indicators of Waste Water Discharged into Municipal Seware Systems	nalyzed not res	pect the Romani	an Standard NTE	A 002/1997-	Ogality Indicator	s of Waste Wate	r Discharged in	to Municipal Se	wasse Systems			:	

means the parameters analyzed not respect the Romanian Standard NTPA 002/1997- Quality Indicators of Waste Water Discharged into Municipal Sewage Systems

Table All. 8.13 Summary of Analysis Results for Industrial Wastewater in Galati (1)

	,  -												
Parameters	S.C. Coca C	S.C. Coca Cola S.A. (Soft Drinking Factory)	inking bactory)	S.C. MAK	S.C. MARTENS S.A. (Brewery Factory)	very Factory)	S.C. INTI	S.C. INTFOR S.A. (Plate Iron Factory)	on Factory)				N IPA 002
	00:6 7:7:66	99777 12:00	00/21 1/2/66	00:6 2/2/66	99/7/7 12:00	99/7/7 15:00	99/7/7 9:00	99/7/7 12:00	99/7.7 15:00	Mfm.	Max.	Average.	
Water Temperature (C)	31.5	59	32	31.5	32	\$2	62	29	26	25	3	સ	07
pH at 20°C (units)	19.72	23.6	10:11	8.07	11.75	7.5	7.67	¥.9	7.4	6.8	11.75	8.9	6.5 - 8.5
BOD, (mg/dm³)	180.8	90.6	156.2	22.6	382	885	8,4	10.1	13.4	8.4	SXX	162	300
COD <sub>(1</sub> (mp/dm3)	387.6	271.7	356.4	40	673	1,470	28.1	23.4	35.6	23.4	1,470	365	200
COD <sub>Mil.</sub> (mg/dm3.)	220.9	6.111	340	28	416	611.7	11.7	14.4	19.4	11.7	612	197	
Chlorides (Cl') (mg/dm <sup>3</sup> )	276.5	78	70.9	68	7.1	102.8	46.1	46.1	71.9	46.1	27.5	9,5	
SS (mg/dm²)	42.6	101.6	62.2	12	70	510	24.4	59.6	26.6	11.6	510	101	300
$(NH_A - N) (mp/dm^3)$	6.0	2.1	6.0	0.3	4,1	2.88	5.75	2.1	3.25	0.3	\$.75	.1	30
Total Nitrogen (mg/dm²)	5.88	19.04	5.88	4.76	5.04	49.73	12.04	6,44	7.84	4.76	19.73	8:	•
Total Phosphorus (mg/dm²)	0.68	3	0.82	0.05	1.77	1.75	0.32	0.34	0.32	0.05	3		٧.
$(H_2S+S^{-2}(mg/dm^3))$	0.05	0	0.04	0	0.01	0.01	0	0	0	0	6.05	÷	0.5
Sulphates (SO <sub>4</sub> <sup>2</sup> ) (mg/dm <sup>3</sup> )	93.1	7.5	7.8	5.2.5	18	(5)	50.3	210.2	54	50.3	210.2	N,3	400
Total Collform Group (no.100 ml)	1.7×10	1.4×10°	3.3×10 <sup>1</sup>	9.2×10³	$2.3 \times 10^{1}$	5.4×10 <sup>7</sup>	5.4×10³	3.5×10⁴	1.6×10⁴	1.7×10³	5,4 × 10	7.6×10°	•
Fecal Coliform Bacteria (no/100 ml)	0	1.1×10	0	1.8×10²	0	1.6×10°	3.5×10 <sup>4</sup>	2.x×10	$1.4 \times 10^3$	Û	1.6 × 10"	3,0 + 10	
Fecal Streptococcus Ciroup (no.100 ml)	3.4×10²	3.5×10³	1.7×10 <sup>4</sup>	1.7×10¹	1.1×103	3.5×10 <sup>5</sup>	1,6×10 <sup>4</sup>	1.1×10	1.3×10°	1.7×10 <sup>8</sup>	3.5 × 10	4,3 × 10	
Arsenic (As) (mg/dm³)	0	0	0	0	0	0	0	0	0	0	0	0.00	•
Lead (Pb) (mg/dm³)	0.013	0.013	0.011	800'0	0.01	0.007	0	0	0	Ð	0.013	0.01	3.0
Cadmium (Cd) (mg/dm <sup>3</sup> )	0	0	0	0	0	0	0	0	0	٥	0	0.00	0.1
Total Chromium (mg/dm³)	0	0	0	0	0	Ð	0	0.055	Q	0	0.055	0.01	Cr*1.0:Cr*0.1
Copper (Cu) (mg/dm²)	0.071	0.03	90'0	0.04	0.052	0.03	0.029	0.03	0.022	0.023	1790	6.0	0.1
Nickel (Ni) (mg/dm³)	0	D	0	0	0	ŋ	0	0	0	c	2	Ü	-
$Zine(Zn)(mydm^3)$	0.26	0.48	0.32	0.33	0.81	0,46	0,36	0.33	0.36	0.26	0.83	0.41	-
Manganese (Mn) (mg/dm²)	0.04	0.05	0.03	0.03	0.03	0.03	0.00	0.51	0.12	0.03	(1.5.)	0,10	_
Cvanide (mujdm³)	0	0	0	0	0	o	0	0	Ð	0	5	Ü	6.5
Phenols (mg/dm³)	٥	0	0	ð	O	o	O	0	0	٥		000	30
Oil and Grease (mg/dm²)	2.6	12.4	16.6	1.3	6.2	××	0.N	0.4	<b>x</b> :0	. 0	16.6	4	20
Determents (mu/dm <sup>3</sup> )	90.0	91.0	90.0	0.01	0,03	0.12	0	0.01	0	0	0.10	<del>1</del> .5	30
means the parameters analyzed not respect the Romanian Standard NTPA 002/1997. Quality Indicators of Waste Water Discharged into Municipal Sewage Systems	nalyzed not res	peet the Romanic	an Standard NTI	PA 002/1997- C	Quality Indicator	a of Waste Wate	r Discharged i	nto Municipal S	ewage Systems				

