INTERNATIONAL COURT OF JUSTICE

CASE

CONCERNING THE GABČÍKOVO-NAGYMAROS

PROJECT

(HUNGARY/SLOVAKIA)

REPLY

OF THE REPUBLIC OF HUNGARY

VOLUME 3

ANNEXES

20 JUNE 1995

1991

1993

1994

1995

Annex 1

MEASUREMENTS OF WATER FLOW AT BRATISLAVA (DEVÍN) AND RAJKA, AND DISCHARGE LEVELS INTO THE MOSONI DANUBE, JANUARY 1992 TO MAY 1995

A: WATER DISCHARGE IN THE DANUBE
(MEASURED AT BRATISLAVA AND THEN DEVÍN)

B: WATER DISCHARGE IN THE DANUBE
(MEASURED AT RAJKA)

C: WATER DISCHARGE IN THE MOSONI DANUBE
(MEASURED AT THE FIRST GATE)

Table A1: *Water discharge (m^3/s) in the Danube (measured at Bratislava), 1992*

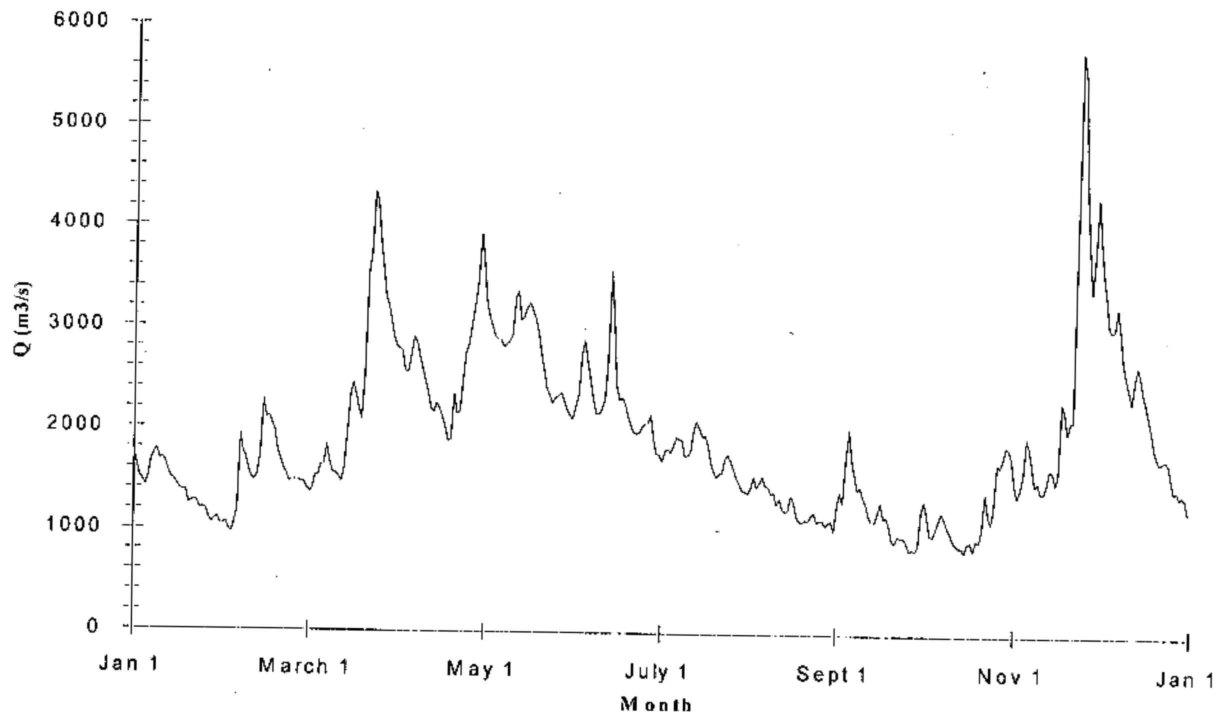

***Table A1:** Water discharge (m^3/s) in the Danube (measured at Bratislava), 1992*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1760	1050	1470	2900	3930	2150	1780	1410	1020	1230	1750	3900
2	1620	1070	1410	2810	3630	2110	1760	1390	1270	1330	1490	3550
3	1510	999	1370	2790	3250	2240	1700	1450	1410	1190	1370	3350
4	1470	966	1400	2770	3110	2350	1800	1560	1300	1000	1460	3060
5	1420	1070	1540	2570	3020	2740	1820	1450	1730	977	1600	3020
6	1500	1180	1530	2560	2920	2890	1790	1500	2030	1050	1960	3040
7	1680	1940	1640	2710	2890	2680	1850	1560	1730	1150	1860	3250
8	1740	1760	1640	2910	2890	2490	1940	1470	1590	1220	1680	3020
9	1780	1720	1840	2840	2810	2310	1920	1460	1430	1150	1480	2720
10	1680	1600	1680	2700	2850	2170	1910	1390	1460	1070	1520	2560
11	1700	1510	1570	2580	2870	2160	1750	1400	1370	1020	1420	2440
12	1650	1480	1560	2470	2930	2210	1760	1280	1300	943	1410	2310
13	1560	1530	1530	2350	3300	2310	1790	1350	1180	902	1490	2520
14	1500	1750	1470	2200	3370	2680	2000	1240	1120	877	1650	2680
15	1480	2290	1600	2170	3080	3580	2100	1210	1120	881	1630	2570
16	1430	2100	1950	2250	3110	3080	2030	1230	1210	826	1500	2400
17	1390	2120	2330	2200	3210	2450	1940	1380	1310	919	1620	2300
18	1370	2040	2450	2120	3250	2300	1960	1310	1160	934	2310	2170
19	1380	1960	2330	2010	3170	2320	1860	1180	1170	842	2210	2040
20	1250	1770	2190	1880	3090	2260	1700	1120	1090	953	2000	1870
21	1260	1690	2090	1900	2950	2140	1610	1110	950	923	2120	1780
22	1280	1600	2540	2350	2750	2060	1550	1140	915	1070	2130	1720
23	1270	1550	3530	2150	2590	1990	1580	1130	988	1410	4000	1740
24	1200	1470	3720	2180	2410	1970	1590	1180	967	1190	5790	1760
25	1210	1490	4340	2490	2350	1980	1730	1210	977	1100	5560	1710
26	1200	1490	4240	2760	2260	2040	1770	1110	921	1290	4370	1560
27	1110	1490	3860	2830	2320	2070	1710	1140	837	1700	3800	1430
28	1060	1460	3600	3040	2340	2070	1630	1130	858	1670	3400	1460
29	1090		3300	3220	2370	2160	1540	1080	839	1740	3780	1380
30	1120		3210	3450	2290	1920	1480	1110	891	1880	4340	1410
31	1050		3060		2210		1420	1130		1850		1370
Min.	1050	966	1370	1880	2210	1920	1420	1080	837	826	1370	1370
Mean	1410	1577	2322	2539	2888	2329	1767	1284	1205	1171	2423	2325
Max.	1780	2290	4340	3450	3930	3580	2100	1560	2030	1880	5790	3900

Annual:

Min.	826 m^3/s
Mean	1938 m^3/s
Max.	5790 m^3/s

Table A2: *Water discharge (m^3/s) in the Danube (measured at Bratislava), 1993*

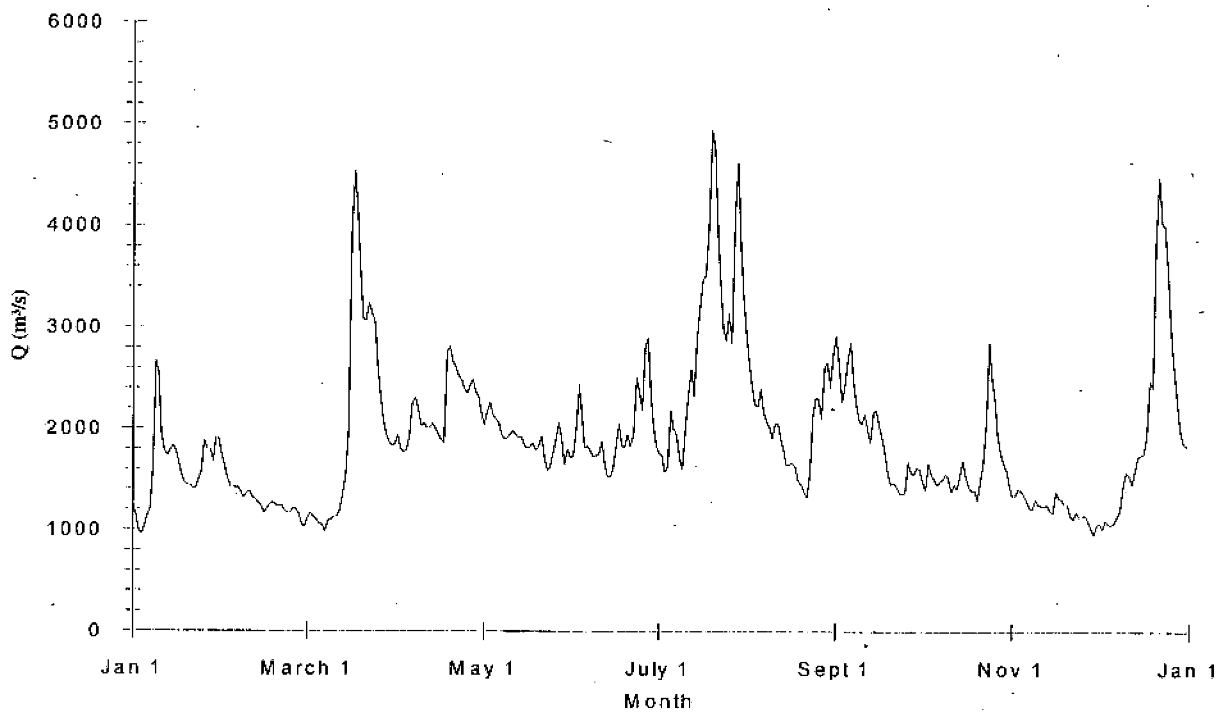

Table A2: Water discharge (m^3/s) in the Danube (measured at Bratislava), 1993

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1230	1750	1050	1830	2320	1800	2030	3310	2740	1600	1450	1050
2	1150	1630	1030	1850	2150	1710	1830	2960	2920	1490	1340	1070
3	991	1510	1120	1940	2040	1730	1750	2660	2650	1390	1340	1010
4	958	1420	1170	1800	2170	1960	1740	2430	2260	1660	1400	1100
5	1030	1420	1120	1770	2260	2450	1570	2250	2430	1550	1390	1060
6	1140	1410	1100	1790	2140	2130	1630	2220	2690	1510	1350	1050
7	1200	1420	1060	1920	2100	1810	2180	2400	2860	1440	1290	1080
8	1630	1370	1050	2250	2060	1830	2000	2160	2480	1480	1220	1140
9	2670	1310	975	2310	1940	1790	1940	2070	2240	1500	1210	1190
10	2560	1360	1090	2190	1900	1720	1710	2030	2090	1560	1300	1430
11	1970	1380	1100	2030	1910	1740	1600	1910	2050	1510	1250	1570
12	1780	1320	1130	2050	1950	1750	1990	2050	2150	1380	1240	1540
13	1730	1300	1130	2010	1980	1880	2320	2060	2000	1450	1230	1450
14	1790	1260	1190	2010	1940	1650	2590	1900	1870	1400	1250	1590
15	1830	1230	1350	2050	1910	1520	2320	1790	2160	1540	1190	1720
16	1780	1160	1520	2000	1920	1530	2890	1640	2190	1690	1170	1740
17	1670	1210	1980	1940	1830	1610	3210	1650	2040	1520	1380	1750
18	1540	1250	4000	1890	1810	1830	3470	1660	1910	1430	1320	1930
19	1460	1270	4540	1860	1820	2060	3510	1630	1760	1380	1300	2480
20	1440	1240	4120	2750	1860	1830	3980	1490	1560	1390	1250	2410
21	1440	1230	3550	2810	1780	1820	4940	1450	1450	1290	1250	3900
22	1400	1240	3080	2670	1840	1940	4750	1380	1470	1480	1140	4480
23	1410	1190	3070	2610	1930	1820	3930	1320	1430	1650	1110	4040
24	1490	1170	3250	2520	1700	1950	3440	1550	1370	2030	1180	3990
25	1570	1170	3140	2480	1580	2510	2990	2140	1350	2850	1130	3580
26	1890	1210	3050	2390	1620	2370	2870	2310	1370	2490	1130	3100
27	1800	1200	2610	2350	1770	2180	3150	2290	1680	2290	1150	2680
28	1800	1150	2320	2430	1900	2810	2840	2100	1570	1940	1100	2420
29	1670		2080	2490	2060	2900	4130	2610	1550	1770	1020	2160
30	1910		1940	2360	1890	2320	4620	2660	1620	1660	958	1940
31	1910		1870		1640		3830	2410		1590		1850
Min.	958	1150	975	1770	1580	1520	1570	1320	1350	1290	958	1010
Mean	1608	1314	2025	2178	1926	1965	2831	2080	1997	1642	1235	2048
Max.	2670	1750	4540	2810	2320	2900	4940	3310	2920	2850	1450	4480

Annual:

Min.	958 m^3/s
Mean	1910 m^3/s
Max.	4940 m^3/s

***Table A3:** Water discharge (m^3/s) in the Danube (measured at Bratislava and Devin), 1994*

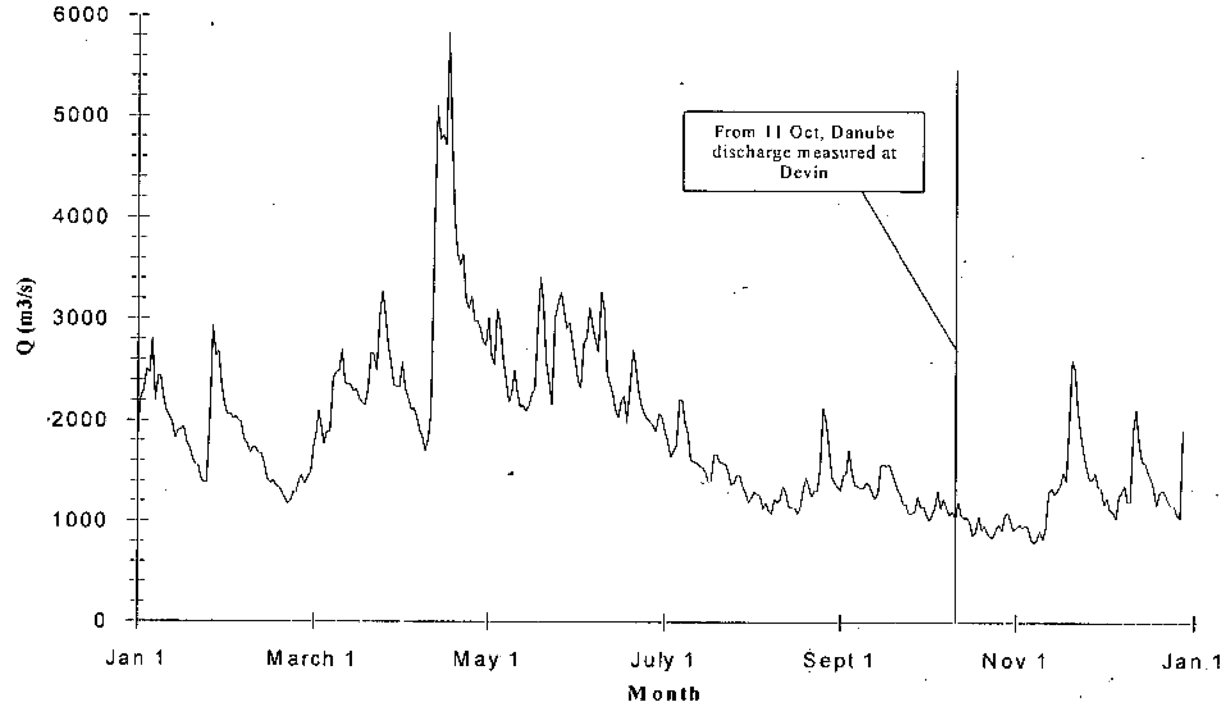

Table A3: Water discharge (m^3/s) in the Danube (measured at Bratislava and Devín), 1994

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1830	2060	1440	2330	2780	2770	2070	1190	1350	1160	922	1340
2	2230	2070	1490	2330	2740	2590	2040	1240	1310	1080	946	1170
3	2300	2020	1760	2580	3010	2400	1900	1300	1460	1010	976	1240
4	2510	2040	1880	2310	2640	2320	1800	1270	1480	1070	940	1120
5	2470	2000	2100	2220	2550	2770	1640	1260	1720	1140	970	1100
6	2810	1980	1960	2110	3100	2810	1700	1130	1500	1310	940	1030
7	2190	1820	1770	2120	2930	3110	1770	1190	1370	1130	822	1250
8	2440	1760	1890	2040	2590	2910	2220	1110	1360	1240	795	1300
9	2430	1680	1900	1910	2410	2800	2200	1080	1330	1130	828	1370
10	2220	1740	2410	1840	2180	2680	1980	1230	1340	1070	922	1200
11	2090	1720	2480	1700	2280	3270	1880	1190	1390	1110	822	1200
12	2040	1670	2490	1820	2500	3080	1610	1220	1370	1040	928	1910
13	1980	1670	2700	2090	2280	2460	1600	1360	1290	1200	1300	2120
14	1820	1570	2370	3860	2140	2370	1580	1290	1230	1070	1340	1800
15	1900	1420	2360	5100	2150	2280	1550	1150	1290	1040	1270	1600
16	1910	1380	2350	4770	2100	2110	1540	1140	1560	1050	1320	1590
17	1940	1410	2290	4810	2150	2040	1500	1140	1570	1000	1370	1500
18	1780	1350	2310	4710	2270	2190	1400	1080	1560	866	1500	1430
19	1730	1340	2220	5830	2310	2250	1400	1140	1570	899	1410	1330
20	1630	1290	2180	4810	2940	1980	1670	1320	1480	1060	1990	1160
21	1560	1230	2150	4000	3420	2320	1670	1440	1390	922	2610	1290
22	1560	1170	2320	3650	3120	2700	1590	1360	1320	964	2510	1320
23	1430	1200	2670	3530	2580	2510	1580	1250	1280	888	2110	1280
24	1380	1290	2650	3640	2390	2280	1570	1310	1180	850	1860	1200
25	1390	1290	2500	3200	2160	2150	1490	1310	1170	855	1670	1160
26	2040	1400	3040	3100	3020	2070	1370	1530	1080	934	1530	1160
27	2930	1460	3270	3230	3140	2020	1390	2140	1090	983	1420	1070
28	2630	1370	3030	2980	3270	1990	1460	1990	1110	916	1430	1040
29	2690		2730	2980	3080	1960	1460	1720	1250	1060	1490	1920
30	2370		2560	2910	2910	1900	1350	1440	1150	1100	1340	
31	2170		2350		2970		1290	1390		1000		
Min.	1380	1170	1440	1700	2100	1900	1290	1080	1080	850	795	1030
Mean	2077	1586	2310	3150	2649	2436	1654	1320	1352	1037	1343	1352
Max.	2930	2070	3270	5830	3420	3270	2220	2140	1720	1310	2610	2120

Annual:

Min.	795 m^3/s
Mean	1858 m^3/s
Max.	5830 m^3/s

Table A4: *Water discharge (m^3/s) in the Danube (measured at Devín), 1995*

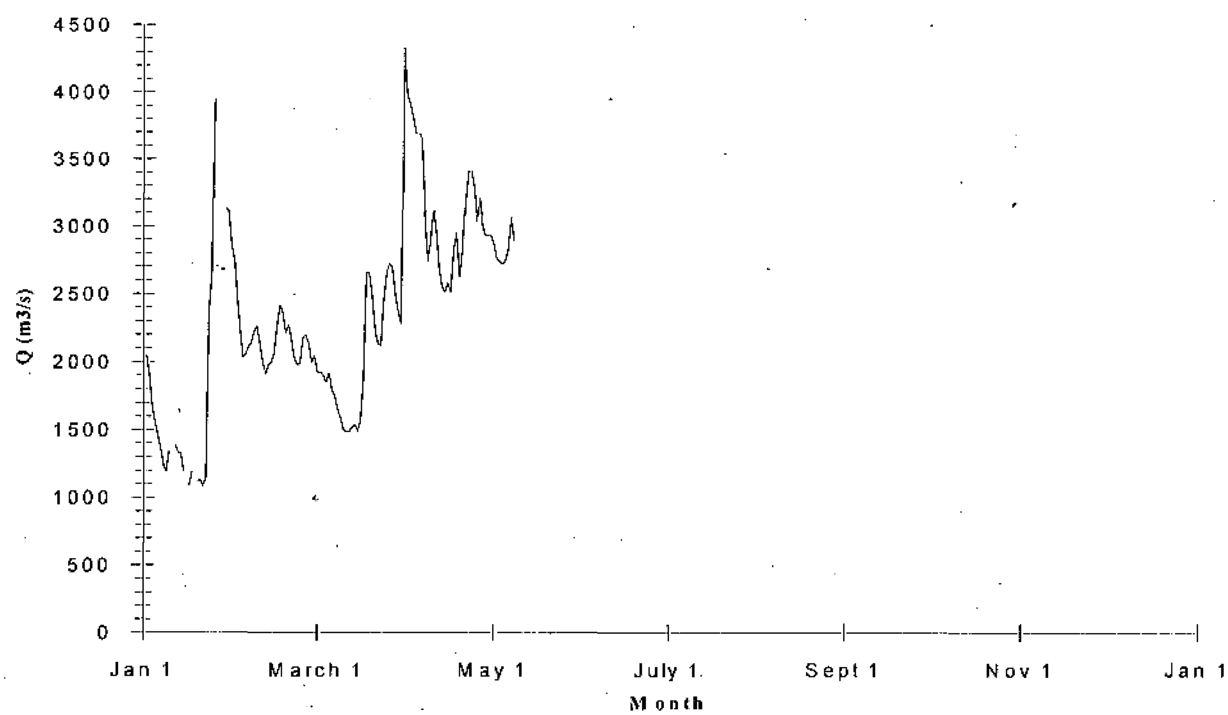

Table A4: *Water discharge (m^3/s) in the Danube (measured at Devín), 1995*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		2860	1990	2280								
2	2050	2730	2050	4330								
3	1910	2420	1920	3980								
4	1680	2200	1930	3910								
5	1560	2030	1900	3810								
6	1460	2060	1850	3690								
7	1360	2110	1920	3690								
8	1240	2140	1800	3650								
9	1190	2220	1750	3100								
10	1340	2260	1650	2740								
11		2130	1590	2880								
12	1390	1990	1500	3120								
13	1340	1910	1490	2970								
14	1320	1980	1490	2690								
15	1190	2000	1520	2550								
16		2060	1540	2510								
17	1090	2260	1490	2580								
18	1190	2420	1580	2510								
19		2370	1890	2820								
20	1120	2210	2660	2950								
21	1130	2280	2650	2620								
22	1080	2170	2490	2820								
23	1150	2030	2240	3190								
24	2350	1980	2130	3410								
25	2640	1990	2120	3410								
26	3950	2180	2460	3290								
27		2200	2650	3030								
28		2130	2730	3210								
29			2690	3010								
30	3130		2490	2930								
31	3110		2370									
Min.	1080	1910	1490	2280								
Mean	1707	2190	2017	3123								
Max.	3950	2860	2730	4330								

Table B1: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1992*

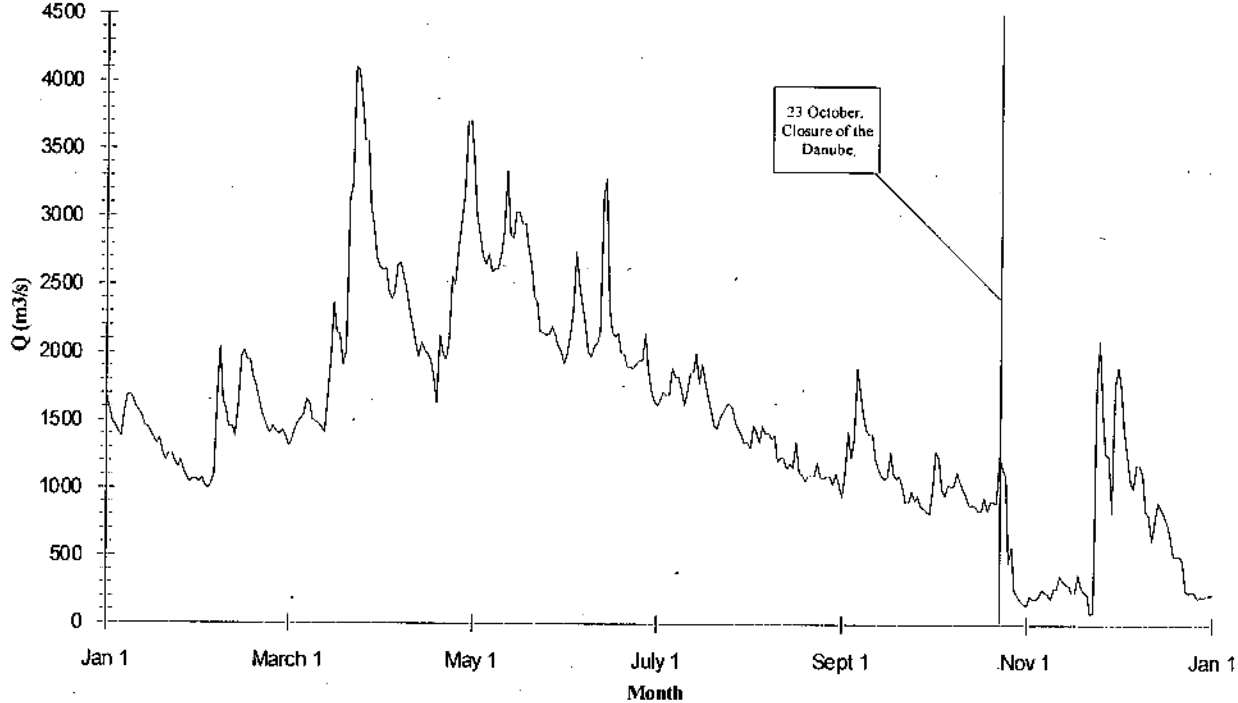

Table B1: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1992*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1680	1040	1390	2630	3710	1920	1660	1350	939	1010	143	1910
2	1590	1080	1310	2610	3450	2000	1620	1300	1110	1290	212	1750
3	1490	1020	1350	2620	3010	2130	1650	1470	1430	1230	195	1450
4	1460	996	1420	2450	2870	2310	1720	1420	1230	1010	190	1260
5	1410	1030	1480	2390	2710	2750	1690	1340	1380	946	212	1070
6	1380	1100	1510	2450	2650	2500	1690	1470	1900	1040	262	1010
7	1570	1700	1540	2650	2730	2360	1900	1410	1720	1020	245	1190
8	1680	2040	1660	2660	2590	2210	1820	1420	1550	1030	228	1190
9	1690	1650	1630	2550	2620	2010	1830	1370	1440	1130	190	1110
10	1660	1580	1510	2460	2620	1970	1740	1400	1410	1060	274	839
11	1600	1450	1490	2300	2720	2050	1620	1200	1410	1000	268	818
12	1570	1460	1480	2200	2890	2070	1720	1240	1230	954	366	622
13	1530	1380	1450	2070	3340	2160	1860	1230	1150	884	324	778
14	1460	1610	1410	1970	2870	3160	1860	1150	1100	888	303	914
15	1450	1970	1680	2080	2840	3290	2000	1190	1080	877	288	860
16	1410	2020	1960	2020	3040	2340	1780	1160	1090	846	239	818
17	1370	1950	2370	1990	3030	2160	1930	1350	1280	842	239	754
18	1330	1950	2150	1950	2950	2120	1790	1120	1120	946	376	661
19	1370	1830	2130	1820	2950	2150	1670	1110	1080	842	282	515
20	1260	1750	1910	1630	2770	2000	1580	1060	1100	912	245	508
21	1200	1650	2010	2130	2650	2000	1460	1100	1010	912	228	512
22	1260	1560	3130	2000	2420	1900	1450	1100	904	896	84	478
23	1260	1500	3220	1950	2370	1900	1530	1100	904	1260	92	251
24	1200	1440	4110	2080	2160	1890	1570	1200	988	1160	1780	239
25	1150	1410	4080	2560	2150	1920	1620	1090	916	1100	2110	254
26	1210	1460	3870	2500	2130	1950	1630	1080	954	453	1580	239
27	1130	1420	3560	2770	2140	1950	1600	1100	873	576	1270	198
28	1080	1400	3560	2960	2200	2150	1500	1100	861	256	1250	217
29	1040	1430	3070	3170	2130	1890	1450	1030	835	217	826	203
30	1070		2930	3710	2050	1730	1400	1120	821	180	1780	225
31	1070		2700		2010		1340	1040		156		222
Min.	1040	977	1310	1630	2000	1650	1100	985	827	147	83.6	182
Mean	1370	1500	2240	2390	2640	2170	1650	1220	1160	863	551	740
Max.	1690	2160	4110	3790	3710	3630	2010	1480	1900	1390	2120	1950

Annual:

Min.	83.6 m^3/s
Mean	1540 m^3/s
Max.	4110 m^3/s

Table B2: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1993*

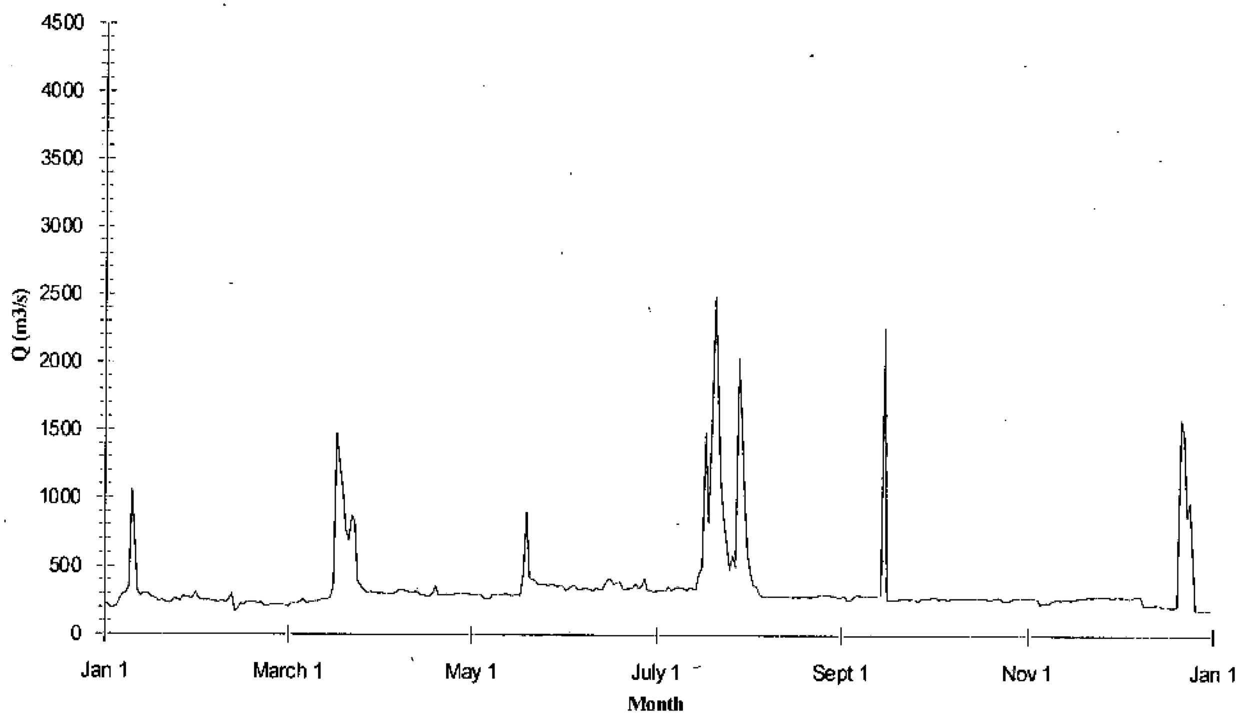

Table B2: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1993*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	228	270	218	309	303	362	331	1000	275	278	278	289
2	218	253	218	303	301	362	320	596	284	284	275	289
3	193	253	204	309	295	329	326	452	295	284	278	287
4	197	253	228	301	292	340	331	368	259	270	275	287
5	211	253	228	301	298	359	326	357	264	275	275	278
6	259	247	228	298	298	365	326	303	281	278	233	278
7	301	242	242	301	267	337	357	289	298	264	242	292
8	298	242	261	315	270	337	329	289	295	275	247	289
9	348	250	233	329	267	343	343	289	292	275	242	292
10	1060	233	236	331	301	343	354	284	292	275	259	220
11	671	253	245	320	298	337	348	284	292	275	267	228
12	315	303	247	315	298	326	345	287	287	278	270	225
13	281	172	247	315	295	345	331	289	292	275	264	228
14	306	188	259	315	303	337	354	289	295	278	273	233
15	303	231	264	317	298	334	340	289	295	278	275	233
16	289	216	259	289	292	377	337	284	2267	278	264	218
17	267	239	275	292	292	412	461	284	267	278	270	220
18	270	236	354	287	298	405	486	287	264	273	275	220
19	239	242	1480	281	289	371	1490	284	264	278	281	209
20	256	236	1250	306	458	390	820	287	264	270	281	214
21	242	231	1050	359	900	387	1530	287	270	267	281	216
22	231	239	776	289	415	337	2490	287	273	275	289	1590
23	236	211	689	295	408	340	1820	284	270	278	284	1470
24	264	207	868	298	396	343	1150	287	270	281	289	872
25	259	218	820	298	371	345	860	292	273	253	289	980
26	247	223	387	295	374	381	675	298	273	259	287	606
27	281	220	362	298	377	345	480	298	250	259	292	188
28	278	223	331	303	359	359	588	295	270	273	289	188
29	273		309	301	371	415	501	298	275	278	287	184
30	264		315	301	374	334	2040	292	273	281	281	193
31	312		312		354		1530	295		281		191
Min.	181	172	197	281	267	326	320	281	250	253	233	184
Mean	298	236	432	306	246	356	737	323	278	274	273	357
Max.	1060	317	1480	359	900	415	2490	1030	303	284	292	1590

Annual:

Min.	172 m^3/s
Mean	353 m^3/s
Max.	2490 m^3/s

Table B3: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1994*

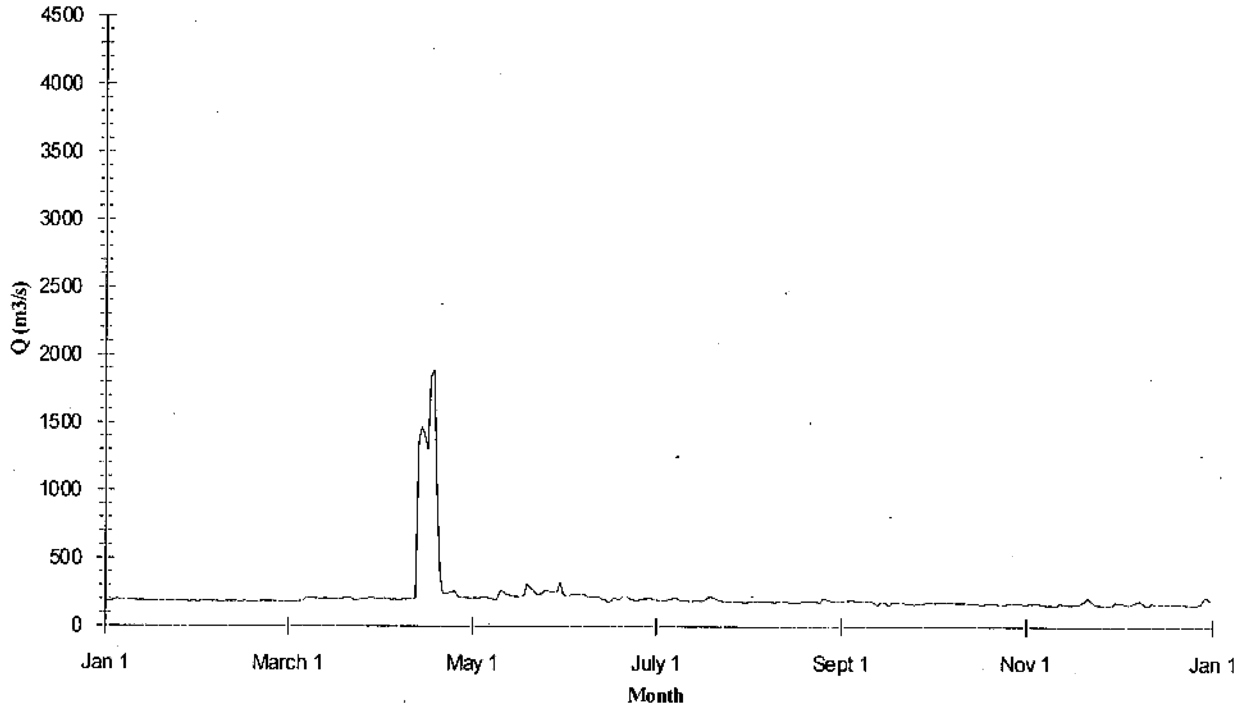

Table B3: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1994*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	186	179	1390	207	211	329	211	179	186	184	168	184
2	186	184	1310	202	207	239	197	181	186	179	163	174
3	186	184	1350	207	211	220	197	188	193	177	172	177
4	195	184	1420	207	209	220	191	188	193	177	170	170
5	202	184	1480	207	207	242	191	184	197	181	174	163
6	193	186	1510	191	216	231	195	184	195	179	179	163
7	193	184	1540	202	214	236	197	188	191	179	161	179
8	193	181	1660	191	211	239	202	184	188	186	165	186
9	191	179	1630	191	204	236	211	184	184	179	156	195
10	191	184	1510	204	197	220	207	186	184	179	163	172
11	193	184	1490	197	197	220	191	179	188	179	156	154
12	188	184	1480	204	261	218	188	184	188	177	154	158
13	191	184	1450	207	259	218	193	188	179	177	179	179
14	188	184	1410	202	233	216	188	188	156	179	165	163
15	186	177	1680	1350	233	200	188	184	184	172	165	163
16	186	186	1960	1470	220	200	191	177	184	179	163	172
17	188	186	2370	1410	220	177	191	181	170	170	161	161
18	186	177	2150	1300	218	188	188	181	154	165	172	170
19	186	177	2130	1840	218	216	195	174	184	161	165	172
20	184	177	1910	1890	231	200	214	186	172	179	181	165
21	184	186	2010	1030	315	204	220	188	184	168	188	172
22	184	184	3130	393	281	225	211	193	184	172	216	168
23	186	184	3220	236	270	225	202	188	174	174	195	168
24	186	186	4110	245	239	207	193	184	168	165	172	163
25	186	184	4080	247	236	202	188	184	177	163	165	165
26	188	184	3870	250	242	193	188	179	165	165	161	165
27	184	184	3560	261	264	195	186	209	174	174	156	161
28	193	186	3560	218	259	200	188	204	172	172	156	165
29	179		3070	211	259	207	188	195	174	172	156	174
30	184		2930	211	250	204	188	188	177	177	156	211
31	184		2700		250		184	184		174		218
Min.	179	177	168	184	197	177	179	172	154	158	154	154
Mean	188	184	200	496	239	217	196	186	180	174	170	172
Max.	202	202	220	1960	474	329	220	209	197	186	278	218

Annual:

Min.	154 m^3/s
Mean	217 m^3/s
Max.	1960 m^3/s

Table B4: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1995*

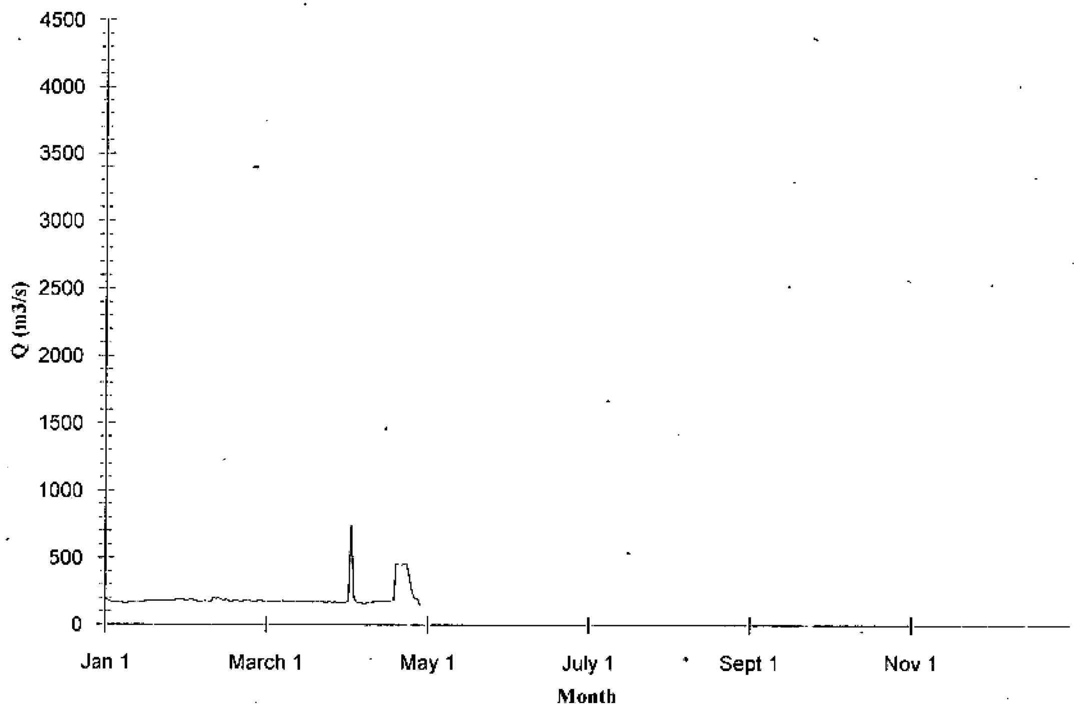

Table B4: *Water discharge (m^3/s) in the Danube (measured at Rajka), 1995*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	197	179	181	165								
2	184	188	174	170								
3	172	193	179	174								
4	170	179	177	740								
5	172	174	170	200								
6	170	172	177	170								
7	170	177	172	165								
8	161	177	177	165								
9	161	177	179	156								
10	168	165	174	165								
11	170	202	174	168								
12	165	193	170	168								
13	165	200	177	174								
14	165	191	179	172								
15	168	179	179	174								
16	174	191	177	174								
17	179	174	177	174								
18	177	172	174	179								
19	177	179	177	181								
20	179	186	170	181								
21	179	172	172	461								
22	179	172	172	449								
23	179	184	174	449								
24	177	179	174	458								
25	181	179	170	458								
26	184	177	168	343								
27	177	170	177	242								
28	193	181	163	195								
29	186		174	197								
30	191		163	142								
31	184		161									
Min.	161	165	161	131								
Mean	176	181	174	251								
Max.	197	202	184	844								