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	S.C. TREFO	S.C. TRANSURB	S.C. PAINE S.A	S.C. GALACTA	NE S.A	s Addis of 8	S.C.		S.C. MENAROM	S.C. APOLLO				
Parameters	S.A. (Wire Factory)	S.A. (Repair Trans Unit)	(Bread Factory, No. 1)	· S.A. (Milk Factory)	(Bread Factory No. 2)	(Stuel Factory)	S.A. (Bakery Factory)	YARD	S.A. (Hydraulic Equipment)	S.A. (Detergents Factory)	Min.	Max	Average	NTPA 002
Water Temperature (°C)	28	26	28	28	32.5	31	28	30	29	32	26	- 32.5	29	64
pH at 20°C (units)	6.71	7.71	7.7	7.03	7.56	161	8.25	7.18	7.68	C1 61	6.71	12.12	8.0	6.5 - 8.5
BOD, (mg/dm <sup>1</sup> )	11.2	151.3	291.7	1,348	133.4	24	58.4	14.6	21	122	11.2	1348	218	300
COD <sub>Cr</sub> (mg/dm3)	30.6	410.3	724	2,673	250	89	109.4	33.5	40	93,636	30.6	31.630	3.597	200
COD <sub>Mn</sub> (my/dm3)	14.5	161.4	353.3	1,758	165	31.8	67.2	17.7	23,4	1,469	14.5	1.75x	406	
Chlorides (CI) (mg/dm³)	138.3	67.4	102.8	- 29	68	102.8	127.7	74.5	46.1	9.571	46.1	9.571	1.039	
SS (mg/dm²)	101.2	857.6	674	358	164	11	276.4	70.4	108.2	192	10.6	1,243	386	300
(NH, -N) (my/dm³)	4	13.4	10.5	20.6	23.3	8.9	2.45	4	2	1.05	-1.05	23.3	ç	30
Total Nitrogen (mg/dm³)	9.07	27.55	20.94	\$5.44	31.1	15.74	9.07	10.14	6.72	12.32	6.72	55,44	20	
Total Phosphorus (mg/dm <sup>3</sup> )	0.3	1,14	0.58	2.5	1.87	0.27	0.47	0.42	0.38	3.17	0.27	3,17	-	5
H <sub>2</sub> S + S <sup>2</sup> (mg/dm <sup>3</sup> )	0	0.01	0.08	0.028	0:02	0.01	0	. 0.01	0.01	0.42	0	0,42	O	50
	112.6	53,3	69	61.5	52.5	61.6	64.6	8.8	. 48	105	37	112.6	ž	400
Total Coliform Group (no./100 ml)	9.4×10³	9.2×10 <sup>5</sup>	1.6×107	5.4×10*	5.4×10°	1.4×10²	9.2 × 10°	1.6×10°	1.6×10°	0	0	1.6 X 10.	3.5×10°	
	3,3 × 10 <sup>1</sup>	3,5×10 <sup>5</sup>	3.5×10°	7.0 × 10 <sup>1</sup>	3.5 × 10 <sup>6</sup>	0	3.5×10°	3.5×10 <sup>5</sup>	5.4×104	0	0	3.5 × 10"	1.1×10°	
Fecal Streptococcus Group (no./100 ml)	5.4×10 <sup>3</sup>	3.5×10⁴	3.4×10³	2.2 × 10 <sup>4</sup>	5.4×10 <sup>5</sup>	2.8×10²	3.5×10²	5.4×10⁴	9.2×10³	0	J	\$.4 X 10	6.7×10 <sup>4</sup>	
Arvenic (As) (ms/dm³)	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
Lend (Pb) (mg/dm³)	0	0.077	0	0	0.026	0	0	٥	0	0	0	0.077	0,01	0.5
Cadmium (Cd) (mg/dm³)	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.1
Total Chromium (mg/dm³)	٥	0	0.022	0	0	. 0	0	0	0	. 0	0	0.022	00.0	Cr*1.0/Cr*0.1
Copper (Cu) (ms/dm³)	0.03	0.53	0.092	0.008	210.0	0	0.003	0.017	0.016	0.02	0	0.53	0.1	0.1
Nickel (Ni) (mg/dm³)	0	٥	0	0	0	0	0	0	0	0	o	٥	0	ı
Zinc (Zn) (my/dm')	0.35	0.53	0.31	0.31	0.41	0	0.03	0.17	0.26	0.22	0	0.53	0.26	
Manganese (Mn) (my/dm³)	0.24	0.22	0.17	0.22	90.0	0.04	90'0	0.04	90'0	0.14	0.04	0.24	0.13	-
Cvanide (mg/dm³)	0	0	0	0	0	0	0	0	0	0	0	D	0	0.5
Phenols (mg/dm³)	0.007	0.11	0	0	0.2	0.05	0	90'0	0	0.05	0	63.0	0.05	30
Oil and Grease (mg/dm³)	12.8	15	12.8	41.2	1.2	8.0	9.0	4.6	41	ř	9 0	36	3 \	Ē
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Komuniun Standard NTPA 002/1997- Quality Indicators of Waste Water Discharged into Municipal Sewage Systems