***Table C1:** Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1992*

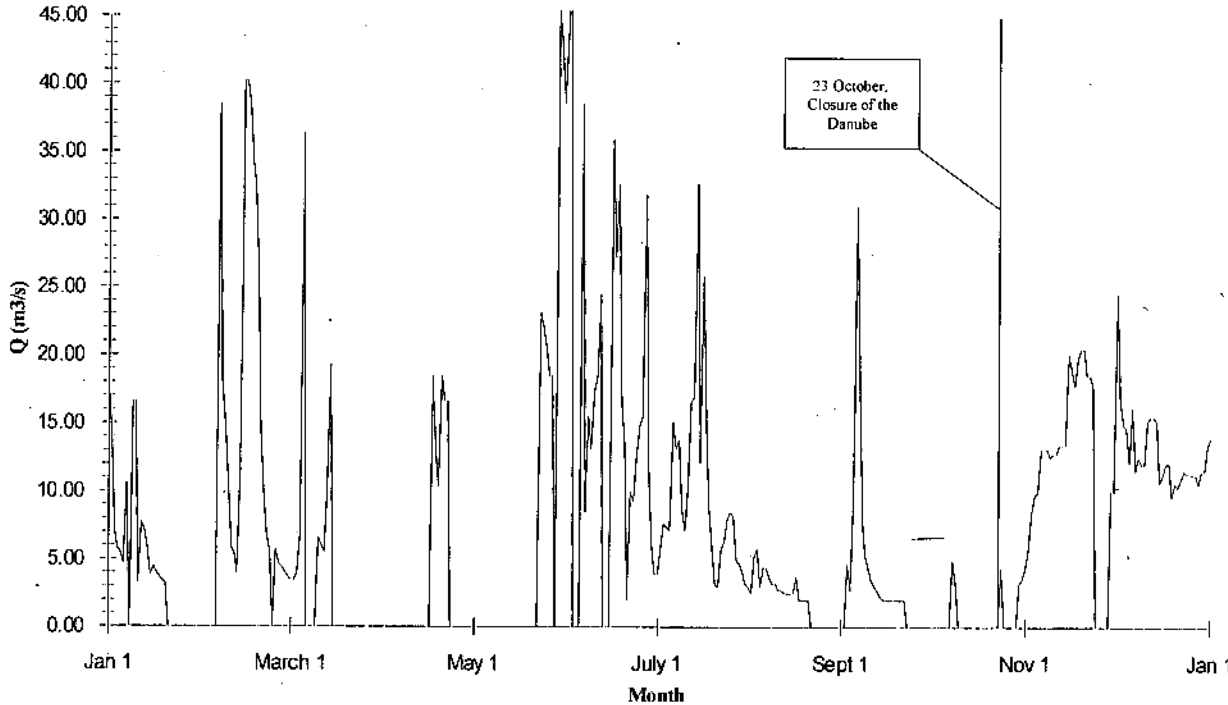

Table C1: Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1992

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	17.70	closed	3.68	closed	closed	38.50	3.92	2.96	closed	closed	4.40	24.50
2	14.30	closed	3.44	closed	closed	43.70	3.92	2.48	closed	closed	5.75	16.70
3	7.10	closed	3.44	closed	closed	48.40	5.75	5.21	4.67	closed	8.45	14.90
4	5.80	closed	3.92	closed	closed	closed	7.64	5.75	2.72	closed	9.69	14.60
5	5.48	closed	6.56	closed	closed	closed	7.37	2.96	10.00	closed	10.00	12.10
6	4.67	closed	36.40	closed	closed	closed	7.10	4.40	31.00	closed	13.10	16.20
7	10.60	38.50	closed	closed	closed	38.50	15.10	4.40	18.50	closed	13.10	11.50
8	closed	18.10	closed	closed	closed	8.45	13.10	3.68	7.64	4.94	13.10	12.50
9	16.60	14.80	closed	closed	closed	15.50	13.80	3.20	5.21	3.20	12.50	12.00
10	16.60	10.20	closed	closed	closed	13.10	8.76	3.20	4.40	closed	12.80	12.00
11	3.20	5.75	6.56	closed	closed	17.30	7.10	2.72	3.44	closed	12.80	15.10
12	7.78	5.48	6.02	closed	closed	18.50	10.30	2.72	2.96	closed	13.40	15.50
13	7.10	3.92	5.48	closed	closed	24.50	16.60	2.48	2.72	closed	13.40	15.50
14	5.75	11.20	10.30	closed	closed	closed	16.90	2.48	2.24	closed	13.40	15.10
15	3.80	40.20	19.30	closed	closed	closed	32.60	2.48	2.00	closed	20.10	10.60
16	4.40	40.20	closed	closed	closed	closed	12.10	2.48	2.00	closed	18.90	11.20
17	4.04	38.50	closed	closed	closed	35.90	25.80	3.68	2.00	closed	17.70	12.00
18	3.68	34.20	closed	18.50	closed	27.20	14.80	2.00	2.00	closed	19.70	12.10
19	3.44	32.60	closed	13.10	closed	32.60	8.76	2.00	2.00	closed	20.50	9.54
20	3.20	26.50	closed	10.30	closed	16.60	5.75	2.00	2.00	closed	20.50	10.60
21	closed	14.80	closed	18.50	closed	13.40	3.20	2.00	2.00	closed	18.50	10.30
22	closed	10.00	closed	16.60	closed	2.00	2.96	closed	2.00	closed	18.50	10.90
23	closed	6.83	closed	16.60	closed	10.00	5.75	closed	closed	closed	17.70	11.50
24	closed	5.48	closed	closed	23.10	9.23	6.29	closed	closed	4.40	closed	11.30
25	closed	closed	closed	closed	22.10	12.50	7.91	closed	closed	closed	closed	11.30
26	closed	5.75	closed	closed	20.50	14.80	8.45	closed	closed	closed	closed	11.20
27	closed	4.67	closed	closed	18.50	15.50	8.18	closed	closed	closed	closed	11.20
28	closed	4.40	closed	closed	18.50	31.80	4.94	closed	closed	closed	closed	10.50
29	closed	4.04	closed	closed	closed	11.80	4.67	closed	closed	closed	10.00	11.50
30	closed		closed	closed	45.60	6.02	4.16	closed	closed	3.20	10.00	11.50
31	closed		closed		42.80		3.20	closed		3.56		13.30
Min.	closed	closed	closed	closed	closed	closed	2.96	closed	closed	closed	closed	9.54
Mean	4.69	13.00	3.39	3.12	6.16	16.86	9.58	2.11	3.72	0.62	11.60	12.90
Max.	17.70	40.20	36.40	18.50	45.60	48.40	32.60	5.75	31.00	4.94	20.50	21.50

Annual:

Min.	0.00 m^3/s
Mean	7.26 m^3/s
Max.	17.70 m^3/s

Table C2: *Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1993*

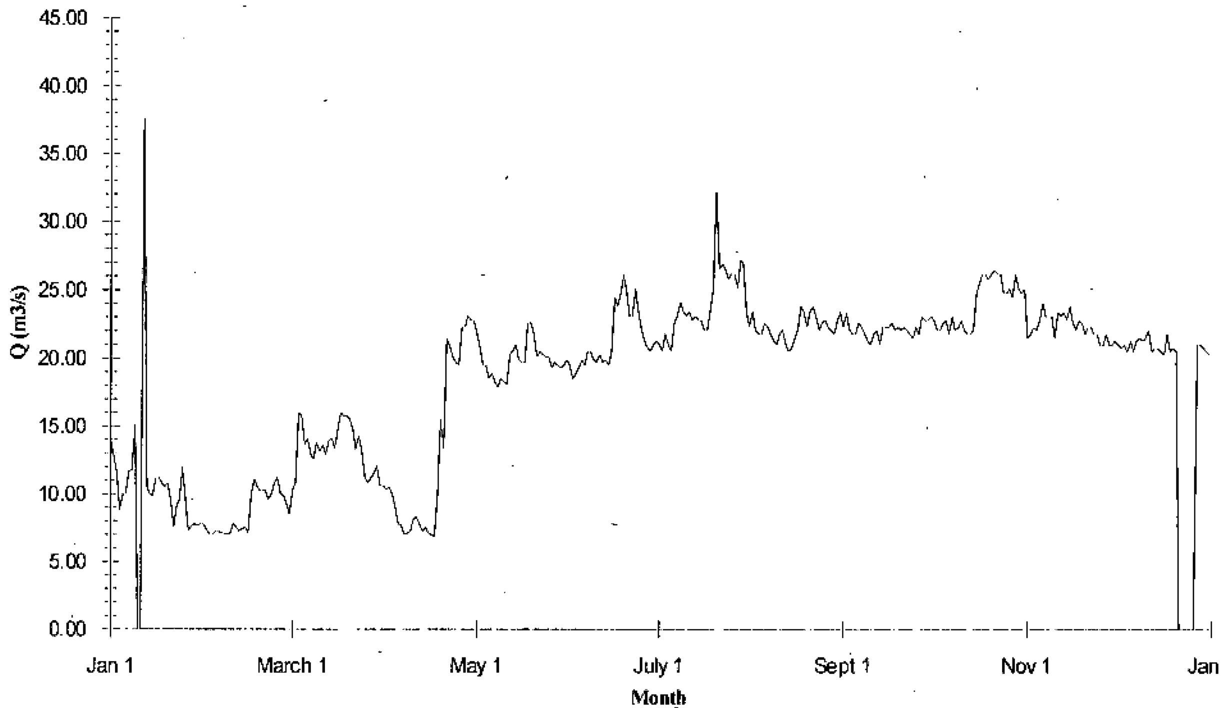

Table C2: *Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1993*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	13.90	7.78	9.23	10.60	22.80	19.50	21.00	23.40	23.40	23.10	25.10	21.30
2	12.80	7.37	8.45	10.60	22.80	19.90	21.30	22.30	22.30	22.80	21.50	21.00
3	11.50	6.96	10.30	10.30	21.80	19.50	21.00	23.40	23.40	22.10	21.80	20.80
4	8.79	6.96	10.80	10.50	20.80	18.50	20.50	22.10	22.10	22.10	22.30	21.00
5	10.00	7.24	16.00	10.00	19.50	18.90	21.80	21.80	21.80	22.60	22.10	20.50
6	10.00	7.24	15.70	9.07	19.50	19.30	21.00	21.80	21.80	22.80	22.80	21.30
7	11.70	7.10	13.60	7.78	18.50	19.90	20.50	22.60	22.60	21.80	24.10	20.50
8	11.70	7.10	14.10	7.67	18.90	19.50	22.60	22.30	22.30	23.10	23.10	21.30
9	15.10	6.96	12.90	6.96	18.30	20.50	23.10	21.80	21.80	22.10	23.10	21.50
10	closed	7.10	12.50	7.10	17.90	20.50	24.10	21.30	21.30	22.30	23.10	21.30
11	closed	7.78	13.80	7.24	18.50	19.90	23.40	21.00	21.00	22.80	21.50	21.50
12	37.60	7.50	13.10	8.05	18.30	19.70	23.10	21.80	21.80	22.10	23.40	22.10
13	10.50	7.24	13.60	8.31	18.10	20.30	23.40	22.10	22.10	21.80	23.10	20.50
14	10.00	7.37	12.90	7.78	20.30	19.70	22.80	21.00	21.00	21.80	23.40	20.80
15	9.85	7.50	13.90	7.24	20.50	19.90	23.10	20.50	22.30	22.10	22.80	20.80
16	11.20	7.10	14.10	7.50	21.00	19.50	22.80	20.80	22.30	24.80	23.80	20.50
17	11.20	10.00	13.30	7.10	19.90	20.50	22.80	21.50	22.30	25.50	22.60	20.30
18	10.80	11.10	14.80	6.96	19.70	24.50	22.10	22.10	22.60	26.20	22.10	21.80
19	10.50	10.50	16.00	6.83	19.70	23.80	22.10	23.80	22.10	26.20	22.80	20.50
20	10.80	10.20	15.70	9.85	22.60	24.80	23.40	23.40	22.30	25.80	22.60	20.80
21	9.54	10.20	15.80	15.50	22.60	26.20	25.10	22.30	22.10	26.20	21.80	20.50
22	7.50	10.30	15.50	13.30	21.80	24.80	32.20	23.40	22.30	26.50	22.30	closed
23	9.07	9.54	14.80	21.50	20.10	23.10	26.50	23.80	22.10	26.20	22.30	closed
24	9.54	10.00	13.30	20.80	20.50	23.10	26.90	23.10	21.80	26.20	21.80	closed
25	12.00	10.80	14.30	20.10	20.30	25.10	26.50	22.10	21.50	24.80	21.80	closed
26	9.85	11.20	13.10	19.70	20.10	23.40	25.80	22.60	22.30	24.80	21.00	closed
27	7.24	10.00	11.20	19.50	20.10	22.10	26.20	22.80	21.80	25.10	21.00	closed
28	7.64	9.85	10.80	22.30	19.30	21.30	26.20	22.30	23.10	24.50	21.80	21.00
29	7.78		11.20	22.30	19.70	20.80	25.10	22.10	22.80	26.20	21.00	21.00
30	7.64		11.50	23.10	19.50	20.50	27.20	21.80	22.80	25.10	21.00	20.80
31	7.78		12.10		19.30		26.90	22.80		24.80		20.50
Min.	closed	6.70	8.45	6.83	17.90	18.50	20.50	20.30	21.00	21.50	20.50	closed
Mean	10.70	8.71	13.10	12.20	20.10	21.30	23.90	23.40	22.20	24.10	22.40	20.95
Max.	37.60	11.50	16.20	23.10	22.80	26.20	32.60	27.20	23.40	26.90	25.10	22.10

Annual:

Min.	0.00 m^3/s
Mean	18.18 m^3/s
Max.	20.50 m^3/s

Table C3: *Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1994*

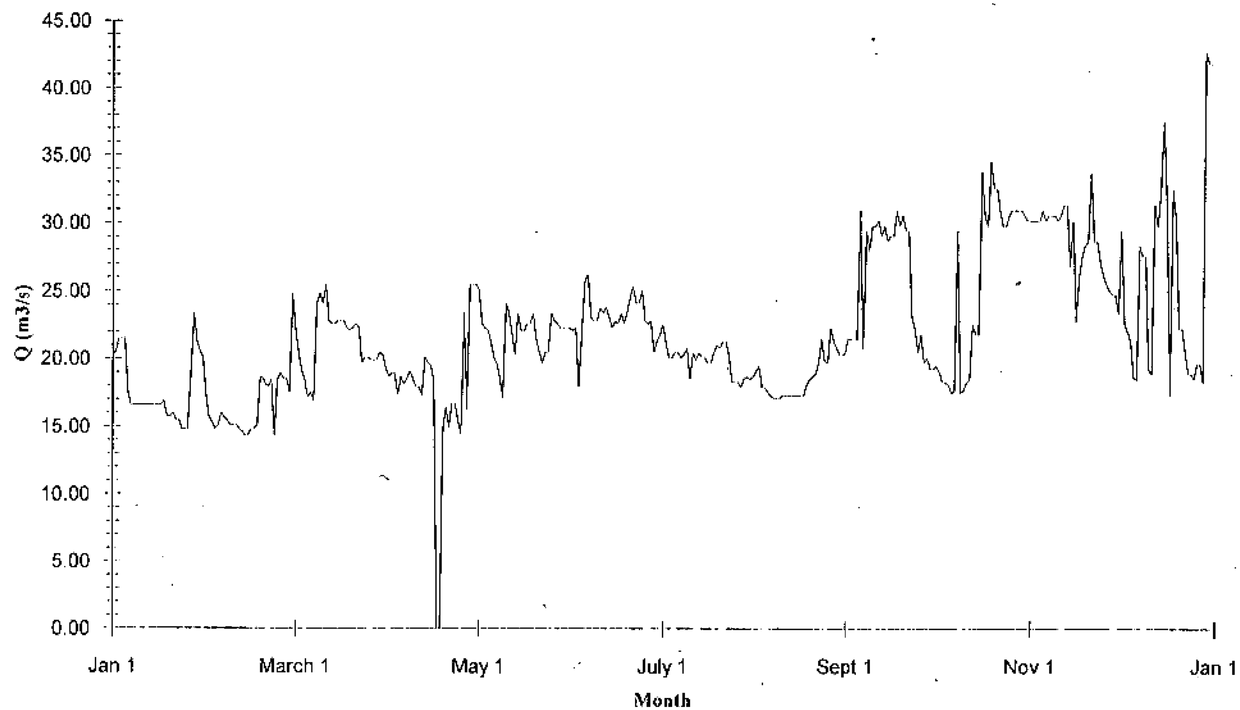

***Table C3:** Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1994*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	20.30	17.30	17.50	20.30	25.50	22.30	21.30	18.50	20.30	19.30	30.20	23.40
2	20.50	15.70	24.80	19.30	25.50	22.30	21.80	18.70	20.50	19.50	30.20	29.50
3	21.50	15.30	22.10	18.70	25.10	22.10	22.60	19.10	21.50	19.10	30.20	22.60
4	21.50	14.80	20.50	18.90	22.60	22.30	21.30	19.50	21.50	18.30	30.20	22.10
5	21.50	15.10	19.10	18.90	22.30	17.90	20.10	17.90	21.50	18.30	30.20	21.30
6	17.50	16.00	18.50	17.30	22.10	21.80	20.10	17.90	21.50	18.10	31.00	18.70
7	16.60	15.70	17.10	18.70	21.30	25.80	20.50	17.50	31.00	17.50	30.20	18.50
8	16.60	15.50	17.50	18.10	20.10	26.20	20.50	17.30	20.80	17.70	30.60	28.40
9	16.60	15.10	16.90	18.50	19.70	23.10	20.10	17.10	29.50	29.50	30.60	27.60
10	16.60	15.10	24.10	19.10	18.50	22.80	20.30	17.10	28.00	17.50	30.60	27.60
11	16.60	15.10	24.80	18.50	17.10	22.80	20.80	17.10	29.80	17.70	30.20	19.30
12	16.60	14.80	24.10	17.90	24.10	23.80	18.50	17.30	29.80	18.30	30.60	18.90
13	16.60	14.60	25.50	17.90	23.40	23.40	20.50	17.30	30.20	18.50	31.40	31.40
14	16.60	14.30	22.80	17.30	21.80	23.80	19.90	17.30	29.10	22.60	31.40	29.80
15	16.60	14.30	22.60	20.10	20.30	23.10	20.50	17.30	29.80	21.80	26.90	32.20
16	16.60	14.80	22.60	19.70	23.40	22.30	20.10	17.30	28.70	21.80	30.20	37.60
17	16.60	14.80	22.80	19.50	22.10	22.80	20.10	17.30	29.10	33.80	22.80	31.40
18	16.90	15.10	22.80	18.30	22.10	22.60	19.70	17.30	29.10	30.60	26.20	17.30
19	15.80	18.70	22.80	closed	22.60	23.40	19.70	17.30	31.00	29.80	27.60	32.60
20	15.70	18.50	22.30	closed	22.60	22.60	20.50	18.10	29.80	34.60	28.40	30.20
21	16.00	18.10	22.10	14.80	23.40	23.40	21.00	18.50	30.60	32.60	28.70	22.30
22	15.50	17.90	22.30	16.40	21.50	24.50	20.80	18.70	29.50	32.60	33.80	22.30
23	15.50	18.50	22.60	14.90	20.50	25.40	21.30	18.90	29.50	31.00	28.70	20.50
24	14.80	14.30	22.30	16.70	19.70	24.10	21.30	19.70	23.10	29.80	28.70	18.90
25	14.80	18.50	19.70	16.70	20.50	24.10	20.30	21.50	22.30	29.80	27.20	18.90
26	14.80	18.90	20.10	15.50	20.50	25.10	18.30	19.90	20.50	30.60	26.20	18.50
27	18.50	18.50	20.10	14.40	23.40	22.80	18.30	19.70	21.80	31.00	25.50	19.70
28	23.40	18.50	19.90	23.40	22.80	22.60	18.30	22.30	19.70	31.00	25.10	19.70
29	21.30		19.90	16.20	22.60	22.80	17.90	21.30	20.10	31.00	24.80	18.30
30	20.50		19.90	25.50	22.30	20.50	18.50	20.80	19.30	31.00	24.80	42.80
31	20.10		20.50		22.30		18.70	20.30		30.60		41.90
Min.	14.80	14.30	16.90	closed	17.10	14.80	17.90	17.10	14.80	17.50	22.80	13.90
Mean	17.50	16.30	21.50	25.50	21.90	22.80	20.40	18.70	25.70	25.50	28.90	25.30
Max.	23.40	18.90	25.50	18.30	25.50	26.20	37.60	22.30	31.00	34.60	33.80	42.80

Annual:

Min.	0.00 m^3/s
Mean	21.78 m^3/s
Max.	41.90 m^3/s

Table C4: *Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1995*

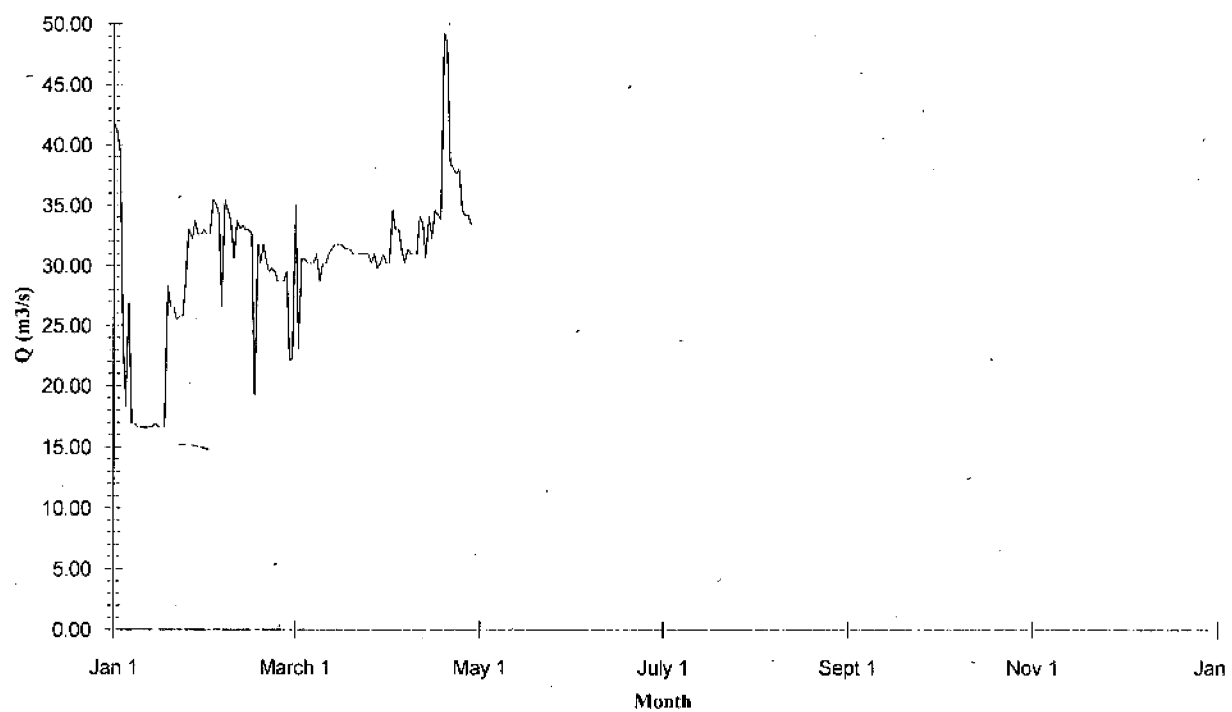

Table C4: *Water discharge (m^3/s) in the Mosoni Danube (measured at the first gate), 1995*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	41.90	32.60	22.10	31.00								
2	41.10	32.60	22.30	30.20								
3	39.40	35.50	35.10	30.20								
4	24.10	35.10	23.10	34.60								
5	18.30	34.20	30.60	33.00								
6	26.90	26.50	30.60	33.00								
7	16.90	35.50	30.20	31.40								
8	16.90	34.60	30.20	30.20								
9	16.60	33.80	30.20	31.40								
10	16.60	30.60	31.00	31.00								
11	16.60	33.80	28.70	31.00								
12	16.60	33.00	30.20	31.00								
13	16.60	33.40	30.20	34.20								
14	16.70	33.00	31.00	33.40								
15	16.90	33.00	31.40	30.60								
16	16.60	32.60	31.80	34.20								
17	16.60	19.30	31.80	32.20								
18	16.60	31.80	31.80	34.60								
19	28.40	30.20	31.47	34.20								
20	26.50	31.80	31.40	33.80								
21	26.50	30.60	31.40	49.30								
22	25.50	29.50	31.00	48.40								
23	25.80	29.80	31.00	38.50								
24	25.80	29.50	31.00	38.10								
25	28.70	28.70	31.00	37.60								
26	33.00	28.70	31.00	38.10								
27	32.20	28.70	31.00	34.60								
28	33.80	29.50	30.20	34.20								
29	32.60		31.00	34.20								
30	32.60		29.80	33.40								
31	33.00		30.20									
Min.	16.20	19.30	22.10	30.20								
Mean	24.90	31.60	30.12	34.39								
Max.	41.90	36.40	35.10	49.30								

Annex 2

THE DANUBE AFTER THE DIVERSION: AN ACTUAL GEOLOGICAL SURVEY

Péter Molnár, April 1995

Geological Institute of Hungary (MÁFI), H-1442 Budapest, POB 106

INTRODUCTION

Since the beginning of the 1990s, a number of hydrological and geological studies of the Szigetköz have been prepared by the Geological Institute of Hungary (MÁFI) upon commissions of various authorities. They gave detailed information about the geological setting, environmental geological conditions of the Szigetköz, in addition to the composition and development of the groundwater, top layer and Quaternary basin (Scharek *et al.*, 1991; Tóth *et al.*, 1992). In addition, hydrogeological models have been prepared by Tóth (1991) and Don *et al.*, (1993).

These studies summarised the morphological features of the main riverbed and floodplain side branches and the various types of alluvial sediments, paying special attention to their role in replenishing the groundwater. An evaluation was made of the changes in the geological and hydrogeological processes since the implementation of the Čunovo Dam. The groundwater quality in the area affected by the water recharge system was also analysed (Scharek *et al.*, 1994a, 1994b). One study was dedicated to considering the long-term protection of water resources of the Szigetköz (Scharek *et al.*, 1994c).

This paper offers a brief survey of changes in the water regime, sedimentation-erosion processes and groundwater recharge subsequent to the diversion of the river Danube.

1. THE ČUNOVO RESERVOIR AND THE HEAD-RACE CANAL OF THE GABČÍKOVO POWER PLANT

The area flooded by the reservoir was previously cleared of forests, and by filling in side branches, the ground was roughly levelled. At the narrows of the reservoir, between Čunovo and Hamuliakovo on the left side floodplain, a new navigation channel was dredged towards the head-race canal. The bottom of the head-race canal and the embankments were covered with an insulating layer in order to prevent water seeping through.

From October 1992 to July 1994, the impoundment level of the Čunovo reservoir fluctuated between 130-131 a.s.l. In July 1994 and up to January 1995, the impoundment level decreased by two metres. Depending on the Danube discharge, the backwater reach extends up to rkm 1867/1872 at the impoundment level of 131 m a.s.l. and up to rkm 1863/1867 at 129 m a.s.l. In the Čunovo reservoir, the velocity of the water reduces from 2 m/s to 0.3 m/s, therefore 90% of the 300,000 m^3 annual bedload material passing Bratislava (Rákóczi, 1989) is deposited on this reach.

An even greater drop in speed can be observed on other parts of the reservoir. Especially at the wide sections at Hrušov and Šamorin where the flow velocity decreases to below 0.15 m/s causing the suspended load to silt in great quantities. At these places floods are not able to disturb the mud, because even at a flow of 3000 m^3/s the speed does not exceed 0.1 m/s. According to model experiments (Kališ *and* Bačik, 1991; VITUKI, 1993), 75-80% of an annual 2.0-2.2 million m^3

suspended load, i.e., 1.5-1.8 million m^3 is deposited in the reservoir. As indicated in Slovak surveys, approximately half of the reservoir is being deposited with more than 10 cm of silt per year, and there are places where more than 40 cm of sedimentation can be expected per year.

In October 1994 at Hamuliakovo, my observations on the reservoir bottom, now dry following one and a half years of flooding, have reinforced the results of the model experiments (*Figure 1*[1]). The thickness of the recent dark grey-brown, finely laminated clayey sediments has exceeded 40 cm. Along the lamellae a great number of slightly carbonised plant particles, stalk, leaves and bark residues occur. The deeply cracked, chapped surface is covered by sparse herbaceous vegetation, grown since July 1994.

The fine sediment on the bottom of the reservoir, i.e., the former top layer and the fresh clayey deposits, are not favourable from a water infiltration perspective. Lacking factual model calculations it can only be assumed that groundwater recharge might essentially occur through the dredged riverbed section of the navigation route. Insufficient infiltration causes the development of an unsaturated layer under the reservoir. At Hamuliakovo, on the reservoir bottom which dried out at rkm 1853 (600 m from the dyke), an 85 cm deep pit was dug right at the water's edge, but no groundwater was reached. The exposed fine sand comprising the lower part of the flooded top layer, rapidly sucked up the water poured into the pit.

2. THE SEEPAGE CANALS

The left and right side seepage canals, parallel with the dykes of the reservoir, were created in order to prevent waterlogging on the protected side by moderating the increase in the groundwater level (Völgyesi, 1989). The water level in the canals is regulated by sluices.

On sections beside the reservoir, the canals do indeed tap the groundwater. According to our observations carried out between Šamorin and Hamuliakovo, the bottom of the left side canal consists of loose, selectite-like gravel. The water infiltrating into the channel removed the sand from the gravel. In pits created at the water's edge of the canal, the water level was identical with that of the canal. In the well lit, hardly flowing water which was free of suspended sediment, algae reproduced extremely well and settled directly on the loose gravelly bottom.

The Hungarian reach of the right side seepage canal is another matter. The canal conveyed 3-4 m^3/s of water from Slovakia until July 1994 and since January 1995, but only 0.5-2.0 m^3/s in the interim period. According to probings carried out by MÁFI, the canal at these sections no longer taps the groundwater, but replenishes it instead. The banks are covered with willow bushes, and from the slowly moving water a thin film of mud has settled. It can be assumed that in the gravel underneath the fixed bed of the seepage canal, clogging is very extensive. Unfavourable infiltration conditions are indicated by the results of the probing: the level of groundwater stood below that of the canal by 1.05 m in July and 1.40 m in October 1994 and April 1995.

The right side seepage canal at lower reaches transports significantly more water than above. Up to the end of October 1994 an additional 12-20 m^3/s arrived through sluice No. 1 at Rajka from the outlet at Čunovo, and since then this has increased to more than 30 m^3/s. 10-20 m^3/s of this flow reaches the Mosoni Danube, about 5 m^3/s is directed into the water recharge system on the Hungarian protected side, while the rest enters the floodplain side arms system through the dyke at

[1] See *Scientific Rebuttal*, HR, vol 2, *Plate 4.1*.

Dunakiliti. According to the data of the surrounding monitoring wells, the seepage canal on this section recharges the groundwater as well.

3. THE MAIN RIVER BED

Following the diversion, the water and sediment movements of the former main river bed changed extensively. The most important change is that since the closure of the river bed, first 400 m^3/s, and later – since the end of 1993 – less than 200 m^3/s "maintaining" flow (excluding the infrequent floods) is let into the main bed through the four-gate bypass weir of the Čunovo plant, as opposed to the former average mean flow of 1800 m^3/s and low flow of 900 m^3/s. Consequently, at certain places the water level in the main riverbed fell almost 4 metres below previous mean flow levels, and is still 1.2-2.0 m below the lowest values ever recorded.

The sudden drop of the water level at the diversion of the Danube caused serious damage to the bank-protecting structures. In the days following the closure, groundwater poured back into the abandoned main riverbed forming abundant springs. As a result, the embankments and the spillovers in the closures of the branches are no longer supported and have collapsed at several places.

Since the closure, the Slovak party has directed some more water through to the main bed, when the total flow of the Danube exceeds the maximum capacity of the Gabčíkovo plant. (Presently this is 3200-3600 m^3/s.) Such smaller "floods" have descended at the end of November 1992, the end of March, end of July – beginning of August and the end of December, 1993, and in mid-April 1994. The level of these "floods", however, hardly reached the former mean water levels, thus the Danube never once inundated its floodplain between Rajka and Dunaremete in the last two years.

The dynamics of the water level fluctuations have changed as well. On average, the water level of the Danube at Dunaremete used to vary by 15 cm a day. Since the closure, the level has stabilised and for weeks the fluctuation is merely a few centimetres. The "floods", however, are more abrupt and rapid, they sometimes last a few days only. The sudden floods are followed by a quicker fall than before, causing more intensive sediment movements in the upper reach of the main bed. Because of the sudden changes in water levels during "flood" periods, the protecting structures of the bank and groynes were impaired, sunk and washed away at several places.

It is well known that downstream of a dam, strong erosion and deepening of the bed is usually experienced. The washed out substance of the bed is deposited by the river a few kilometres downstream in the form of bars and shallows. At Čunovo, the situation is further complicated by the fact that the water during floods was not discharged directly into the main bed, but rather onto the right side floodplain. At the time of the flood in November 1992, ten of the twenty gates of the inundation weir had no tail-water protection. Therefore, approximately 3 million m^3 of gravel was eroded downstream of the inundation weir and later deposited in the main bed (VITUKI, 1993). Deposits are mainly concentrated in the reach between rkm 1851 and 1840, but the impact of the increased sediment transport can be sensed down to rkm 1832. The fresh gravel layer, which is sometimes 1.5 m thick, is still moving actively during the ephemeral floods; hence the vegetation has not been able to overgrow these bars.

There is a different picture on the middle reach of the abandoned main bed, down to rkm 1815. Under natural conditions, significant vegetation on well sorted, clay-free sediments of the bars can only establish above the level of 2500-3000 m^3/s mean water flow – at places where inundations do not exceed 40-70 days in the vegetation period. Since the closure – due to the low water levels –

parts of the bars which used to be underwater, are now dry. On the top of these bars there are well developed willow bushes and poplars, while the sides are thickly overgrown with herbaceous plants. When floods have passed, the suspended load is deposited from the slowly moving, stagnant water among the lush vegetation, causing the surface of the bars to become covered with a thick silty top-layer several cm thick, overlying the formerly clean gravel surface.

Another new phenomenon is the intensive algal abundance in the main bed. The amount of suspended sediment decreased to a few mg/l in the water conveyed from the Čunovo reservoir into the main bed, and thus the well-lit zone has spread to a significant part of the whole bed. Algal growth is triggered by the shallow water, the long-lasting stable water level, the reduced velocity which decreased to half the original (approx. 1.0 m/s), the diminished sediment content and the stabilised river bottom. The thick algal threads further aggravate the situation by reducing the speed of the water at the bottom and "catching" part of the suspended sediment. Thus, the silting of the main bed has begun, even at places where water velocity did not allow this.

The overgrown vegetation on the bars, as well as the algal abundance on the bottom bind the deposited coarse sediment, thus the passing floods can no longer transport it easily. The overgrown, bound bars hinder the passing of high-waters and ice. The silted bed obstructs the replenishment of groundwater and sufficient infiltration, even during floods.

The situation has especially changed at the lower reaches of the main bed, for 5-7 km upstream of the conjunction with the Gabčíkovo tail-race canal, where extensive silting is visible (*Figure 2*[2]). Given the present water distribution, the tail-race canal nearly always brings much more water than does the main bed. The greater flow coming from the tail-race canal holds the water of the main bed back. Depending on the ratio between discharges of the tail-race canal and the main bed, the backwater reach extends up to rkm 1815/1826, and most of the year it reaches as far as rkm 1821 (VITUKI, 1993).

In the backwater reach the flow velocity and slope diminishes, and what is more, at the beginning of the floods between rkm 1811 and 1817, reverse flow occurs. Suspended sediment is deposited from the slowly moving water. On this reach the former gravelly river bottom is covered with a silty layer 0.5-1.0 m thick, mainly along the banks (VITUKI, 1995).

Downstream of the conjunction with the tail-race canal, the river flow has maintained its original character (in general). However, due to the impact of the Gabčíkovo plant and the dredging, the river bed is deepening at Palkovičovo, while on the stretch between Medveďov and Nagybajcs sedimentation has increased.

4. FLOODPLAIN SIDE BRANCHES

Following the diversion of the Danube, right up to the summer of 1993, the floodplain side branch system did not receive any fresh water from the main riverbed. Due to the considerable drop in water level, the groundwater recharge role of the main bed ceased, and most of the branches dried up such that water only remained in the erosion pits below the closures. Dried out river beds were overgrown with vegetation.

2 See *Scientific Rebuttal*, HR, vol 2, *Plate 3.1b*

In Spring 1993, for the purposes of constructing the floodplain water recharge system, the majority of cross-dykes in the side branches were demolished, and their lower, previously open mouths were separated from the main bed. Some stretches were dredged and new throughcuts created. Thus, an isolated channel system more than 36 km long was generated. The fill-up spillover at rkm 1845.9 was dismantled to the level 121.4 a.s.l., allowing water to enter the branch system when the discharge in the main bed exceeds 900 m^3/s. This has occurred three times so far, for a period of 20 days in total. Since 9 August 1993, part of the water that arrives through the Mosoni Danube outlet at Čunovo and the right side seepage canal from Slovakia, i.e., 5-20 m^3/s, has been diverted into the floodplain water recharge system.

Recharge of the floodplain branches can also be accomplished by the main bed. However, since the water level of the main bed is some 2-4 m below the level of the branches, water can only get into the branch system by pumping, damming the main riverbed or dredging a new water recharge channel. In 1994, three pumping-stations were put into operation. From July to October, the pumps supplied 12-15 m^3/s extra water into the branch system. Due to the unfavourable infiltration conditions of the branch beds and the strong draining effect of the main bed, just a slight increase in the groundwater level could be attained and then only next to the water recharge system.

The bed surfaces of the floodplain recharge system are not always suitable for replenishing the groundwater. Due to the different bed substances and extent of drainage, the intensity of infiltration varies within a wide range. The deposited silty gravels and silts of low permeability in the side branch riverbeds restrict infiltration. Where there is an extreme drainage effect, however, clogging processes develop underneath and around the bed, and the effectiveness of the groundwater recharge diminishes, as well.

Silting and clogging of the riverbed not only reduce the quantity of infiltration but also impair the groundwater quality. The silty sediments are rich in organic matter, which causes anaerobic, reductive conditions during infiltration. In the groundwater recharged through such sediments, the contents of HCO_3, iron, manganese, ammonium, arsenic and lead increase, while the contents of nitrate and dissolved oxygen are strongly reduced. Groundwater probes, carried out by MÁFI along the banks of side branches, clearly revealed this process (Scharek *et al.*, 1994c).

The estuary of the Ásványi Danube and the Bagomér branch system are within the backwater of the Gabčíkovo tail-race canal confluence, and as a result the former gravelly bottom is covered with a significant amount of silt everywhere. The dark-grey colour and bad odour of the sedimented fines clearly indicate the anaerobic, strongly reductive conditions.

5. BRANCHES ON THE PROTECTED SIDE

As a consequence of the diversion of the Danube and the sudden drop of the groundwater level, the abandoned meanders and oxbow lakes, spared so far on the protected side, also dried out in the upper Szigetköz. In fact, it was only on certain deeper reaches of the Zátonyi Danube that some water remained. In order to save the aquatic and riparian habitats of the protected side, the water recharge system of the branches in this area was put into operation in Spring 1993. 4-5 m^3/s of the water amount released by the Slovak party through the Mosoni Danube outlet at Čunovo and the right side seepage canal was directed into these meandering branches. Due to the constant water supply, the water levels at some places exceeded the former average by 0.5-1.0 m. Indeed, a permanent flood condition has developed in the protected side branches.

The bottom of the protected side branches, covered with the thick layer of silty and clayey sediments that have been deposited over decades and rich in organic substances, is not favourable for replenishing the groundwater. The small amount of infiltrating water cannot increase groundwater levels on surrounding areas. According to MÁFI probes, groundwater levels, even close to the beds, are 1.0-1.5 m below the surface water.

REFERENCES

Don, Gy. et al. *1993. Geological Setting of the Szigetköz. Publ. by MÁFI, Budapest. pp 63.*

Kališ, J. and M. Bačik. 1991. Silting problem arising with the realization of the Gabcikovo water scheme. Grain Sorting Seminar, Ascona, Switzerland.

Rákóczi, L. 1989. Vízlépcsők hatása a hordalék- és mederviszonyokra. (The effect of river barrages on sediment and bed conditions.) *Vízügyi Közlemények 71(1): 5-24.*

Scharek P. et al. *1994a. Beszámoló jelentés az "Európai Közösség ajánlásaiban megfogalmazott hidrogeológiai feladatok elvégzéséhez alapadatok összeállítása és értékelése" c. szerződés teljesítéséről.* (Compilation and evaluation of basic figures in order to complete the hydrological tasks formulated in the expert recommendations of the EC.) *Manuscript, MÁFI Archives, Budapest.*

Scharek P. et al. *1994b. Beszámoló jelentés a "Szigetköz hidrogeológiai és aktuálgeológiai állapotfelmérése, az adatok térinformatikai feldolgozása" c. szerződés teljesítéséről.* (Hydrogeological and geological assessment of the Szigetköz) *Manuscript, MÁFI Archives, Budapest.*

Scharek P. et al. *1994c. A Szigetköz távlati vízbázis védelme.* (Long-term protection of the Szigetköz water resources.) *Manuscript, MÁFI Archives, Budapest.*

Scharek, P. et al. *1991. A Szigetköz és a kapcsolódó térség földtani viszonyai.* (The geological conditions of the Szigetköz) *Manuscript, MÁFI Archives, Budapest.*

Tóth, Gy. 1991. A Szigetköz és környékének hidrogeológiai értékelése. (Hydrogeological evaluation of the Szigetköz) *Manuscript, MÁFI Archives, Budapest.*

Tóth, Gy. et al. *1992. A Szigetköz védett területeinek földtani és hidrogeológiai jellemzése.* (Geological and *hydrogeological* characterisation of the protected floodplain in the Szigetköz.) *Maniscript, MÁFI Archives, Budapest.*

VITUKI. 1993. Hidrológiai és medermorfológiai vizsgálatok a Duna felső szakaszán és a szigetközi ágrendszerben. (Hydrological and riverbed morphological investigation of the Danube and Szigetköz branches.) *Manuscript, VITUKI Archives, Budapest.*

VITUKI. 1995. A Felső-Duna és a szigetközi ágrendszer környezetállapotának vizsgálata. (Research on the environmental condition of the side arm system of the Szigetköz and the Upper-Danube.) *Manuscript, VITUKI Archives, Budapest.*

Völgyesi, I. 1989. Időben vátozó talajvízszintek megcsapoló csatorna hatásterületén. (Changes in soil-water regime with time in the vicinity of the drainage channel). *Vízügyi Közlemények 71.*

Annex 3

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Your ref.: K.Kern, 25/1/95 *CH-8123, Ebmatingen, April 5, 1995*

Gabčikovo- Nagymaros
Case Hungary versus Slovakia, pending at the International Court of Justice

Dear Ladies and Sirs

on behalf of your Ministry, by letter of January 25, 1995, Dr. Klaus Kern, Karlsruhe/Germany, referred to the lecture I have given in Bratislava on October 8, 1993, and he asks a few specific questions in it. Annexed to the letter were sent a copy of paragraph 8.03 and of annex 32 of the Slovak counter - memorial, where reference was made to this lecture.