(3)

Summary of Analysis Results for Industrial Wastewater in Galati (2) Table Ali.8.14

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Parameters	S.C. TREPC S.A. (Wire Factory)	S.C. TRANSURE S.A. (Repair Trans Unit)	S.C. PAINE N.A (Bread Pactory No. 1)	S.C. GALACTA S.A. (Milk Factory)	S.C. PAINE S.A (Bread Factory No. 2)	S.C. NIDIEN S.A. (Steel Factory)	S.C DUNARBANA S.A. (Bukery Factory)	GALATINS HILE	S.C. MENAROM S.A. (Hydrathe Equipment)	S.C. APGLEO S.A. Übetergents Factoryo	Nfm,	Max	Silenavy	200 VII.N
Water Temperature (°C)	% 2	26	28	28	32.5	31	28	30	62	gg	26.	3.28	ຄ	0;
pH at 20°C (units)	6.71	7.71	7.7	7.03	7,56	7.97	8.25	7.18	7.68	4: c:	6.71	::	0.8	6,5 8,5
BOD, (mydm³)	11.2	151.3	291.7	1.348	133.4	24	58,4	14.6	 	122	2.2	- 24.8x	×	1 0
COD <sub>cr</sub> (mt/dm3)	30.6	410.3	724	2,673	250	89	\$'60I	33.5	40	31,630	36.6	31,630	3,597	\$00
COD <sub>Min</sub> (mg/dm3)	14.5	161.4	353.3	1.758	165	31.8	2'29	17.7	23.4	1,469	\$ <del>1</del>	1,758	905	
Chlorides (CI') (mg/dm')	138.3	67.4	102.8	29	68	102.8	127.7	74.5	46.1	9.571	107	172,0	6£071	
SS (mg/dm³)	101.2	N57.6	674	358	164	11	276.4	70.4	108.2	1,243	10,6	1.243	386	300
$(NH_i - N) (mg \cdot dm^3)$	7	13,4	10.5	20.6	23.3	8.9	2.45	4	2	1.05	1.05	5.15	50	30
Total Nitrogen (my-dm³)	9.07	27.55	20.94	\$5,44	31.1	15,74	9.07	10.14	6.72	12.32	£7.9	PT 53	ę	1
Total Phosphorus (mg/dm³)	6.3	1.14	0.58	2.5	1.87	0.27	0.47	0.42	0.38	3.17	0.27	<u>r.</u>		٧.
H <sub>2</sub> S + S <sup>2</sup> (mg/dm <sup>3</sup> )	٥	0.01	0.08	0.028	0.02	0.01	O	0.01	0.01	0,42	3	2F'0	c	5.0
	112,6	53.3	69	61.5	\$2.5	9.19	64.6	48.8	84	501	<u>S</u> ;	112.6	×	400
Total Coliform Group (no./100 ml)	9.4×10	9.2×10°	1.6×10°	5.4×104	5.4×10 <sup>6</sup>	1,4×10²	9.2×10 <sup>6</sup>	1.6×10"	1,6×10 <sup>6</sup>	٥	3	1.6 > 10	3.5 × 10°	,
	3.3×10	3.5×10 <sup>5</sup>	3.5×10°	7.0 × 10 <sup>1</sup>	3.5×10°	ŋ	3.5×10°	3.5×10°	5.4×10 <sup>4</sup>	c	5	13.16		
Fecal Streptococcus (Proup (no./100 ml)	5.4×10³	3.5×10 <sup>4</sup>	3.4×10³	2.2×10 <sup>4</sup>	5.4×10 <sup>5</sup>	2.8×10²	3.5×10²	5.4×10 <sup>4</sup>	9.2×10³	0	0	21 11 12	01.812.0	
Arsenie (As) (mg/dm³)	0	0	0	0	0	0	0	٦	0	0	()	3	0.00	1
Land (Pb) (mg/dm <sup>1</sup> )	0	0.077	0	0	0.026	0	0	0	0	0	0	7200	10'0	0.5
Cadmium (Cd) (mg/dm³)	0	0	0	0	0	0	0	O	0	0	9	()	0.00	0.1
Total Chromium (mydm?)	0	O	0.022	0	0	0	0	0	0	0		279.5	00'0	Cr. 1.0.Cr."0.1
Copner (Cu) (mg/dm³)	0.03	6.53	0.092	800.0	0.017	0	0.003	0.017	0.016	0.02	Ð	10.54		1.0
Nickel (Ni) (mg/dm³)	0	0	0	0	0	0	ŋ	0	0	0	0	23	0	-
Zine (Zn) (mg/dm²)	0.35	0.53	0.31	0.31	0.41	0	0.03	0.17	97.0	0.22	a		0.20	
Manganese (Mn) (mg/dm²)	0.24	0.22	0.17	0.22	0.06	0.04	0.06	0.04	90'0	0.:4	+0,0	#C'11	0.13	_
Cyanide (mg/dm <sup>3</sup> )	0	0	0	0	0	0	0	0	0	0	0		5	0.5
Phenols (mg/dm²)	0.007	0.11	0	0	E 0	\$0.0	0	0.06	0	50.0	,j		\$0.0	30
Oil and Grease (mg/dm²)	12.8	15	12.8	1.12	1.2	×.0	9.0	5.4	**	73	0.0	1.	8.01	20
Detergents (my/dm³)	0.03	0.08	14.0	0.78	0.36	62.0	0.08	0.02	0.02	1.67	0.02	20%	6.3	30
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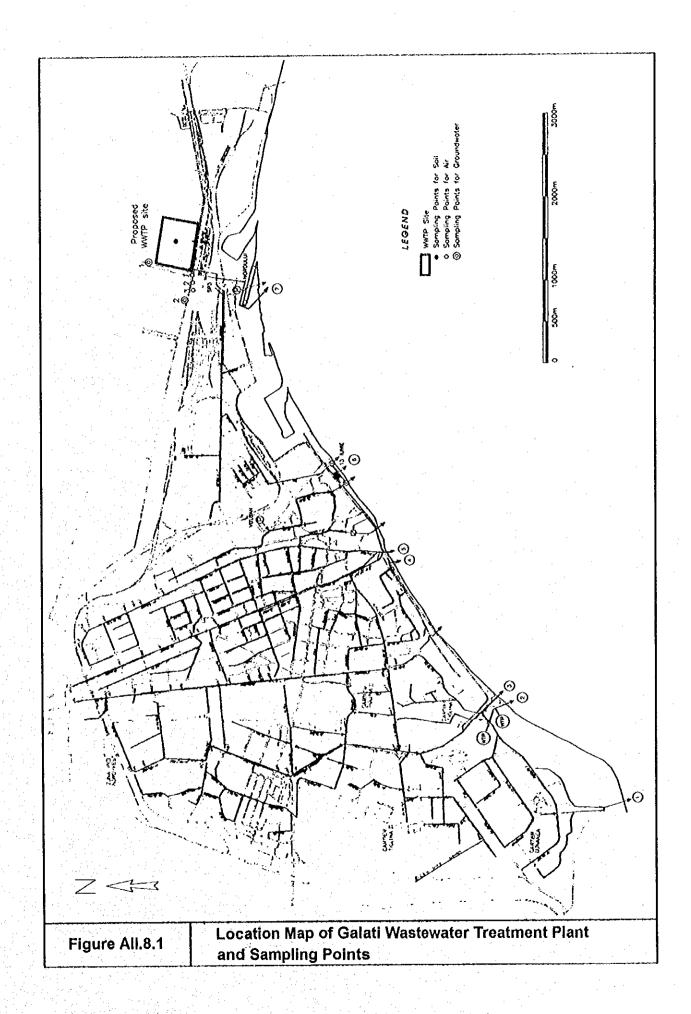
mount the parameters analyzed not respect the Romanian Standard NTPA 602:1997. Quality Indicators of Waste Water Discharged into Municipal Sewage Systems