On some occasions, I have expressed my views on the possibilities of river restoration in relation to the Gabčikovo scheme. Until now, I have not be commissioned to conduct any investigation in this case. These views I have expressed are based on my general professional experience on one side, and on a number of private visits in the concerned region between 1990 and 1993 on the other side.

The lecture given in Bratislava was the first occasion of a public presentation. The paper which is reproduced as annex 32 of the Slovak counter memorial is an extended abstract I have submitted to the Slovak Ministry of Environment to be distributed to the public. So, it obviously can not contain all the information I was giving during the lecture and in particular not the result of the discussion. It was the only written document I had produced at that time on the subject.

A few weeks later, I wrote an article on the subject where I reworked all the main ideas expressed during the lecture and also some of the

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issues of the discussión. The article was published by the Neue Zürcher Zeitung on January, 12, 1994. It was also reproduced in a more or less shortened version by Magyar Nemzet the same day and by zahranicny monitor in Bratislava on January 17, 1994. I enclose copies of these articles.

In the following, the quotations are taken from the original text published in the Neue Zürcher Zeitung and translated by myself into English.

All my considerations concern the Danube between Cunovo/Dunakiliti and Palkovičovo, and the adjacent alluvial zones (wetlands). There are basically the following possibilities for the future of this reach :

1. Leave it more or less in the present situation with the Gabčikovo plant operating, with a residual discharge of 50 m^3/s (original project)

2. Leave it in the present situation, but restoring the original discharge regime by taking Gabčikovo out of operation

3. Leave it in the present situation with a higher residual discharge (200 to 400 m^3/s, more or less the actual regime; different sources give different answers).

4. Build the 'underwater weirs' (I called them low weirs in my paper reproduced as Annex 32) to raise the ground water table and partly inundate the alluvial zones

5. Induce a large scale river restoration by removing a large number of the existing training structures and by inducing lateral erosion .

The purpose of my lecture in Bratislava and of the article was clearly to propose variant 5 as a solution for the conflict about the Gabčikovo scheme. For details of the proposal I refer to the enclosures. My assessment of this variant compared to the others mentioned above can also be found there.

In particular - and here I start to answer Dr. Kern's questions - I made a comparison between variant 4 and 5 :

"This proposal (no. 5) - which has not yet the maturity of a project - is somehow contrasting to the official Slovak project variant supposed to solve the ecological problems of the bypassed reach. It incorporates a series of submerged weirs or sills.........With such measures the water table in the alluvial zones can be raised to a high level. As in the bypassed main channel the level would be nearly constant, what was not the case in the past where seasonal variations of the water level have been substantial. A full realisation of this system would result in a series of lakes, through which the water would flow only very slowly. The Danube would completely loose its character of a running water, a character for which an intensive fight is on between Vienna and Hainburg. The official project variant serves the purpose to preserve the character of the alluvial zones by irrigating these regions. This corresponds to a static vision of nature conservation.... The proposal (no. 5) orientates itself on a dynamic point of view... The two views (no. 4 and no. 5) do not exclude each other directly. It could make sense to irrigate the alluvial zones as a sort of emergency measure, in order to avoid a total collapse of the plant population."

It is therefore obvious that variant 4 - the construction of eight weirs in the old Danube and their extensions in the wetlands on both banks - is primarily designed to improve the ecological conditions in these wetlands by adjusting the ground water table to a desired level, but to the detriment of the morphological evolution in the main river channel. The impoundment will favour effects like siltation, temperature raise and eutrophication. To what extend this will happen would of course have to be investigated more in detail. Generally speaking, this reach of the Danube would not be a gravel bed river any more, what will surely have consequences for the habitat conditions.

On the other hand, the raise or the ground water level will certainly improve the conditions for the wetland vegetation on both banks and compensate both the detrimental effects of channel excavation before building of the Gabčikovo scheme and the subsequent water derivation.

For this variant 4 the question of discharge regime is of somewhat secondary importance. Most of the water would be stagnant or slow flowing. An alteration in the mean flow and low flow range would not change much to this situation. The low weirs in the Danube and the side weirs in the wetland would act as broad crested weirs with little change of water elevation as function of discharge. Only high floods can be expected to induce some morphological changes in the side branches. The amount of discharge is therefore mainly a question of compensating the seepage losses.

The question would be different if a river restoration according to variant 5 would be adopted. The discharge regime would then have to be adjusted to the developing river morphology. Some artificial floods would have to be produced to induce lateral erosion and the building of new gravel bars. An artificial acceleration of the process using excavators may prove to be necessary. It can be expected that if the main channel widens by lateral erosion, then the bed level will rise and the level difference between river bed and ground level in the wetlands will decrease. Furthermore, it can be expected that on the new bars the conditions will be favourable for the formation of new wetland.

It is to early to assess the level difference in such a river and wetland system. If the principle of such a restoration is accepted, specific investigations would have to be performed. Amongst others, the problem of residual discharges would have to be examined as a function of the developing morphological elements. As a very first answer, I can imagine that compared to the actual discharges the mean residual flow may have to be increased during the vegetation season, and may eventually be somewhat decreased during winter time.

I hope, that these statements will be useful to you and may eventually help to settle the dispute.

Sincerely yours

Dr. Martin Jaeggi

Enclosures

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Enclosure 1

Neue Zürcher Zeitung 12 January 1994.
A way out from the conflict of Gabčíkovo?
A proposal for revitalising the Danube
by Martin Jäggi

**[German language enclosure omitted.
Original submitted to the Court]**

Enclosure 2

Národná Obroda 17 January 1994.
Let Nature's Hands be Free
A Swiss water management expert's propsal for the
revitalisation of the Danube at Gabčíkovo

**[Slovak language enclosure omitted.
Original submitted to the Court]**

Enclosure 3

Magyar Nemzet 12 January 1994.
A way out from the conflict of Gabčíkovo?
A proposal for revitalising the Danube
by Martin Jäggi

**[Hungarian language enclosure omitted.
Original submitted to the Court]**

Annex 4

QUANTIFICATION OF THE ENVIRONMENTAL IMPACTS OF THE PLANNED GABČÍKOVO-NAGYMAROS PROJECT. FORECAST OF THE EFFECTS ON BENTHIC INVERTEBRATES BASED ON AN ANALYSIS OF THE AUSTRIAN DANUBE

Hasko Nesemann and Otto Moog, April 1995

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SUMMARY

The Austrian Danube is inhabited by 1,142 benthic macroinvertebrate species, the larger majority of which are scarce. These are only found locally adjacent in the main channel and in a variety of aquatic floodplain habitats. The species inventory of the more or less unimpacted free-flowing section totals about 240. This inventory could be reduced by 50-90% because of the loss of structures by channelisation. Species reductions in impounded sections are of the same order of magnitude showing a steady decrease towards weirs. This corresponds to a decline in the Shannon & Weaver (S&W) diversity index to 0.06.

Since the 1960s there has been a steady procession of invading and introduced neozoan species due to a multitude of anthropogenic impacts. These species can colonize the altered and often homogenized habitats at such densities that they inhibit the native fauna.

In certain reaches of the Hungarian Danube (e.g., Mosoni Danube, Szigetköz, the Danube Bend and Szentendre Danube) conditions are sufficient to provide the last refuges for the original Danubian fauna. These sensitive and critical communities would surely be altered, if not destroyed, by the completion and operation of the Gabčíkovo-Nagymaros project, as originally planned.

INTRODUCTION

As in most European countries, the large natural rivers in Austria had already been destroyed before scientific investigations began to document their biotic and abiotic characteristics (Fittkau and Reiss, 1983). Although the fauna of the Austrian stretch was relatively unknown until recently (103 species listed by Russev, 1979, and 167 benthic invertebrate species by Russev, 1985), qualitative faunistic research during the last fifteen years provides a large amount of new data. Hitherto, a total number of 1142 benthic invertebrate species have been recorded in the Austrian part of the Danube (Moog, Humpesch and Konar, 1995). The Upper Austrian Danube is strongly influenced by four dams (Jochenstein, Aschach, Ottensheim and Abwinden). The number of species, inhabiting the river channel, varies between 25 and 142. A natural floodplain only exists within the Basin of Linz partially along the tailwater section below the weir of Abwinden. Here the number of species increases to 256. The Danube in Lower Austria contains five impoundments (power stations: Wallsee, Ybbs, Melk, Altenwörth and Greifenstein) and two larger free-flowing stretches (Wachau and Vienna basin).

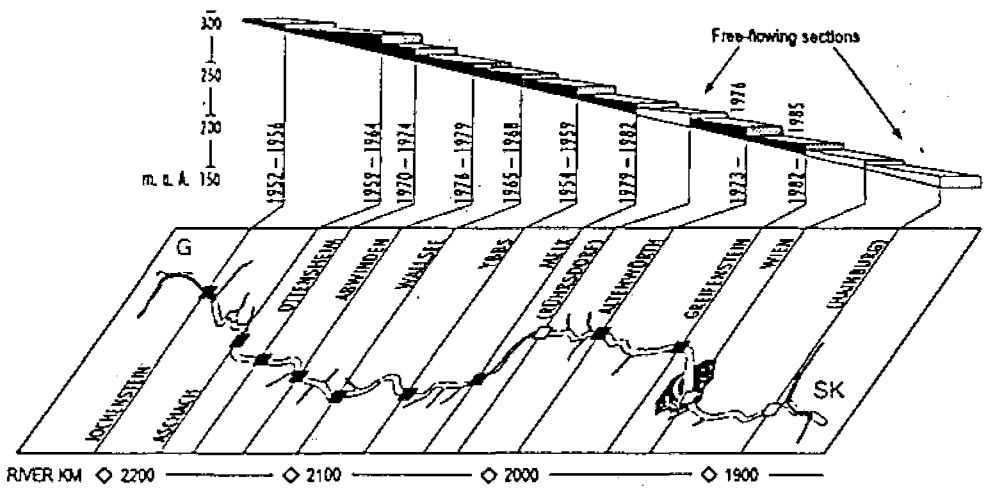

Figure 1: Hydropower schemes on the Austrian Danube and their construction periods

These recent investigations of the Danubian fauna demonstrate the impacts of human influences and clearly show the faunal changes that have occurred within the impounded reaches of this river.

DIVERSITY AND SPECIES INVENTORY

Species diversity and distribution are common tools for assessing the environmental quality of aquatic systems. The importance of free-flowing river reaches within fluvial systems can be demonstrated through diversity indices and species composition inventories. The large influence of transverse barrages or dams within the Austrian Danube can be clearly proven with simple species counts within various impacted or free-flowing river reaches. A comparable impact would occur on the Danube between rkm 1696 and 1820 if the Nagymaros dam were constructed.

THE ECOLOGICAL QUALITY OF THE FREE-FLOWING STRETCHES OF THE RIVER DANUBE

The Wachau region exemplifies a natural narrow valley, where the Danube breaks through the Bohemian Crystalline Zone. Here a floodplain with backwater habitats would not naturally exist. With the exception of singular records, this free-flowing section has never been investigated. Only the well-documented rkm 2005, just at the beginning of the Altenwörth impoundment, may give an impression about the potential species richness of the free-flowing Danube. Although the habitat and flow conditions are comparatively homogeneous, the number of benthic invertebrate species comprises 143 taxa (Humpesch and Anderwald, 1988). A similar order of magnitude is reported by Katzmann *et al.*, (1992), who found 174 benthic invertebrate taxa in a channelised as well as polluted, but still free-flowing side branch of the Danube in Vienna (Donaukanal).

The free-flowing section of the Danube below Gabčíkovo has a very rich endemic benthic fauna (Csányi, 1994) and, due to the natural character of the riverbed, will assuredly have a higher species diversity than the impacted sections described above.

Downstream from the Greifenstein power station, the river is free-flowing up to the Slovak border. In this part of the Danube the floodplain is still dynamic and nearly all adjacent waters are influenced by the hydrological regime of the main stream. The free-flowing Danube and its floodplain between Vienna and Hainburg will be protected as an important Austrian National Park. Although never thoroughly investigated, the species number of this free-flowing stretch is the highest to be found in all of Austria. The number of known benthic invertebrate species from the main channel varies between 166 and 241. The total number of species inhabiting these two floodplains is 447 (Mannswörth-Hainburg) and 511 (floodplains around Vienna), respectively.

Table 1: *Number of benthic invertebrate species of the Austrian Danube*

Section	Total	A	B	C	D	E	F	G
River km		-2200	-2163	-2150	-2120	–	-2100	-2060
Species	1142	44	142	25	102	256	53	51

Section	H	I	J	K	L	M	N	O
River km	-2005	-1980	–	-1940	-1920	–	1850	–
Species	157	242	149	242	166	511	241	447

*Summary of information on the distribution of invertebrates along the Austrian Danube (Moog, Hupmesch and Konar, 1995). **T** = Total number of recent records of species. **A**: From the German border to the Jochenstein power station (PS); **B**: Jochenstein PS to Aschach PS; **C**: Aschach PS to Ottensheim-Wilhering PS **D**: Ottensheim-Wilhering PS to Abwinden-Asten PS; **E**: floodplains at Linz; **F**: Abwinden-Asten PS to Wallsee-Mitterkirchen PS; **G**: Wallsee-Mitterkirchen PS to Ybbs-Persenbeug PS; **H**: Ybbs-Persenbeug PS to headwater section of Altenwörth including Melk PS; **I**: Headwater section of Altenwörth to Altenwörth PS; **J**: floodplains at Altenwörth; **K**: Altenwörth PS to Greifenstein PS; **L**: Greifenstein PS to Freudenau; **M**: floodplains from Greifenstein to Vienna (including the New Danube); **N**: Freudenau to the Slovak border; **O**: floodplains from the East of Vienna to the Slovak border.*

The diversity of benthic invertebrates along the free-flowing stretches of the Austrian Danube has already been documented for various typical substrates and aquatic habitats of the riverine floodplain by Biffl, Jungwirth and Moog (1988). The study area includes the Danube from Vienna in the West (rkm 1928), and the confluence of the River Fischa to Hainburg (rkm 1883) in the East. In the gravel bed of the main channel, diversity ranged from 1.51 to 2.09 (Shannon & Weaver diversity index = S&W) or 2.17 and 3.02 (Wilhm & Dorris diversity index = W&D). In the natural confluence of the River Fischa, where 39 taxa were found, the diversitiy is higher (S&W diversity index 2.90; W&D index 4.18) due to the overlapping of Danubian fauna with the original fauna of this tributary. In the natural side branches and lentic waters of the floodplain alongside the free-flowing Danube, the diversity is generally higher than in the main channel. The following diversity was recorded: silty sediment 1.14 (S&W)/1.65 (W&D); sand 1.03 (S&W)/1.48 (W&D); gravels up to 2.35 (S&W)/3.39 (W&D). The richest fauna from side branches contains up to 42 taxa with a diversity of 2.97 (S&W)/4.28 (W&D).

Table 2: Diversity of the free-flowing main channel and side branches of the floodplain along the Danube in lower Austria (Biffl,Jungwirth and Moog, 1988)

River Danube, East of Vienna				
	river km	species number	Shannon and Weaver index	Wilhm and Dorris index
Main channel of the Danube free-flowing section	1899.9	16	1.81	2.61
	1901.8	17	2.07	2.99
	1902.4	14	1.51	2.17
	1928.1	17	2.09	3.02
River Fischa		39	2.90	4.18
side branches (Parapotamon)	A 2 - algal cover	37	2.30	3.31
	A 4	7	1.95	2.81
	A 5	32	2.64	3.81
	A 6 sand	7	1.03	1.48
	A 7	42	2.89	4.17
	A 8	34	2.09	3.01
	A 10-11	7	1.95	2.81
	A 14 gravel	42	2.35	3.39
	B 18	34	2.97	4.28
	B 19 gravel	35	2.74	3.95
	B 24	18	2.05	2.95
	D 9 silt	14	1.14	1.65

Since the Danubian fauna in Austria has been studied thoroughly, these results clearly document the ecological consequences of the construction of hydroelectric power stations.

THE ECOLOGICAL QUALITY OF THE CHANNELISED AND IMPOUNDED STRETCHES OF THE DANUBE

In general the total number of species is reduced by the alterations of the riverine habitats, which are regularily impounded for hydropower use. In Austria, the total number of species (511) in the floodplain from Greifenstein to Vienna is the reference point from which we can compare the active floodplain alongside the free-flowing river with the dammed and impounded stretches. Damming the Danube disrupts the interconnectivity of the floodplain, significantly reducing the biodiversity. The number of benthic invertebrate species of the floodplain along the Danube in the Tulln basin amounts to less than 30% of the total existing in the floodpain between Greifenstein and Vienna. The total number of species in the main channel is also reduced. With the exception of Altenwörth (242 species), a frequently and thoroughly surveyed impoundment, there are no impounded stretches of the Austrian Danube which have a higher biodiversity than the free-flowing river stretch downstream from Vienna (241 species). In general, the number of species inhabiting the main channel *is reduced to about 50%* of the original fauna (Moog, Humpesch and Konar, 1995). These data are well documented by the investigations in the head-race section of the

Aschach power station (Moog, Nesemann and Janecek, 1991) and the free-flowing sections proposed for natural protection, east of Vienna (Moog, Humpesch and Konar, 1995).

Data of the diversity of the benthic invertebrate fauna are known from the impounded stretch of the Aschach power station. Here the faunal composition was thoroughly studied in 1989 by Janecek, Moog and Nesemann (1991). The diversity found in this impounded river section declines to 0.07 (S&W)/0.10 (W&D). Thus *the diversity index is remarkably lower* than in the free-flowing section (compare Biffl, Jungwirth and Moog, 1988).

The uniform rip-rap fauna along the banks is poor in species (14 taxa in the sampling site at Saag) and is dominated by the neozoan amphipod *Corophium curvispinum*, which may have an abundance of 501,500 individuals per square metre. Here the diversity index only reaches 0.06 (S&W). These results clearly demonstrate that artificial habitats, despite the arguments of environmental engineers, have a *detrimental effect* on the ecological integrity and functioning of this system.

The influence of an impoundment can be clearly demonstrated by the diversity index of the lower River Traun in Upper Austria (Moog, 1988). This is one of the largest tributaries of the Austrian Danube and is thus comparable. The lower section of the River Traun belongs to the same biocoenitic region (epipotamal or barbel region) as the Austrian and Upper Hungarian Danube and it contains a very similar faunal composition, dominated, for example, by the aquatic molluscs *Sphaerium corneum*, *Dreissena polymorpha*, *Radix ovata*, *Bithynia tentaculata* and *Ancylus fluviatilis*. The studied area is the impoundment of the hydroelectric power station at Pucking (Traun rkm 14.0), situated in the downstream section of the Marchtrenk impoundment (Traun rkm 24.0). Only in the tailwater section of the Marchtrenk power station is the diversity index relatively high. It is reduced by the homogeneous substrate and water flow in the headwater section of the Pucking impoundment. The following longitudinal zonation of the diversity index (S&W) is reported for the investigation period 1985-1986 (Moog, 1988 at p 89, *Table 27*). It definitively shows a continuous reduction in diversity. March 1985: diversity index 2.47 (tailwater section of Marchtrenk) and 1.79 (headwater section of Pucking); November 1985: 2.27 and 0.98; March 1986: 2.31 and 1.03; June 1986: 1.75 and 1.50; October 1986: 1.75 and 1.10, respectively.

***Table 3:** Diversity index (S&W) of the impounded main channel of the River Traun in Upper Austria*

River Traun near Linz (S&W diversity index)						
River km	Mar. '85	Oct. '85	Nov. '85	Mar. '86	June '86	Oct. '86
	2.47			2.31	1.75	1.75
23.5						
	2.28		2.27	2.18		1.69
22.9						
22.5						
	1.85					2.03
21.4						
21.2	2.54					
			2.56	2.69		1.98
20.5						
19.5	2.12					
						1.54
18.5	2.11			2.61		
18.0		1.71	1.01			
17.5						
			1.11	1.62		
			1.24			
		1.23		1.34		
16.5	1.38					1.10
16.0		1.08				
15.5	1.48	1.01	0.96	1.19		1.19
15.0						
	1.79	0.99	0.98	1.03	1.50	1.10

Pucking Power station at Traun, rkm 14.0 (Moog, 1988).

CHANGES IN THE FAUNAL COMPOSITION

The benthic invertebrate fauna of the Danube is being altered for several reasons. Besides shipping and exploitation of its hydropower, waste waters and eutrophication have influenced the water quality of the river. The channelisation and regulation of the upper Danube and its pre-alpine tributaries in Austria and Germany altered the biocoenotic character of the main channel from a former barbel region (Epipotamal) to a grayling region (Hyporhithral). Combined with this recent development of the Austrian and Upper Hungarian section of the river, the construction of new dams creates an artificial habitat, quite unlike the original characteristics of the Danube. The effect of a series of hydroelectric power stations along the river is accompanied by a qualitative change in the faunal composition of the free-flowing section downstream.

In the Austrian stretch of the Danube, a total number of 24 Malacostracans exist. Eight species (33.3%) are new immigrants and six species (25%) originate from marine or peripheral pontocaspian fauna. Here, the higher Crustaceans (Malacostraca) are mainly represented by so-called "Neozoa", which have occupied the Upper Danube for the last three to five decades. These species are often in competition with the autochthonous fauna and are more tolerant of water pollution and changes in salinity due to their marine origin.

In the free-flowing section between the Greifenstein power station and Vienna, a total number of 10 Malacostraca species (100%) has been recorded. Five of these species belong to the group of "Neozoa" which have only been present in this section since 1980. They are the dominant forms of the Malacostracan fauna, while the original members of the Danubian fauna are now restricted to the floodplain and tributaries. The two Amphipods (*Gammarus roeselii, G. fossarum*), formerly found in abundance, are now nearly extinct in the main channel, and only a few specimens that had drifted from adjacent waters into the Danube were recorded in recent times. These data are an example of the rapid disappearance of the original macrozoobenthic community.

Apparently the substrates of the riverbed in the impounded sections have been altered. The original gravel banks have disappeared. Instead of the former benthic composition (Moog, Nesemann and Janecek, 1991), lithophilic and euryoecious fauna have taken its place. This process is well documented for the Austrian Danube. The riverbanks are fixed by large stones or boulders. These artificial habitats are settled by a "typical" rip-rap fauna (Janecek and Moog, 1994). The macrozoobenthic assemblage of these boulders can now be classified as a typical Danubian rip-rap community, consistently and closely correlated to specific habitat parameters, i.e., velocity, algal cover, and substrate. Artificially created boulder-banks in impoundments are normally added to areas with atypically low slope and low water velocity. This community of Neozoans is poor in species and dominated by *Corophium curvispinum* and *Dreissena polymorpha*.

The 65 species of aquatic molluscs include four immigrants and two pontocaspian species. Their occurrence and increasing distribution are supported by the development of impoundments.

In all European rivers, faunal immigrants are becoming increasingly abundant. For example, in the German stretch of the Rhine, about 40 benthic invertebrate species inhabit the rip-rap banks (Kinzelbach, 1985). Neozoan immigrants constitute 10-15% of this community (Kinzelbach, personal communication).

If both the Gabčíkovo and Nagymaros power stations were constructed, the faunal composition in this section of the Danube would change in a similar way. Immigrant species or Neozoa would occupy many of the important ecological niches, and the total number of macrozoobenthic species would be considerably lower.

Within impounded reaches near Aschach, including a free-flowing head-race section and some restructured riparian areas of the Danube, 26 species of molluscs exist, one of which is on the endangered species list (A1) (Frank and Reischütz, 1994). In contrast, the free-flowing reach between Greifenstein and the Slovak border contains 63 species of molluscs, 12 of which are endangered. Hence there has been an 83% reduction of species in the A1 category of the Red Data Book.

This situation does not conform to the preservation of the natural character of the Danube and its ecological functionality including the essential riparian zones (Oberleitner, 1990).

IMPACTS OF PEAK OPERATION ON THE AQUATIC FAUNA

The downstream effects of intermittent power generation are documented for some tributaries of the Rhine and Danube in Austria by Bretschko and Moog (1989). On two 6th-order rivers (Enns and Bregenzerach), pulse releases cause a catastrophic breakdown of the whole freshwater fauna, mainly benthic fauna and fish. In general, intermittent power generation creates frequent and dramatic discharge peaks combined with intervening extremely low water conditions. While no alterations were found in the qualitative composition of zoobenthos, the decrease in abundance and biomass may amount to as much as 95% (Moog 1987; Breschko and Moog 1989). The drastic reduction of zoobenthic biomass not only affects fish production but also minimises self-purification processes and the ecological functioning. The comparison of faunal abundances between permanently and periodically flooded parts of the riverbed (Bregenzerach) reveals highly significant differences. The abundance of macroinvertebrate fauna in the original unimpacted rivers are 3.9 to 4.6 times higher than in areas only periodically flooded.

In a review study, Moog (1993) quantifies daily peak hydropower effects on the aquatic fauna below some more power stations. Within all the Austrian river sections investigated (6th-7th-order streams), a breakdown of 75 to 95% in the benthic invertebrate biomass was observed within the first few river kilometres. A reduction in the biomass to between 40 and 60% of that in undisturbed areas, could be detected within the following 20 to 40 rkm.

The reduction of fish fauna is within the same order of magnitude and correlates well with the amplitude of the flow fluctuations (*Figure 2*).

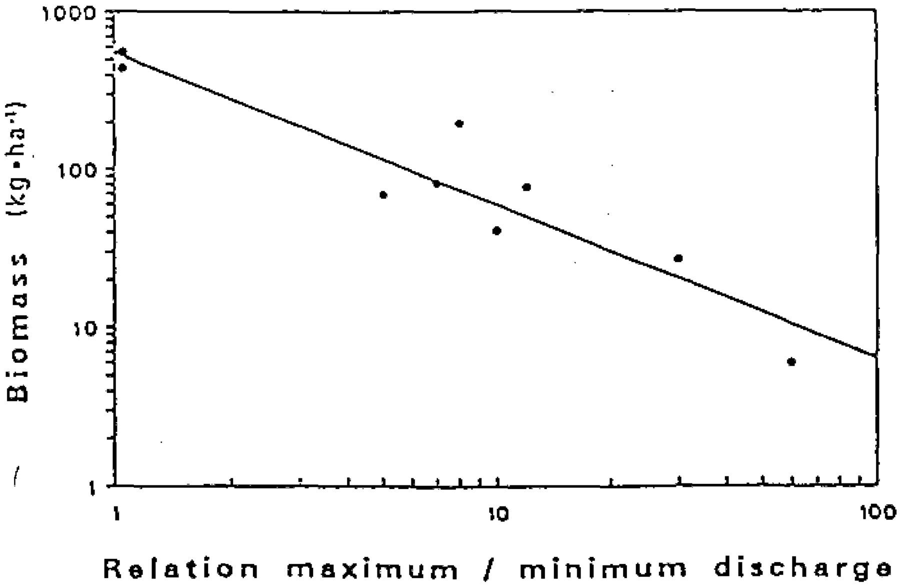

Figure 2: *Effects of discontinuous discharge on fish biomass in 5th- to 7th-order streams (data from Jungwirth and Schmutz, 1992)*

Based on the Austrian investigations and a literature survey several reasons for the breakdown of the biota can be summarised (*Tables 4* and *5*).

Table 4: *Detrimental effects of sudden pulse release discharge variations on aquatic biota*

Flushing	Flushing of fauna that are not adapted to high-flow velocities eliminates the standing crop, including the fish eggs and fry. In canalised sections with a poor structure, these phenomena may be increased.
Drift	Limitation of benthic invertebrates by catastrophic drift during the increase in discharge.
Habitat	Changes in the morphology of the watercourse, as well as bank and/or sediment erosion, alter the composition of the bed sediments. Subsequently the abundance and composition of the aquatic fauna change, given the type of substrate (including microdistribution). High loads of suspended matter kill fish by clogging their gills or forces the fauna to leave the affected area.
Food	Food depletion may limit the number of organisms. Diminution of benthic invertebrates because of erosion of periphyton and/or macrophytes. Elimination of leak packs and CPOM. Flushing of debris and FPOM. Diminution of fish population due to reduced food supply.

Table 5: Effects of sudden flow reduction on aquatic habitats and fauna

Physiological and behavioural limitations	Physiological limitations of species with a high oxygen demand under conditions of low-flow may be multiplied by higher temperatures if the channel is shallow enough and/or by a lack of riparian vegetation as well as other alterations of the temperature regime. Behavioural limitations and flow-reduced interferences with feeding mechanisms (e.g., net-spinning Trichoptera). Faunal depletion because of catastrophic drift caused by drought reactions.
Physical limitations	Stranding and death of organisms owing to desiccation and/or asphyxiation during dewatering of large areas of the channel bed.
Habitat	
Space Reduction	Reductions of living space during low-flow periods affects the population size and may be aggravated by ice formation if the water is shallow enough.
Silt	Deposition of silt during receding spates alters the substrate composition and heterogeneity and causes a change in the number and composition of benthic invertebrates, fish eggs and fry.
Food	Food depletion by desiccation of primary producers diminishes the population size of certain functional feeding groups of benthic invertebrates. Food depletion of benthic invertebrates diminishes the size of the fish population.

REMARKS ON SOME ENDANGERED MACROINVERTEBRATE SPECIES IN THE SZIGETKÖZ AREA

Theodoxus danubialis, *Borysthenia naticina*, *Esperiana esperi* and *Microcolpia dautebartii* are endemic freshwater snails of the Danubian basin. They were widespread in the Austrian and German Danube until the beginning of this century. Nowadays, these species are classified as highly endangered organisms (A1) in the Red Data Books of Austria and Germany. Due to water pollution and regulation, the last large populations remain in the Hungarian section of the Danube (Nesemann, 1991, 1992). The construction and operation of the Gabčíkovo-Nagymaros Barrage System would influence their habitats and may even destroy the populations. Instead of these typical faunal elements, introduced (Neozoa) or euryoecious species would take over or occupy their ecological niche in the main channel of the riverbed. The only remaining habitat would be the middle and lower reaches of the Mosoni Danube.

The leech *Placobdella costata*, an ectoparasite of the freshwater turtle, and two other leech species, *Batracobdelloides* sp. and *Erpobdella testacea*, are very rare inhabitants of swamps in the Eastern

Szigetköz area. Each of these species is only present in a single stagnant water locality. Their occurrence is restricted because their habitats (small ponds or channels) in the floodplain are disappearing. These habitats will only continue to exist if the dynamics of the floodplain are preserved. Otherwise a large number of small waterbodies will consequently be destroyed within the next two to three decades through the altered hydrological and morphological regime. Thus the biodiversity would gradually be reduced.

REFERENCES

Arbeitsgemeinschaft Biffl-Jungwirth-Moog, 1988. Beurteilung der limnologischen, insbesondere trophischen und saprobiellen Entwicklung des Ausystems zwischen Fischamend und Bad-Deutsch-Altenburg. - *Studie im Auftrag des Österreichischen Wasserwirtschaftsverbandes*, Wien, September 1988. (IV):369 +Annexes.

Bretschko, G. and O. Moog, 1989. Downstream effects of the intermittent power generation. - *International conference on water pollution control in the basin of the river Danube*: 119-127, Novi Sad.

Csányi, B. 1994. The macrozoobenthos community of the Danube between Rajka and Budapest. Miscellanea Zoologica Hungarica 9, Budapest.

Fittkau, E. J. and F. Reiss, 1983. Versuch einer Rekonstruktion der Fauna europäischer Ströme und ihrer Auen. - *Arch. Hydrobiol.* 97: 1-6, Stuttgart.

Humpesch, U. H. and P. H. Anderwald, 1988. Beitrag zur Faunistik der Österreichischen Donau – Das Makrozoobenthos bei Stromkilometer 2005. *Wasser und Abwasser* 32(1988): 41-55, Wien.

Janecek, B. F. U. and O. Moog, 1994. Origin and composition of the benthic invertebrate riprap fauna of impounded rivers. *Verh. Intenat. Verein. Limnol.* 25: 1624-1630, Stuttgart.

Janecek, B. F. U.; Moog, O. and H. Nesemann, 1991. Benthosbiozönotische Untersuchungen. *In* Waidbacher-Zauner-Kovacek-Moog (Hrsg.): *Fischökologische Studie oberes Donautal in Hinblick auf Strukturierungsmaßnahmen im Stauraum Aschach (Oberösterreich)*. pp 175, Wien.

Jungwirth, M. and S. Schmutz, 1992. *pers. comm.*

Katzmann-Spindler-Tockner-Hadl, 1992. Limnologische Studie des Wiener Donaukanals. Ökologische Begleituntersuchung der Strukturierungsmaßnahmen im Wiener Donaukanal. pp 146, *Studie im Auftrag der Wasserstraßendirektion*, Wien.

Kinzelbach, R. 1985. Zur Entstehung der Zoozönose des Rheins. Mainzer Naturwiss. Arch. Beiheft 5: 5-49, Mainz.

Moog, O. 1987. Das Makrozoobenthos unterschiedlicher Staubereiche der Enns im Sommer 1986. *Gutachten im Auftrag der Ennskraftwerke-AG*, Universität für Bodenkultur, Wien.

Moog, O. 1988. Überlegungen zur Gütebeurteilung von Flußstauen. In (1990) Auswirkungen anthropogener Eingriffe auf aquatische Ökosysteme. Habilitationsschrift; Universität für Bodenkultur.

Moog, O. 1993. Quantification of daily peak hydropower effects on aquatic fauna and management to minimize environmental impacts. *Regulated rivers: Research and Management* 8: 5-14.

Moog, O.; Humpesch, U. H. and M. Konar, 1995. The distribution of benthic invertebrates along the Austrian stretch of the River Danube and its bioindicative value. *Arch. Hydrobiol.* Suppl. 101 (Large Rivers 9) 2: 121-213, Stuttgart.

Moog, O.; Konar, M. and U. H. Humpesch, 1994. The macrozoobenthos of the River Danube in Austria. *Lauterbornia* 15: 25-51, Dinkelscherben.

Nesemann, H. 1991. Zoogeography and composition of leech fauna of Danubian lowland rivers in the Kisalföld compared with some molluscs (Hirudinea, Gastropoda). *Misc. Zool. Hung.* 6: 35-51, Budapest.

Nesemann, H. 1992. Species composition and zoogeography of the invertebrate fauna at the lower reaches of the Lajta River. *Misc. Zool. Hung.* 7: 15-38, Budapest.

Oberleitner, F. 1990. Landschaftswasserbau. Neue rechtliche Rahmenbedingungen. *Landschaftswasserbau* 10: 565-576, Wien.

Russev, B. 1979. Gegenwärtige Kenntnisse über die Artenzusammensetzung des Zoobenthos der Donau. – *XIX. Jubiläumstagung der internationalen Arbeitsgemeinschaft Donauforschung*, pp 306-339, Sofia.

Russev, B. 1985. Das Zoobenthos im österreichischen Donauabschnitt unter dem Einfluß der Stauanlagen. *In*: W. Naidenow (Hrsg.): *Die Auswirkungen der wasserbaulichen Maßnahmen und der Belastung auf das Plankton und das Benthos der Donau*. Verl. Bulgar. Akad. Wiss., Sofia, 151 pp.

Annex 5

IMPACT OF THE GABČÍKOVO-NAGYMAROS PROJECT ON VEGETATION IN THE SZIGETKÖZ

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SUMMARY

Ten forest community types characteristic of wetland habitats have developed in the Szigetköz. On the 5,800 ha wooded land, most forest stands had preserved their almost original species composition and diversity from the 1960s. The degree of degradation of these woods is rather small, much lower than that of the floodplain vegetation along any other major river in Europe. These forest stands can serve as an appropriate source for the restoration of natural vegetation on flood areas of similar character. The substantial drop in the groundwater level due to the diversion of the Danube will inevitably result in the death of these communities.

Wetland vegetation, wet meadows and hayfields cover some 2,600 ha. About 1,700 ha of this is situated in the region between Dunakiliti and Ásványráró, most of which has dried out or is currently drying out as a result of Variant C. Their transformation into arid, weedy grasslands has already started. The economic value of these new species assemblages is around one-tenth of the original vegetation, while their biological value is negligible.

The number of vascular species inhabiting the Szigetköz is 1,008, ten percent are protected by law. Among these there are numerous endangered, red-listed and endemic species.

The high diversity of plant communities is a characteristic feature of the entire Szigetköz, but most particularly in the floodplains along the main Danube and the Mosoni Danube. The community spectrum (*Figure 4*) reflects the almost natural state of the region, showing that it preserved its ecological potential until the diversion of the river.

Our biological monitoring studies between 1987 and 1992 revealed that no essential changes occurred in the species composition and naturalness of the characteristic and dominant plant communities.

Measurements and field surveys carried out following the diversion of the Danube clearly indicate the process of degradation, which consists of habitat drying, mass invasion of weeds, increasing abundance of drought-resistant species, and a significant decline of the assimilatory leaf area and other growth measures of plants (*Figures 1- 3*).

1. GENERAL DESCRIPTION OF THE VEGETATION IN THE SZIGETKÖZ

INTRODUCTION

Covering almost 36,500 ha, the Szigetköz is the largest semi-natural flood area in the entire Danube Valley today. Its unique status explains the outstanding importance of its wetland habitats. Due to the region's particular geological, geomorphological, climatic, hydrological and soil properties, a great habitat diversity has developed, which in turn supports a high biodiversity. This is reflected equally in the large variety of plant communities, the high species diversity within communities and the unique species composition. In addition to its important role in preserving biodiversity at several organisational levels, as a wetland biotope the Szigetköz also has the potential of absorbing antropogenous nutrient load, mostly nitrogen and toxic heavy metals. For this reason, wetland habitats receive special attention world-wide that includes efforts for both the maintenance of still-existing natural biotopes and the restoration of degraded ones.

The region's highly varied topography – ranging from plains to sand dunes, or from bars to islands of various sizes – and its peculiar hydrography with a rich system of tributaries, oxbow lakes and numerous types of aquatic habitats, sustain a wide range of biotopes from dry terrestrial to aquatic ones. Their vegetation and fauna are remarkably diverse, including aquatic, marsh, swamp and meadow plant communities, willow-poplar (softwood) and oak-ash-elm (hardwood) forests, oak woods with *Convallaria majalis*, oak-hornbeam woods and the forest-steppe vegetation of sandy ridges, all were preserved in an almost natural state.

Sites of highest natural value are protected by law as parts of the Szigetköz Landscape Protection Area that was set up in 1987. Also, the idea of establishing a joint Austrian-Hungarian-Slovak National Park in the region has been considered already. Despite the general tendency to expand agricultural fields throughout Europe, this unique area has preserved its original biocoenoses in small fragments (Simon, 1962; Láng, Banczerovski and Berczik, 1993).

NATURAL SITE CONDITIONS IN THE SZIGETKÖZ

The Szigetköz and its environs comprise the youngest, still developing part of the Danube's vast alluvial fan, where alluvial deposits are the exclusive sources of soil formation. The centre of the region is covered by Pannonian clay-sand sediments that were laid down towards the end of the Tertiary period, or by several hundred metres thick sandy-gravelly deposits of Quaternary origin, that were accumulated by the Danube and its tributaries.

These sediments are characterized by a high carbonate content and a very heterogeneous grain composition both vertically (stratification) and horizontally (patchiness). This highly diverse alluvium provided the matrix for the initial steps of soil development, i.e., humification (process which leads to the formation of humus) and soil structure formation. Depending on the duration of undisturbed soil development and the quantity of its products in the vertical soil profile, various soil types developed in the Szigetköz such as crude alluvial soil, typical alluvial soil, humic alluvial soil and their intermediates.[1]

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1 *Scientific Evaluation*, HC-M, vol 2, chap 5.1.

Further development of humic alluvial soils is determined by the water regime and the soils' wetting characteristics. As precipitation is distributed quite homogeneously over the area, the differences in soil-water relations between the habitats of natural plant communities can be attributed to the spatial variation in either topsoil hydrological properties or groundwater table characteristics.

The latter is determined by the following two factors:

- the depth of the groundwater level below the surface, and its temporal fluctuation;
- the stratification of the soil profile between the surface and the groundwater table, and the water regime of each individual strata.

In addition to the highly diverse geomorphological and soil properties, the regular yearly inundation is the most important ecological factor responsible for the development and long-term survival of the region's natural vegetation. Along with the frequency of floods and the depth of the groundwater table, other soil properties (e.g., the thickness of the fertile topsoil, grain composition, capillarity, calcium and organic matter contents) also play an important role. All these factors can easily alter the reliance of natural communities on subsurface water supply and, as a consequence, influence their further existence or transformation.

HISTORY OF RESEARCH ON THE REGION'S FLORA AND VEGETATION.

Probably it was because of the hard terrain – numerous river reaches and oxbow lakes, the lack of roads and bridges – that floristic data was only reported from the environs of cities surrounding the Szigetköz (Bratislava, Mosonmagyaróvár, Győr), even in the golden age of floristic surveys (in the 19th and mid-20th centuries, e.g., Wierzbicki, 1820, Polgár, 1941). Bálint Zólyomi was the first real botanical explorer of the Szigetköz. In addition to reporting the characteristic details of the local flora (60 species), he was the first botanist to give a thorough description of five forest associations (Zólyomi, 1937) using the modern methods of the European school of phytosociology (Braun-Blanquet, 1928). Sand grasslands on nearby sand dunes were studied by Borhidi (1956). A monographic treatment of the alluvial forests of the entire Danube Valley in Hungary was given by Kárpáti (1957), which included four forest communities from the Szigetköz. The construction of the dam system on the Danube initiated scientific studies in the area. As a part of this, Simon and his colleagues summarised the results of previous botanical research (1978), prepared the potential vegetation map of the area (1980), and reported ample new data (Kevey, 1989, 1992, 1993; Werner, 1990; Kevey and Alexay, 1992). Simon (1992) gave a general overview of the plant community types in the Szigetköz, while gallery forests were studied in detail by Kevey (1993) in his PhD thesis. The former (as reported by Zólyomi, 1937) and current coenostates of willow forests were compared in an analysis by Simon, Szabó, Draskovits, Hahn and Gergely (1993).

These studies have shown clearly that the area of natural habitats decreased considerably after World War II, mostly due to the intensive industrial and agricultural activities in the Szigetköz. The surviving remnants of the original flora and vegetation are still threatened by these activities. However, it became apparent during the study of willow woods that the degree of degradation of forests and meadows is much lower on the wet floodplain of the Szigetköz than elsewhere in the Danube Valley. This also means that the self-regulating mechanisms of ecosystems can operate on flood areas of appropriate size in the Szigetköz.

FLORISTIC VALUES

The number of **vascular species** known in 1994 from the Szigetköz is 1,008. This means that 47% of the country's total vascular flora occurs in this relatively small area. The number of known **phytocoenoses** amounts to 80 mostly as the result of botanical surveys in the 1980s (Simon, 1992; Simon *et al.*, 1993; Kevey, 1993). These figures are much higher than those for similar floodplains at Wallsee or in the Vienna Basin in Austria (Wendelberger and Zelinka, 1952; Grabherr and Mucina, 1993; Mucina, Grabbherr and Wallnöfer, 1993), and in the vicinity of Baja in Southern Hungary (Kárpáti I., 1957; Kárpáti V., 1963). They are evidence of an outstanding floristic diversity which must be preserved by all means.

The rapid invasion of numerous weed species in exposed river beds and oxbow lake bottoms – having dried up after the diversion of the Danube – contributed greatly to the increase in the number of vascular species in the region (Szabó, Hahn and Gergely, 1995). Compared to the weed list given by Czimber (1993), there are further weeds (e.g., *Chenopodium* and *Amaranthus* spp., *Leonorus marrubiastrum, Lappula squarrosa*) and adventive[2] species (e.g., *Parthenocissus quinquefolia, Tagetes patula, Lycopersicon esculentum* and *Mimulus guttatus*) involved in this invasion process. This ongoing process is leading to an overall degradation of the ecological value of the area.

There are 4 strictly protected, 88 protected and 6 endemic plant species in the area comprising 10% of the local flora. In addition, 58 other species can be considered as threatened to various extents. Among the protected species, an aquatic fern (*Salvinia natans*), an endemic thistle (*Cirsium brachycephalum*) and a pondweed (*Groenlandia densa*) appear on the "European red list of rare and endangered plant species" issued by the Bern Convention and the IUCN. According to Hungarian law, strictly protected species are for example, three orchids (*Ophrys apifera, O. insectifera, O. sphegodes*) and a lily (*Lilium bulbiferum*). Some of these have survived in small populations in wet biotopes. The further survival of an additional 19 orchid species, 4 species from the Iridaceae family and numerous plant species dwelling in aquatic, marsh and swamp habitats, is seriously threatened by the extensive habitat drying – being most extreme in the Middle Szigetköz – caused by the diversion of the Danube in 1992.

FOREST PLANT COMMUNITIES

From the beginning of this century the area of forest stands has continuously decreased on sites protected from floods, while those in the active floodplain have partly survived. In 1963, forests covered approx. 9,000 ha in the Szigetköz. Within this, the proportion of poplar plantations has gradually increased and now reaches approximately 80% of the forested area. The remaining 20% occupied by natural forests are particularly attractive and species-rich. At some places (e.g., in the environs of the Medve Bridge, on the great island at Ásványráró, in the "Nyáros" area of Dunasziget, and on the islands of the main river and its tributaries), stands have a definite pristine character with original forest biota. Although weed species dominate in poplar plantations, some remnants of the original flora still occur. The bird and insect faunas are also rich in these plantations.

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2 adventive – introduced foreign species, not native to the environment..

Plant communities that remained in their original, almost natural state include two communities of **willow thickets** (*Rumici-Salicetum purpureae*, mostly found along the main river on bars and river banks with gravely coarse-grained sand, and *Polygono-Salicetum triandrae*, chiefly on the banks of tributaries and oxbow lakes), and **willow woods** (*Leucojo-Salicetum albae*, covering the largest area on low-lying floodplains). Diverse stands of these forests rule the landscape and represent a high value for the protection of nature. They can be considered as natural gene banks as well as reserves of the original flora and fauna. Where the terrain becomes somewhat elevated on the low-lying floodplain, **poplar woods** (*Senecio-Populetum*) replace willow forests, having a similar role in many respects. These four phytocoenoses – covering 5,000 ha altogether – represent the highest natural value of the region and probably of the entire Danube Valley in Europe. The immense fall in the groundwater table caused by the diversion of the Danube can destroy these communities within a few years.

Three plant associations of relict character represent **swamp forests** preserving several protected and relict species. These are **willow swamps** (*Calamagrosti-Salicetum cinereae*), **alder swamps** (*Dryopteridi-Alnetum*) and **river-valley alder woods** (*Carici acutiformis-Alnetum*). The area of these wet forests decreased to the largest extent due to agriculture, drainage and climatic drought. The recent fall of groundwater level further threatens the existence of these communities.

Formerly **oak-ash-elm** (or hardwood) **forests** (*Fraxino pannonicae-Ulmetum*) played pivotal role on higher-lying flood areas. Only few fragments of these remained along the main river (at Dunasziget and Dunakiliti), but several stands can be found in an almost natural state on the protected side of the Danube and along the Mosoni Danube (Rajka, Fekete-erdő, Mosonmagyaróvár, Máriakálnok, Magyarkimle, Hédervár, Ásványráró). These forests preserved numerous montane floristic elements (dealpine and *Fagetalia* species), most of which are rare and protected. On higher terrains, **oak woods** (*Convallario-Quercetum*) or **oak-hornbeam woods** (*Querco robori-Carpinetum*) rich in montane species, grow. The species composition of oak-hornbeam woods showed only 10% degradation since 1930. On several sand ridges, **forest-steppe oak woods** (*Festuco-Quercetum roboris*) grow as relicts of former warm climatic periods and contain numerous thermophilic drought-resistant species (Kimlei erdő and Püski erdő). The expansion of these forests are expected in the future as a consequence of the groundwater table fall.

The above discussion can be summarised as follows. Eleven characteristic forest associations have developed in this relatively small area. In certain parts of the 5,800 ha forested land the main features of species composition have been preserved since the sixties till now. Degradation of these forests is relatively small, so they can serve as appropriate sources for the restoration work planned in the Landscape Protection Area. This also means that the original high floristic and community diversity of the floodplain can be restored in the Szigetköz. However, the drastic fall of the groundwater table threatens these ecosystems.

HERBACEOUS PLANT COMMUNITIES

The mostly aquatic habitats of the Szigetköz support a diverse **wetland vegetation**. Numerous protected and relict species find shelter in these communities (e.g., *Salvinia natans, Hottonia palustris, Nymphoides peltata, Nymphea alba, Batrachium fluitans, Groenlandia densa*). Until 1992 (the year of the diversion of Danube), smaller or larger stands of **13 wetland plant associations** (*Lemno-Spirodeletum, Salvinio-Spirodeletum, Lemno-Utricularietum, Hydrochari-Stratiotetum, Batrachietum fluitantis, Hottonietum palustris, Elodeetum canadensis, Myriophyllo-Potamogetonetum, Potameto-Batrachietum circinatis, Potamogetonetum natantis, Nymphaeetum* *albo-luteae, Nymphoidetum peltatae*) thrived undisturbed with beautiful flower mats in the stagnant or slow-running waters of tributaries, oxbow lakes, ponds and canals. Most of them have lost their habitats as the water level fell markedly in October 1992. Numerous stands have already been destroyed in the Middle Szigetköz. On silty banks, original **silt vegetation** of pioneer character appears. **Four silt communities** (*Eleochari-Caricetum bohemicae, Eleochari aciculari-Schoenoplectetum supini, Cypero-Juncetum bufonii, Dichostyli-Gnaphalietum uliginosi*) can be found exclusively in the riparian zone of flood areas that remained in their original state. These phytocoenoses are very rare in all of Central Europe.

Among the plant associations of **wet meadows and hayfields** there are ancient swamp meadows and – more frequently – extensive marsh meadows and hayfields. On **swamp meadows,** rare protected and relict species grow (e.g., *Eriophorum angustifolium, E. latifolium, Sesleria uliginosa, Dactylorrhiza maculata, Dianthus superbus, Iris sibirica, Gentiana pneumonanthe, Gentianella austriaca, Carex appropinquata*). Three phytocoenoses of this type (*Seslerietum uliginosae, Carici flavae-Eriophoretum, Succisio-Molinietum*) can be mostly found in the Upper Szigetköz and have been proposed for protection throughout the country. Six **marsh meadow** associations appear in the area. These produce ample hay which is cut two times a year and provide a habitat for rare orchids and other colourful protected plants (e.g., *Orchis laxiflora ssp. palustris, Dactylorrhiza incarnata, Epipactis palustris, Pedicularis palustris*). Less frequently, phytocoenoses of relict nature occur (*Cirsio cani-Festucetum pratensis, Trisetetum flavescentis noricum*). On hayfields, *Arrhenaterum elatius* dominates and is accompanied by many protected species (e.g., *Ophioglossum vulgatum, Ophrys* and *Orchis* species, *Anacamptis pyramidalis*). Traditional hayfield management practised throughout the past decades saved these wet meadows. Their species composition remained almost unchanged. The lower groundwater table since the end of 1992 is a serious threat for the survival of these. The process of habitat dessication, the disappearance of the most susceptible relict or protected species, and the invasion of weeds have already started.

Wetland vegetation, wet meadows and hayfields cover approximately 2,600 ha in the Szigetköz, of which 1,700 ha are situated in the environs of Dunakiliti and Ásványráró. Some parts of the latter have completely dried out as a consequence of Variant C, elsewhere the process is still under way. These communities will be replaced by dry, weedy grasslands unless a successful water recharge can be carried out in 1995. Their economic value would fall to one tenth of its present value, while its biological value would become negligible.

Dry grassland communities are represented by open and closed[3] grassland associations. As agriculture occupies all the land in the Szigetköz where sand is settled and humic, only small fragments of the natural sand grasslands have survived on sites of low fertility (e.g., Kimlei-erdő, Püski-erdő). Thermophilic steppe species inhabiting these grasslands contribute to the high floristic diversity of the Szigetköz. Precious and protected species here are, e.g., *Onosma arenaria, Stipa borysthenica, Jurinea mollis, Adonis vernalis*, and even several endemic components occur as well (*Dianthus pontederae, Carduus collinus, Erysimum odoratum*). Of the **three sand grassland communities,** the closed sand grassland association (*Astragalo-Festucetum rupicolae*) is the most frequent and has the most pristine character.

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3 open grassland ~ partly covered leaving some soil bare; closed grassland ~ completely covered with vegetation

The expansion of **weed communities** after the diversion of the Danube indicates the degradation to the natural value of the area. An extensive weed invasion occurred in exposed river beds, banks and oxbow lake bottoms in 1993. Among weed species the allergenic ragweed (*Ambrosia artemisifolia*) plays a dominant role in most places, thus increasing the overall pollen contamination of the air over the region.

CONCLUSION

The plant community spectrum of the area was prepared according to the above phytosociological summary. It is possible that the list of phytocoenoses is not complete yet, and that plant associations once existed, but have now disappeared or become hidden (e.g., bar communities of pioneer character). According to the draft of the new Law of Nature Conservation, *eight of the 59 plant communities would be protected.* Twenty-five phytocoenoses can be considered as an element of the natural vegetation, six more as slightly disturbed and 20 as having a weedy character.

2. DETAILED REPORT OF MONITORING RESULTS SINCE 1986

The plan for monitoring the characteristic and dominant vegetation types in the Szigetköz was elaborated in 1986. Sampling sites were chosen as well as the methods for sampling and evaluating data.

During the first six years of our study (1987-1992) prior to the diversion of the Danube (Variant C), we prepared a thorough portrayal of aquatic and wet habitats in their original natural state. This provides an appropriate basis for comparison with the situation after the realisation of Variant C. In this way a valid assessment and demonstration of the rapid habitat degradation can be performed. Up to the diversion of the Danube, the Szigetköz managed to preserve its ecological potential.[4]

The botanical monitoring system mainly consisted of an analysis of **indicator populations,** a survey of **vegetation communities**, and particular areas.

CHANGES IN INDICATOR POPULATIONS

Indicator populations react to habitat changes fairly rapidly and sensitively. For example, the size of the assimilatory leaf area is an excellent indicator of the water regime in a given habitat. Measurements of the leaf area of dominant forest-forming tree species (*Quercus robur, Alnus incana* and *Fraxinus pennsylvanica* at Dunasziget, and *Salix alba* at Kisoroszi) started in 1989 at two localities: one within the Szigetköz (Dunasziget), the other outside (Kisoroszi). After the diversion of the river, leaf area measurements of *Salix alba* were extended and two further sites were studied in the Szigetköz: one is in the floodplain at Dunaremete influenced by the diversion, and the other is an unaffected control plot situated downstream of the confluence of the tail-race canal and the Old Danube at Vének. Samples for measuring the leaf area were collected in autumn after leaf-fall. In each case, a sample of 200 leaves was taken from which we calculated the average leaf area.

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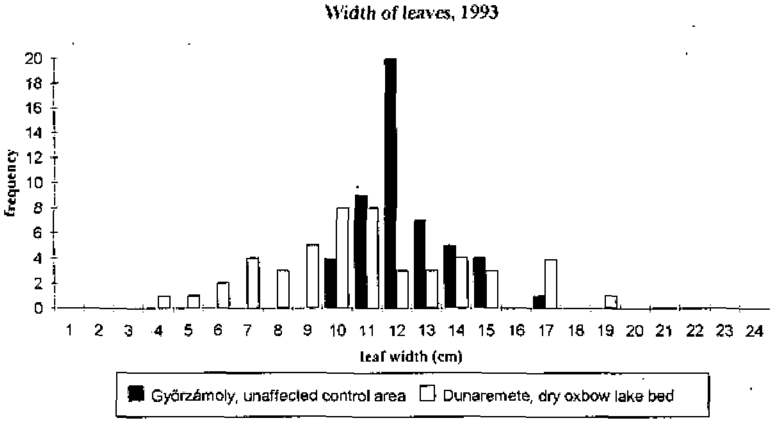
4 See *Scientific Rebuttal*, HR, vol 2, *Plate 5.2.*

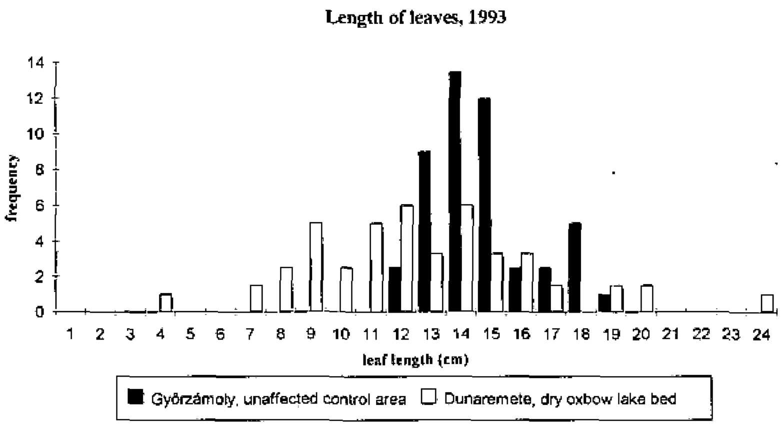
Results are summarised in *Table 1*. The leaf area proved to be a sensitive indicator for most species, particularly *Salix alba*. The influence of the river diversion is clearly reflected in the leaf area values, especially in the considerable decrease in 1993. At Dunasziget, the average leaf area of *Quercus* and *Alnus* for the two years after the diversion (1993-1994) was 21-27% lower than that for the years prior to it (1989-1992). For *Fraxinus* this trend could only be observed in 1993, as the higher precipitation in 1994 proved to be beneficial for this species. The mean leaf size of *Salix alba* remained practically unchanged in the unaffected control site, but decreased some 28% in the vicinity of Dunaremete. The decrease in the average leaf area indicates that trees are experiencing a suboptimal water supply that in turn markedly lowers their photosynthetic activity and biomass production. These can lead to the death of floodplain willow forests within few years.

***Table 1:** Results of leaf-area measurements*

Forest	Species	1989	1990	1991	1992	Avge.	1993	1994	Avg.
Dunasziget hardwood forest	*Quercus robur*	55.6	46.1	35.1	42.6	44.8	27.3	39.0	33.1
	Alnus incana	37.4	31.1	20.6	25.2	28.6	18.3	27.7	23.0
	Fraxinus penn.	16.2	21.4	16.2	25.0	19.7	12.3	23.5	17.9
Kisoroszi softwood forest	*Salix alba*	11.9	14.5	8.7	8.4	10.9			
Dunaremete (affected) softwood forest	*Salix alba*						6.55	7.10	6.80
Vének (control) softwood forest	*Salix alba*						9.42	9.44	9.43

Several herbaceous species (*Nuphar lutea, Plantago altissima and Phragmites australis*) have been included in our botanical monitoring studies since 1993. Certain morphological characteristics and changes in several organ sizes of these plants indicate a general habitat drying resulting from the fall in the groundwater level. For example, the mean leaf size of the yellow water lily (*Nuphar lutea*) was 50% and 75% lower than that of the controls in 1993 and 1994, respectively. The same trend can be observed for leaf width and length (*Figure 1*). Although there are surviving and even flowering *Nuphar* individuals – appearing as curious "terrestrial" forms of a floating aquatic pondweed – the species' complete extinction is anticipated within three years in the terrestrialised wetlands of the Szigetköz. This change is further accelerated by the mass invasion of native marsh meadow species and alien weeds in the exposed beds of former oxbow lakes. These newcomers can rapidly outcompete the suffering aquatic plants.





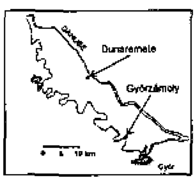
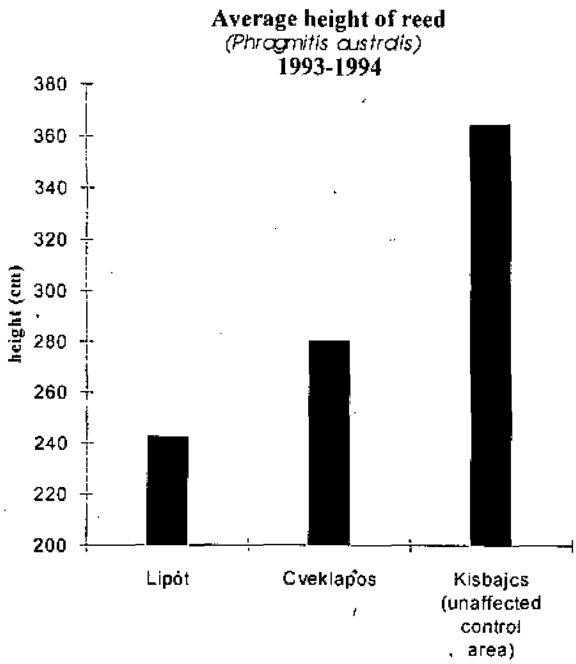


Figure 1: *The average leaf size of* Nuphar lutea *decreased to more than half the unaffected control sample in 1993 as a consequence of Variant C.*

Communities of **common reed** (*Phragmites australis*) are typical of shallow aquatic habitats and are under protection throughout the country. In stands occurring in the Szigetköz, both plant height and stem diameter have decreased, thus reflecting unfavourable changes in the habitat's water regime. Shoot height was 10-25% lower on sites influenced by the Danube diversion (at Cveklapos and Lipót) than on unaffected control plots (at Kisbajcs; see *Figure 2*). This phenomenon unambiguously indicates the beginning of a habitat transformation under the protected marsh-reed phytocoenoses.



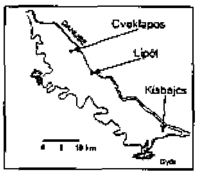
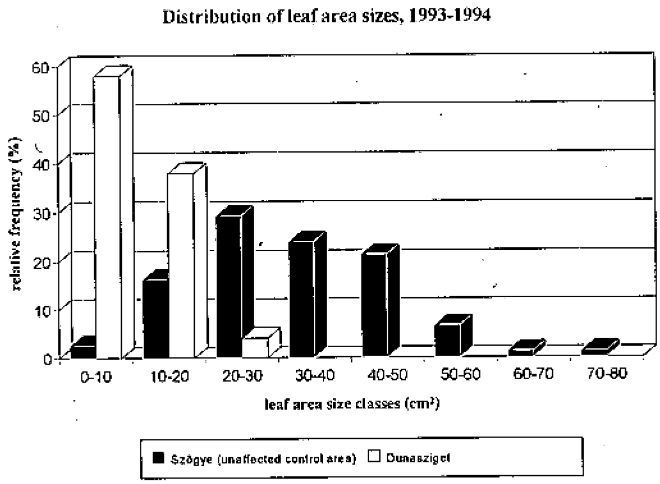
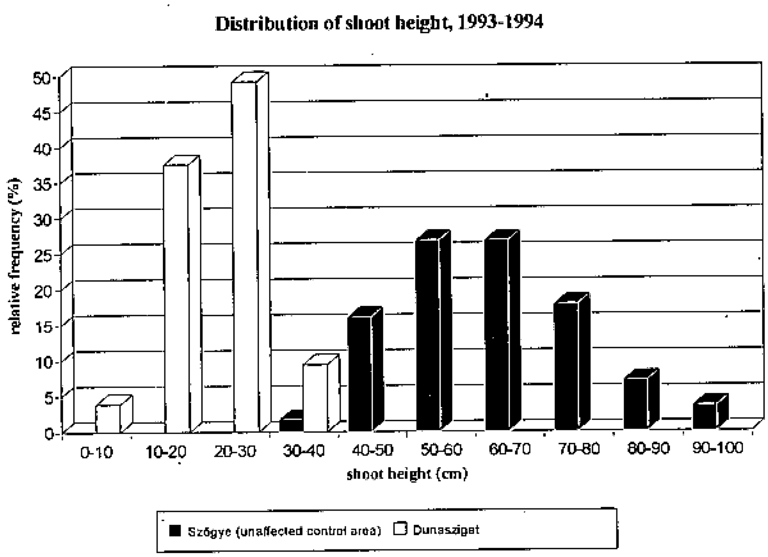


*Figure 2: The height of reed (*Phragmites australis*) stands at Lipót and Cveklapos decreased considerably – if compared with the unaffected control area at Kisbajcs.*

The general habitat drying, initiated by the Danube diversion is demonstrated even more clearly for floodplain meadows in the Middle Szigetköz by the shoot heights and leaf areas of the dominant tall plantain (*Plantago altissima*, *Figure 3*). These parameters were 200-300% higher on the control plot (at Szögye) than on sites affected by the river diversion (at Dunasziget). In other words, the average leaf area and shoot height of tall plantain growing in meadows at Dunasziget decreased to half or even one-third of controls. All these changes indicate the rapid drying of wetland habitats that will ultimately lead to the destruction of these meadows of high biodiversity.





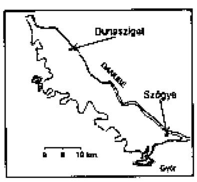


Figure 3: *In 1993-1994, the leaf area and shoot height of tall plantain (*Plantago altissima*) in a wet meadow influenced by Variant C (at Dunasziget) were half of the unaffected controls (at Szőgye).*

CHANGES IN THE PLANT COMMUNITIES

Results obtained from monitoring during the first six years prior to the Danube diversion showed plainly that although the whole biota and vegetation in the Szigetköz underwent certain changes in the past, it still uniquely preserved the original floodplain vegetation in Europe. Floodplain willow woods in the Szigetköz were in a more natural state within the years of our monitoring studies (Simon *et al.*, 1993) than those elsewhere in the Danube Valley 30 years ago (Kárpáti, 1957).

Before 1992, a certain drop of groundwater levels could be observed.[5] However, the subsequent change in subsoil irrigation only resulted in slight changes to the plant communities. In addition, in previous years, drought periods occurred frequently in the Szigetköz, as is shown by precipitation and potential evapotranspiration (PET) data.

These two factors are responsible for the slight tendency of drying in the last ten years. Concomitant moderate changes in the ecosystems warned us, that the vegetation of floodplains and surrounding protected areas – especially in the Middle Szigetköz – could not tolerate any further or more intensive drying without causing irreversible damage. However, no essential changes in the degree of naturalness or species composition of the characteristic dominant phytocoenoses appeared before the autumn of 1992. The restoration of natural site conditions is particularly important since many threatened species occur in fragmented habitats or small populations only, frequently approaching the limit of their tolerance.

The degree of naturalness or degradation of the Szigetköz vegetation is shown in *Figure 4*. Before the realization of Variant C, some 75% of the plant communities was in a natural state. Almost 20% of this is made up of relict communities of outstanding nature conservational value (e.g., *Nymphaeetum albo-luteae, Nymphoidetum peltatae, Scirpo-Phragmitetum, Caricetum elatae, Carici flavae-Eriophoretum, Calamagrosti-Salicetum cinereae, Dryopteridi-Alnetum, Leucojo-Salicetum albae, Senecio-Populetum, Fraxino pannonicae-Ulmetum, Querco robori-Carpinetum*). Secondary phytocoenoses of dry habitats only constitute the remaining 25% of the region's plant cover. The expected long-term changes in the biodiversity of natural plant communities as a consequence of Variant C are also shown in *Figure 4*. The figure shows that the proportion of drought-resistant secondary communities will increase even in the near future (after 20-30 years) with a simultaneous decline of natural and relict phytocoenoses.

5 See *Scientific Rebuttal*, HR, vol 2, *Plate 4.3.*

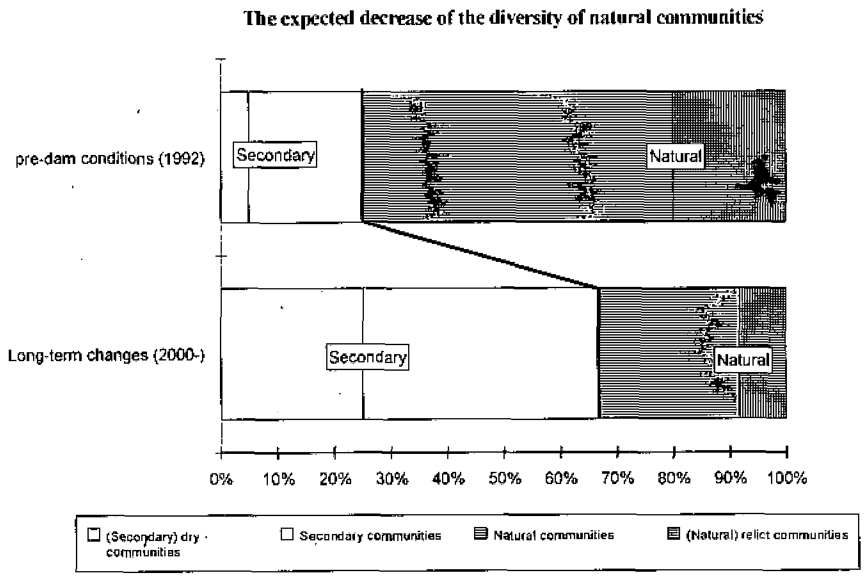


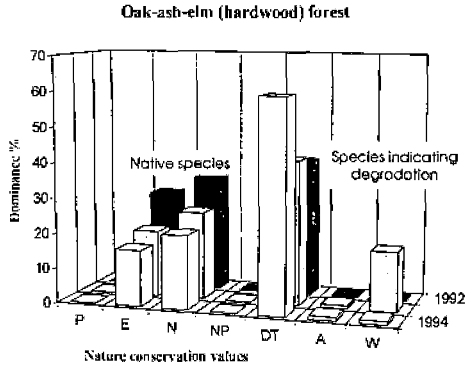
Figure 4: The degree of naturalness and degradation for the vegetation of the Szigetköz. 1992: the pre-dam situation, i.e., the last, almost natural state. 2000: expected long-term changes in biodiversity and plant communities due to Variant C. The proportion of natural communities will decrease, while secondary plant associations will gain a higher importance.

The anticipated damage in the characteristic vegetation types of the Szigetköz is demonstrated for two groundwater table drop scenarios in the largest continuous active floodplain between Dunakiliti and Ásványráró (*Table 2*). Every stand of willow woods on low-lying floodplains, relict swamp forests and hardwood forests on higher terrains will undergo irreversible changes due to a 1 m average groundwater level drop.

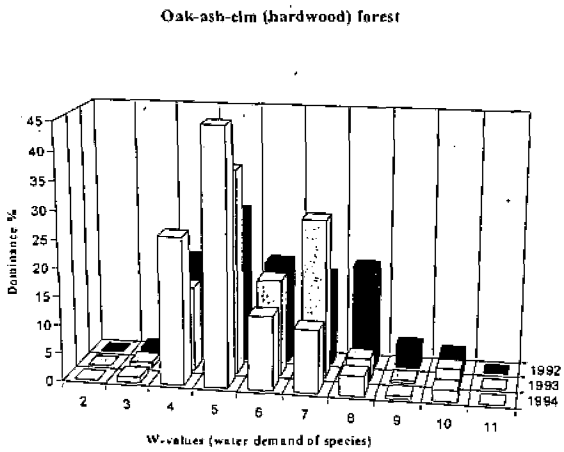
Table 2: Anticipated damage in the characteristic vegetation types of the Szigetköz given two scenarios (a 1 m and 2 m fall in the groundwater level) in the largest continuous flood area between Dunakiliti and Ásványráró.

		Anticipated damage (%)	
Vegetation type	**Area (ha)**	**1 m**	**2 m**
Aquatic pondweed communities	700	50	100
Marshes and marsh meadows	1000	70	100
Willow woods and swamp forests (softwoods)	5000	100	-
Hardwood forests	800	100	-

After the river diversion, the proportion of water-demanding species (e.g., *Impatiens glandulifera*) decreased, while the frequency of weeds or disturbance tolerant species (*Fraxinus pensylvanica, Urtica dioica, Rubus caesius*) increased in the **hardwood forests** at the Dunasziget Nyáros sample area (*Figure 5*). These show the beginnings of habitat drying on the floodplains. The new ecological conditions after the Danube diversion is favourable for species with a wide tolerance range. In competitive interactions, species with a higher degree of drought tolerance can succeed, while the abundance of hydrophilic plants declines.



P:Protected species; E:Naturally dominant species in plant communities; N:Natural species; NP:Natural pioneer species; DT:Disturbance-tolerant species; A:Adventives (introduced foreign species); W:Weeds.



W-values: 2-5:Drought-tolerant xerophilic species; 6-8:Mesophilic species; 9-11:Hydrophilic species (e.g., 11=aquatic plants)

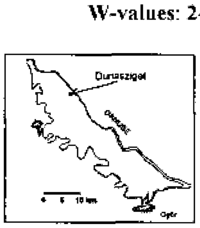
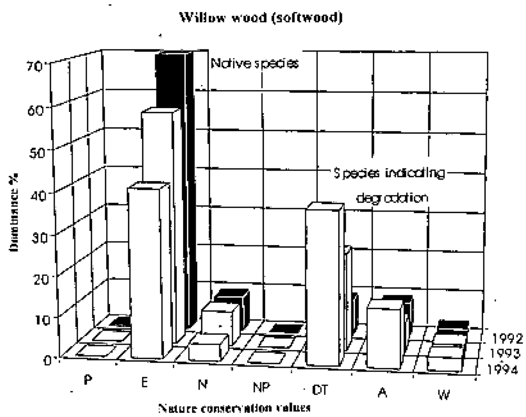
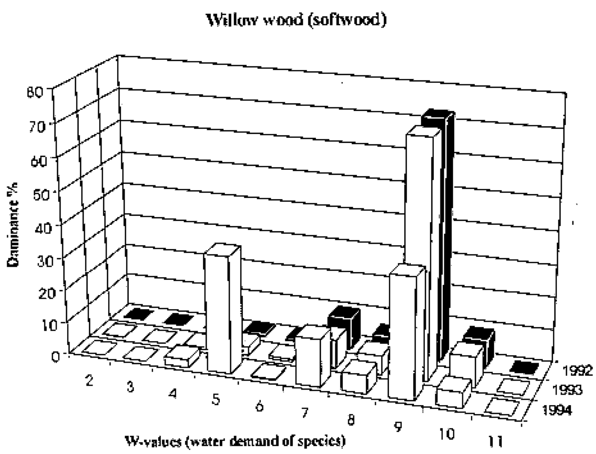


Figure 5. *Degradation of hardwood forests at Dunasziget in response to Variant C*

Willow woods are even more influenced by a shortage of water, so they have a more pronounced transformation of the vegetation pattern (*Figure 6*). In the herb layer, the proportion of water-demanding species (e.g., *Myosotis palustris, Myosoton aquatica, Poa palustris*) decreased substantially. Simultaneously, the ground cover of meadow components (e.g., *Agrostis stolonifera, Cirsium arvense, Bidens tripartitus*) increased.



P:Protected species; **E**:Naturally dominant species in plant communities; **N**:Natural species; **NP**:Natural pioneer species; **DT**:Disturbance-tolerant species; **A**:Adventives (introduced foreign species); **W**:Weeds.



W-values: **2-5**:Drought-tolerant xerophilic species; **6-8**:Mesophilic species; **9-11**:Hydrophilic species (e.g., **11**=aquatic plants)

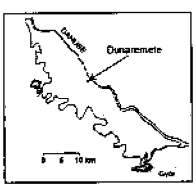


Figure 6: *Degradation of softwood forests at Dunaremete in response to Variant C*

OBSERVATION AREAS

Information on the precise course of the secondary succession initiated by the river diversion was collected through field studies at two localities near the village Dunaremete. **Sample site No 1. ("Danube bed")** was set up 400 m downstream of the water gauge at Dunaremete on a gravel terrace in the partly exposed river bed. **Sample site No 2. ("Dry oxbow lake bottom")** was placed 1 km upstream of the water gauge in an oxbow lake bottom that has completely dried up.

Danube bed (site 1)

In the Danube bed, the vegetation that has developed as the result of secondary succession is very heterogeneous. The natural pioneer elements and weed-like species of dry bed weed communities (*Echinochloo-Polygonetum lapathifolii*) and pioneer bar vegetation (*Myricario-Epilobietum*) intermingle with the components of willow thickets (*Salicetum purpureae*) and willow forests (*Salicetum albae-fragilis*). These invasive plant species first appeared in exposed river beds in spring 1993, shortly after the Danube diversion. The substrate for their establishment was the gravelly alluvial silt, which only retains its coarse matrix in the vicinity of running water. Farther away from the current river bed, the silt gradually becomes more and more stratified.

The average height and ground cover of vegetation increase in the first four sampling plots of the transects, moving away from the surface of the Danube. The arrangement of plant populations along this transect – representing a moisture gradient – indicates the relative water requirement of the species. This appears as the water-demanding species reach a higher cover close to the running water.

The frequency and cover of willow and poplar seedlings of particular importance in the secondary succession were studied along the transects. The highest frequency and cover were found in the riparian zone 10-22 m away from the new river bed (the peak cover occurring at a 10-14 m distance), then these parameters abruptly decline farther away on the bank. In early summer, willow species – especially *Salix purpurea* – dominated, while young *Populus alba* individuals occurred in a great number in the lower quadrats by the end of summer. Seedlings of *Alnus glutinosa* and *Populus nigra* occurred at the same place as well. These species indicate the development of the next successional stage (i.e., willow thickets) in the near future, probably followed by narrow galleries of softwood riparian forests.

Dry oxbow lake bottom (site 2)

The components of dry bed weed communities (*Polygonum mite, Polygonum lapathifolium, Rumex obtusifolius* and *Echinochloa crus-galli*) had already appeared on the wet silt substrate in 1993. Simultaneously, the stunted, "terrestrial" individuals of the original aquatic pondweed, *Nuphar lutea,* also occurred. The total plant cover was about 20-40% at that time. By the summer of 1994, vegetation cover reached 60-90% (or in some quadrats even 100%). The dominant *Polygonum* species overtopped and overshadowed *Nuphar* specimens suffering from serious water shortage. Several *Nuphar* individuals were still able to produce flowers, but their leaf surface area decreased to half or even one third of the original size.

Compared with the Danube bed (site 1), the water regime of the dry oxbow lake bottom is more favourable for plant growth, as is also indicated by the higher number and dominance of water-demanding species. Here the gravel basement is covered with an 80-cm-thick, fine-grained sediment with good water connections, which is able to support marsh plants in the short-term but not in the long run.

CONCLUSION

In summary, it can be stated that the water supply of floodplains along the main Danube bed worsened considerably as a consequence of the river diversion. The original flora and plant communities are threatened by the processes of degradation which have already started. In areas along the Mosoni Danube, the degree of water shortage is smaller, so the vegetation degradation is therefore less profound, at least for the time being.

3. ANTICIPATED LONG-TERM CHANGES IN THE POTENTIAL VEGETATION COMMUNITIES OF THE SZIGETKŐZ

METHOD

In order to have a "reference point" for the estimation of the effects of different water regimes, a map of the potential vegetation in its latest, almost natural state (between 1980-1992) is necessary. In response to altered groundwater levels, a transformation of this natural potential vegetation will occur, which can be forecast on the basis of the soil properties and water supply dependency of different vegetation communities (*Figure 7*). At some places this can lead to a fundamental alteration of the floodplain's ecological potential, entirely losing its wetland character.

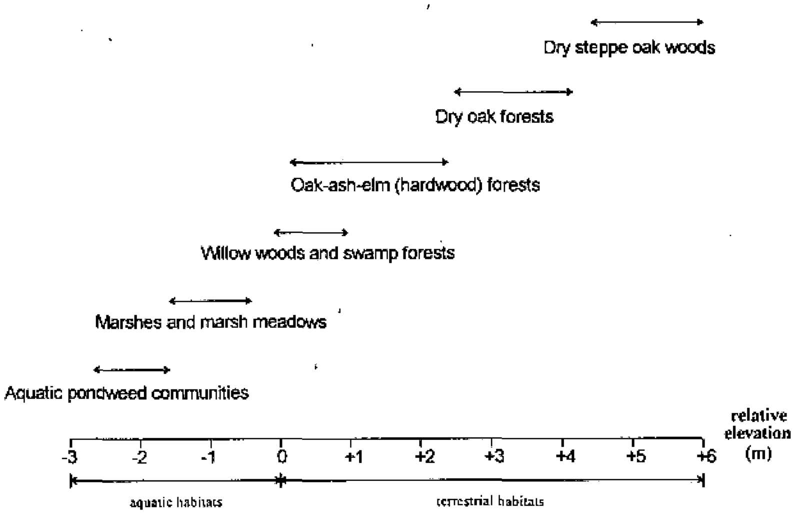


Figure 7: *Relative elevation of the habitats of the main vegetation types above or below the (ground) water level. Arrows indicate the water requirement range of each community. This relationship can be used in estimating the expected vegetation changes in response to a drop in the groundwater level.*

During the mapping of the original, almost natural plant cover we started with stands of floodplain forests, marshes, swamps, meadows and grasslands covering altogether approximately 25% of the Szigetköz area. Most of these are good manifestations of the floodplain's ecological potential. In addition to our field surveys on the vegetation, average groundwater table depth data served as sources of information for mapping as this factor is the most important determinant of the distribution of community types.

To increase clarity, the original vegetation types were aggregated into four main groups according to similarities in their ecological characteristics. The spatial distribution of these groups was mapped. The groups are as follows:

I. **Flooded forests and aquatic-marsh herbaceous vegetation.** Characteristic communities include temporally inundated willow thickets, willow and poplar forests, pondweed and marsh plant associations.

II. **Wet forests and meadows.** Typical phytocoenoses are alder woods, alder swamps, wet type oak-ash-elm forests, marsh and swamp meadows.

III. **Damp (mesophilic) forests and meadows.** Characteristic associations are mesophilic oak-ash-elm forests (with *Convallaria majalis, Galium odoratum, Circaea lutetiana* and *Brachypodium sylvaticum*), oak forests with *Convallaria majalis*, oak-hornbeam woods, mesophilic hayfields and pastures.

IV. **Dry forests and grasslands.** Typical communities are sand oak woods and various steppe meadows.

THE NATURAL POTENTIAL STATE (PRE-DAM CONDITION)

The potential vegetation pattern described between 1980-1992 can be considered as the original "zero" state (*Plate 5.2*). At that time, the natural floodplain ecological potential still existed in the major part of the Szigetköz. **Willow and poplar forests (I)** thrived along the Great Danube in a band 2-4 km wide, which also encompassed habitats of aquatic and marshy macrophyte vegetation. Such a wide lower riparian willow poplar zone with tributaries so richly inhabited by pondweed-marsh vegetation is unmatched in Hungary. This area of approximately 10,000 ha was a natural gene bank for white willow (*Salix alba*), which also supported the largest poplar woods as well as providing a habitat for sizeable stands of aquatic-pondweed and marsh communities (see previous chapter).

An extensive band of **wet forests and meadows (II)** is adjacent to this watery world which also includes the Mosoni Danube Valley from Rajka to Istvánmajor. This latter area preserves the most splendid remnants of former hardwood forests even today (e.g., Felső, Lóvári, Parti, Derék, Agg and Kimlei forests, Malomszer, Vadaskert). This zone, covering almost 20,000 ha, supports the second most valuable vegetation type of the Szigetköz with abundant montane and dealpine elements, enclosed orchid-rich meadows as well as the extremely rich and versatile fauna associated with these.

Damp (mesophilic) forests and meadows (III) make up the third potential zone. This covers approximately 5,000 ha in the environs of Dunakiliti, Fekete-erdő, Sérfenyősziget and Magyarkimle-Horvátkimle.

The last vegetation zone **(IV)** exists only in small fragments on sand dunes of somewhat higher elevation. The biota of these **dry forests and grasslands** increases the overall biodiversity in the area.

THE POTENTIAL STATE AFTER THE IMPLEMENTATION OF THE ORIGINAL PROJECT

Fundamental and extensive changes are anticipated in the potential vegetation on the realisation of the Original Project (*Plate 5.3*). Most importantly, the complete willow-poplar forest zone of 3 km mean width along the Great Danube with associated pondweed-marsh habitats, would practically disappear in the Upper and Middle Szigetköz on an area of approximately 6,500 ha. The gene bank of white willows would also be destroyed, as well as the habitats of poplar plantations of high economic value. The extent of the resulting damage cannot be expressed explicitly due to the spatial variation in either topsoil hydrological properties or groundwater table characteristics. All these changes would be irreversible. This vegetation zone is expected to be replaced by dry forests (e.g., sandy oak woods) and steppe meadows (e.g., closed sandy grasslands) between rkm 1832 and 1817 on an area of almost 1,000 ha. In an additional belt of approximately 2,000 ha, a mosaic of dry and damp (mesophilic) forests and meadows is foreseen to occur. Farther away from the Danube, two major patches of this mosaic would develop on approximately 5,000 ha: one in the environs of Sefrenyősziget-Halászi-Máriakálmok, the other SE of this in the surroundings of Novákpuszta. In summary, the floodplain ecological potential would disappear completely on approximately 4,500 ha and partially on 3,500 ha.

Between these two habitat systems, as well as in the Mosoni Danube Valley, dry-mesophilic floodplain forests and meadows would dominate. With the destruction of these aquatic habitats the rich floodplain flora and fauna, and numerous almost natural communities would also disappear. Wet forests and meadows are only expected to survive in the Upper Szigetköz, upstream of Dunakiliti and Tejfalusziget, as a result of the nearby reservoir. However, their character would change due to the lack of regular floods.

THE POTENTIAL STATE AFTER THE IMPLEMENTATION OF VARIANT C

The effects of Variant C (*Plate 5.4*) are very similar to those of the Original Project. One major difference is in the extent of the dry riparian zone, which would proceed much farther to the North, so dry forests and grasslands are anticipated to occur between Rajka and Doborgaz (rkm 1851-1837) on an area of approximately 1,000 ha. Between Nagysziget and Ásványráró (rkm 1832-1818) a mosaic of dry and damp (mesophilic) forests are expected along the river. The same mosaic would cover the environs of Novákpuszta, and would also protrude somewhat into the Mosoni Danube Valley, where in contrast to the seminatural forests of the "zero" variant, are predicted to sustain from Istvánmajor to Rajka along several river reaches. The influence of Variant C could already be observed during our field studies in 1993-1995. Drying trees and shrubs, destroyed aquatic pondweed vegetation, and decreased plant sizes (height, leaf area) are the main responses to the resulting groundwater level drop which reaches several meters in some places.