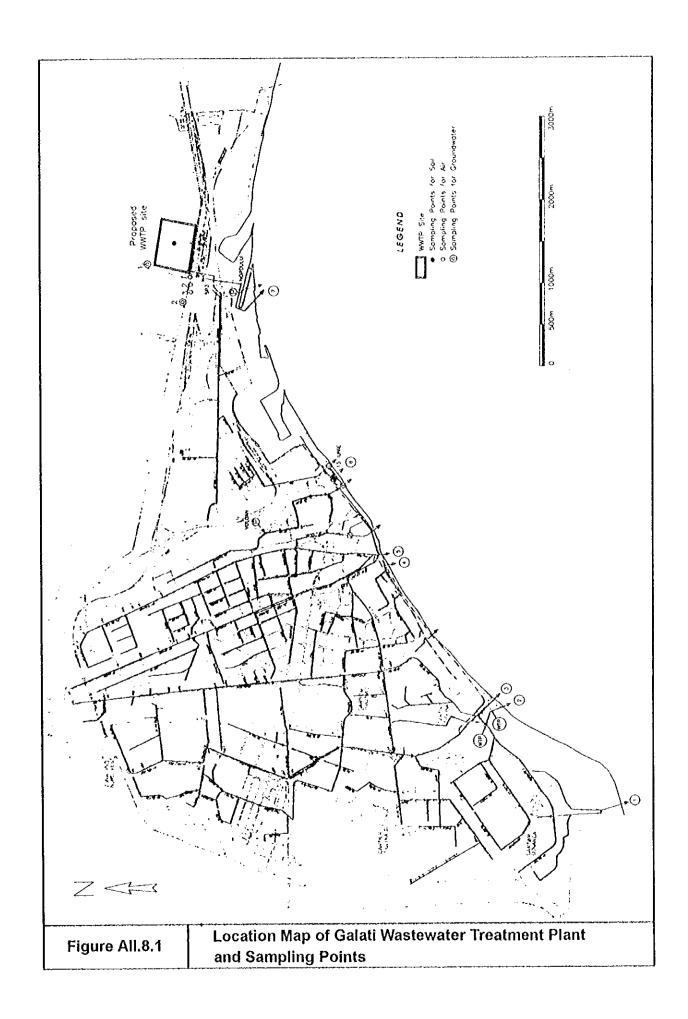
Table All.8.15 Summary of Analysis Results for the Air in Braila, Galati, Tulcea, Roman and Constanta WWTPs

City	Parameters	0 m from WWTP Boundary	50 m from WWTP Boundary	150 m from WWTP Boundary	Limits for 30 Minutes Sampling Period (R.S. 12574/1987)
and the second of the second o	H <sub>2</sub> S	()	()	0	0.015 mg/m <sup>3</sup>
Braila	NH <sub>3</sub>	0.105	0.105	0.105	0,3 mg/m <sup>3</sup> .
	Odor Level	1	1	1	1 - 5
Galati	H₂S	0	0	0	0.015 mg/m <sup>3</sup>
Free Zone Area	NH <sub>3</sub>	0.08	0.05	0.02	0.3 mg/m <sup>3</sup>
	Odor Level	1	1	l l	1 - 5
Galati	H <sub>2</sub> S	0.0006	0.0004	0.0003	0.015 mg/m³
Pumping Station No.3 Area	NH <sub>3</sub>	0.018	0.012	0.01	0.3 mg/m³
	Odor Level	1	1 (4)	1	1 - 5
	H <sub>2</sub> S	0	0	0	0.015 mg/m <sup>3</sup>
Tulcea	NH <sub>3</sub>	0.115	0.105	0.095	0.3 mg/m <sup>3</sup>
	Odor Level	. 1	1 ,	1	1-5
	H <sub>2</sub> S	0.45	0.48	0.42	0.015 mg/m³
Roman	NH <sub>3</sub>	0.33	0.35	0.35	0.3 mg/m <sup>3</sup>
	Odor Level	4	4	4	1 - 5
	H <sub>2</sub> S	0.35	0.05	0.031	0.015 mg/m³
Constanta	NII <sub>3</sub>	0.30	0.11	0.10	0.3 mg/m³
	Odor Level	4	3	3	1-5

Table All.8.15 Summary of Analysis Results for the Air in Braila, Galati, Tulcea, Roman and Constanta WWTPs

City	Parameters	0 m from WWTP Boundary	50 m from WWTP Boundary	150 m from WWTP Boundary	Limits for 30 Minutes Sampling Period (R.S. 12574/1987)
nd and mad ne deficiency the English the section of	H <sub>2</sub> S	()		()	0.015 mg/m²
Braila	NH,	0,105	0.105	0.105	0.3 mg/m <sup>3</sup>
	Odor Level	1	1	1	1 - 5
Galati	H <sub>2</sub> S	()	()	()	0.015 mg/m <sup>3</sup>
Free Zone Area	NH <sub>3</sub>	0.08	0.05	0.02	0.3 mg/m <sup>3</sup>
	Odor Level	1	1	1	1 - 5
Galati	H <sub>2</sub> S	0,0006	0,0004	0,0003	0.015 mg/m <sup>3</sup>
Pumping Station	NH <sub>3</sub>	0.018	0.012	0.01	0.3 mg/m <sup>3</sup>
No.3 Area	Odor Level	1	1	1	1 - 5
Tulcea	H <sub>2</sub> S	()	()	0	0.015 mg/m <sup>3</sup>
	NH <sub>3</sub>	0.115	0.105	0.095	0,3 mg/m <sup>3</sup>
	Odor Level	1	1	1	1 - 5
ar een gangagan ayaayahan kayahiidadhanaadh ee ah paadaadh	H <sub>2</sub> S	0,45	0.48	0.42	0.015 mg/m³
Roman	NH <sub>3</sub>	0.33	0.35	0.35	0.3 mg/m <sup>3</sup>
	Odor Level	4	4	4	1 - 5
	H <sub>2</sub> S	0.35	0.05	0.033	0.015 mg/m³
Constanta	NH <sub>3</sub>	0,30	0.11	0.10	0.3 mg/m <sup>3</sup>
	Odor Level	4	3	3	1 - 5





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