THE IMPACT OF SIDE ARM RECHARGE

An assessment of the changes in the potential vegetation communities was carried out for a recharge system with 100 m^3/s supplied into the Hungarian side branches, coupled with 300 m^3/s in the main bed (based on Variant C). This remedial measure would lead to the preservation of site conditions in original willow-poplar forests and wet forests from Kisbodak to Doborsziget in an area of only 1,000 ha (see inset on *Plate 5.4*). This would be the only redress to the effects of Variant C.

CONCLUSION

In summary, the floodplain ecological potential would disappear completely on approximately 4,500 ha, and partially on 3,500 ha in the case of Variant C without water recharge. If water was supplemented, the area of complete loss would decrease to 3,500 ha. In addition, the character of all vegetation inside the dykes will not remain the same due to the lack of natural floods. That is, they will no longer be alluvial vegetation, but rather than a mixture of common floodplain species and additional lowland taxa. Further damages are expected due to the rise in the water-table in the Lower Szigetköz, induced by both variants.

REFERENCES

Borhidi, A. 1956. Die Steppen und Wiesen im Sandgebiet der Kleinen Ungarischen Tiefebene. *Acta Bot. Acad. Sci. Hung.* 2 :241-274.

Braun-Blanquet, J. 1928. *Pflanzensoziologie*. Berlin.

Czimber, Gy. 1993. Segetal weeds of the Szigetköz. ScD Thesis, Budapest. Manuscript. pp 1993 (in Hungarian)

Grabherr, G., and L. Mucina 1993. *Die Pflanzengesellschaften Österreichs* Teil II. Natürliche waldfreie Vegetation. Jena – Stuttgart – New York.

Kárpáti , I. 1957. Gallery forests of the River Danube in Hungary, PhD. Thesis. (in Hungarian). Budapest, Manuscript.

Kárpáti, V. 1963. Die zönologischen und ökologischen Verhältnisse der Wasservegetation des Donau-Überschwemmungsraumes in Ungarn. *Acta Bot. Acad. Sci. Hung.* 9 :323-385.

Kevey, B. 1989. Data on the Flora and Vegetation of Hungary V. (in Hungarian). *Bot. Közl.* 76 :83-96.

Kevey, B. 1992. Data on the Flora and Vegetation of Hungary VI. (in Hungarian). *Bot. Közl.* 80 :53-60.

Kevey, B. 1993. Comparative cenological investigation of the Gallery Forests of the Szigetköz. PhD. Thesis. (in Hungarian). Pécs, Manuscript.

Kevey, B., and Z. Alexay 1992. Data on the Flora of the Szigetköz. (in Hungarian). *Acta Ovariensis* 34 :29-37.

Láng, I., J. Banczerowski, and Á. Berczik (Eds.) 1993. *Szigetköz*. Environmental Researches. Environmental Status, ecological directives. (in Hungarian). Hungarian Acad. of Sc. Budapest.

Mucina, L., G. Grabherr, and S. Wallnöfer, 1993. *Die Pflanzengesellschaften Österreichs*, Teil III. Wälder und Gebüsche. Jena – Stuttgart – New-York.

Polgár, S. 1941. The Flora of the County Győr (in Hungarian). *Bot. Közl.* 38 :201-352.

Simon, T. 1962. The natural Vegetation of the Kisalföld. (in Hungarian). *Földrajzi Közl.* 2 :183-193

Simon, T. (Ed.) 1978. Study of biological equilibrium in relation to the establishment of the Gabčíkovo-Nagymaros Barrage System. Manuscript. (in Hungarian). Budapest.

Simon, T. 1992. Plant communities and their Naturalness in the Szigetköz. (in Hungarian). *Természetvéd. Közl.* 2 :43-55.

Simon, T., M. Szabó, R. Draskovits, I. Hahn, and A. Gergely, 1993. Ecological and phytosociological changes in the willow woods of Szigetköz, NW Hungary, in the past 60 years. *Abstracta Bot.* 17 :179-186.

Simon, T., R. Draskovits, A. Gergely, I. Hahn, and M. Szabó, 1993. A Szigetköz biológiai megfigyelőrendszere: Botanikai monitoring, 1993, 1994. (*The biological monitoring system of the Szigetköz*): Botanical monitoring. 1993, 1994.

Szabó, M., T. Hahn and A. Gergely, 1995. Plant succession studies in the Danube river bed at Dunaremete, in Szigetköz. (forthcoming 1995).

Wendelberger-Zelinka, E. 1952. *Die Vegetation des Donauauen bei Wallsee.* Linz.

Werner, E. 1990. Botanical Values of the Upper-Szigetköz. (in Hungarian). *Mosonmagyaróvári Kossuth L. Gimn. Évk.* 1989-1990. 20-29.

Zólyomi, B. 1937. Results of the botanical Researches of the Szigetköz. (in Hungarian). *Bot. Közl.* 34:169-192.

Annex 6

ASSESSMENT OF THE LONG-TERM CHANGES IN THE PRODUCTIVITY OF FOREST STANDS IN THE SZIGETKÖZ THAT CAN BE EXPECTED UNDER DIFFERENT WATER REGIMES

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INTRODUCTION

The Slovak Counter-Memorial states that if Hungary implemented a water recharge program, the ecological conditions could be improved in the Szigetköz. Since trees rely heavily on available water, the level of the groundwater table and its dynamics strongly affect growth and productivity in the long run. The objective of this study was to assess the productivity of stands in the Szigetköz forests:

- under the original conditions (i.e., those that existed before the implementation of Variant C)
- under the effect of Variant A
- under the effect of Variant C
- under the effect of remedial measures (i.e., with side arm recharge)

and to analyse the differences between the assessed productivity levels. Low-resolution maps were required, showing the production of the forests of the Szigetköz where major changes could be expected. This area stretches from Dunakiliti to Ásványráró in the active floodplain.

The method to assess the long-term productivity of the forest was based on observed and simulated groundwater levels as well as recorded yield levels of different forest species under various hydrological conditions. This method and the data base is appropriate to estimate the potential productivity of the forest under different water regimes.

A SHORT SUMMARY OF THE ECOLOGY OF STAND PRODUCTIVITY

The production of stands primarily depends on the species composition and structure of the stands, and site conditions. Forest management may also affect stand productivity: species selection and sylviculture can both increase and decrease production. In the optimum case where the species composition and structure of a stand correspond well with site conditions, and forestry operations (such as planting, tending, thinning and all other sylvicultural treatments) are done in a proper way, production is maximal. In this study, we assume such a forest management, that is, a management that is optimal for tree growth. The forestry practice in the Szigetköz has always fulfilled this assumption. Therefore, we can assume that only site conditions limit production.

Site conditions can be defined as the complexity of all factors: their spatial and temporal changes and dynamics that enable or limit tree growth. Of these factors, the hydrological conditions, soil and climate are the most important. What follows is a short description of these conditions and of how the Gabčikovo-Nagymaros Project may affect them.

THE HYDROLOGICAL CONDITIONS IN THE SZIGETKÖZ

The precipitation in the Szigetköz amounts to 500-600 mm a year, of which only about 250 mm falls in the vegetation period. As a comparison, *Table 1* shows the amount of water required for hybrid poplar timber production (Halupa and Tóth, 1988; see Tihanyi, 1980, for details). It is clear from the figures that the high level of productivity of the stands of the Szigetköz was made possible by the excess water provided by floods and subsoil irrigation by the Danube (cf. *Table 3)*.

Table 1: *The amount of water in the vegetation season used by hybrid poplars (cultivar 'I-214' and 'Robusta') at different timber production levels (Halupa and Tóth, 1988).*

Current annual increment* (m^3/ha)	**Water usage of the stand (mm)**		**Water usage of the stand plus evaporation (mm)**	
	'I-214'	**'Robusta'**	**'I-214'**	**'Robusta'**
60	814	1320	1510	2384
50	679	1100	1258	1987
40	543	880	1006	1589
35	475	770	881	1391
30	407	660	755	1192
25	339	550	629	993
20	271	440	503	795
15	209	330	377	596
10	136	220	255	397

* Annual rate of growth

In the site classification system used in forestry practice in Hungary, the hydrological conditions of a floodplain site are characterised by taking into account the following factors:

- the frequency and duration of the inundations, which depend on both the elevation of the site above the bank and the water-level of the river;
- the depth of the groundwater level;
- soil thickness (the rooting depth may be limited by the gravel below the cover layer if it appears within the normal rooting depths of the trees).

Based on the above, the accessibility of the water for a given site in the floodplain is classified in one of the following 6 elevation categories (the percentages in brackets show the proportion of each category by area before the diversion of the Danube):

- **Extremely high elevation** (<1%): only inundated during the highest floods, or where the gravel layer is less than 50 cm from the surface. The groundwater is inaccessible for the roots, because they only penetrate the uppermost layer of the gravel, and trees are rarely watered by inundations.
- **High elevation** (<1%): inundated rarely, but an average flood raises the groundwater level. In this way, surplus water is periodically available for the trees.

- **Medium high elevation** (20%): the total duration of inundations is between 1 week and 1 month. The groundwater table is usually no deeper than 2 m and is accessible for the roots for most of the vegetation season. Favourable for timber growth.
- **Medium low elevation** (71%): inundated for $^1/_6$ - $^1/_3$ of the vegetation season, which indicates continuously watered, very good conditions for the trees. Floods frequently inundate these areas in spring and summer – the most favourable sites for growing poplar.
- **Low and extremely low elevation** (deep-seated and extremely deep-seated areas, 7%): too much water for most trees (only willows can exist on part of these sites).

The percentages given for the different categories refer to the original state, i.e., the state before the diversion of the Danube. Conditions changed dramatically after 1992: the water-table level dropped by 2-3 m in some places, and inundations no longer occured. Since then, areas of medium-low and lower elevations are seldom found between Dunakiliti and Ásványráró, and groundwater is generally observed in the gravel layer – not accessible for roots.

THE SOILS OF THE SZIGETKÖZ

The soils of the Szigetköz are alluvial soils – the effect of the vegetation on soil development was limited by the regular disturbance of the floods. These soils are favourable for tree growth. With regard to the structure and the physical properties of the soils, no major changes can be expected for several years as a consequence of the G/N Project. The nutrient content will, however, decrease shortly due to the lack of inundations.

THE CLIMATE OF THE SZIGETKÖZ

The climate can be regarded as homogeneous over the whole Szigetköz. Except for the amount of precipitation, it is favourable for the trees. No major changes in the climate are anticipated as an effect of the G/N Project. However, a minor decrease in air humidity can be expected locally, owing to the diminished size of open water surfaces.

Regarding all site conditions, the amount of available water seems to have been by far the most important factor determining tree growth. In the future, the decrease of this water may limit production.

THE BASIC CONCEPT FOR ASSESSING PRODUCTION

To assess stand productivity, one needs information about the site, and the growth of each tree species under any specified conditions. Actual site characteristics can be surveyed; expected conditions at a given place resulting from altered water regimes must be simulated. In either case, a model is required to describe tree growth under the specified conditions.

Because trees are long-living; the model of tree growth differs if production is estimated in the short or long run. The reaction of trees (and forestry) in the short run is rather uncertain and less important than long-term productivity. Therefore, we used models which estimate the long term production of the stands. This level of productivity will be referred to as potential production capacity.

DATA AND METHODS

As mentioned above, the production of the stands depends on the tree species and the site conditions. Since the spatial variability of the site conditions, and hence that of tree growth, is very high, detailed information was needed about relevant site conditions and stand characteristics. The most important source of this information was data collected by the Forest Management Planning Service, Budapest during the continuous forest inventory of the region.

Such inventories are carried out in the Szigetköz – as in all forests of Hungary – to help plan forestry operations. In this inventory, information is obtained on stand and site characteristics for each forestry compartment. The average size of these compartments is about 4-5 ha, so data of some 700 compartments were used.

Each site in this survey was characterised by the hydrological conditions, soil type, physical soil properties, and the depth of the gravel. Data for the original status of the stands included the area of the compartment, tree species, age, areal ratio of species, and increment (the annual rate of growth).

In addition to the forest survey data, soil analyses were also performed on the plots of the Forest Research Institute established within the framework of the Hungarian Biomonitoring to measure the yield of stands (see Halupa *et al.,* 1986, for details). The field experience of both the researchers of the Forest Research Institute and the foresters working in the region was also heavily relied upon.

Maps of soil thickness and water-table levels for Variant A and Variant C were produced by MÁFI and VITUKI Co., respectively. The assessment of the potential production capacity of the stands was based on the ecological conditions suggested by these maps. It must therefore be stated that the accuracy of these assessments is limited by the accuracy of these maps, and also by the assumptions of modelling the water-table level under the different scenarios. These assumptions include a stable water-table level, i.e., there are no inundations. The lack of floods may, however, be crucial for the production, or even the existence, of stands. In our assessment, we always assumed that no inundations take place.

Based on the information of the site conditions and the stand characteristics of the compartments, relationships can be found between site and production. However, the production of a particular compartment also depends on factors other than the site and spatial variability within each site is very high in the region, as was mentioned above. Therefore, site-production relationships were better modelled by also using general models (Járó, 1973). An example of a fraction of this model, expressed in a tabular form, is shown in *Table 2.*

The production capacity, or yield level in the model is expressed in 3 categories: high, medium, low. The yield level may also be expressed by the amount of timber produced in unit area and time (e.g., 23 m^3/ha/year). Thus, the productivity of common forest species was estimated for each category, based on average recorded values (*Table 3).*

Table 2: *A sample part of the tabulated model of relationships between site characteristics, species occurrence and production level (WP=white poplar; WW=white willow; A=alder; HP=hybrid poplar; PO=pedunculate oak; l=low; m=medium; h=high)*

Elevation	Rooting depth (cm)	Physical structure	Tree species	Production level
Medium high	<50	sandy	WP WW	l-m l-m
		loamy	WP WW A	m l-m l-m
	50-70	sandy	WP HP A WW PO	m m m m m
		loamy	WP HP PO	h-m h-m m
	70-100	sandy	WP HP PO	h-m h-m h-m
		loamy	HP PO	h h
	>100	sandy	HP PO	h h
		loamy	HP PO	h h

Based on all these assumptions, data and models, the actual and potential production capacity was estimated for each compartment in the specified part of the floodplain and for all water regimes specified above (*Table 4*). Both species and their production capacity categories for each compartment were then represented on forestry maps provided by the Forest Management Planning Service. The scale of these maps is 1:25,000, and their accuracy is fairly good.

From the forestry maps, large-scale maps were produced (See *Scientific Rebuttal*, HR, vol 2, *Plates 6.1-6.4*) that show the estimated situation for each scenario.

Table 3: Yield of stands at unit area and time for the yield levels, and current approximate value (in HUF) of unit timber

Species	Yield (m^3/ha/year) per yield level			Current value of timber (Ft/m^3) per yield level		
	high	medium	low	high	medium	low
Hybrid poplar	34.0	16.0	8.0	3500	2600	1800
Native poplar	17.2	8.5	5.3	1350	1270	950
Willow	16.8	12.8	7.5	2200	1450	780
Hardwoods	9.0	6.5	3.5	3250	2800	2060
Black locust	12.5	10.7	5.2	2010	1650	1173

RESULTS AND DISCUSSION

The main result of this study consists of maps showing the different yield levels of forest productivity in the area studies for the investigated scenarios (see *Scientific Rebuttal,* HR, vol 2, *Plates 6.2, 6.3, 6.4*). In addition, we summarised our estimations in *Table 5*. This table shows the area and total annual production of stands, as well as the order of magnitude of the value (in HUF) of the annual production under the different water regimes. To calculate these values, we used approximate specific monetary values (*Table 3*). The conclusions that were made based on all maps and tables are summarised below.

THE ORIGINAL SITUATION (PRE-DAM CONDITIONS)

The large part (67%) of the stand was made up of highly productive hybrid poplars *(Plate 6.1)*. There are several clones and cultivars of these poplars, but we did not distinguish between them because their proportions have and would continue to change as a result of tree breeding activities.

Almost all other stands in the floodplain were composed of willow (22%) and native poplars (9%). These are less productive, but can very well utilise sites too wet or too dry for the hybrid poplars. The proportion of hardwoods in the floodplain was very limited, because they cannot exist in such wet conditions, or (to a smaller extent) more productive species can be grown instead.

The majority of stands grew under optimal conditions *(Plate 6.2)*, which is demonstrated by the fact that the production capacity was high in 90, 74 and 71% of all hybrid poplar, willow and native poplar stands, respectively.

ANTICIPATED LONG-TERM IMPACT OF THE G/N PROJECT ON FORESTRY

Variant A

After the implementation of the Gabčíkovo-Nagymros Project both the area and the productivity of the stands would, in the long run, change considerably (*Plate 6.3*). Willows could not grow any more, and all areas of high productivity for hybrid and native poplars and ash trees would be lost. The severe loss of highly productive hybrid poplar stands in favour of medium and low productive native poplar sites results in an overall financial loss in forest productivity of about 140 million HUF per year.

Variant C

For this scenario *(Plate 6.4)* a discharge of about 350 m^3/s in the old riverbed was assumed, which corresponds to the average release from the Čunovo Reservoir in 1993.[1] The resulting increase in groundwater levels maintains 12% and 29% of the high productivity areas of hybrid and native poplars respectively. Thus the long-term financial loss caused by Variant C would be about 110 million HUF per year.

Effect of recharge (based on Variant C)

Assuming a constant supply in the Hungarian side arms of 100 m^3/s coupled with a flow of 300 m^3/s in the main channel, only a local increase in groundwater tables would occur. The impact of the water recharge would only be effective in a part of the bay at Dunasziget, but not in the floodplain forests of the village of Kisbodak, at Dunakiliti and at the bay at Ásvány. (see *Scientific Rebuttal,* HR, vol 2, *Plate 6.4,* insert) Therefore only 30-40% of the forests would be affected positively.

As a result of the water recharge, the area of hybrid poplar would increase slightly compared to the anticipated effects of Variant C. The significant change would be that the ratio of hybrid poplars and native poplars with a high yield level would be larger. Compared to Variant C without recharge, the area of hybrid poplars with a high yield would be doubled, and the area of native poplars with a high yield level would increase threefold. The area of native poplars with a low yield level would diminish proportionately.

However, the annual overall value of forest production would not improve considerably compared to Variant C conditions without recharge, and the annual financial loss would still amount to about 100 million HUF.

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1 In 1994, 217 m^3/s were released on average, thus the situation in 1994 corresponds to Variant A (see HR, Annexes, vol 3, annex 1)

Table 4: *Potential production capacity and other data of sample compartments (WW=white willow; MAR=Pop. 'Marilandica'; ROB=Pop. 'Robusta'; NP=native poplar; IP=Pop. 'I-214'; HP=hybrid poplar; BP=black poplar)*

Site	Compart-ment	Area	Species	Current areal ratio	Age	Height	Depth of gravel	Area (ha) by potential production capacity		
		ha		%	yr	m	cm	high	medium	low
Ásványráró	1A	13.9	WW	5	38	32	200	0.7		
			MAR	65	38	32		9		
			ROB	30	38	26		4.2		
Ásványráró	2A	11.9	NP	5	29	23	80-200		0.6	
			ROB	30	29	25		3.5		
			ROB	65	29	25		7.8		
Ásványráró	2B	7.1	WW	40	26	23	150	2.9		
			IP	30	26	27		2.1		
			ROB	30	26	28		2.1		
Ásványráró	2C	7.1	WW	21	28	25	70-200	1.5		
			IP	30	28	28			2.1	
			ROB	49	28	28		3.5		
Ásványráró	2D	7.3	WW	40	21	20	200	2.9		
			IP	40	21	24		2.9		
			ROB	20	21	24		1.5		

Site	Compart-ment	Area	Species	Current areal ratio	Age	Height	Depth of gravel	Area (ha) by potential production capacity		
		ha		%	yr	m	cm	high	medium	low
Ásványráró	2E	4.6	BP	50	4		200	2.3		
			HP	50	4			2.3		
Ásványráró	3A1	7	WW	30	11	8		2.1		
			HP	70	11	13		4.9		
Ásványráró	3A2	9.7	WW	70	11	8		6.8		
			HP	30	11	13		2.9		
Ásványráró	3B	1.4	WW	36	20	13		0.5		
			IP	64	20	17		0.9		
Ásványráró	4A	2	IP	90	21	24	100	1.8		
			WW	10	21	18		0.2		
Ásványráró	4B	0.6	WW	17	23	17	100	0.1		
			NP	83	23	18		0.5		
Ásványráró	4C	1.7	WW	29	21	14	100-150	0.5		
			HP	71	21	16		1.2		
Ásványráró	4D	0.8	WW	100	21	17	200	0.8		

Table 5. *Area, increment and value of increment of species by yield level under several water regimes.*

Variant	Stand property	Hybrid poplar				Native poplar				White willow				Pedunculate oak			Ash				Black Locust			
		Yield level				Yield level				Yield level				Yield level			Yield level				Yield level			Grand
		high	med	low	Total	high	med	low	Total	high	med	low	Total	high	med	Total	high	med	low	Total	med	low	Total	Total
pre-dam cond.	Area (ha)	1492	161	2	1655	158	63		221	404	144		548	9	1	10	25	1		26	12		12	2472
	% (within spec.)	90	10	0	100	71	29	0	100	74	26	0	100	95	5	100	96	4		100	100		100	100
	% (grand total)	60	7	0	67	6	3	0	9	16	6	0	22	0	0	0	1	0		1	0		0	100
	Increment (m^3/yr)	50728	2576	16	53320	2718	535		3253	6787	1843		8630	84	3	87	225	6		231	150		150	65671
	% (within spec.)	95	5	0	100	84	16	0	100	79	21	0	100	97	3	100	97	3		100	100		100	100
	% (grand total)	77	4	0	81	4	1	0	5	10	3	0	13	0	0	0	0	0		0	0		0	100
	Value (10^3 HUF/yr)	177548	6698	29	184275	3669	679		4348	14931	2672		17603	273	8	281	731	20		751	301		301	207559
	% (within spec.)	96	4	0	100	84	16	0	100	85	15	0	100	97	3	100	97	3		100	100		100	100
	% (grand total)	86	3	0	89	2	0	0	2	7	1	0	8	0	0	0	0	0		0	0		0	100
Variant A	Area (ha)	0	804	124	928	0	754	504	1258	0	0	0	0	2	74	76	0	86		86	217		217	2565
	% (within spec.)	0	87	13	100	0	60	40	100	0	0	0	0	3	97	100	0	100		100	100		100	100
	% (grand total)	0	31	5	36	0	29	20	49	0	0	0	0	0	3	3	0	3		3	8		8	100
	% of original	**0**	**499**	**6200**	**56**	**0**	**1197**		**569**	**0**	**0**		**0**	**22**	**14800**	**776**	**0**	**8600**		**330**	**1808**		**1808**	**104**
	Increment (m^3/yr)	0	12804	992	13796	0	6409	2671	9080	0	0	0	0	18	481	499	0	559		559	2322		2322	26256
	% (within spec.)	0	93	7	100	0	71	29	100	0	0	0	0	4	96	100	0	100		100	100		100	100
	% (grand total)	0	49	4	53	0	24	10	35	0	0	0	0	0	2	2	0	2		2	9		9	100
	% of original	**0**	**497**	**6200**	**26**	**0**	**1198**		**279**	**0**	**0**		**0**	**21**	**16033**	**574**	**0**	**9317**		**242**	**1548**		**1548**	**40**
	Value (10^3 HUF/yr)	0	33290	1785	35075	0	8139	2537	10676	0	0	0	0	59	1347	1406	0	15652		15652	3831		3831	66640
	% (within spec.)	0	95	5	100	0	76	24	100	0	0	0	0	4	96	100	0	100		100	100		100	100
	% (grand total)	0	50	3	53	0	12	4	16	0	0	0	0	0	2	2	0	23		23	6		6	100
	% of original	**0**	**497**	**6155**	**19**	**0**	**1199**		**246**	**0**	**0**		**0**	**22**	**16838**	**500**	**0**	**78260**		**2084**	**1273**		**1273**	**32**

Variant	Stand property	Hybrid poplar Yield level high	Hybrid poplar Yield level med	Hybrid poplar Yield level low	Hybrid poplar Total	Native poplar Yield level high	Native poplar Yield level med	Native poplar Yield level low	Native poplar Total	White willow Yield level high	White willow Yield level med	White willow Yield level low	White willow Total	Pedunculate oak Yield level high	Pedunculate oak Yield level med	Pedunculate oak Total	Ash Yield level high	Ash Yield level med	Ash Yield level low	Ash Total	Black Locust Yield level med	Black Locust Yield level low	Black Locust Total	Grand Total
Variant C	Area (ha)	180	1110	22	1312	46	610	326	982	0	28	0	28	2	74	76	0	86		86	39		39	2523
	% (within spec.)	14	85	2	100	5	62	33	100	0	100	0	100	3	97	100	0	100		100	100		100	100
	% (grand total)	7	44	1	52	2	24	13	39	0	1	0	1	0	3	3	0	3		3	2		2	100
	% of original	**12**	**689**	**1100**	**79**	**29**	**968**		**444**	**0**	**19**		**5**	**22**	**14800**	**776**	**0**	**8600**		**330**	**325**		**325**	**102**
	Increment (m^3/yr)	6120	17760	176	24056	791	5185	1728	7704	0	358	0	358	18	481	499	0	559		559	417		417	33593
	% (within spec.)	25	74	1	100	10	67	22	100	0	100	0	100	4	96	100	0	100		100	100		100	100
	% (grand total)	18	53	1	72	2	15	5	23	0	1	0	1	0	1	1	0	2		2	1		1	100
	%of original	**12**	**689**	**1100**	**45**	**29**	**969**		**237**	**0**	**19**		**4**	**21**	**16033**	**574**	**0**	**9317**		**242**	**278**		**278**	**51**
	Value (10^3 HUF/yr)	21420	46176	317	67913	1068	6585	1642	9295	0	519	0	519	59	1347	1406	0	15652		15652	688		688	95473
	% (within spec.)	32	68	0	100	11	71	18	100	0	100	0	100	4	96	100	0	100		100	100		100	100
	% (grand total)	22	48	0	71	1	7	2	10	0	1	0	1	0	1	1	0	16		16	1		1	100
	% of original	**12**	**689**	**1093**	**37**	**29**	**970**		**214**	**0**	**19**		**3**	**22**	**16838**	**500**	**0**	**78260**		**2084**	**229**		**229**	**46**
Variant C+ recharge	Area (ha)	400	1018		1418	160	536	193	889		28			19	56	75	15	69	1	85	38	1	39	2534
	% (within spec.)	28	72		100	18	60	22	100		100			25	75	100	18	81	1	100	97	3	100	100
	% (grand total)	16	40		56	6	21	8	35		1			1	2	3	1	3	0	4	1	0	1	100
	% of original	**27**	**632**		**86**	**101**	**851**	-	**402**		**19**			**211**	**560**	**750**	**60**	**690**	-	**326**	-	**316**	-	**102**
	Increment (m^3/yr)	13600	16288		29888	2752	4556	1023	8331		358			171	364	535	135	448	4	587	475	11	486	39162
	% (within spec.)	46	54		100	33	55	12	100		100			32	68	100	23	76	1	100	98	2	100	100
	% (grand total)	35	40		75	7	11	3	21		1			0	1	1	0	1	0	1	1	0	1	100
	% of original	**27**	**632**		**56**	**101**	**851**	-	**256**		**4**			**204**	**12133**	**636**	**60**	**7466**	-	**254**	-	**324**	-	**60**
	Value (10^3 HUF/yr)	47600	42349		89949	3715	5786	972	10473		519			556	1019	1575	439	1254	16	1709	954	18	972	105197
	% (within spec.)	53	47		100	36	55	9	100		100			35	65	100	26	73	1	100	98	2	100	100
	% (grand total)	45	41		86	4	6	1	11		0			0	1	1	0	1	0	1	1	0	1	100
	% of original	**27**	**632**		**49**	**101**	**852**	-	**241**		**3**			**204**	**12737**	**560**	**60**	**6270**	-	**228**	-	**323**	-	**51**

REFERENCES

Halupa, L., K. E. Szendrei, 1986. A szigetközi hullámtéri erdők ökológiai viszonyainak feltárása. (*Investigation of the ecological conditions of the floodplain forests in the Szigetköz*) ERTI Report.

Halupa, L., B. Tóth, 1988. A nyár termesztése és hasznosítása. *(Production and exploitation of poplar*). Mezőgazdasági Kiadó, Budapest.

Járó, Z. 1973. A termőhelytípusok és a célállományok kapcsolata. *(The relationship between the types of cultivated lands and the planned forest culture*). In Danszky, I. (ed.): Erdőművelés (*Forest Management*). Mezőgazdasági Kiadó, Budapest.

Tihanyi, Z. 1980. Anyagforgalmi vizsgálatok nyárfával végzett szennyvízöntözéses tenyészedény-kísérletekben (vol II). (*Material transport research on pot-grown poplar. Investigations of waste water irrigation*). Agrokémia és Talajtan 27 (3-4):399-416.

Annex 7

FOUR SLOVAK CASE STUDIES SUBMITTED TO THE INTERNATIONAL COURT OF JUSTICE
ON THE TOPIC OF SOILS AND GROUNDWATER,
BRATISLAVA, 1993

CONTENTS

PART 1: ENHANCEMENT OF THE INTENSITY AND EFFICIENCY OF THE AGRICULTURAL IRRIGATION SYSTEM WITHOUT NEGATIVE ECOLOGICAL EFFECTS

Prepared by:	Irrigation Farming Research Institute (VUZH), Vrakúňska 29, 825 63 Bratislava.
Main task no. & Description:	N-05-529-907
	Enhancement of the intensity and efficiency of the agricultural irrigation system without negative ecological effects.
Co-ordinator:	Ing. Michal Santa
Sub-task no. & description:	N-05-529-907-08
	The effect of the operation of the Danube Barrage System on the changes in the water regime of soils and the proposals for its optimization from the perspective of agricultural production.
Co-ordinator:	RNDr. Štefan Rehák Csc.
Solution time-frame:	1990-1994
Type of report:	Annual
Phasing of solutions:	
E-01:	The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System.
E-02:	The evaluation of the retention, transport and selected chemical properties of soils affected by the soil-water regime and groundwater contamination.
E-03:	*Determination* of the optimal depth of the groundwater level for future agricultural activities and the proposals for hyro-amelioration measures in the affected area.
Responsible managers for each phase:	RNDr. Š. Rehák, Csc., RNDr. I. Sobocký, RNDr. K. Nováková, Csc., Ing. J. Alena.
Team members:	RNDr. J. Takáč, Csc., RNDr. P. Bielik.
Annual report prepared by:	RNDr. Š. Rehák, Csc., RNDr. I. Sobocký, RNDr. K. Nováková, Csc., RNDr. J. Takáč, Ing. J. Alena.
Date of processing:	November, 1993.

1. AUTHORS' PRESENTATION

This annual report contains the solutions and results of the phases of sub-task 06, as well as the direct applications of these results in the problems and projects concerning the Danube Barrage System.

Within the framework of E 01, the position of the farmland substrate covering complexes and gravel layers have been defined from the perspective of the capillary water supply to the root zone of plants. In establishing the area data for capillary transport, the groundwater levels used in the assessments for the years 1960, 1990 and 1993 (April to June) were taken into account.

In order to ensure a comprehensive assessment of the ecological status of farm lands, they were categorised using the method of parametric synthesis. The base unit was the agricultural-hydrological object category, denoted by codes of three digits. With the help of the standard database program dBase IV, data can be classified and dumps or printouts produced of the increase lists of the Žitný Ostrov region as per user requirements.

A part of the solution is the implementation of an information system for the Žitný Ostrov region in the form of a GIS (Geographical Information System). The data on geographical factors and processes relate to the unified cartographic system in a local manner, which enables two-way cross-referencing between various area data.

Within the implementation of E 02, a solution was found to establish the retentive and hydraulic characteristics of the Žitný Ostrov farmlands within the framework of the hydrological categorisation of this area. Because of the necessity for a fast and operative assessment of these characteristics, various utility programs were designed and the characteristics stored in the standard application database. The approximation of retention curves was achieved by the program RetCur according to the "van Genuchten" method. The establishment of hydraulic parameters was performed according to Mualem. Input groups were set up for the models SWACROP and DAISY. It was on the basis of these groups that the representative retentive and hydraulic parameters that are applicable to the farmland hydrological categories were identified.

Within the framework of the E 03 solution, we have achieved the optimum depth modelling of groundwater levels (GL) – with the help of the Dutch SWACROP model – for four basic crops: spring wheat, grain maize, sugar beet and late potatoes. As the basis for designing the model, we took two years with different climatic conditions: 1986, which has been classified as a dry year, and 1989, classified as normal (medium). In defining the optimum groundwater depth, we took the ratio between actual and potential production, or actual and potential transpiration as the basic criterion, which has a definitive (i.e., directly proportionate) role in the production process of biomass.

2. THE REPORT

2.1 INTRODUCTION

The solution of the sub-tasks has continued throughout 1993 along the lines of the methodology modified according to the opposing expert opinions of both RNDr. I. Mucha DrSc. and Ing. J. Benetina, DrSc.

In contrast, the solution of the sub task "The effect of the operation of the Danube Barrage System on the changes in the water regime of soils and the proposals for its optimization from the perspective of agricultural production" has been modified because of the facts themselves:

a) the objectives of the various phases of the sub-task have become broader;
b) the need arose to create direct applications of the results attained;
c) criteria have been set up for the solution of specification problems with relevance to the Gabčíkovo hydroelectric plant.

The facts referred to above are the following:

* Contradictions with regard to the performance and validity of the construction and operation contracts of the Gabčíkovo-Nagymaros system of barrages;
* Suspension of works by Hungary at Nagymaros and the corresponding parts of the Gabčíkovo barrage system;
* The decree of the Czechoslovak government with regard to the temporary technical solution "Variant C";
* The establishment of 19 conditions to ensure the safety of a stable ecosystem in the Žitný Ostrov region, defined by the Slovak Environmental Organisation (SKZP) as a precondition to the completion of works according to "Variant C";
* The closing of the Danube on October 25, 1992;
* Slovak Government Decree no. 190 (March 30, 1993) on the submission of a Memorial to the Hague International Court..

Sub-task 06 has the nature of a case study, and its solution is to a large extent related to the projects that directly draw on the results. These projects are:

1. Project PHARE/EC/WAT/1 Danubian Lowland-Groundwater Model, co-ordinated by a Danish hydraulic institution;
2. Grant project "Completion of input parameters for the DAISY model", submitted by the Ministry of Environment of the Slovak Republic;
3. Monitoring, processing and interpretation of the actual and potential soil moisture of the Žitný Ostrov farmlands. The co-ordinating committee for the monitoring activity is the "Water in the unsaturated zone" technical team;
4. Memorial submitted to the Hague International Court by the Foreign Ministry of the Slovak Republic.

Sub-task 06 is made up of three temporally and substantially interrelated phases. The task's essential solution structure is as follows:

E01 The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System;

E02 The evaluation of the retention, transport and selected chemical properties of soils affected by the soil-water regime and groundwater contamination;

E03 Determination of the optimal depth of the groundwater level for future agricultural activies and the proposals for hydro-amelioration measures in the affected area.

2.2 MAJOR INFORMATION OBTAINED FROM THE SOLUTION OF THE TASK

2.2.1 The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System

Identification of the position of the covering layer complexes and gravel layers in farmland.

The basic data for the assessment of capillary supply from the groundwater level to the root zone are derived from the map published as "The iso-lines of the depth of the gravel bed in the Žitný Ostrov area". In the assessment of capillary supply, the groundwater levels of 1960, 1990 and 1993 (April-June) were taken as the basis.

Categorisation of the Žitný Ostrov farmlands

A system of categorisation by way of parametric synthesis has been developed to support the comprehensive assessment of the agricultural conditions in the Žitný Ostrov region. The basic identification unit for the area is an agricultural-hydrological category, synthesising information on the type of farmland, the grain composition of the soil, the thickness of the covering layer, and the depth of the gravel bed and gravel layers that limit capillary supply.

GIS Information System for the Žitný Ostrov region (GIS: Geographical Information System)

On the analytic level, information is concentrated on the individual components of the geosystem and the ecosystem. Information is related to the unified cartographic system in a local manner, which enables two-way cross-referencing between various area data. Besides quantitative values, a GIS-format information system uses graphic information as well, that describe the local and regional aspects of the data in the form of cartographic base data, in vectoral or screen form.

2.2.2 The evaluation of the retention, transport and selected chemical properties of soils affected by the soil-water regime and groundwater contamination.

Assessment of the retentive and hydraulic characteristics of the Žitný Ostrov farmlands

A large number of utility programs have been developed to enhance the operative assessment of the hydrophysical parameters of farmland. Approximation of the retention curves was performed according to the "van Genuchten" method, while permeability was defined according to Mualem. The parameters of retention curves α, n, Q_r and Q_s were calculated. A model was set up for the statistical assessment of the results of the approximation, and graphic representations of the retention curves and permeability were also developed. These basic retentive and conductive characteristics were defined for the "Hydro-pedological characteristics work-team", which represent the classification of domestic farmland soil types (light, medium heavy, heavy, very heavy) within the framework of farmland soil-hydrological categories. Input groups were defined for the models DAISY and SWACROP.

Assessment of the Žitný Ostrov region farmlands according to their chemical properties

The results of the examination of the chemical properties of Žitný Ostrov farmlands may be described as the recognition of the present state, covering the spatial variations of the properties monitored and the fluctuation of values within the framework of hydrological categories. The assumption that the Žitný Ostrov farmlands are not contaminated by heavy metals has been proven, even in directly exposed locations. The soil is alkaline, the value of $CaCO_3$ varies between 13% and 50%. Acidification of the soil only appears as an isolated phenomena. The humus content of the arable layer is around 4% and displays extreme reductions in the lower, horizontal arable profiles.

2.2.3 Determination of the optimal depth of the groundwater level for future agricultural activities and the proposals for hydro-amelioration measures in the affected area

On the basis of the results of E 01 and E 02, and with the aid of Danish colleagues and experts, representative farmland soil profiles were selected in the PHARE project to provide an adequate description of the arable soil cover of the Žitný Ostrov region. The optimum groundwater depths were simulated with the SWACROP model. Modelling was done for four basic crops: spring wheat, grain maize, sugar beet and late potatoes. The two typical years taken as the basis for models were 1968, classified as a dry year, and 1989, classified as normal (medium). A basic criterion in defining the optimum depth of the groundwater level was the ratio between actual and potential evapotranspiration (for potatoes), or as the coverage of potential transpiration with the actual values (since at present there is not yet a productive function in the cases of the crops modelled). We regard the results obtained by the model described above as preliminary.

2.3 POSSIBILITIES FOR THE APPLICATION OF THE RESULTS OBTAINED

2.3.1 Utilisation of the results of E 01

* The information published on the iso-lines of the gravel layer map is used by the technical team and the "Groundwater" team as an interim working draft as well as a source of basic data, and is also drawn upon in the materials prepared by the Foreign Ministry of the Slovak Republic.

* Synthetic map information: the categorisation of the Žitný Ostrov farmlands is considered an essential interpretational framework for a wider application of the results as well as for the validation of the model DAISY in the project PHARE/EC/WAT/1 "Danubian lowland-Groundwater model".

* The GIS information system for the Žitný Ostrov region will be used to solve further problems related to the operation of the hydroelectric plant and the optimum utilisation of the Žitný Ostrov farmlands. This system supports the analysis and synthesis of the factors and components affecting the water regime of the region as well as those determining agricultural productivity and the quality of the natural environment.

2.3.2. Utilisation of the results of E 02

* The representative retention and transport characteristics of the farmland soil in the Žitný Ostrov region were used as initial input groups for the DAISY model (PHARE project).

2.3.3 Utilisation of the results of E 03

* The optimum groundwater depth data are used as the basis for the solution of the set of problems tackled by the PHARE project, and in the establishment of the hydroelectric plant's management and operating procedures.

2.4 PROPOSALS FOR FURTHER SOLUTIONS

2.4.1 Proposals for further solutions to E 01

* The GIS structure should be completed so that it can support the operative utilisation of information to meet the practical needs of agricultural production, the requirements of the region's water management and in the planning of other activities.

  Geographical information and factors have to be established more precisely for the deeper layers, and the development of database groups must continue.

2.4.2 Proposals for further solutions to E 02

* The selection of representative farmland soil profiles for the models must be rendered more exact, and input database groups have to be set up;
* The chemical properties of farmland soils and their variability and dynamics have to be assessed according to farmland hydrological categories, taking into account the system of production (fertilisation).

2.4.3 Proposals for further solutions to E 03

* Within the framework of the agricultural-hydrological categories, the optimum groundwater depths for agricultural crops have to be identified definitively on the basis of representative farmland soil profiles.
* The maximum and minimum groundwater levels have to be identified from the aspect of the capillary supply; the conditions of saturation and influx of undesirable materials in groundwater have to be determined.
* Remedial measures must be proposed for the operating conditions of the hydroelectric plant with the assessment of their effects on the potential productivity of crops.

Publications of the preparing team during 1993

Alena, J. 1993. New approaches toward the development of rural regions in The Netherlands. (in press).

Nováková, K. 1993. The influence of long lasting irrigation on physical properties of the soil. *Advances in Water Sciences, International Symposion, vol. I:, Physics of soil water*. Stárá Lesná. pp. 40-45.

Rehák, S. Heldi, A. Cilák, V. 1993. Base data to the irrigational farming database and the related Žitný Ostrov agriculture. Report for the Ministry of Foreign Affairs of the Slovak Republic.

Rehák, S., Alena, J., Takáč, J. 1993. New conditions of the irrigational farming arising from the operation of the Gabčíkovo plant on the area affected. *Abstracts to the international conference "Ecology of the Danube"*. Castá-Papiernicky (in press).

PART 2: ANNUAL REPORT ON THE RESULTS OF PHASE 01 OF SUB-TASK 08 IN 1993

Irrigation Farming Research Institute (VUZH), Vrakúňska 29, 825 63 Bratislava.

Description & no. of sub-task:	CU 08
	The effect of the operation of the Danube Barrage System on the changes in the water regime of soils and the proposals for its optimization from the perspective of agricultural production
Co-ordinator:	RNDr. Štefán Rehák Csc.
Team:	Hydropedological Department
Description & no. of phase:	The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System.
Prepared by:	RNDr. Igor Sobocký RNDr. Š. Rehák, Csc. RNDr. J. Takáč

Task objective

To prepare an assessment of the farmland soil conditions of the Žitný Ostrov region, identify agricultural soil hydrological categories, especially from the perspective of the thickness of the covering layers in the various areas and regions and their relation to the depth of groundwater levels; to provide the hydrophysical parameters of farmland soils and their morphogenetic evolution.

1. INTRODUCTION

The ecological effects of the operation of the Danube Barrage System will probably affect extensive agricultural areas in the Žitný Ostrov region, which are the farmlands producing the highest yields per hectare in our country, due to the advantageous groundwater regime.

The construction and operation of the Danube Barrage System will bring about a lasting change in the depth of groundwater levels in the areas affected, which will be reflected in the modification of farmland soil characteristics and systems (especially with regard to the water regime and the temperature system), and will be accompanied by modifications in the most important conditions of agricultural production. A wide range of regulatory measures will need to be implemented in order to maintain the present productivity level and fertility of these farmlands, and sensitive production co-ordinating elements will have to be put in place to minimise the fall in productivity.

The soil ecological analysis of the area in question is an integral part of ecological and geo-ecological research in which special attention is paid to the condition of farmlands, and will open the way for the solution of further phases of sub-task CU 06.

2. MAJOR INFORMATION ARISING FROM THE SOLUTION OF THE PHASE

Within the framework of phase 01 of sub-task CU 08, we have completed the mapping of the thickness and strength of the covering layers for the whole of the Žitný Ostrov region during 1993. We have added our own results of layer analysis to the material received from Geofond, and represented them on maps of 1:10,000 scale, which were then mapped to 1:50,000, creating the map entitled "The iso-lines of the depth of the gravel bed in the Žitný Ostrov region". All data used in the compilation of this map have been entered into the database of the hydropedological department.

Using the maps of farmland soil types and categories prepared by VUPU (Soil Amelioration Research Institute), the synthesis of this map produced the map entitled "Categorisation of the farmland soils in the Žitný Ostrov region".

2.1 CATEGORISATION OF THE FARMLAND SOILS IN THE ŽITNÝ OSTROV REGION

We have carried out the categorisation of the region according to farmland soil types in order to support the comprehensive solution for the problems of the unsaturated water regime in Žitný Ostrov farmlands.

The base units of categorisation are the agricultural-hydrological categories (PHK). All agricultural-hydrological categories (PHKs) are for a spatially delimited unit characterised by relatively homogeneous farmland and hydrological conditions. PHKs are assigned with three digit codes according to the basic hydrophysical and transport characteristics of their soils.

Base unit: farmland hydrological category (PHK)

Structure of the PHK code

A	B	C
X	X	X
Type of agricultural soil	farmland type group	Thickness of covering layer

a) Type of farmland soil

The types of agricultural soil are characterised by hydrophysical values (K, k, pF, θ, etc.)

Code	Symbol	Description	Granulometric category
1XX	LP	light soil	< 20%
2XX	STP	medium heavy soil	21-45 %
3XX	TP	heavy soil	46-60%
4XX	VTP	very heavy soil	> 60%
5XX	RS	peat soil	-

b) Farmland type – group

According to the evolutionary genesis, we classify farmland types according to the following groups:

Code	Symbol	Description
X1X	NP	arable soil group
X2X	LP	alkaline soil group
X3X	CM	black soil group
X4X	RS	peat soil group
X5X	SC	acidic soil group
X6X	DA	undeveloped soil group

c) Thickness of covering layers

The thickness of covering layers has been determined by a combination of direct and indirect probes. There is a solid earth covering layer, below which we find the permeable gravel layers.

Code	Symbol	Description
XX1	< 1	thickness of covering layer < 1 m
XX2	1-2	thickness of covering layer 1-2 m
XX3	2-3	thickness of covering layer 2-3 m
XX4	> 3	thickness of covering layer > 3 m

Examples:

111 light soil, group NP, thickness < 1 m

222 medium heavy soil, group LP, thickness 1-2 m

333 heavy soil, group CM, thickness 2-3 m

424 very heavy soil, group LP, thickness > 3 m

541 peat soil, thickness < 1 m

2.2 Regional and areal assessment of the capillary supply to the Žitný Ostrov farmlands from the groundwater

Under the leadership of Prof. I. Mucha and with the co-operation of the consultation team "Groundwaters", maps were compiled depicting the capillary supply to the Žitný Ostrov farmlands from groundwater levels for the years 1960, 1990 and 1993 (April-June). In the compilation of these maps we have used the map "The iso-lines of the depths of the gravel bed in the Žitný Ostrov region" for 1960, 1991 and April-June 1993; see *Figures 1-12* (omitted).

2.3. Database system

The description of geological boreholes taken from Geofond as well as the descriptions obtained from our own research, have been stored in the database. With the help of the program Digit (Rodák, 1991), the co-ordinates of the borehole were digitised in the JTSK set of co-ordinates and were processed in the four primary textual database sets (diggf.g, diggf.s, digzh.g, digzh.s). The groups called "diggf" contain data on 1170 boreholes taken from Geofond, while the groups called "digzh" contain data on 960 drillings from our own research. The groups with the extension "g" (diggf.g, digzh.g) were entered according to the co-ordinate indices of the boreholes, the height above sea level and the page number of the maps. Groups with the extension "s" (diggf.s, digzh.s) contain the following data in the order of the indices: number of boreholes, name of borehole, map page, cadaster, depth of borehole, depths of clay-sand, sand-gravel, and gravel-clay boundaries, groundwater level, constant groundwater level and the description of the profile. The description of the profile was developed with the help of the set of codes established in co-operation with the "Groundwater" consultant team.

The program DigPlus was developed to create a unified textual group for these fundamental data groups, enabling the ordering of primary groups and their synthesis in the group "digitdb.txt", a sample of which is attached in the Appendix (omitted). Meanwhile, the data from the group were also transformed into the standard database group "digitdb.dbf", which, among others, supports their classification and the creation of output extracts according to user requirements via the standard database program dBase IV.

Layout of database records

The characteristics of the fields in the records of digitdb.dbf are listed in the table below:

Field Name	Type	Length	Decimals	Content
IND	num.	5	0	index
ZDROJ	alpha	6	-	information source code
XSUR	num.	12	3	drill co-ordinates X
YSUR	num.	12	3	drill co-ordinates Y
ZSUR	num.	7	3	altitude above sea level
CISVRTU	alpha	6	-	drill number
NAZOVRT	alpha	9	-	drill name
MAPA	alpha	8	-	map page no.
KATASTER	alpha	6	-	settlement cadaster
HLBKA	num.	6	2	drill depth
CS	num.	6	2	depth of clay-sand border
SG	num.	6	2	depth of sand-gravel border
GC	num.	6	2	depth of gravel-clay border
HPVNAR	num.	6	2	depth of groundwater level found
HPVUST	num.	6	2	depth of constant groundwater level
POPIS	alpha	80	-	description of drill

All boreholes or probes were assigned an index, enabling the dumping of information and the extraction of data from a given probe according to the various groups (e.g., the hydrogeological and hydropedological groups). On the basis of the source code, the source and content of information from the given probe can be determined according to the following table:

Code	Source of Information	Contents of Information
VUZHx0	VUZH dug probes	hydropedological characteristics from the selected research areas
VUZHx1	VUZH dug probes	description of profile, particle size distribution, selected hydropedological characteristics
VUZHx2	VUZH drilled probes	description of profile, possible particle-size distribution
VUZHx3	Geofond archive	description of profile

Granulation and other hydropedological characteristics have been entered in the database according to the requirements of the solution of phase 02 of sub-task 08, "The evaluation of the retention, transport and selected chemical properties of soils affected by the soil-water regime and groundwater contamination".

The next three fields represent spatial co-ordinates and altitude above sea level, followed by the specification of the name and number of the borehole in two fields. The next two fields contain the page numbers of the maps, scale 1:10,000, and the numeric code for the cadaster of the settlement where the probe is located.

The following six numeric fields contain: the depth data of the probe or borehole, the clay-sand, sand-gravel and gravel-clay border depths, and the groundwater levels as detected by the probe and according to convention.

The largest field contains a coded description of the borehole. To all records of the profile horizon, a record containing the main granular fraction is attached, containing further particle size fraction data of significant mixtures and the distance from the lower depth limit in metres. The record can also contain flags indicating various characteristics of the material or their substitution, as may be seen on the table below:

	Occurrence Code	
Fraction	**Main Component**	**Mixtures**
gravel	S	1
sand	P	2
clay	H	3
silt	Q	4
clayey soil	I	5
loess, aeolic matter	X	6
peat, organic matter	R	7
land fill	N	8
humus	O	-
rocky soil	C	9
boulders	B	0

Characteristic (occurrence)	**Code**
fine grained	F
medium grained	M
coarse grained	G
changes in layers	> < +

2.4 Geographical Information System (GIS) format information system for the Žitný Ostrov region

The development of a GIS format information system for the region in question is a part of the tasks of phase 01. On the analytic level, information is concentrated on the various components of the geosystem and the ecosystem. Knowledge of the factors and components influencing the geo-ecological processes in the affected areas enable the assessment of the conditions of agricultural production, while on the other hand they provide reciprocal information on the effect of agricultural and water regulation activities on other elements of the region according to their state and level of development in real time and space.

Information is consolidated onto the unified cartographic system by localisation, which enables two-way cross-referencing between various area data. Consolidated information for the selected areal base unit – the agricultural-hydrological category – provides the means for the statistical assessment of the data stored in the information system. Besides quantitative values, the GIS format information system of the Žitný Ostrov region uses graphic information, that describes (represents) the local and regional aspects of the data in the form of cartographic base data, in vectoral or screen form.

3. POSSIBLE APPLICATIONS FOR THE INFORMATION GATHERED

The solution of the task is related to the PHARE/EC/WAT/1 "Danubian lowland-Groundwater model" project, carried out in co-operation with a Danish-Dutch consortium under the leadership of the Danish Hydrological Institute and in consultation with the "Groundwaters" research team.

On the basis of the structural data of the layers, the GIS format information system for the Žitný Ostrov region supports a wide range of areal analyses and syntheses examining the factors and components affecting the water regime and agricultural productivity of the region, as well as monitoring the status and development of these.

4. PROPOSALS FOR FURTHER SOLUTIONS

The GIS concept and structure should be extended according to the requirements of agricultural practice and water management in the Žitný Ostrov region.

Transformation of data into the database should be continued, in the form of textual, vectoral and screen data.

Solution E 02 will necessitate the spatial narrowing and adjustment of the various agricultural-hydrological categories. It is necessary to update already existing results by applying the DPZ method in conjunction with the Chair of Geo-Information Systems of the Agricultural Faculty of Comenius University, and to implement long-term soil research methods.

[Appendices, *Table 1* (Extract from the database "digitab txt") and Table 2 (Locality codes for different villages) omitted]

PART 3: THE EVALUATION OF RETENTION, TRANSPORT AND SELECTED CHEMICAL PROPERTIES OF SOILS AFFECTED BY THE SOIL-WATER REGIME AND GROUNDWATER CONTAMINATION

Annual Report No.: N-05-529-907-06-02/4

Irrigation Farming Research Institute

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Bratislava, November 5, 1993

1. COVER PAGE

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Headquarters:	Vrakúňská 29, 825 63 Bratislava
Director:	Ing. Michal Šanta
Task description:	Enhancement of the intensity and efficiency of the agricultural irrigation system without negative ecological effects.
Task no.:	N-05-529-907
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Phase no.:	N-05-529-907-06-02
Preparation:	1989-1994
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Report compiled by:	RNDr. Katerína Nováková Csc.
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	Ing. Eugenia Blašková
Report title:	The evaluation of the retention, transport and selected chemical properties of soils affected by the soil-water regime and groundwater contamination.
Type of report:	Annual
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2. THE REPORT

2.1 INTRODUCTION

The construction of the Danube Barrage System constitutes a significant intervention into the natural environment of the region which will bring about lasting changes in the groundwater levels in the southern part of the Danubian plains. In a large part of this area, changes in the groundwater level entail the modification of the regimes of farmlands, modifying the characteristics of agricultural soils, and changes in the levels of high mineral content groundwater may accelerate the accumulation of salts in the soil or farmland profiles. Individual changes to the soil in the various areas will depend on the level of groundwater in those areas, the composition of the soil grains and the duration of the effects of the modified conditions. Given the manifold nature of particle composition of farmlands and soil, and the differences in the depth and salt content of groundwaters, we have to expect a wide range of changes in the properties and transport characteristics of farmland soil.

The objective of the task is to provide an assessment of the hydrophysical, transport and chemical properties of soils and the impact factors prevalent in the water regimes of the areas affected by the operation of the hydroelectric plant.

2.2 RESULTS OF THE SOLUTION IN 1993

2.2.1. On-site and laboratory measurements

Phase 02 is directly linked to phase 01, "The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System". Within the framework of the solution of phase 01, 70 representative areas were selected, where the hydrophysical, chemical and transport properties of soils were determined in phase 02.

In 1992 and 1993, pedological probes were dug in the 70 selected representative areas. The following tasks were performed for each probe:

* description of soil profiles
* stratigraphical sampling of the disrupted and intact soil parts
* measurement of saturated permeability with a single probe or full probe method (where the probes were filled)
* infiltration tests with a double probe method
* measurement of the entry values of air with the Bouwer method

Samples of disrupted and intact soil were delivered to the laboratory where their hydrophysical, transport and chemical properties were identified according to:

* particle-size analyses
* mineral composition
* Atterberg limits
* specific mass and volume
* capillary fluid intake
* maximum capillary capacity
* water retention capacity
* total porosity
* non-capillary and semi-capillary porosity

* decay point
* retention line
* saturated permeability
* active pH and variable pH
* dissoluble substances
* humus
* total nitrogen, inorganic nitrogen
* carbonates, chlorides and sulphates
* potassium, phosphorus, magnesium, sodium
* iron, manganate, boron
* copper, zinc, cadmium, lead, mercury

Since on-site work has continued through to late autumn, the annual report does not provide full data for the totality of areas affected by the operation of the Danube Barrage System. From among laboratory examinations, the identification of retention curves and saturated permeability as well as the analysis of mineral and chemical composition still remain to be performed. All other field and laboratory work has been completed.

2.2.2 Evaluation software and database

A number of computer programs have been developed to support the evaluation of the hydrophysical and transport properties of the soil. During previous years these were:

* **HydLim**

Supports calculation of basic hydrophysical characteristics such as volume mass, specific mass, total capillary porosity, non-capillary and semi-capillary porosity, capillary water intake, maximum capillary capacity, water retention capacity, decay point.

* **Hustomer (measurement of density)**

Calculation and display of grading curves with the Cassagrande method.

* **Infiltra**

Assessment of infiltration experiments with a two-cylinder infiltrometer.

* **CiPr**

Processing of excess line.

* **ETref**

Calculation of potential evapotranspiration.

* **UnSatur**

Calculation of unsaturated permeability – $k(\theta)$ – from the retention curves.

In 1993 the program RetCur was developed for direct input groups to the models DAISY and SWACROP to approximate retention curves. The program supports the approximation of retention curves with the help of the van Genuchten method, and the calculation of permeability according to Mualem. The parameters calculated for retention curves are α, n, θ_r and θ_s. The program also carries out the statistical evaluation of the results of approximation and the graphic representation of retention lines and permeability.

The above-mentioned programs have been written in Turbo Pascal 6.0 (Borland International, 1990.)

The database file "hydroped.dbf" has been developed for the input of hydrophysical characteristics in dBase IV, a standard application database program.

The characteristics of the various fields of "hydroped.dbf" are shown on *Table 1*.

The contents of a number of fields in "hydroped.dbf" is sourced from "digitdb.dbf", the database file developed for phase 01 of sub-task 08: "The evaluation of soil ecological conditions in the area potentially influenced by the operation of the Danube Barrage System". The field LOKALITA contains the numeric code for the cadaster of the settlement containing the probe. Other information taken from "digitdb.dbf" include the number and index of the probe and the co-ordinates entered into the fields SONDA, IND, X_SUR and Y_SUR. The year of the collection of the sample is stored in the field ROK_STAN, while the depth of the probe (in cm) is stored in HLBKA_CM.

The next two fields contain the values of specific and mass volume. Next come the values of capillary water intake capacity (KN), maximum capillary capacity (MKK), water retention capacity (RVK), the decay point (PS) and total porosity (PO) as a percentage of volume.

The particle-size distribution of the samples is characterised according to two different sets of classification. The fields I_KAT, II_KAT, III_KAT, and IV_KAT, plus PODNYDRUH store the percentage distribution of the various grading fractions, according to the Kopecky classification, and the coded soil references according to the Nováková classification. The fields CLAY, SILT, FINE_SAND, and COARSE_SN show the average occurrence of the various grading fractions according to the classification system of FAO. The field TEXTURE records the code characterising the soil type according to the USDA classification system using a triangular diagram. In the case of the occurrence of gravel or other coarse matter with diameters of over 2 mm, their percentage ratio is shown in the field STRK.

The other fields of the database file contain the characteristics of retentive profiles lines, i.e., the humidity values at the following pressure altitudes: 2.5 cm, 4.0 cm, 100 cm, 300 cm, 1000 cm and 3000 cm, the humidity variance θ_r and the parameters of the retention curves. The last field, K_NASYT, contains the value of saturated permeability expressed in $cm.d^{-1}$.

2.3.3 The statistical evaluation of results

In the next phase the results of laboratory measurements and analyses were entered on "hydroped.dbf" after statistical processing. The following 13 characteristics were extracted from the group: mass volume, porosity, water retention capacity, decay point, contents of particles in category I (Kopecky method), clayey soil and clay content, fine and coarse sand (granulates of all four categories according to the FAO classification), the values of θ at pressure altitudes of 2.5 cm, 1000 cm and 3000 cm, and the value of saturated permeability. The data were divided into groups according to the depth of the sample profile taken: < 30 cm, 30-60 cm, and > 60 cm. All three groups were further subdivided according to the granulate contents in category I (< 20%, 20-45%, 60% <) representing the soil-type classification applied, i.e., light, medium heavy, heavy, and very heavy soil, thereby resulting in a total of 12 groups. These .dbf files were converted to ASCII format, and those that contained at least 6 pieces of data were processed with the statistical program Stati from the GeoEAS package. The results of statistical processing are shown on *Table 2*. Of the data in the table the high variances of saturated permeability K, and the relatively low variances between certain characteristics of light and medium heavy soils are worth noting.

2.2.4 Approximation of retention curves

The approximation of the selected retention curves and the definition of input groups for the models DAISY and SWACROP were performed with the program RetCur. *Figures 1* and *2* (omitted) show the graphic representation of two selected retention curves and the permeabilities.

2.2.5 Chemical properties of soils

In the examination of the chemical composition of soils, the following have to be determined at 70 locations of the Žitný Ostrov: N content, inorganic N content, total P and available P, K, Mg, $CaCO_3$, Na, Mn, Fe, Cd, Pb, Cu, Zn, Hg, Cl, SO_4^{2-}, humus, salt and soil alkalinity or acidity.

The analyses performed thus far clearly show that the soils of the Žitný Ostrov region are not contaminated with heavy metals. Soil pH index reaction is slightly alkaline on the whole area of the Žitný Ostrov. All soils in the area are chalky with $CaCO_3$ contents between 13% and 50%. We have found high salt contents in only a few locations (in the vicinity of Vydrany, Nová Stráz, and Topoľníky). In the case of arable lands, the characteristic value of humus content was around 4%, which is medium/good. In lower horizons, humus contents display a sharp decrease, reaching extremely small values. Total N content is variable. Total and available P content is extremely variable. Given the other soil properties ($CaCO_3$ content, alkali pH, and the low or zero P content under the arable layers and at lower horizons), we may assume that the broad interval of free P is due to fertilisation. At a number of locations P content is optimal, while elsewhere we can mention an acute lack of the substance. The soils of the Žitný Ostrov region possess extremely favourable K contents, while Na content is variable. Given the high variance of sulphur ions, the various horizons show that the high salt content of the soils at certain locations has a sulphate character. Chloride content is higher at lower horizons.

The results of the chemical analyses of soils from the selected locations are shown in *Table 3*.

2.2.6 Representative soil units

The variance of agricultural potential in the area will be assessed by performing a large number of simulation exercises, and applying the consolidated results to the five most common crops (autumn wheat, spring barley, maize, sugar beet and alfalfa) in the major soil units defined according to their soil type, particle-size distribution, organic content, depth of the gravel layer and groundwater level. Simulations will be performed on each soil unit using four years' climatic data for dry, rainy and average years, preceded by a one-year period to achieve the stabilisation of the model. The model will use sub-model RZ1 of DAISY. Calculations will be performed for simulated irrigation and no irrigation as well. The crop data from the models with no irrigation will be used to express the potential.

The major soil types have been identified on the basis of the results of the Chair of Farmland Soils:

* carbonate black soil

* pseudo-gley black soil (alkaline black soil, black gley soil)
* carbonate black pasture soil (alkaline carbonate soil)
* black pasture gley soil (limey alkaline soil)
* carbonate fluvial soil (flood area carbonate soil)
* fluvial gley soil (flood area limey soil)

The categories in parentheses are references to the older geneo-agronomical soil classification system.

From the point of view of grading, the components of black soils are mainly medium heavy soils (and only very rarely heavy or light soils), pasture black soils, medium heavy soils and the fluvial soils are mainly composed of medium heavy and heavy soils (with a minor amount of light soil).

It is clear that the gravel horizon cuts off the capillary connection between the groundwater and the root zone. As expected, the fluctuation of groundwater levels will only have an effect in the case of fluvial soils, as they are located nearer to the river, while in locations further inland the amount of variance decreases.

2.2.7 Retention properties of soils

There are three retention groups available in relation to the Žitný Ostrov area: the 20 profiles of the report on the solutions for soils and agriculture, referring to the area impacted by the construction of the hydroelectric plant at Gabčíkovo (2) (group F); 51 profiles from Lehnice, assessed within the frameworks of several projects (group L), and the 70 profiles obtained from the solution of the present sub-task, evenly distributed over the whole of the Žitný Ostrov area (group D). We have processed 39 profiles from group D in laboratory conditions, and are presently processing the samples taken during this year. Expected completion date is next Spring.

The curves have been classified according to soil types and grading classes, though they are only available for a few groups. The analysis of the curves has already shown that all groups show variances. The porosity of the F curves is usually much higher than the curves for any other group, which leads to the conclusion that the retentivity profiles is different from those of the other groups, especially in the range 0-2 pF. On the other hand, some of the profiles from group F are extremely steep. The porosity of some of the soils in this group seems extremely low if compared with the majority of the mass volume and grading measurements made at the given depth.

Light soils are only represented in group F at location MP-1, and for moderately clayey horizons at MP-3 and MP-4. At the upper clayey horizons MP-10 and MP-11, they have lower horizons with large sand content. Because of their significant similarity, the selected curves of MP-4 have been taken as the representative samples for all soil types whose grading characteristics are defined as light.

Profiles MP-2, MP-20 (from group F), Z0-4 and Z0-18 (from group D) are available for fluvial carbonate soils, but display no similarities. The porosity of the F curves is 10% higher than of the D curves, while the difference between the medium heavy and heavy grading classes is negligible. Until we obtain further information, we shall use Z-4 as the representative profile, leaving room for adjustments, as porosity reaches the level common to most samples at depths over 45 cm. Once the next batch of samples have been analysed, the data will be re-assessed.

It appears there is no significant difference between the retentivity profiles of black soil and agricultural black soil, nor between medium heavy and heavy soils.

At the 20 cm depth level the similarity between profiles MP-5 (the most representative sample from group F for this soil type and texture) and some of the D curves (e.g., ZO-5 profile, depth 30 cm, Z0-5 profile, depth 20 cm, Z0-22 profile, depth 30 cm) is fairly good. In deeper layers, data of the groups F and L display similarities (with the exception of higher porosity F samples). The data in group D are much steeper.

In depths of over 60 cm we usually find clayey or clayey sandy soils, resulting in two different curves for the layer at this depth. It is not yet clear whether this is a systematic change specific to sandy soils. The percentage occurrence of sandy sub-soils for the various soil types is as follows: pasture black gley soil, 18%; carbonate pasture black soil, 9%; carbonate black soil, 4%; pseudo-gley black soil, 2% (on the basis of the samples analysed till now).

Taking into consideration the fact that the retentivity profiles for black soil and pasture black soil, and the medium heavy and heavy grained soils are similar, it is sufficient to represent these groups with two identical sets of curves: one for clayey soils over the clay layer and one for clayey soils over the sandy layer.

Taking into account the soil units identified, their physical properties and organic content, and the depths of the gravel horizons and groundwater levels, and excluding combinations, as none exist in the Žitný Ostrov area, we may assume the number of model soil profiles to be around 75. A draft proposal for the unified structure of the model is shown on *Table 4*.

2.3 CLAUSE

Following the assessment of the physical, chemical and retaining capacity of soils at the selected locations of the Žitný Ostrov region, and using further data from there (KPP & research reports from previous phases), approximately 75 representative soils have been selected. The criteria for selection were the following: soil type, soil class, organic content, depth of the gravel layer, and depth of groundwater levels. All representative soil profiles will serve as an input group for the mathematical models SWACROP and DAISY. With the help of these models we shall determine the effect of the construction and operation of the hydroelectric plant on the soil system and agricultural production, and the possibility for nitrogenous substances to infiltrate groundwaters.

2.4 PROPOSALS FOR FURTHER SOLUTIONS

After completing field work in the Žitný Ostrov region, the analysis of the soil samples obtained will continue; tasks that remain include completion of the approximation of retention curves, and the definition of saturated permeability and some chemical properties. Once all results have been obtained from the 70 Žitný Ostrov locations, adjustments will have to be made to the representative soil profiles used for the models.

APPENDICES

LIST OF TABLES AND FIGURES

Table 1: Record structure of the database "Hydroped"

Field	Type	Length	Decimals	Contents
LOKALITA	numeric	3	0	location code
ROK_STAN	numeric	4	0	year of sample
SONDA	numeric	3	0	probe number
IND	numeric	5	0	index
X_SUR	numeric	12	3	probe X co-ordinate
Y_SUR	numeric	12	3	probe Y co-ordinate
HLBKA_CM	numeric	3	0	depth of probe in cm
SPEC_HMOT	numeric	4	2	specific volume
OBJ_HMOT	numeric	4	2	mass volume
KN	numeric	5	2	capillary water uptake capacity
MKK	numeric	5	2	max. cap. water uptake capacity
RVK	numeric	5	2	water retention capacity
PN	numeric	5	2	non-capillary porosity
PS	numeric	5	2	semi-capillary porosity
PO	numeric	5	2	total porosity
BV	numeric	5	2	decay point
I_KAT	numeric	5	2	grain size category I
II_KAT	numeric	5	2	grain size category II
III_KAT	numeric	5	2	grain size category III
IV_KAT	numeric	5	2	grain size category IV
PODNYRUH	flag	2	–	soil type code
CLAY	numeric	5	2	clayey soil contents (FAO)
SILT	numeric	5	2	clay content (FAO)
FINE_SAND	numeric	5	2	fine sand content (FAO)
COARSE_SN	numeric	5	2	coarse sand content (FAO)
STRK	numeric	5	2	gravel content
TEXTURE	flag	4	–	soil type code (USDA)
TV_2.5	numeric	6	3	humidity at 2.5 cm pressure altitude (retention line)
TV_40	numeric	6	3	humidity at 40 cm pressure altitude (retention line)

Field	Type	Length	Decimals	Contents
TV_100	numeric	6	3	humidity at 100 cm pressure altitude (retention line)
TV_300	numeric	6	3	humidity at 300 cm pressure altitude (retention line)
TV_1000	numeric	6	3	humidity at 1000 cm pressure altitude (retention line)
TV_3000	numeric	6	3	humidity at 3000 cm pressure altitude (retention line)
THETA_REZ	numeric	6	4	residual humidity θ_r
PAR_ALFA	numeric	5	3	Phillipe's α parameter for a 2-parameter equation
PARN_N	numeric	5	3	Phillipe's n parameter for a 2-parameter equation
K_NASYT	numeric	6	2	saturated permeability K

Table 2: Basic statistical data characterising the soils of the Žitný Ostrov region

Soil Type	Depth	No. of Samples	Average	Variance	Min.	Mean	Max.
Mass Volume [g/cm³] (% in the original)							
Light Soil	30-60	8	1.49	0.09	1.38	1.48	1.66
	> 60	27	1.50	0.12	1.25	1.51	1.73
Medium	0-30	45	1.47	0.11	1.24	1.46	1.66
Heavy Soil	30-60	31	1.49	0.13	1.24	1.50	1.79
	> 60	23	1.57	0.13	1.31	1.59	1.80
Heavy Soil	0-30	11	1.44	0.10	1.29	1.45	1.57
	30-60	14	1.44	0.16	1.17	1.42	1.85
	> 60	7	1.39	0.22	1.21	1.46	1.60
Porosity [%]							
Light Soil	30-60	3	46.3	3.58	39.7	47.0	49.9
	> 60	27	45.3	4.40	36.7	44.7	53.9
Medium	0-30	45	46.3	4.53	38.6	46.9	60.9
Heavy Soil	30-60	31	45.9	4.70	34.7	45.5	54.4
	> 60	23	43.5	4.66	35.4	43.2	52.4
Heavy Soil	0-30	11	46.8	3.68	41.9	46.4	51.8
	30-60	14	48.1	6.72	32.1	43.2	56.8
	> 60	7	50.3	7.89	42.9	48.1	66.7
Water Retention [%]							
Light Soil	30-60	8	32.0	4.63	25.8	31.4	38.3
	> 60	27	28.9	6.98	16.7	26.7	40.1
Medium	0-30	45	34.6	7.54	28.5	33.3	50.7
Heavy Soil	30-60	31	32.1	4.48	24.0	32.6	42.4
	> 60	23	34.8	4.19	26.2	34.8	45.2
Heavy Soil	0-30	11	37.7	2.24	33.8	37.6	41.5
	30-60	14	36.9	3.93	28.1	37.5	42.1
	> 60	7	39.9	6.50	33.5	38.1	53.5

Soil Type	Depth	No. of Samples	Average	Variance	Min.	Mean	Max.
Decay Point [%]							
Light Soil	30-60	8	5.7	1.44	4.1	5.2	8.4
	> 60	27	5.2	1.44	2.2	4.9	8.1
Medium	0-30	45	13.4	2.96	7.7	12.7	22.3
Heavy Soil	30-60	31	10.7	3.59	5.1	10.6	19.5
	> 60	23	9.2	2.92	4.5	8.2	18.0
Heavy Soil	0-30	11	18.2	2.42	14.3	18.4	21.8
	30-60	14	14.7	3.42	9.6	14.8	22.8
	> 60	7	15.2	4.08	9.3	16.9	19.7
Granulmetric Category I [%]							
Light Soil	30-60	9	14.2	4.97	3.0	15.0	20.0
	> 60	28	11.5	5.70	3.0	11.0	20.0
Medium	0-30	45	35.0	6.83	23.0	37.0	45.0
Heavy Soil	30-60	32	34.0	8.62	21.0	33.5	45.0
	> 60	26	33.7	6.98	21.0	33.5	45.0
Heavy Soil	0-30	11	50.4	2.90	46.0	51.0	56.0
	30-60	14	51.3	3.24	46.0	50.5	56.0
	> 60	7	55.3	2.43	50.0	56.0	57.0
Argillaceous Content (FAO)							
Light Soil	30-60	9	7.2	2.39	2.0	7.0	10.0
	> 60	28	5.8	2.45	3.0	6.0	10.0
Medium	0-30	45	15.8	4.48	1.0	16.0	25.0
Heavy Soil	30-60	32	15.9	5.26	4.0	15.0	26.0
	> 60	26	15.0	3.30	8.0	15.0	22.0
Heavy Soil	0-30	11	21.6	3.58	15.0	22.0	28.0
	30-60	14	23.6	2.85	18.0	24.0	28.0
	> 60	7	24.9	5.30	16.0	24.0	32.0

Soil Type	Depth	No. of Samples	Average	Variance	Min.	Mean	Max.
Clay Content (FAO) [%]							
Light Soil	30-60	9	13.2	6.53	1.0	13.0	24.0
	> 60	28	9.9	5.87	2.0	9.5	21.0
Medium Heavy Soil	0-30	45	29.8	7.83	15.0	30.0	48.0
	30-60	32	28.8	8.49	13.0	28.0	48.0
	> 60	26	32.8	6.98	19.0	33.5	43.0
Heavy Soil	0-30	11	41.0	6.48	32.0	42.	53.0
	30-60	14	42.5	7.84	28.0	43.0	58.0
	> 60	7	46.9	5.27	41.0	47.0	55.0
Fine Sand Content (FAO) [%]							
Light Soil	30-60	9	61.9	22.3	7.0	68.0	81.0
	> 60	28	64.5	18.7	11.0	69.0	89.0
Medium Heavy Soil	0-30	45	48.3	9.24	29.0	46.0	65.0
	30-60	32	44.7	11.6	27.0	44.0	66.0
	> 60	26	47.1	10.5	24.0	48.0	65.0
Heavy Soil	0-30	11	33.5	4.13	28.0	33.0	40.0
	30-60	14	30.6	4.18	23.0	30.5	39.0
	> 60	7	24.9	3.72	18.0	25.0	29.0
Coarse Sand Content (FAO) [%]							
Light Soil	30-60	8	19.9	30.2	1.0	8.5	90.0
	> 60	28	19.8	22.0	1.0	10.5	82.0
Medium Heavy Soil	0-30	45	5.4	4.30	1.0	4.0	19.0
	30-60	32	9.9	9.01	1.0	7.0	37.0
	> 60	26	4.7	5.01	1.0	3.0	23.0
Heavy Soil	0-30	10	4.2	3.64	1.0	3.0	13.0
	30-60	13	3.6	3.78	1.0	2.0	12.0
	> 60	7	3.4	4.04	1.0	2.0	12.0

Soil Type	Depth	No. of Samples	Average	Variance	Min.	Mean	Max.
θ if h = -2.5 cm							
Light Soil	> 60	15	0.406	0.039	0.351	0.418	0.492
Medium	0-30	28	0.427	0.038	0.362	0.425	0.506
Heavy Soil	30-60	22	0.408	0.036	0.353	0.401	0.473
	> 60	11	0.394	0.023	0.363	0.389	0.425
Heavy Soil	0-30	7	0.482	0.048	0.413	0.476	0.571
	30-60	8	0.432	0.025	0.399	0.421	0.465
	> 60	6	0.437	0.040	0.374	0.438	0.500
θ if h = -1000 cm							
Light Soil	> 60	15	0.102	0.054	0.031	0.108	0.209
Medium	0-30	28	0.247	0.046	0.131	0.255	0.342
Heavy Soil	30-60	22	0.239	0.062	0.113	0.253	0.317
	> 60	11	0.224	0.078	0.084	0.224	0.337
Heavy Soil	0-30	7	0.306	0.026	0.261	0.306	0.348
	30-60	8	0.315	0.034	0.270	0.315	0.363
	> 60	6	0.321	0.034	0.277	0.317	0.372
θ if h = -3000 cm							
Light Soil	> 60	15	0.072	0.030	0.027	0.085	0.116
Medium	0-30	28	0.219	0.041	0.123	0.227	0.304
Heavy Soil	30-60	22	0.214	0.063	0.059	0.228	0.299
	> 60	11	0.186	0.061	0.078	0.186	0.298
Heavy Soil	0-30	7	0.287	0.027	0.243	0.286	0.323
	30-60	8	0.296	0.022	0.262	0.300	0.326
	> 60	6	0.295	0.030	0.263	0.290	0.336

Soil Type	Depth	No. of Samples	Average	Variance	Min.	Mean	Max.
Saturated Permeability K [cm/d]							
Light Soil	> 60	15	68.9	89.1	1.3	33.3	274.9
Medium	0-30	28	28.0	29.6	0.8	16.9	127.5
Heavy Soil	30-60	22	135.4	395.8	2.8	36.7	1892.2
	> 60	11	27.8	46.7	0.9	5.1	142.9
Heavy Soil	0-30	7	78.9	80.1	3.2	36.2	203.4
	30-60	8	36.4	37.1	5.9	21.6	116.3

Table 3. *The chemical composition of the soil at sites 20-32 in the region of Okoč*

Depth [cm]	Cu [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Hg [mg/kg]	Fe [mg/kg]	Mn [mg/kg]	Sulphates [mg/kg]
20	21.30	0.06	8.04	0.142	7142	238.1	51.0
60	5.16	<0.01	3.05	0.156	3996	159.8	523.8
100	1.94	<0.01	2.71	0.153	5974	298.7	115.2
Depth [cm]	**Dry Mass [kg/kg]**	**Diss. Matter [%]**	**Org Dis. Matter [%]**	**Humus [%]**	**pH value**	**pH variance**	**Chloride [mg/kg]**
20	0.851	0.114	0.061	4.28	8.4	7.5	18.0
60	0.816	0.252	0.115	2.01	8.2	7.6	30.3[1]
100	0.830	0.218	0.129	0.40	8.5	7.9	39.7
Depth [cm]	**Total P [mg/kg]**	**Free P [mg/kg]**	**Total N [%]**	**inorg N [mg/kg]**	**K [mg/kg]**	**Na [mg/kg]**	
20	1093.6	124.7	0.287	27.5	269.5	36.8	
60	666.6	2.9	0.101	83.9	108.4	71.2	
100	585.6	0.5	0.017	14.2	27.9	38.6	

1 This value was 303 in the original.

Table 4: Structure of the units of the Žitný Ostrov model.

Depth of gravel horizon: (GH) Map specification: 0-1, 1-2, 2-3, 3 m Simulation depths: 0.75, 1.5, 2.5, 5.0 m
Groundwater levels (GL) Map specification: 0-1, 1-2, 2-3, 3-4, 4-6, 6-8 m Simulation depths: Ak GH = 0.75 m; GL = 0.75 m or free drainage Ak GH = 1.5 m; GL = 1.0 m, 1.5 m free drainage Ak GH = 2.5 m; GL = 1.0 m, 1.5 m; 2.0 m free drainage Ak GH = 5.0 m; GL = 1.0 m, 1.5 m, 2.0 m, 3.0 m free drainage
Retentivity profiles (RP) All soil types, light soils Fluvial, medium heavy soils Black soil, pasture black soil, medium heavy and heavy soil Black soil, pasture black soil, medium heavy soil and on light substrates
Organic substances (OH) All soil types, light soils: Fluvial, medium heavy soils Black soil, medium heavy soil Black soil, heavy soil Black soil, pasture black soil, medium heavy and heavy soil Black soil, pasture black soil, medium heavy soil and on light substrates **TOTAL GH X GL X (OH + RP) = 84 model units**

PART 4: ANNUAL REPORT ON THE RESULTS OF PHASE E 03 OF SUB-TASK 06 CU IN 1993

Irrigation Farming Research Institute (VUZH), Vrakúňska 29, 825 63 Bratislava

Description and no. of sub-task:	CU 06 The effect of the operation of the Danube Barrage System on the changes in the water regime of soils and the proposals for its optimization from the perspective of agricultural production
Co-ordinator:	RNDr. Štefan Rehák Csc.
Team:	Hydropedological Department
Description and no. of phase:	E 03 Determination of the optimal depth of the groundwater level for future agricultural activities and the proposals for hydro-amelioration measures in the affected area.
Prepared by:	Ing. Ján Alena RNDr. Štefán Rehák, Csc.
Contributors:	RNDr. Jozef Takáč RNDr. Igor Sobocký RNDr. Katerína Nováková, CSc.

OBJECTIVE OF THE PHASE

To define by way of model solutions the critical minimum and maximum depths of groundwater on the basis of the anticipated agricultural activity in the affected parts of the Žitný Ostrov region; to provide the grounds for proposals on the optimised system of groundwater levels with respect to agricultural production and the potential contamination of the groundwaters. The hydro-amelioration measures proposed to attain this objective are an integral part of the phase.

THE REPORT

Phase E 03 is temporally and substantially linked to phases E 01 and E 02. Phase E 01 included the selection of representative areas and the conducting of basic on-site research, on the basis of which the laboratory research conducted in phase E 02 identified the hydrophysical, chemical and transport characteristics to represent the soil profiles of the Žitný Ostrov region.

INTRODUCTION TO THE SOLUTION OF THE PROBLEM

Four soil profiles were selected from the preliminary results of E 02, providing an adequate representation of the soil covering the Žitný Ostrov area. As phase E 02 has not yet been fully completed, we present these results as preliminary and subject to further clarification. The soil profiles selected are the following:

1. light soils (soil types NP, LP, CM)
2. medium heavy and heavy soils (soil type NP)
3. medium heavy and heavy soils (soil types LP, CM)
4. medium heavy and heavy soils on light soils (soil types LP, CM)

In taking samples of these soils, the experts from Denmark provided co-operation, and suggested that these be used for the DAISY model (transport of nitrate in the soil profile).

Following their preliminary hydrophysical filing and further additions (retention curves, saturated and unsaturated permeability) they were used to model the optimum level of groundwater for the production of agricultural crops within the framework of the model SWACROP.

Modelling of the optimum level of groundwater was performed for four basic crops:

1. spring wheat
2. grain maize
3. sugar beet
4. late potatoes

We received the necessary crop parameters directly from the model designers in The Netherlands and from the Slovak Academy of Sciences. Potatoes were included in the model because they provided the actual and potential crop production values as well as the actual and potential transpiration and evaporation. We believe that in the near future we shall be able to identify the production functions of the other modelled crops as well.

We have used two years with different climatic conditions as the basis for the model: 1986, which has been classified as a dry year, and 1989, classified as normal (medium). The data were taken from our own research station, Most pri Bratislave, and meet the criteria of completeness, accuracy and locality perfectly.

The basic criterion for the determination of the optimum groundwater level is the ratio of the actual and potential productivity of crops. Given the present state of the SWACROP model, we were only able to apply this criterion to potatoes. In the case of the other crops, the basic criterion used was the ratio of actual and potential transpiration, which is directly proportionate to the production rate of the biological mass.

We have to add that the model SWACROP describes crop production on the basis of the utilisation of water assuming a good flow of nutrients and an optimal level of agricultural technology.

To calculate potential evapotranspiration, we have used the Monteith-Rijtema method, and the Belmans method for potential evaporation. The values of actual transpiration were calculated using the Sink Lermu-Feddes method.

In the majority of the cases modelled, the effects of the level of sub-surface waters on transpiration (or production) were examined at 4 levels: 0.5 m, 1.0 m, 2.0 m, and 3.0 m below the surface. In some cases we had to examine intermediate levels as well (e.g., 0.75 m, 1.5 m) to identify the maximum ratio between actual and potential transpiration.

MAJOR INFORMATION OBTAINED FROM THE SOLUTION OF PHASE E 03

During the medium year (N), potential evapo-transpiration (ETp) – a function of the length and calendar position of the vegetation period – was highest for sugar beet (451 mm), 394 mm for maize, 379 mm for potatoes and 314 mm for wheat. In the dry year (D) potential evapo-transpiration for sugar beet was 574 mm, 437 mm for maize, 418 mm for potatoes and 364 mm for wheat.

The seasonal total of actual evapotranspiration (ETa) depends on the position of groundwater levels below the surface and the real-time changes in meteorological characteristics. In the medium year, the ratio ETa:ETp for optimum groundwater levels is 0.57-0.78. In the dry year, this value was between 0.46 and 0.76.

In selecting the optimal groundwater level from the point of view of the production of agricultural crops, the criterion used was the identity of actual and potential transpiration, to which we could add the relationship between actual and potential production in the case of potatoes.

Starting from the assumption that the maximum production of crops is achieved when the value Pa:Pp (actual to potential production) is at its maximum, and moreover, that groundwater levels are optimal for the various crops, soil profiles and climatic conditions, we found the values of the ratio Ta:Tp between 0.95 and 1.00. Preliminary consolidated results for the modelling of the optimum groundwater level are shown in the table below.

Consolidated results of the SWACROP model for the optimum level of groundwaters

Crop	Soil conditions	Climatic conditions	Optimum HPV (m)	Ta:Tp	Ea:Ep	ETa:ETp	Pa:Pp
Spring wheat	1	D	1.0-2.0	1.0	0.25-0.18	0.58-0.54	-
		N	1.0-2.0	1.0	0.27-0.27	0.61-0.60	-
	2	D	1.0	1.0	0.194	0.54	-
		N	1.0- 2.0	1.0	0.27-0.24	0.61-0.60	-
	3,4	D	0.8	1.0	0.12	0.50	-
		N	1.0-1.5	1.0	0.2-0.18	0.57-0.55	-
Grain maize	1	D	1.0-2.0	0.99-0.98	0.27-0.24	0.52-0.51	-
		N	> 1.0	0.98-1.0	0.33	0.60	-
	2	D	1.0	1.0	0.23	0.51	-
		N	> 1.0	0.99-1.0	0.33	0.59-0.60	-
	3,4	D	1.0-1.5	0.97-0.99	0.12-0.16	0.46-0.45	-
		N	> 1.5	0.98-0.99	0.32	0.38-0.59	-
Sugar beet	1	D	1.0-1.5	1.0	0.32-0.31	0.69-0.68	-
		N	> 1.0	1.0	0.38	0.71	-
	2	D	0.95	1.0	0.24	0.63	-
		N	> 1.0	1.0	0.38	0.71	-
	3,4	D	1.0	0.98	0.17	0.60	-
		N	> 1.0	0.99	0.35	0.69	-
Late potatoes	1	D	1.0	1.0	0.41	0.76	1.0
		N	1.0-2.0	1.0-0.99	0.45-0.39	0.70-0.76	1.0
	2	D	0.75	1.0	0.40	0.76	1.0
		N	1.0	1.0	0.45	0.78	1.0
	3,4	D	0.60	0.95	0.24	0.67	0.97
		N	1.0	0.99	0.53	0.74	0.99

D : drought year

Ta: actual transpiration

Tp: potential transpiration

Ea: actual evaporation

Ep: potential evaporation

N: medium year (average)

ETa: actual evapo-transpiration

ETp: potential evapotranspiration

Pa: actual production

Pp: potential production

POSSIBLE APPLICATIONS OF THE RESULTS OBTAINED

The results obtained from examining the optimum groundwater level – which will have to undergo further investigation – are also used in the PHARE program by Professor I. Mucha. The results of the solution will be put to direct use in setting up the definitive management and operating procedures of the Danube Barrage System.

The optimal groundwater levels will be compared with actual and forecast values to provide the grounds for the adoption of appropriate technical measures (draining, increasing the groundwater levels, etc.) to ensure the water level requirements and to approximate the optimum level.

PROPOSALS FOR FURTHER SOLUTIONS

* To identify more precisely the representative hydrophysical characteristics of the soil conditions of the Žitný Ostrov and to determine definitively the optimum depth for groundwater levels;
* To prepare an assessment of the changes in groundwater levels after the implementation of the Danube Barrage System from the point of view of agricultural production;
* To draft proposals for technical measures with the assessment of their effects on the potential production of crops.

Annex 8

GEOPHYSICAL RESULTS OF THE INTERNATIONAL DANREG PROJECT

[Figures omitted]

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1. INTRODUCTION

The Austrian, Hungarian and Slovak geological and geophysical institutions agreed in 1990 that they would unify their knowledge about an area of 20,000 km^2, along the Vienna-Bratislava-Budapest reach of the Danube (*Fig 1*, omitted), and a dozen maps would be published. In this project geophysics has achieved good results using its specific methods to investigate the Neogene basins, mapping their overburden and basement as well. About 30 geoscientists from the three countries took part in the evaluation of geophysical data.

The paper presents the united geophysical maps. The techniques used in constructing the gravity, magnetic, geoelectric and seismic maps are briefly discussed, measurements carried out as part of this project are mentioned and integrated interpretation of all geophysical data given.

It is worth emphasising that part of this project was the geophysical prospecting of the Danube's detrital cone which is one of the most significant fresh water reservoirs in Europe; its extent is about 3,500 km^2, and its greatest thickness reaches as much as 600-700 m. Interesting results were obtained in the investigation of the Neogene sequences and the pre-Tertiary basement whose depth reaches as much as 8-10 km; one of the most significant ones is the delineation of the Rába-Hurbanovo structural line which can be interpreted as a plate boundary and has primarily been detected by magnetotellurics. Finally, below the 8-10 km deep sedimentary basin a crust-mantle diapir can be assumed based on the crust and mantle investigations.

Let us now discuss these results starting from the surface downwards.

2. RESULTS OF THE QUATERNARY INVESTIGATIONS

It is well known that the Danube leaving the mountains and entering the lowland at Bratislava has deposited a huge detrital cone and built large islands. The young, sandy and gravelly sediments produced by the deposition and filling-up procedure represent one of the largest fresh water reservoirs in Europe. Its extent and thickness, however, were hardly known before the integrated survey of the DANREG project. It is characteristic that the whole Quaternary sequence was drilled through only at three sites on the right bank of the Danube. Therefore, in recent years the earlier rather loose grid of geo-electric information has been made more dense by extensive geophysical – resistivity and induced polarisation – measurements in Hungary and Slovakia. Design, technical implementation, processing and interpretation of these measurements were carried out in a coordinated way. The work has resulted in several maps, two of these are now presented.

Thickness of the Quaternary sequence can be seen in *Fig. 2* (omitted[1]). It is striking in this map that the Quaternary sequence is the thickest in the vicinity of the Danube; its thickness exceeds even 600 m between Dunakiliti and Lipót. In general, we can say that sequences of larger thickness can be found in the deepest part of the Neogene basin; this sequence becomes of insignificant thickness at the Lesser Danube to the NE, at the Rába line, along the Györ-Čalovo-Kolárovo line to the SE. This wedging out gives rise to an intensive IP anomaly (*Fig. 3*, omitted) which, by the way, coincides with the zone of the Rába line, a structural line to be discussed later.

It should be emphasised that the surface of the Pliocene underlying the Quaternary is not a sharp physical layer boundary. Due to the continuous sediment deposition there are no clear petrophysical contrasts in the transition zone. It is roughly true that the grain size decreases downwards, and together with this the resistivity of the sequence as well.

As requested by the hydrogeologists and hydrologists we have constructed the thickness map of the coarse gravel sequence (*Fig. 4*, omitted[2]) which practically begins at the surface and represents the upper part of the Quaternary sequence. Its importance lies in the extremely high water-bearing capacity. It can be seen on the map that a thick gravel layer can be found along the Danube only, between Dunajská Streda and Mosonmagyaróvár. Its largest thickness exceeds 300 m at Lipót.

3. RESULTS OF THE TERTIARY INVESTIGATIONS

One of the most intensively subsiding sub-basins in the last 8-10 million years within the Carpathian Basin can be found in the middle of the survey area, below the thick detrital cone of the Danube. Depth to the base of the Pliocene (Pannonian) sequence reaches 5000 m (*Fig. 5*, omitted). This map has been constructed on the basis of the seismic results obtained by the Hungarian oil industry, the Eötvös Loránd Geophysical Institute of Hungary and the Geofyzika Brno. Subsidence of the basin became intensive during the Miocene. Thus, the depth to the pre-Tertiary basement reaches 8 km at the central part (*Fig. 6*, omitted[3]). This map is based on the survey results, primarily seismic, telluric, magnetotelluric and partly gravity data of the previously mentioned institutions and that of the Österreichische Mineralöl Verwaltung (ÖMV); and, of course, on wells. Unfortunately, less than 10 of the boreholes are deeper than 3000 m, and only one reached the depth of 4000 m. A new feature can be recognised in the map, the depth of the Vienna Basin exceeds 5000 m.

4. PROBLEMS OF BASEMENT AND STRUCTURE OF CRUST

Traditional methods of basement structure studies are gravity and magnetics. Geophysical investigation of this study area began using these methods as early as in the 1930s. It is known that generally the gravity and magnetic maps qualitatively reflect relative depressions and elevations of the basement. Closely spaced isolines on the gravity map suggest faults, similarly to the elongated magnetic anomalies which reflect the effect of magmatic intrusions along these tectonic lines. At

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1 See, e.g., HC-M, Annexes, vol 5, *Plate 3.3.*

2 See, e.g., HC-M, Annexes, vol 5, *Plate 3.2.*.

3 See HC-M, Annexes, vol 5, *Plate 6.1* for a part of the map.

the same time we know that some sub-basins in the Carpathian Basin revealed also by wells do not appear with the expected gravity low but in some cases with definite highs which suggest anomalies, namely, diapirs in the crust and upper mantle below the 6-8 km deep basins. Being aware of these inconsistencies we began to construct the united gravity and magnetic map for this selected territory of the three countries. Although accuracy of the measurements was practically the same in each of the three countries construction of the united maps encountered several difficulties.

Construction of the gravity (Bouguer) anomaly map is based on the observation data of about 50,000 stations. At first, however, base station networks had to be connected by measurements. In the course of processing it became obvious that in the practice of the individual countries there were differences in every step of the Bouguer anomaly calculation. Therefore the raw observation data had to be put into a common data base and the whole map had to be reconstructed using a common processing method. The result is shown in *Fig. 7* (omitted), and this map satisfies the expectations. Definite structural lines can be recognised (e.g., the Hurbanovo line); it reflects qualitatively the relative elevations and depressions within the basin, but it is striking that the lowest gravity values appear in the approximately 5000 m deep Vienna Basin shown in the previous map and the values in the 8000 m deep basin between Bratislava and Győr are somewhat higher. This alone might suggest a mantle diapir penetrating the crust.

Construction of the magnetic map was an even more difficult task. It is worth looking at *Fig. 8* (omitted) which shows the Hungarian and Slovak magnetic maps put simply together. It makes the situation even more complicated that airborne ΔT measurements at different altitudes were carried out in different sub-areas, while ground ΔZ measurements in others. Solution of the task started again with the connection of the base networks with measurements and using the software of the University of Vienna and the Geologische Bundesanstalt a ΔZ map reduced to the ground surface was constructed. Accuracy of the transformations was checked by a network of ground ΔZ measurements performed two years ago. This network covers some of the most significant anomalies in all three countries. The measurements were carried out using one single Czechoslovakian made magnetometer. The result can be seen in *Fig. 9* (omitted). Strike direction of the most characteristic anomaly breaks in the middle of the area, similarly to that of the Rába-Hurbanovo line to be shown later. On the other hand, it is striking that the axis of the maximum roughly coincides with the deepest zone of the pre-Tertiary basement. This also suggests that the source of the magnetic anomalies should be sought for within the basement (mantle diapir).

5. RESULTS OF THE RÁBA-HURBANOVO LINE INVESTIGATIONS

The Rába line separates the Transdanubian Middle Range type basement and the basement type containing Alpine nappes. In the opinion of some geologists the previous one is part of an African type plate, while the latter one belongs to the European plate.

The most characteristic difference between the physical parameters of the two basement types is the behaviour of the electrical conductivity in relation to depth. Magnetotelluric measurements detected formations of unknown age and rock type but of extremely low resistivity (1–2 Ωm) in the Middle Range type basement as early as in the 1960s. A. Ádám thinks that they are the same as the graphitic formations found on the surface in Austria (Gail Valley), but others have different ideas. In the light of recent studies there are significant differences in seismic images of the basement between the two sides of the Rába line. Similarly, obvious differences in the structure and thickness of the crust can be deduced from gravity data as well.

The Rába line was followed with further magnetotelluric measurements in Slovakia as well in 1991 and 1992. Characteristically different magnetotelluric sounding curves from the SE and NW side of the Rába line are shown in *Fig. 10* [omitted]. It is clear that discrimination of the two basement types is absolutely unambiguous, even in such cases when the depth to the low resistivity formations in the basement and their thickness can be determined with difficulties only. Continuation of the Rába line detected in the Győr region in Hungary can be traced along a straight line up to Kolárovo. Here, however, it turns to E-W direction and can be identified as the Hurbanovo line already known in Slovakia (*Fig. 11*, omitted).[4]

It is interesting that this break is at Kolárovo where an intensive gravity maximum can be found on the unified (Hungarian–Slovak) Bouguer anomaly map (*Fig. 12*, omitted). It is certain that the source of this anomaly should be sought for in the pre-Tertiary basement because it is obvious from the magnetotelluric profile shown in *Fig. 11* (omitted) that it cannot be explained with the morphology of the basement. On the contrary, the basement is suddenly sinking just in this region.

Finally, a reflection seismic section is presented which was measured between Bratislava and Győr (*Fig. 13*, omitted), on the right bank of the Danube. Data were processed down to the depth of the Mohorovičić discontinuity.

In the upper part of the figure (between 2 and 4 s) the 4-8 km thick Neogene sedimentary sequence can be seen consisting of undisturbed layers which are good reflectors. Their resistivities are in the 3-19 Ωm range according to the magnetotelluric measurements shown in the section.

The time interval between 4 and 10 s can be divided into several parts both vertically and laterally but probably the latter one is of greater importance. In the NW part of the section (left side of the figure) reflections can be seen in the basement and the Mohorovičić discontinuity can also be easily followed between 9 and 10 s. There are no reflections from the basement in the right part of the figure and the Mohorovičić discontinuity disappears as well. Comparing this phenomenon with the results of other measurements it can be observed that the sources of gravity and magnetic anomalies should be just in this region and at a depth of 10-20 km.

6. CONCLUSIONS

1. Geological formations and structures generally do not terminate at country borders, therefore first of all in basins geological maps, e.g., maps of deep structures put simply together cannot be fitted (*Fig. 14,* omitted).[5] (Depths to the basement are not identical at two sides of the border, tectonic lines or formations "do not continue", etc.) Therefore, in order to unite the existing pieces of knowledge and to fit different pieces of information together without contradictions, new common investigations are required.

2. To fit the geological knowledge together at the borders is a process of necessity. Without this it is impossible to pursue a correct mineral prospecting, water management, protection of the environment, soil and groundwater, etc., or to assess the earthquake risk. Three Central European countries along the Danube realised this in 1990 and made the first steps in geology and geophysics, over an area of 20,000 km^2. We intend to continue this kind of activity.

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4 See, e.g., *Scientific Rebuttal*, HR, vol 2, *Plate 8.3*.

5 See, e.g., *Scientific Rebuttal*, HR, vol 2, *Plate 8.2*.

Annex 9

LIST OF EPICENTRES OF THE HISTORICAL EARTHQUAKES IN THE REGION OF THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM

ERZSÉBET GYŐRI,[1] ZOLTÁN PÁNCSICS,[2] *GYŐZŐ SZEIDOVITZ*,[3] APRIL 1995

The list is based on the completed and corrected catalogue of T. Zsíros *et al.* (1988) which lists the earthquakes in the Pannonian Basin and its vicinity in the period between 456 and 1986. The catalogue data of T. Zsíros *et al.* were completed and corrected by E. Győri, Z. Páncsics and Gy. Szeidovitz up to 1994. Deviations from the catalogue are explained in the six remarks at the end of this introduction. Earthquakes with a Richter-magnitude higher than 3 in the investigated area (47°20'– 48°50' and 16°40'–19°) are plotted on the map (see *Scientific Rebuttal*, HR, vol 2, *Plate 8.1*). The magnitudes are taken from the catalogue mentioned above. When the magnitude was not determined from seismograms recorded by instrument, it was calculated using the Gutenberg–Richter relation:

$$M = 0.6\, I_o + 1.8 \log h - 1.0$$

where M is the magnitude,
I_o is the epicentral intensity, and
h is the focal depth in km.

Where the focal depth is not known, an average of 10 km was assumed. The magnitude for historical earthquakes was calculated from the highest intensity observed.

The events are listed in chronological order with

- date (year, month, day);
- time (hour:minute) in Central European Time (GMT + 1 hour);
- location (latitude, longitude in tenth of degrees)
- with the accuracy of epicentre determination (A: ±5 km, B: ±10 km, C: ±20 km, D: ±50 km, E: unidentified);
- focal depth (km), where "+" denotes instrumental determination. When it is missing the macroseismic depth can be obtained from the reference or from the Kövesligethy formula (Kövesligethy, 1907);
- magnitude, where "+" denotes instrumental determination (when it is missing the magnitude can be taken from the reference or calculated from the Gutenberg–Richter relation);

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- epicentral intensity in the MSK–64 scale. For weak events of instrumental observation " * " denotes the lack of perceptible epicentral intensity;

- name (or *location*, in italics) of the earthquake using mainly the geographical names of the historical Hungary.

Magnitude-frequency diagrams were constructed for the periods 1794-1893 and 1894-1993 (*Figure 1*), presenting the total number of seismic events (in a logarithmic scale with standard deviations) of a given magnitude interval. Trends and values are very similar, suggesting a homogeneous time distribution of the earthquakes over the last 200 years. According to further investigations, the probability of an event with a magnitude of 6.0 - 6.5 is 0.1 or higher, ground acceleration caused by such an earthquake is much higher than 0.1 g.

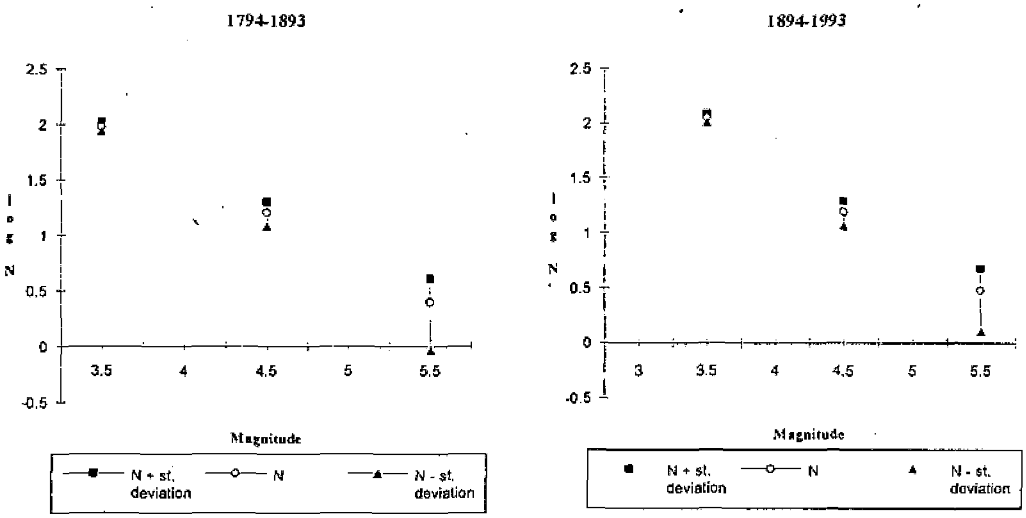

Figure 1. *Frequency of earthquakes in the Gabčíkovo area, 1794-1893 and 1894-1993 (N is the number of earthquakes with a magnitude of M±0.5)*

Remarks

1. Brouček (1969) studied in detail one of the most significant earthquakes in the area which occurred in the vicinity of Slovenská Ľupča (Zólyomlipcse) in 1443. In his work, also cited in Zsiros *et al.*, he determined M = 6 and a focal depth of 25 km instead of the values mentioned in the catalogue, 6.4 and 36 km respectively. Brouček gave the isoseismal lines of the earthquake, too.

2. The earthquake of 1599 hit the towns of Nové Zámky (Érsekújvár), Esztergom and Komárom. Focus should supposedly be sought along the Komárom–Esztergom section of the Rába-Hurbanovo-Diósjenő line.

3. The epicentral intensity of the main shock of the 1763 earthquake was 8.5, with a half-grade accuracy. The focus might be located W–NW of Komárom. The focal depth was between 6 and 8 km.

4. The main shock mentioned in the previous point was followed by many aftershocks. Komárom was mentioned as the epicentre of the majority of these aftershocks. Gy. Szeidovitz (1990) gives other settlements in addition to Komárom where the aftershocks were felt.

5. According to the calculations of L. Stegena and Gy. Szeidovitz (1991), 6 to 9 km was the focal depth of the 1810 earthquake at Mór.

6. In those cases when it was impossible to determine the epicentre as many settlements felt an equal shock intensity, one single settlement at the centre of gravity of all the settlements with equal shock is chosen as the plotting point of the epicentre (e.g., Márianosztra 1780.6.26, Szentivánfa 1907.11.2, Fertőszentmiklós 1916.1.6, Sopronkövesd 1922.12.22, Nagybörzsöny 1931.10.31, Bezi 1942.11.24, Bicske 1948.8.7, Nagybajcs 1952.4.4, Esztergom 1952.5.14, Bakonysárkány 1969.2.10, Törökbálint 1974.1.30).

REFERENCES

Brouček, I. 1969. Erdbeben in der Kleinen Karpaten, *in Contributions of the Geophysical Institute of Slovak Academy of Sciences* 1:15–25.

Kövesligethy, R., 1907: Seismischer Stärkegrad und Intensität der Beben. *Gerlands Beitr. Geophys.*, Band VIII, Leipzig

Stegena, L., Szeidovitz, Gy., 1991, The 14 January 1810 earthquake in Mór, Hungary: The first isoseismal map. *Tectonophysics*, 193, pp. 109–115.

Szeidovitz, Gy. 1990, Komárom és Mór környezetében keletkezett történelmi rengések epicentrális intenzitásának és fészekmélységének meghatározása (Determination of the epicentral intensity and focal depth of historical earthquakes in the vicinity of Komárom and Mór), Ph.D.Ac. thesis.

Zsíros, T., Mónus, P., Tóth, L., 1988, Hungarian Earthquake Catalog (456–1986). Published by the Seismological Observatory, Hung. Acad. Sci.

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1441				48.45	18.90	E		5.6	8.0	Selmecbánya
1443	6	5		48.77	18.63	D	25	6.0	8.0	Zólyomlipcse
1515	2			48.38	17.58	E		5.0	7.0	Nagyszombat
1586				48.17	17.10	E		5.0	7.0	Pozsony
1599	10	1	09:00	47.75	18.16	E		5.6	8.0	Komárom
1607	11	27	19:00	48.80	18.00	E		3.8	5.0	Trencsén Arca
1660	11	30	09:00	48.38	17.58	D		4.4	6.0	Nagyszombat
1700				48.17	17.10	E		3.8	5.0	Pozsony
1727				48.17	17.10	E		3.2	4.0	Pozsony
1754	10	21	15:00	47.68	17.62	E		3.8	5.0	Győr
1757	8			47.75	18.16	D		3.8	5.0	Komárom
1759				47.75	18.16	E		3.8	5.0	Komárom
1763	6	28	04:15	47.75	18.16	C		3.2	4.0	Komárom
1763	6	28	06:28	47.75	18.16	C	7	5.6	8.5	Komárom
1763	7	2		47.75	18.16	C		3.8	5.0	Komárom
1763	7	7		47.75	18.16	C		3.2	4.0	Komárom
1763	7	9		47.75	18.16	C		3.8	5.0	Komárom
1763	7	10	08:00	47.75	18.16	C		3.2	4.0	Komárom
1763	7	18		47.75	18.16	C		3.2	4.0	Komárom
1763	7	19		47.75	18.16	C		3.2	4.0	Komárom
1763	7	20		47.75	18.16	C		3.2	4.0	Komárom
1763	7	29		47.75	18.16	C		3.5	4.5	Komárom
1763	8	9		47.68	17.62	D		3.5	4.5	Győr
1764	6	28	06:00	47.75	18.16	C		3.2	4.0	Komárom
1764	7	17	08:00	47.75	18.16	C		3.2	4.0	Komárom

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1764	7	30	04:00	47.75	18.16	C		3.2	4.0	Komárom
1764	8	17	02:00	47.75	18.16	C		3.2	4.0	Komárom
1764	9	10	23:00	47.75	18.16	C		3.2	4.0	Komárom
1764	9	11	19:30	47.75	18.16	C		3.2	4.0	Komárom
1764	9	24	05:15	47.75	18.16	C		3.2	4.0	Komárom
1764	12	30	02:00	47.75	18.16	C		3.2	4.0	Komárom
1765	1	7	20:15	47.68	17.62	D		3.2	4.0	Győr
1765	2	5	23:45	47.75	18.16	C		3.8	5.0	Komárom
1765	2	21	17:30	47.68	17.62	D		3.2	4.0	Győr
1765	2	26	07:00	47.75	18.16	C		3.2	4.0	Komárom
1765	2	27		47.75	18.16	C		3.2	4.0	Komárom
1765	6	23	09:45	47.75	18.16	C		3.2	4.0	Komárom
1766	8	17	01:00	48.17	17.10	E		3.2	4.0	Pozsony
1767	3	17	10:30	47.75	18.16	C		3.2	4.0	Komárom
1767	9	8		47.75	18.16	C		3.2	4.0	Komárom
1768	1	5	04:00	47.68	17.62	C		3.8	5.0	Győr
1779	4	2	06:00	47.68	17.62	E		3.2	4.0	Győr
1780	6	26	22:20	47.81	18.83	C		4.1	5.5	Márianosztra
1783	4	22	03:45	47.75	18.16	C	7.	5.3	8.0	Komárom
1783	4	22	12:00	47.75	18.16	C		3.8	5.0	Komárom
1783	4	22	19:00	47.75	18.16	C		3.2	4.0	Komárom
1783	5	12		47.75	18.16	C		3.2	4.0	Komárom
1783	5	18		47.75	18.16	C		3.2	4.0	Komárom
1783	5	19		47.75	18.16	C		3.2	4.0	Komárom
1783	5	31	12:00	47.75	18.16	C		4.4	6.0	Komárom

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1783	6	10		47.75	18.16	C		3.2	4.0	Komárom
1783	7	1		47.68	17.62	C		3.2	4.0	Györ
1783	12	10	05:00	47.75	18.16	C		3.5	4.5	Komárom
1784	5	11		48.75	18.33	E		3.2	4.0	Zayugrócz
1784	6	15		47.75	18.16	C		3.8	5.0	Komárom
1784	8	7	04:40	47.75	18.16	C		3.8	5.0	Komárom
1786	1	30	14:45	47.38	18.20	D		3.8	5.0	Mór
1786	7	8	06:00	47.75	18.16	C		3.8	5.0	Komárom
1791	8	29	16:00	48.17	17.10	E		3.2	4.0	Pozsony
1794	12	27	22:00	48.25	17.22	E		3.2	4.0	Pozsonyszt.györgy
1796	3			47.75	18.16	C		3.2	4.0	Komárom
1805				48.60	17.65	E		3.8	5.0	Lancsár
1806	9	22	20:45	47.75	18.16	D		5.0	7.0	Komárom
1807	20			47.75	18.16	D		3.2	4.0	Komárom
1810	1	14	18:09	47.38	18.20	B	8	5.4	8.0	Mór
1810	1	14	19:00	47.38	18.20	C		3.8	5.0	Mór
1810	1	14	23:30	47.38	18.20	B		3.2	4.0	Mór
1810	1	15	04:00	47.38	18.20	B		3.2	4.0	Mór
1810	1	21	03:00	47.38	18.20	B		4.4	6.0	Mór
1810	2	3		47.38	18.20	B		3.2	4.0	Mór
1810	2	23		47.38	18.20	B		3.2	4.0	Mór
1810	3	1		47.38	18.20	C		3.8	5.0	Mór
1810	3	4		47.38	18.20	C		3.8	5.0	Mór
1810	4	1		47.38	18.20	B		3.2	4.0	Mór
1810	4	14		47.38	18.20	B		3.2	4.0	Mór

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1810	5	27	09:00	47.38	18.20	B		5.0	7.0	Mór
1810	5	30		47.38	18.20	B		3.2	4.0	Mór
1810	5	31		47.38	18.20	B		3.2	4.0	Mór
1810	6	3		47.38	18.20	B		4.1	5.5	Mór
1810	6	24	15:00	47.38	18.20	B		4.4	6.0	Mór
1810	7	4	07:30	47.38	18.20	B		3.2	4.0	Mór
1810	7	13		47.38	18.20	B		3.2	4.0	Mór
1810	9	13	02:00	47.38	18.20	B		3.2	4.0	Mór
1810	10	5	02:00	47.38	18.20	B		3.2	4.0	Mór
1810	11	3	19:00	47.38	18.20	B		3.2	4.0	Mór
1810	12	20		47.38	18.20	B		3.8	5.0	Mór
1810	12	21	17:30	47.38	18.20	B		4.4	6.0	Mór
1811	4	21	06:00	47.38	18.20	B		3.2	4.0	Mór
1811	4	24	03:00	47.38	18.20	B		3.8	5.0	Mór
1811	6	24		47.38	18.20	B		3.2	4.0	Mór
1811	6	28	02:15	47.38	18.20	B		3.8	5.0	Mór
1811	7	3	15:00	47.38	18.20	B		3.2	4.0	Mór
1811	07	09	10:00	47.32	18.23	B		3.2	4.0	Bodajk
1811	9	6	02:00	47.38	18.20	B		4.1	5.5	Mór
1811	9	25		47.38	18.20	B		3.5	4.5	Mór
1811	10	23		47.38	18.20	B		3.2	4.0	Mór
1811	10	24		47.38	18.20	B		3.2	4.0	Mór
1811	10	31	10:00	47.38	18.20	B		3.2	4.0	Mór
1813	9	6		47.38	18.20	B		3.8	5.0	Mór
1813	9	15		47.38	18.20	B		3.8	5.0	Mór

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1813	11	12		47.38	18.20	B		3.8	5.0	Mór
1814	5	7	17:15	47.38	18.20	B		4.4	6.0	Mór
1814	5	10	03:37	47.38	18.20	B		3.8	5.0	Mór
1814	5	14	17:26	47.38	18.20	B		3.8	5.0	Mór
1814	6	3	06:15	47.38	18.2	0	B	3.8	5.0	Mór
1815				48.60	17.65	E		3.2	4.0	Lancsár
1815				47.73	18.33	E		4.4	6.0	Dunaalmás
1815	6	15	09:00	48.60	17.68	E		4.4	6.0	Sterusz
1815	8	18	11:49	47.38	18.20	B		3.8	5.0	Mór
1820	1			47.38	18.20	B		3.8	5.0	Mór
1820	2			47.38	18.20	B		3.8	5.0	Mór
1822	2	6	09:00	47.75	18.16	B		4.7	6.5	Komárom
1822	2	18	17:15	47.75	18.16	B		4.4	6.0	Komárom
1822	2	18	22:45	47.75	18.16	B		3.2	4.0	Komárom
1822	2	19	00:30	47.75	18.16	B		3.2	4.0	Komárom
1822	5	3	06:50	47.75	18.16	B		3.2	4.0	Komárom
1822	5	22	09:00	47.75	18.16	B		3.2	4.0	Komárom
1822	8	12	07:30	47.75	18.16	B		3.2	4.0	Komárom
1822	8	25	02:45	47.75	18.16	B		3.2	4.0	Komárom
1822	12	24	01:15	47.75	18.16	B		3.2	4.0	Komárom
1827	6	14	03:00	47.38	18.20	B		3.2	4.0	Mór
1841	10	24	13:10	47.75	18.16	C		4.7	6.5	Komárom
1845	5	9	14:00	47.75	18.16	C		3.8	5.0	Komárom
1845	12	31		48.77	18.63	C		3.2	4.0	Zólyomlipcse
1851	7	1	22:15	47.75	18.16	B		5.0	7.0	Komárom

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1851	7	17	22:00	47.75	18.16	C		3.2	4.0	Komárom
1854	9	16	17:00	48.45	18.90	C		3.2	4.0	Selmecbánya
1854	10			48.60	18.80	C		3.2	4.0	Selmecb.-Zólyom
1855	1	31	13:30	48.45	18.90	C		3.8	5.0	Selmecbánya
1856	6	22		47.38	18.20	B		3.8	5.0	Mór
1857				47.38	18.20	B		3.2	4.0	Mór
1857	4	2		47.93	18.82	C		3.2	4.0	Marianosztra
1857	6	9	16:47	47.75	18.16	C		3.8	5.0	Komárom
1858	2	9	01:30	48.45	18.90	D		3.2	4.0	Selmecbánya
1859	12	30	16:10	47.72	18.45	B		3.8	5.0	Süttő
1861	11	8		48.72	18.92	C		3.8	5.0	Körmöcbánya
1862	1	8		48.72	18.92	C		3.2	4.0	Körmöcbánya
1862	1	9	04:30	48.72	18.92	C		3.2	4.0	Körmöcbánya
1862	1	13	01:55	48.45	18.90	C		4.1	5.5	Selmecbánya
1862	3	18	21:45	48.45	18.90	C		3.8	5.0	Selmecbánya
1862	4	18	03:30	47.75	18.16	B		3.2	4.0	Komárom
1863	9	30	08:30	47.75	18.16	B		3.2	4.0	Komárom
1863	10	20	18:00	47.38	18.20	B		3.8	5.0	Mór
1864	4	9	19:45	47.38	17.97	B		3.8	5.0	Csatka
1866	2	27	02:00	47.75	18.16	B		3.2	4.0	Komárom
1866	2	27	20:57	47.75	18.16	B		3.2	4.0	Komárom
1870	1	5	05:00	48.17	17.10	D		3.8	5.0	Pozsony
1870	6	30	18:30	47.42	18.60	B		3.2	4.0	Alcsút
1874	12	2	07:00	48.67	17.53	C		3.8	5.0	Brezova
1875	4	13	16:07	47.75	18.16	B		3.2	4.0	Komárom

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1877	12	13	19:00	47.77	17.98	C		3.2	4.0	Aranyos
1877	12	13	21:00	47.77	17.98	C		3.2	4.0	Aranyos
1877	12	14	02:00	47.77	17.98	C		3.2	4.0	Aranyos
1879	9	23	06:00	48.75	17.83	C		3.2	4.0	Vágújhely
1884	6	29	06:45	48.75	17.83	C		3.2	4.0	Vágújhely
1884	12	7	03:45	47.94	16.72	B		3.2	4.0	Széleskut
1885	3	14	12:45	47.78	18.75	B		3.8	5.0	Szenttamás
1886	1	12	10:40	47.33	17.47	C		3.2	4.0	Pápa
1886	3	27	08:50	47.75	18.30	B		3.2	4.0	Izsa
1888	1	18	11:16	47.55	18.17	B		3.2	4.0	Szend
1888	8	16	04:21	47.42	18.60	D		3.2	4.0	Alcsút
1888	8	16	05:25	47.55	18.17	C	9	3.7	5.0	Szend
1888	8	17	06:30	47.45	18.10	B		3.5	4.5	Bakonysárkány
1889	6	18	15:20	47.78	18.75	B		3.2	4.0	Esztergom
1889	7	11	03:30	47.40	18.07	B	7	3.2	4.5	Aka
1890	1	28	09:11	48.77	18.63	B	6	4.0	6.0	Zólyomlipcse
1890	11	25	10:56	48.25	17.22	C	26	4.5	5.0	Pozsonyszt.györgy
1890	11	28		48.28	17.05	C	11	4.5	6.0	Maszt
1890	12	18	02:50	48.18	16.98	B		3.2	4.0	Dévény
1890	12	24	03:00	48.18	16.98	B		3.2	4.0	Dévény
1892	5	31	22:00	48.17	17.10	C		3.2	4.0	Pozsony
1893	3	24		48.60	17.83	B	3	3.4	6.0	Pöstyén
1896	4	14		47.54	18.08	C		3.2	4.0	Etc
1898	3	18	08:45	47.38	18.20	B		3.2	4.0	Mór
1899	8	20	09:00	48.77	18.63	C		3.2	4.0	Zólyomlipcse

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1900	8	2	08:30	48.75	18.33	C		3.2	4.0	Zayugrócz
1901	1	29	15:00	48.10	16.70			3.2	4.0	*Austria*
1901	2	5	17:17	47.42	17.75	B	11	3.9	5.0	Bakonytamási-Gic
1901	5	10	11:30	47.43	17.75	B		3.2	4.0	Gic
1903	3	8	03:00	48.40	16.80			3.5	4.5	*Austria*
1904	4	20	15:03	48.60	17.42	B		5.0	7.0	Jablonica
1904	8	3	11:07	47.75	18.16	B		3.5	4.5	Komárom
1904	8	5	08:37	47.80	18.05	C		3.2	4.0	Dunaörs
1904	10	12	04:00	48.52	17.45	C		3.8	5.0	Szomolány
1906	1	10	00:05	48.60	17.55	C	11	5.7	8.0	Jókő
1906	1	10	02:06	48.60	17.55	C		3.8	5.0	Jókő
1906	1	15	01:30	48.60	17.55	C		3.2	4.0	Jókő
1906	1	16	03:52	48.60	17.55	C	9	5.2	7.5	Jókő
1906	1	16	04:44	48.60	17.55	C		3.8	5.0	Jókő
1906	1	16	06:15	48.60	17.55	C		3.2	4.0	Jókő
1906	1	16	22:05	48.60	17.55	C		3.8	5.0	Jókő
1906	1	16	23:45	48.60	17.55	C		3.2	4.0	Jókő
1906	2	4	03:50	48.60	17.55	C		3.8	5.0	Jókő
1906	2	8	08:05	48.60	17.55	C		3.2	4.0	Jókő
1906	2	12	18:15	48.60	17.55	C		3.2	4.0	Jókő
1906	2	21	11:10	48.60	17.55	C		3.8	5.0	Jókő
1906	2	22	02:00	48.60	17.55	C		3.8	5.0	Jókő
1906	2	22	10:25	48.60	17.55	C		3.2	4.0	Jókő
1906	2	23	00:30	48.60	17.55	C		3.2	4.0	Jókő
1906	2	25	04:45	48.60	17.55	C		3.2	4.0	Jókő

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1906	2	26	11:30	48.60	17.55	C		3.2	4.0	Jókő
1906	2	28	01:00	48.60	17.55	C		3.8	5.0	Jókő
1906	2	28	05:00	48.60	17.55	C		3.2	4.0	Jókő
1906	3	1	01:00	48.60	17.55	C		3.8	5.0	Jókő
1906	3	2	01:45	48.60	17.55	C		3.8	5.0	Jókő
1906	3	2	03:34	48.60	17.55	C		3.2	4.0	Jókő
1906	3	2	04:00	48.60	17.55	C		3.8	5.0	Jókő
1906	3	3	01:10	48.60	17.55	C		3.8	5.0	Jókő
1906	3	3	04:30	48.60	17.55	C		3.8	5.0	Jókő
1906	3	8	05:00	48.60	17.55	C		3.2	4.0	Jókő
1906	3	9	02:00	48.60	17.5	5	C	3.8	5.0	Jókő
1906	3	13	22:50	48.60	17.55	C		3.2	4.0	Jókő
1906	3	16	21:45	48.62	17.48	C		3.8	5.0	Hradist
1906	3	25		48.62	17.48	C		3.2	4.0	Hradist
1906	3	25	02:06	48.60	17.55	C		3.8	5.0	Jókő
1906	3	31	15:00	48.60	17.55	C		3.2	4.0	Jókő
1906	4	1	07:45	48.60	17.55	C		3.8	5.0	Jókő
1906	4	6	01:00	48.60	17.55	C		3.2	4.0	Jókő
1906	4	7	19:25	48.60	17.55	C		3.2	4.0	Jókő
1906	4	7	19:27	48.60	17.55	C		3.8	5.0	Jókő
1906	4	9	08:26	48.60	17.55	C		4.1	5.5	Jókő
1906	4	12	02:00	48.60	17.55	C		3.2	4.0	Jókő
1906	4	15	16:00	48.60	17.55	C		3.2	4.0	Jókő
1906	4	16	00:20	48.60	17.55	C		4.4	6.0	Jókő
1906	4	20	00:55	48.60	17.55	C		4.4	6.0	Jókő

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1906	4	23	01:45	48.60	17.55	C		3.2	4.0	Jókő
1906	4	24	00:30	48.60	17.55	C		3.2	4.0	Jókő
1906	5	10	14:00	48.60	17.55	C		3.2	4.0	Jókő
1906	5	15	23:10	48.60	17.55	C		3.8	5.0	Jókő
1906	6	1	00:50	48.60	17.55	C		3.2	4.0	Jókő
1906	6	1	02:45	48.60	17.55	C		4.4	6.0	Jókő
1906	6	2	04:17	48.60	17.55	C		3.2	5.0	Jókő
1906	7	5	00:05	48.60	17.55	C		3.5	4.5	Jókő
1906	8	16	22:00	48.60	17.55	C		3.2	4.0	Jókő
1906	8	25	03:30	48.60	17.55	C		3.8	5.0	Jókő
1906	9	12		48.60	17.55	C		3.2	4.0	Jókö
1907	11	2	22:30	47.37	16.97	B		3.2	4.0	Szentivánfa
1908	2	19	22:11	48.00	16.70			5.0	7.0	*Mt. Lajta*
1908	3	14	23:18	47.75	18.30	C		3.2	4.0	Izsa
1908	12	18	04:30	48.60	17.55	C		3.2	4.0	Jókö
1909	3	14	04:05	48.60	17.55	C		3.8	5.0	Jókő
1913	7	27	15:40	47.55	17.57	B		3.5	4.5	Győrszemere
1914	2	4	13:00	47.68	17.62	B		3.5	4.5	Győr
1914	4	18	06:15	48.33	17.32	C		4.4	6.0	Modor
1914	11	25	17:12	47.33	18.20	A	20	4.4+	4.5	Isztimér
1916	1	6	04:45	47.49	16.81	C		3.8	5.0	Fertőszentmiklós
1921	12	14	04:45	47.75	18.16			3.2	4.0	Komárom
1922	1	7	03:30	47.38	18.20		12	3.6	4.5	Mór
1922	12	22	08:00	47.56	16.75			3.5	4.5	Sopronkövesd
1923	9	1	06:45	47.75	18.16			3.8	5.0	Komárom

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1928	12	11	12:11	47.60	16.70			3.5	4.5	Nagycenk
1929	9	6	01:15	48.67	17.55			3.5	4.5	Dobrá Voda
1929	11	15	01:40	47.75	18.16	B		3.2	4.0	Komárom
1930	3	4	10:30	48.67	17.55	C		3.8	5.0	Dobrá Voda
1930	3	6	01:00	48.67	17.55	C	6	4.6	7.0	Dobrá Voda
1930	3	6	06:13	48.61	17.72	B	6	4.0	6.0	Vrbové
1930	3	6	23:00	48.67	17.55	C		3.4	4.0	Dobrá Voda
1930	3	7	00:21	48.67	17.55	C		3.4	4.0	Dobrá Voda
1930	3	7	08:42	48.67	17.55	C		3.4	4.0	Dobrá Voda
1930	3	17	01:30	48.67	17.55	C		3.5	4.5	Dobrá Voda
1930	9	11	08:49	47.55	17.62	B		3.8	5.0	Felpéc
1931	10	31	16:08	47.98	18.86	B		3.8	5.0	Nagybörzsöny
1934	4	26	17:55	47.72	18.70	B		4.1+	5.5	Esztergom
1936	12	28	23:20	48.45	18.9	8		3.5	4.5	Banská Stiavnica
1942	5	14	09:28	47.33	17.68	B		3.7+	6.0	Bakonykoppány
1942	5	19	09:52	47.73	17.67	C		3.2	4.0	Bacsa
1942	11	24	18:20	47.69	17.47	B		3.8	5.0	Bezi
1947	10	10	19:23	47.75	18.50	C		3.4+	5.0	Lábatlan
1947	12	11	12:01	47.62	18.92	B		3.1+	4.0	Pilisszentiván
1948	8	7	08:06	47.48	18.73	C		3.2	4.0	Bicske
1949	1	20	06:16	47.82	18.41	C		3.2	4.0	Bátor-Keszi
1952	3	10	06:42	47.38	18.20	B	11	3.4+	5.0	Mór
1952	4	4	19:32	47.75	17.61	B	7	3.2	4.5	Nagybajcs
1952	5	14	18:17	47.87	18.81	C		3.2+	4.0	Esztergom
1952	12	5	17:44	47.55	18.22	C		3.0+	4.0	Dad - Szák

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1953	5	2	13:37	48.10	16.80			4.1	5.5	*Lajta Area*
1955	12	13	23:35	48.47	17.43	C		3.2	4.0	*Malé Karpaty*
1956	9	7	08:30	47.79	18.33			3.2	4.0	Hurbanovo
1957	4	20	04:30	47.65	18.08	B		3.2	4.0	Nagyigmánd
1958	1	31	16:54	47.80	16.90			3.5	4.5	*Austria*
1959	2	10	23:44	48.30	16.90			3.5	4.5	*Austria*
1964	12	30	03:09	48.30	17.20	C	9	3.5	4.5	Modra
1964	12	30	04:10	48.30	17.10	C	10	4.4	6.0	Modra
1967	6	17	18:45	48.50	17.40			3.7	5.0	*Malé Karpaty*
1967	9	16	21:19	48.40	17.10	B	7	3.5	4.5	*Malé Karpaty*
1967	9	20	23:44	48.40	17.20	C	8	3.8	5.0	*Malé Karpaty*
1967	12	3	23:11	48.60	17.40	B	4	4.0	6.5	*Malé Karpaty*
1969	2	10	00:08	47.43	18.88	B	20	4.6+	5.0	Bakonysárkány
1970	1	25	02:45	48.30	16.90			3.2	4.0	*Austria*
1970	6	4	14:37	48.20	17.40			3.2	4.0	Senec
1973	10	28	04:56	48.50	17.00	B	9	3.8	5.0	Malacky
1974	1	30	23:56	47.41	18.88	B		3.4+	5.0	Törökbálint
1974	1	31	11:33	47.43	18.92	B		3.0+	*	Törökbálint
1974	12	9	13:14	48.25	16.90		5	3.0	5.5	*Austria*
1975	11	11	22:45	48.70	18.40			3.2	4.0	Bojnice
1976	8	25	00:23	48.60	17.40	C	10	4.1	5.5	*Malé Karpaty*
1976	12	23	23:04	48.40	17.20	B	7	3.4	4.5	*Malé Karpaty*
1977	2	6	22:45	48.20	16.90			4.0	5.5	*Lajta Area*
1977	4	11	01:55	48.50	17.50			3.5	4.5	*Malé Karpaty*
1983	1	29	23:43	47.51	18.93	B		3.8	5.0	Budakeszi

Year	MM	DD	H:M	Lat.	Long.	Q	Focal Depth	Magnitude	Epi. Int.	Name
1984	6	27	18:48	47.34	17.28	A	4+	3.2+	*	*Marcal Basin*
1985	8	15	05:18	47.36	17.91	B	10+	3.8+	*	(Berhida)
1987	5	30	09:16	48.51	17.73	A		3.1+	*	Pieštany
1988	6	29	14:59	47.93	17.23	A	6+	3.4+	*	*Moson Region*
1989	2	11	03:46	47.87	17.06	A		3.1+	5.0	*Fertő Region*
1989	2	23	14:11	47.34	16.82			3.1+	*	Szeleste
1989	6	22	13:05	47.74	18.23	A	21+	3.0+	*	Komárom
1992	1	19	02:50	47.37	18.92	B	12+	3.1+	3.5	Érd
1993	8	27	03:34	47.36	18.68	B	30+	3.5+	3.5	Vál

Annex 10

SUMMARY REVIEW OF CERTAIN STUDIES RAISING CONCERNS
RELATED TO THE ORIGINAL PROJECT
(1977-1989)

1. INTERNATIONAL STUDIES

November 1986: **The Gabčíkovo-Nagymaros Project, Impacts on Nature and on the Balance of Nature** (Study prepared for the WWF, J. Lösing, Essen, HC-M, Annexes, vol 4 (part 1), annex 3)

A. Nagymaros Barrage

* The power plants should not be operated in peak mode to avoid daily fluctuations.
* The Barrage should have had a comprehensive environmental impact assessment.

B. Impoundment at Dunakiliti

* The Barrage should have had a comprehensive environmental impact assessment.
* Old Danube must receive more water, at a minimum 600 m^3/s.

2 March 1989: **INFORT/Ecologia, Gabčíkovo-Nagymaros Barrage System Study, Preliminary Report** (HM, Annexes, vol 5 (part 1), annex 5)

A. Impoundment at Dunakiliti

* The reduced river flow will simulate drought for the riverine forests downstream of Dunakiliti.
* It is likely that there will be a major net loss of riverine forest.
* 64% of the commercial catch in the main river will cease to exist in areas where they are presently found if flow is impounded or drastically reduced.
* Sediment deposition will increase.
* Nutrient concentration upstream of the dams may lead to algal blooms and other eutrophication problems.
* Development of an anaerobic layer at the reservoir bottom will allow heavy metals to dissolve from deposited particles, increasing the likelihood of groundwater contamination.
* 3-4 million m^3 of sediment, laced with heavy metals and bacteria, will percolate into the natural aquifer, causing serious, possibly irreversible, contamination problems.

B. Nagymaros Barrage

* The reduced flow will allow pollutants to settle on the riverbed and seep into the underlying aquifer. Concern over Budapest's water supply is of utmost importance.
* The costs of long-term degradation of the groundwater may be very high.
* The dams will deprive the riverbeds of fine-grained sediments, preventing re-establishment of the natural river bottom filter zone; this will cause a half-metre average drop in the river surface, reducing water extraction from bank-filtered wells.
* Dam construction will necessitate further dredging, which will damage the existing filter layer and allow pollutants to enter nearby water supplies.

C. The Project as a whole

* Installation of a monitoring system to track water quality to create a baseline set of data is essential.
* Development of a 3-dimensional computer modelling system is essential.
* Establishment of a Geographic Information System to integrate the data collected is essential.
* Waste-water treatment works should be a mandatory prerequisite.

<u>May 1989:</u> **INFORT/Ecologia, Gabčíkovo-Nagymaros Barrage System Study: Program Options and Impacts, Interim Report** (HM, Annexes, vol 5 (part 1), annex 6)

A. Impoundment at Dunakiliti

* Substantially diminished flow will simulate drought for the riverine forests, sometimes with irreversible damage.
* Decline in the subsurface water table directly downstream of the Dunakiliti barrage will have negative consequences.
* Mitigation of impacts on the riverine forest ecosystem will be difficult, and there will likely be a major net loss of riverine forest.
* Eliminating the flow of water necessary to support the floodplain ecosystem will undermine the productive base for fish spawning.
* Soil erosion and increased siltation clogging the natural bank infiltration system will occur.
* The water-table will lower by 5-6 m, causing a groundwater depression that affects area wells and the future viability of farming.

B. The Project as a whole

* Recommends suspension of works due to unresolved questions concerning the potential ecological and economic impacts.

<u>August 1989:</u> **Taken by WWF with Regard to the Gabčíkovo Barrage Project** (WWF, Rastatt, HC-M, Annexes, vol 4 (part 1), annex 4)

A. Nagymaros Barrage

* Based on the ecological and technical data, construction at Nagymaros must not be completed.
* The Gabčíkovo barrage must not be operated unless the effects of peak mode on the environment are researched and the necessary mitigation measures taken.
* The landscape will change significantly in the historical part of the Danube.
* Construction should be discontinued for three years to allow for further studies.

B. Impoundment at Dunakiliti

* Considerable drinking water reserves may be endangered by the power plant construction.
* Considerable ecological impacts on the river fauna and on the wetlands generally are expected.
* A significant reduction in the number of fish species is expected.
* Qualitative and quantitative losses to groundwater are expected.
* Impoundment of Dunakiliti should not occur to allow time for further studies.

2. HUNGARIAN STUDIES

1978: **The biological water quality of the Danube between Rajka and Nagymaros** (Éva T. Bartalis in: Hidrológiai Közlöny, 1978 No. 7 at p.311)

* It is expectable that phytoplankton associations of high populations develop in the Danube at low levels, and even at medium levels, if the given trophity is accompanied with favourable water temperature and optimal light conditions. The eutrophic waves detrimental to the intake structures are expected March-May and August-September.

1978: **Research on the efficiency of the seepage canals of the Dunakiliti reservoir. Report** (Endre Varrók, VITUKI, Budapest, 1978)

A. Dunakiliti Impoundment

* The groundwater level is going to fall in the middle of Szigetköz.
* The seepage canals only have effect on a relatively small area.

1979: **Research on the efficiency of the seepage canals of the Dunakiliti reservoir. Summary report** (Otto Haszpra, VITUKI, Budapest, 1979)

A. Impoundment at Dunakiliti

* The groundwater table will rise a maximum of 1.6-1.5 m by the reservoir, and drop a maximum of 4.4-5.2 m in the Szigetköz.

1980: **Tectonic structure of the territory of the planned Nagymaros Barrage and of the region thereof. Report** (Hungarian Geological Institute, Budapest, 1980)

A. Nagymaros Barrage

* There is insufficient data on the movements by the main tectonic lines; the possibility of such movements cannot be excluded.

October 1981: **Working Group of the Hungarian Academy of Sciences, Summary of the Report on the Agricultural and Environmental Impacts of the Gabčíkovo Nagymaros Barrage System** (HM, Annexes, vol 5 (part 1), annex 1)

A. Nagymaros Barrage

* Further studies on expected siltation are needed to prepare the waterworks along the Nagymaros impoundment.

B. The Project as a whole

* An integrated synthesis of agricultural, environmental, and land use concerns are necessary.
* It is necessary to integrate agricultural and environmental regulation into the planning documentation of Gabčíkovo-Nagymaros Barrage System.

November 1981: **Remarks concerning the Gabčíkovo-Nagymaros Barrage System** (Árpád Berczik, János Tóth, Botanic Research Institute of HAS, Hungarian Danube Research Center, Budapest, 1981)

A. Impoundment at Dunakiliti

* Changes in the water level may cause *eutrophication* in the reservoir, endanger *self-purification* of the water, threaten drinking water supplies, render *forestry* in the Szigetköz infeasible, and diminish *agricultural production.*

B. Nagymaros Barrage

Sedimentation can jeopardise the bank filtered *water supplies.*

28 April 1982: Report of the Polinszky (ad hoc) Commission set up by the HAS (detailed report prepared on 13. May 1982)

A. Impoundment at Dunakiliti

* Recommends to undertake a study in which the possibility of discharging 500 m^3/sec into the old Danube instead of 50-200 m^3/sec and of letting water through turbines at Dunakiliti is examined.
* The expected effects on agriculture and forestry remain unresolved due to insufficient data on the functioning of drain systems.
* The hydrology of the Szigetköz as well as hydrobiological aspects of the Project need further investigation

6 September 1982: Minutes of the conference held in National Development Bank on ecological questions related to GNBS (Állami Fejlesztési Bank)

A. Impoundment at Dunakiliti

* Béla Keresztesi (member of HAS, in his letter to the conference): Even a discharge of 500 m^3/sec, rather than the planned 50 m^3/sec, will decrease the *groundwater table* and decisively affect the floodplain forests.
* The decrease of the groundwater table may alter agricultural production by 10%, which is commensurate with a 30-40 million Ft/year loss.

1983: Natural Resources and Economic values of the Győr Basin and the planned barrage system (Mihály Erdélyi in: Földrajzi Értesítő XXXII., 1983 3-4 at pp 475-490)

A. Impoundment at Dunakiliti

* The discharge into the main riverbed (50-200 m^3/sec) is *insufficient* to maintain the high velocity groundwater *movement* necessary for the flushing and carrying away of the *contaminated groundwater* to its discharge zone, the Hanyság swamp.

1983: About some predictable ecological problems and environmental impacts of the Gabčíkovo-Nagymaros Barrage System (János Tóth in: Földrajzi Közlemények XXXI, 1983 no.1 at pp 1-11; HR, Annexes, vol 3, annex 49)

A. Impoundment at Dunakiliti

* The saprobity (i.e., the capability to decompose organic matters) of the Dunakiliti reservoir will decrease.
* *Eutrophication* will increase.
* The connection between the main branch and the side-branches will worsen and thus the possibility of *deposition* and *self-purification* will disappear.

B. Nagymaros Barrage

* Peak mode will destroy the ecological conditions necessary for the breeding of fish.
* Recommends to determine whether the advantages of peak mode operation are comparable with the *damages* resulting therefrom.

<u>1983</u>: **Research on the impacts of the GNBS on water quality. Report** (Béla Hock, VITUKI, Budapest, 1983)

A. The project as a whole

* The decreased water flow will increase the mass of planktonic algae in the growing season.

<u>30 April 1983:</u> **Prognosis of Ecological Impacts Expectable in the Case of Implementation of Gabčíkovo-Nagymaros Barrage System with the Given Technical Parameters** (Report of the Working Group commissioned by the Secretary of HAS on the basis of Res. 30.022/1982 of TPB)

A. Impoundment at Dunakiliti

* Due to the substantial reduction of discharge into the Old-Danube, *stagnant sections* may develop in the main bed and branch system.
* *Algal bloom* in these stagnant sections may develop together with *growth of reed grass.*
* *Flood plain shrubs* may *proliferate,* thus decreasing the capacity of the riverbed to carry off floods.
* Floods may carry the *organic matter* developed in the stagnant sections into the main branch.
* These phenomena may lead to the *deterioration of the water quality* on the section downstream of the project.
* The groundwater table may *increase* close to the surface in the area of the reservoirs.
* The groundwater table may *decrease* in the middle and lower Szigetköz area of the Old-Danube.
* The *structure of agricultural production* may have to be *altered.*
* The high groundwater table may increase the concentration of *magnesium* in the root zone, thereby *decreasing productivity*
* In areas where the groundwater table decreases, *drought* may develop, *floodplain forests* may completely disappear, and the *structure of agricultural production* may have to be *altered.*
* Agricultural production in the area would decrease 10%, resulting in a *50-60 million Ft*/year loss.
* The increase in organic matters and their decomposition will decrease the amount of oxygen and inhibit *self-purification.*
* The 3-4 m high flows coming twice a day from the tail-race canal would bank up the water of the Old Danube, the Mosoni Danube and the Rába, slow the flow down and decrease *self-purification.*
* The deterioration of *water quality* is highly probable.
* Certain *protected species of fish may become extinct.*
* The 10 km^3 *water supply* under Kisalföld may be threatened.
* The preparation of an *Environmental Impact Assessment* is recommended.

B. Nagymaros Barrage

* Organic matters may burden the lower section of the Old-Danube.
* On the Gönyű-Komárom-Nagymaros section, the diminished flow may cause the growth of floating flora and fauna, thereby *adversely impacting water extraction.*
* Due to peak mode and resulting water level changes, the *flora and fauna on the banks* of the river will be damaged
* *Organic matters* banked up in the side branches during peak-mode will burden the lower sections.
* *Colmatation* along the Gönyű-Nagymaros section is expected.
* Water extraction may be jopardised by the growth of organic matters in the Danube

20 December 1983: Presidency of the Hungarian Academy of Sciences Statement, Position Paper concern the Ŝcientifically Debated Question of the Gabčíkovo-Nagymaros Barrage System (HC-M, Annexes, vol 3, annex 36).

A. The Project as a whole

* The general danger to the environment appears worse than predicted.
* No survey has ever been prepared in which technical, ecological, economic and related risks are analysed in an integrated manner.
* A comprehensive environmental impact assessment must be prepared within 2 years.

29 March 1984: The effect of GNBS on the water quality of the Danube. Interim Report (József Németh, VITUKI, Water Quality Protection Institute, Budapest, 1984)

A. Impoundment at Dunakiliti

* Even at 700-1800 m^3/s there is no communication between the main bed and the side branch system in the *Szigetköz*; only the lower, open sections of the branches have direct connection with the main flow.
* The *trophity* of the side branches in the *Szigetköz* is larger than that of the main flow. The zooplankton species are unique to a medium eutrophicated and polluted water flow.
* The sedimentation below Bratislava will increase from the present 30% (of the suspended material) to 55% in the *Hrušov reservoir*.

1985: Comparative hydrobiological studies in the main and side arm of the Danube at Ásványráró in 1984 - Phytoplankton and chlorophyll-a content (In German) (J. Németh - F. Skobrák, 25. Arbeitstagung der IAD Bratislava. Wissenschaftliche Kurzreferat, at pp. 237-241)

A. Impoundment at Dunakiliti

* The *trophity* of the water of the Danube will *increase.*

1985: Effects of the Gabčíkovo-Nagymaros Barrage System on the ecological conditions of the forests in Szigetköz. Manuscript (Lajos Halupa, Manuscripts, Forestry Research Institute, Budapest, 1985)

A. Impoundment at Dunakiliti

* The *productivity* of commercial forests in the Szigetköz would *decline* to one third of the present potential if the groundwater level decreases by 2 m.

<u>17 February 1985:</u> Proposal for a realistic modification of the Joint Contractual Plan (prepared by Károly Perczel and 7 other experts)

A. Impoundment at Dunakiliti

* Recommends the discharge of *600 m^3/sec* into the main riverbed at Dunakiliti through turbines instead of a draining system.
* There will be *eutrophication* in the Danube
* The cleaning effects that the islands on the Szigetköz section have on the Danube's water will no longer take place.
* The deposition and decomposition of organic matters will damage the *potable water supplies*.
* 4000 ha will be deprived of water that previously reached the root zone. The decrease in the groundwater table will damage *agriculture*.
* There is no evidence that a *draining system* works in practice.
* 1400 ha *forest* will be cut off due to the expected 1.5-6 m decrease in the groundwater table in the Szigetköz.

B. Nagymaros Barrage

* *Colmatation* in the Nagymaros reservoir will result in the *drying out* of bank filtered wells.
* The *karst water* of the Dunántúli Középhegység (Transdanubian Middle Range) will be *polluted*.

<u>March 1985</u>: GNBS Water Quality Research. Report on the research conducted in 1985 (Béla Hock, Water Quality Protection Institute of VITUKI, Budapest, 1985)

A. Impoundment at Dunakiliti

* The *trophity* of the water will increase.
* The *side branches* will cease to flow, resulting in the increase of *trophity* in these branches.
* *Eutrophication* of the Danube will occur; larger algae will proliferate.
* The *suspended material* will be sedimented at certain places; oil emulsion absorbed on its surface will accelerate this sedimentation.
* Recommends that certain parts be dredged.
* Recommends the formulation of plans to contain the extent of trophity and allow rapid draining of the reservoir if needed.
* Several plant and animal species may be substantially *diminished*.
* In the summer months the water may need to be aerated artificially.
* Recommends forming rules of operation to provide for flushing below Dunakiliti and under Gabčíkovo with a larger discharge.

B. Nagymaros reservoir

* The living conditions for the *biota living on the bank* will be drastically changed by peak mode operation.
* Dredging may be needed because of sedimentation.
* The bank-filtered wells may be adversely affected by sedimentation.
* The water filtered through the sediment will be short of oxygen, and will contain dissolved iron, manganese, carbon dioxide, ammonia, hydrogen sulphide and also organic matter; yet dredging

to alleviate this will damage the biological film, and also deteriorating the quality of the extracted water.

<u>June 1985</u>: **National Water Board for Environmental and Nature Protection, The Gabčíkovo-Nagymaros Barrage System, Environmental Impact Assessment, Summary**. (HM, Annexes, vol 5 (part 1), annex 4.)

A. Nagymaros Barrage

* Examination of the bank-filtered water basis and its quality aspects must be continued.

B. The Project as a whole

* Research of the temperature balance and evaluation of the sedimentation processes and ice conditions, particularly their water quality and biological impacts, must be continued.
* Measurement of the groundwater movements must be continued.
* Examination of the structural stability of the biotopes in the water must be continued.

<u>28 June 1985:</u> **Hungarian Academy of Sciences, Opinion.** (HC-M, Annexes, vol 3, annex 39)

A. Nagymaros Barrage

* Siltation will start and the pores in the riverbed will be choked.
* The yield of the bank-filtered wells will fall.
* Regular dredging of the mud will need to be carried out.

B. The Project as a whole

* The incomplete state of the ecological research has not ceased to exist with the completion of the EIA.
* The EIA deals with the impacts to be expected upon the realisation of the Joint Contractual Plan or of its modernised concept, and thus an examination and assessment of the impacts to be expected from alternative technical solutions has been neglected.
* Conducting further research is necessary to make the expected impacts more accurately definable.
* Prior to 1977, only a few preliminary studies exploring the expected ecological impacts had been prepared and their synthesis was missing.
* The studies conducted since 1977 are of no full value or need more time to be completed.
* A uniform monitoring network should be established immediately.

<u>28 June 1985</u>: **Opinion concerning Károly Perczel's proposal, based on the conference held 21 June 1985** (Hungarian Academy of Sciences)

A. Impoundment at Dunakiliti

* Recommends a *minimum 600* m^3/sec discharge into the main riverbed.

B. Nagymaros Barrage

* *Peak mode operation* shall *not* be allowed until all the *sewage* on both sides of the river can be completely cleaned.
* Peak mode operation raises concerns about damage to the bank-filtered water supplies.

C. The Project as a whole

* GNBS should only be set into operation after sewage plants are totally completed, thus lessening expected ecological damages.
* There has been no comprehensive study on the ecological impacts.

<u>December 1985</u>: **The effect of hydrological regime on the primary production in the main stream and the side arms of the Danube** (Milan Ertl in: Arch. Hydrobiol. Suppl. 68, Stuttgart December 1985, at pp. 139-148)

A. Impoundment at Dunakiliti

* On the basis of the study of the main stream of the Danube at Gabčíkovo and the adjacent side-arm system negative correlation has been found between annual averages of discharge and primary production. In the side arms the highest production rate of phytoplankton was connected with a slow and constant current.

<u>1986</u>: **The Water Quality of the Danube** (Pál Benedek, in: Hidrológiai Közlöny 1986, Year 66., No. 4-5 at pp. 193-205)

A. Impoundment at Dunakiliti

* The decreased water flow will increase trophity (and the number of algae).

<u>1986</u>: **Summary of the works so far completed in the field of geosciences within the framework of the agreement on the co-operation between the Hungarian and Slovak Academies** (Research Institute of HAS on Geosciences and Agrochemics, Budapest, 1986)

A. Impoundment at Dunakiliti

* The *groundwater level* drop in certain regions of the Szigetköz will halt *capillary action*, adversely affecting the water supply of plants and crops.
* The majority of the area of Mosonmagyaróvár will suffer from the *decrease in groundwater, 2-3 m* at the inundation dyke, and *4 m* near Doborgaz sziget.
* Where the groundwater is currently in the cover layer, the 100-200 mm water supplying the plants from groundwater will disappear.
* The lack of water coming from groundwater may *diminish* the *variety* of plants, the *crop yield* and the *safety of production.*

<u>1986</u>: **Report on the works done for VIZITERV in 1986** (Prepared by the Research Institute of HAS on Geosciences and Agrochemics, Budapest 1986)

A. Impoundment at Dunakiliti

* The decrease in the flow of certain side branches and the frequency of inundations of the floodplain will lead to the *degradation of* the present *ecosystems.*
* The side arms will receive water only for a few days/year, severely affecting the *aquatic biosystem* and riparian *flora and fauna.*
* Above the *impoundment at Dunakiliti* the groundwater table will rise to a level equivalent to that of floods.
* *Between Dunakiliti and Szap* the water-table will decrease significantly, up to 4 m

* The lack of water coming from groundwater may *diminish* the *diversity* of plants, the *crop yield* and the *safety of production.*

<u>August 1986</u>: **Optimal groundwater level of the forests affected by the water recharge system in the Szigetköz and the changes therein. Report to VIZITERV** (Lajos Halupa, Institute of Forestry Sciences, Department of Forest Management and Wood Production, Budapest, 1986)

A. Impoundment at Dunakiliti

* Timber production will decrease to 1/3 of the present.

<u>12 November 1986</u>: **Ecological conditions of Szigetköz. Report to AGRIT** (Lajos Halupa, Institute of Forestry Sciences, Department of Forest Management and Wood Production, Budapest, 1986)

A. Impoundment at Dunakiliti

* Due to the infrequency of floods, the naturally thin cover layer will not provide sufficient water to plants in the growing season and the soils will deteriorate in quality.

<u>1987</u>: **Report on the works done for VIZITERV in 1987** (Prepared by the Research Institute of HAS on Geosciences and Agrochemics, Budapest 1987)

A. Impoundment at Dunakiliti

* The supply of water for the plants from the groundwater through *capillary action* will diminish.
* The water level in the *side branches* and *meanders* will decrease.
* Pollution of the groundwater and of inland waters will increase.
* In the region of Győr, carbonate accumulation will decrease soil productivity and the thickness of the productive layer.
* The gravel layer will be clogged by the fines washed out of the cover layer, causing a decrease in soil productivity.

<u>1987</u>: **Phytoplankton studies in the Kisalföld section of the Danube in 1981- 1982** (Keve Tihamér Kiss in: The ecology of the Kisalföld section of the Danube At pp. 77-102, Veszprém 1987)

A. Impoundment at Dunakiliti

* The trophity of the side-arm system and the number of algae to be found therein increase with diminished discharge, i.e., the decrease of the water discharge will rapidly result in the eutrophication of the river.

<u>1987</u>: **Certain characteristics of the oxygen conditions in the Kisalföld section of the Danube** (Zsuzsa Dvihally in: The ecology of the Kisalföld section of the Danube, at pp. 102-119, Veszpém 1987)

A. Impoundment at Dunakiliti

* Self purification will be lost if the side arms are disconnected from the main branch.

<u>1987</u>: **Dissolution of the ecological equilibrium of the floodplain forests in the region below Bratislava** (József Cifra in: The ecology of the Kisalföld section of the Danube, at pp 215-226, Veszprém, 1987)

A. The project as a whole

* The ecological stability of the floodplain forests by the Danube is dependent upon the groundwater level, the latter being strongly connected the water level of the Danube.

<u>1987</u>: **Research on the connection between the Danube and the karstic reservoir system on the area impacted by Gabčíkovo-Nagymaros Barrage System, Preliminary report** (Árpád Lorberer, VITUKI, Budapest, 1987)

A. Nagymaros barrage

* The karst system has a direct connection to the Danube at Esztergom, and is connected indirectly at Almásneszmély. The karst water level has dropped to below that of the Danube in 1983-1984 at Esztergom.

<u>1987</u>: **Gabčíkovo-Nagymaros Barrage System Monitoring system. Assessment of water quality. Report** (Béla Hock, VITUKI, Budapest, 1987)

A. The project as whole

* The reduced flow velocity will increase the biomass.

<u>1987</u>: **GNBS Nagymaros Barrage. Water supply of the complexes located on the banks. Report** (László Bárdóczy, Sándor Mikolics, VIZITERV, Budapest, 1987)

A. Nagymaros barrage

* The water supplies at Dobos-hegy and Kórház will become unusable; the replacement of these requires urgent measures.

<u>13 May 1987</u>: **The expectable effects of the GNBS on soils (Summary of the works done within the framework of the agreement on the co-operation between the Hungarian and Slovak Academies in the field of geosciences in 1986-1987)** (Research Institute of HAS on Geosciences and Agrochemics, Budapest, 1987)

A. Impoundment at Dunakiliti

* the possibility for capillary water supply to the plants from the groundwater will diminish.
* the water level in the *side branches* and in the *meanders* will decrease.
* in the areas where groundwater level rises, the danger of polluted groundwater and inland waters will increase.
* In the region of Győr, carbonate accumulation will decrease soil productivity and the thickness of the productive layer.
* The gravel layer will be clogged by the fines washed out of the cover layer, causing a decrease in soil productivity.

<u>1988</u>: **Research on the connection of the Danube and the karstic reservoir system on the area impacted by GNBS. Report** (Árpád Lorberer, VITUKI, Budapest, 1988)

A. Nagymaros barrage

* The water quality of the karstic reservoir will deteriorate.

<u>1988</u>: **Studies into water, sediment and hydrobiology on the Danube and on its side waters. Report** (Katalin Zotter, VITUKI, Budapest, 1988)

A. Impoundment at Dunakiliti

* According to experiments conducted in the Ásványi branch of the Danube, lower flow velocities cause an increase in biomass.

B. Nagymaros barrage

* Iron and manganese is expected to appear in the bank-filtered water.

September 1988: Standpoint of the ad hoc Committee of the Hungarian Academy of Science on the possibilities to abandon the Nagymaros Barrage and the consequences thereof

A. Nagymaros Barrage

* There will be an increased risk of *contamination* of drinking water.
* There is a danger of decreased *bank-filtered water* supply.
* Problems with disposal of *polluted sediment* generated in the reservoir
* Damage to the ecosystem, *degradation of the genetic stand.*

4 September 1988: Statement prepared by the Danube Circle based upon the conference on the topic "Barrages on the Danube". (The conference was held in Budapest between 2-4 September in the organisation of the Danube Circle, WFN, International Rivers Network, with the participation of about 500 persons. Contributions to the conference: for instance Árpád Berczik, János Szentágothai, Gábor Vida)

A. Impoundment at Dunakiliti

* By discharging the water into the by-pass canal *the bank filtration system* will cease to exist.
* The *bank-filtered wells* on the section above the power plant are threatened by the deposition of polluted suspended sediment.
* *The draining system* will not mitigate harmful affects of lowered groundwater levels because of *colmatation.*
* *Eutrophication* is expected in the reservoirs.

B. Nagymaros Barrage

* The deposition of polluted sediment will jeopardise the supply of the bank-filtered wells.
* The *flora and fauna* in the area will degrade.
* Recommends the suspension of works at Nagymaros.

October 1988: Results of long-term zooplankton investigations in the Danube in Hungary (A. Bothár in: Verh. Internat Verein Limnol., Stuttgart Oktober 1988, at pp 1340-1343)

A. The project as a whole

* Strong risk of increased eutrophication in the Danube.

1989: Water quality issues concerning GNBS: Models and Applicability (László Somlyódy, HC-M, Annexes, vol 4 (part 2), annex 13)

A. Dunakiliti Impoundment

* Suspended sediment transport changes, i.e., a decrease in the transport of bedload, and an increase in the depositing ratio of suspended load.

* Change in the volume, particle-size, and distribution of bed-silt, and also the volume, quality and distribution of pollutants bonding to the granules.
* A change in water temperature.
* Increase in water transparency.
* A basic change in trophity conditions;
* Oxygen management will be greatly modified.
* Unfavourable changes to the water quality are expected to take place in the shallow parts of the reservoir.
* Dredging will be necessary. Efforts must be made to find an appropriate storage place for the silt, greatly polluted with heavy metals and possibly other toxic materials.
* There will be algal bloom in the shallow parts of the reservoir.
* All the above will possibly affect water quality conditions in the Old Danube (in the upstream section), and the quality of seepage waters.
* The biomass can be expected to double on the section below the Dunakiliti reservoir.

B. Nagymaros Barrage

* There will be increased volumes of living and dead algae downstream of the barrage.
* Degradation of the riverbed under the reservoir is expected, decreasing the thickness of the filtration layer which will effect the bank-filtered water quality.

1989: Statement of the General Committee on Microbiology on the expectable impacts of the Gabčíkovo-Nagymaros Barrage System (in: Magyar Tudomány, 1989, vol 34, No 6 at pp 515-517)

A. The project as a whole

* Changes in the flow of the river will have serious negative effects on the microbiological *self-purification* of the Danube.
* There is a high probability that the Danube will *eutrophicate*.

1989: The connection between river and groundwater at the extraction of bank-filtered water supply (A. Kontur at IAWPRC Conference on Water Pollution Control in the River Danube Basin, Beograd, 1989)

A The project as whole

* It is detrimental to diminish the filter layer by dredging or by other technical measures, or to create such conditions that may lead to colmatation.

1989: Hydrobiological conditions of the section of the Danube in the impact area of GNBS. Report on the research conducted in 1987-1988 (Pál Gulyás, VITUKI, Budapest, 1989)

A. Impoundment at Dunakiliti

* The fact that the side-arm system will have no connection with the main riverbed will lead to the degradation of the fish fauna.
* Several species will disappear.
* The supply of the stock of fish in the Danube will be substantially affected.
* The structure of phytoplankton in the side-arms will fundamentally change.

<u>1989</u>: **Genetic values of Szigetköz** (Gábor Vida in: The flood after us, Danube Circle - Department of Political Sciences ELTE Faculty of Law, Budapest, 1989)

A. The project as a whole

* The pattern of the stands will change, reducing the genetic diversity of species

<u>April 1989</u>: **Environmental effects of the barrage system on the Danube at Gabčíkovo-Nagymaros** (Károly Perczel, George Libik in: AMBIO 1989, vol. 18 No 4 at pp 247-249)

A. Impoundment at Dunakiliti

* Peak mode operation will cause untreated urban and industrial sewage water to flow back and forth along the riverbanks in the area of Győr

B. Nagymaros barrage

* The change in direction of flow between the karst water and the Danube as a result of increased water level, will spoil the karst water supplies.

C. The project as a whole

* The capacity and water quality of the bank-filtered wells will decrease.

<u>12 June 1989</u>: **Summary report on the expectable effects of GNBS on soils. Manuscript** (György Várallyay, Research Institute of HAS on Geosciences and Ågrochemics, Budapest, 1989)

A. The project as a whole

* Where the groundwater table drops, the concentration of organic matter in the soils will decrease, the structure of the soil will worsen.
* Where the groundwater loses its connection with the root zone, 50-100 mm water supply will be lost annually, increasing the plants sensitivity to drought.
* Where the groundwater level rises, the risk of inland waters is growing, secondary sodification is expectable and anaerobe processes will prevail.

<u>23 June 1989:</u> **Hungarian Academy of Sciences, Report on Environmental, Ecological, Water Quality and Seismic Impacts of the Nagymaros Barrage Construction or its Cancellation** (HM, Annexes, vol 5 (part 1), annex 7)

A. Impoundment at Dunakiliti

* There is no way to avoid the deterioration in water quality owing to the inevitable intensive growth of algae
* The impact of dissolved materials from the asphalt and the durable and grave risk primarily to drinking water has to be analysed.

B. Nagymaros Barrage

* Abandoning the Nagymaros Barrage would be beneficial for the drinking water supply and bank-filtered water.
* Damage caused by the deposition of the pollutants are mainly expected on the Lábatlan-Nagymaros stretch.
* Certain parts of the Szentendre Island wells will be unfavourable influenced in the longer-term.

* Modifications of the water regime and the physical, chemical and biological characteristics of the soils are expected.
* The biochemical material balance of the soil will change unfavourably.
* Biological activity and soil productivity will decrease.
* The soils sensitivity to drought and excess water will increase.
* Microbe colonies typical of fertile soils will be destroyed, therefore the biological nitrogen absorption will decrease, the soil structure will ruin, and the yield will diminish.
* Serious nature protection and landscape aesthetic values will be endangered.
* The significant degradation of the biocoenoses owing to the likely changes in hydrodynamic conditions is definite.
* Research so far cannot evaluate the seismic safety of Nagymaros.
* The further deterioration of the water body trophity conditions and smaller or larger, unwanted sedimentation is expected.
* Peak power has to be excluded for hydrobiological, ecological, water quality reasons.

C. The Project as a whole

* The 1985 EIA is imperfect and contains contradictions especially from the hydrobiological, bacteriological and water quality points of view.
* The layers penetrated by the rising groundwater surface were never considered, despite the fact cemented layers, toxic zones, etc., may arise.
* A serious deficiency is that the comprehensive geological report analysing the whole area of the barrage system, and the detailed map showing the depth of the gravel layer were not available.
* It seems necessary to prepare a summary report on the comprehensive geological-tectonic, applied geological, hydrogeological, environment geological, regional pollution sensitivity, and the transmissivity surveys of the first geological layer under the soil.
* A more accurate determination of the seismic risk is necessary.
* Environmental, ecological and water quality impacts were not properly taken into account during the design and construction.
* Due to the complexity of the ecological processes and the lack of measured data and relevant calculations, the environmental impacts cannot be evaluated .

<u>July 1989</u>: Agenda and Guarantees for the prevention of the deterioration of water quality of the Danube (Ministry of Environment Protection and Water Management)

A. Nagymaros Barrage

* *Eutrophication* is expected since the number of algae will increase by 2-5 times at Dunakiliti and, if constructed, at Nagymaros
* In certain areas of the reservoirs, sedimentation is expected and local *shortage of oxygen* may also occur.
* The sedimented heavy metal will filtrate into the groundwater.
* Due to the increased groundwater level the filtration into karst water upstream of Nagymaros may increase.

<u>3-7 July 1989</u>: **Standpoint of the expert committee set up by the president of the Central Geological Office on the basis of Resolution 1071/89 (VI. 15.) of the Government on the geological-geophysical questions concerning the construction of the GNBS** (Central Geological Office, Budapest, 1989)

A. The project as a whole

* The plans of the GNBS were not supported by adequate geoscience examinations.

<u>10 July 1989</u>: **Seismic stability of the barrage system to be constructed at Gabčíkovo-Nagymaros. Expertise** (Endre Dulácska-Ferenc Hunyadi, Budapest, 1989)

* The embankment of the Dunakiliti Reservoir does not satisfy seismic standards.
* The embankments are not high enough to withhold the wave generated as a result of the maximum credible earthquake.

<u>August 1989</u>: **Remarks on the report of the II/a. expert Committee set up by the Hungarian Government for the examination of environmental questions related to GNBS** (Workers of the Biological Center Szeged, Szeged 1989)

A. Impoundment at Dunakiliti

* The discharge into the old Danube bed is not enough to maintain freshwater conditions.

B. Nagymaros Barrage

* Peak mode operation allows for a limited flushing of the reservoir bed, but 5-10 cm silt/year would still be deposited.
* Sedimentation in the reservoir will increase, necessitating dredging.
* Peak mode operation can result in the pollution of bank-filtered wells.
* Under peak mode operation the collected sewage would simultaneously be released, causing a more concentrated sewage to travel down the Danube at one time.
* The riverbed would be permanently changing under peak operation.
* The banking and peak mode operation would substantially affect the ecology of the Győr section of the Mosoni-Danube and Rába and Rábca.
* There is a greater possibility of colmatation under peak operation conditions.

C. Project as a whole

* There is no geophysical documentation of the whole GNBS
* Results of the geophysical surveys done on the Slovak side are not available.

<u>15 August 1989</u>: **Expertise on the seismic stability of the earthworks of the Gabčíkovo-Nagymaros Barrage System. Manuscript** (Prof. Dr. Béla Goschy, Budapest, 1989)

A. The project as a whole

* The earth dams do not correspond to regulations on seismic stability.
* Slope stability is not secured, and collapse is possible.
* The risk of liquefaction prevails in the middle section of the foot of the dam.
* The above may lead to the busting of the dams, and in extreme cases to the total demolition of long sections.

<u>September 1989:</u> **The Hardi Report, Summary for the Council of Ministers of the results of an Expert Review concerning the Ecological, Environmental, Technological, Economic, International, and Legal Issues of the GNBS** (Committee of Independent Specialists; HM, Annexes, vol 5 (part 1), annex 8)

A. Impoundment at Dunakiliti

* Deterioration in the conditions of obtaining and supplying potable water
* Deterioration in the self-purifying capabilities of the river and a consequential decline in water quality as a result of eutrophication
* The decimation, even the destruction, of the natural flora and fauna
* The nutrient supply in the soil will be changed substantially, and over a longer period the structure of the soil will change.
* The barrages would dramatically transform the original hydrological conditions of the Danube and would damage the physical, chemical and biological filtration capabilities of the riverbed.
* The potential for water production with bank-filtered in the Szigetköz area would be completely lost.
* In the area of the Kisalföld, the quality of the hitherto perfect underground water reserves would be endangered.
* The concentration of toxins in the deposited silt would increase manifold.
* The Barrage system would lead to a deterioration in water quality.

B. Nagymaros Barrage

* The water production of the bank-filtered wells is adversely affected by the construction of the Nagymaros barrage

C. The Project as a whole

* No research has been undertaken to assess the potential genetic resources in the region
* No adequate monitoring system has been developed.
* No documentation is available to assess the complete barrage system from a geological and geophysical perspective, nor have the results of research been consolidated.
* It is absolutely necessary to perform a complex geological analysis across the entire impact area of the Barrage system.

<u>5 September 1989</u>: **Opinion concerning the study of the Ministry of Environment protection and Water Management entitled "Assessment of the versions listed in point V. Res. 3205/1989 (VII. 20.) of the Hungarian Government"** (Prepared by the independent expert committee set up by the Hungarian Government, Internal Document)

A. Impoundment at Dunakiliti

* As a result of peak mode operation the filtration layer in the Szigetköz would change.
* Even without peak mode, the groundwater supply of Szigetköz would be damaged.

B. Nagymaros Barrage

* The monitoring system is not developed sufficiently .
* Downstream of Gönyű the *bank-filtration system* would be damaged by *sedimentation.*

__18 September 1989:__ **Remarks of the Danube Circle on the GNBS** (Budapest, 1989)

A. Impoundment at Dunakiliti

* The diversion will stop infiltration through the gravel layer depriving the groundwater of clean water supplies, thus polluting the groundwater
* As a result of *the deposition of silt* and the death of *algae*, 3-5 million m^3 polluted sediment would be generated.

B. The Project as a whole

* The seismic risks have not been assessed.

__20 September 1989:__ **Remarks of the Environment Protection Group of Bajcsy-Zsilinszky Association on the materials prepared by the Ministry of Environment Protection to the Commissions II/1-3** (Budapest, 1989)

A. Impoundment at Dunakiliti

* The planned water recharge system in the Szigetköz raises severe problems.
* Despite the continuous recharging, the side branches will *cease to be living water*
* The increased infiltration of the water will accelerate *colmatation,* also intensified by sedimentation
* Intensive colmatation would increase *the pollution of the groundwater* .
* As a result of colmatation, the connection between the river and the groundwater would disappear, and thereby decrease the *groundwater table.*
* Recommends a discharge between 600-1000 m^3/s and 2000-3000 m^3/s in order to aid the recharging of the Szigetköz.

__November 1989__: **Water, sediment and hydrobiological researches in the Danube, the branch water flows and the side branches. Report to VIZITERV** (Katalin Zotter, Water Quality Protection Institute of VITUKI, Budapest, 1989)

A. Impoundment at Dunakiliti

* In the *reservoirs* the *phytoplankton* of the Danube will at least *double* on average.
* The *sedimentation* of the suspended material in the reservoirs will lead to the increased *accumulation of oil* in the sediment, and to the increased concentration of toxic and organoleptic materials in the sediment.
* *Heavy metals* will be deposited in the reservoir.
* At certain parts of the reservoir the dominance of *ciano bacteria* is likely to develop which would be disadvantageous for water extraction

B. Nagymaros Barrage

* On the section of the *Danube between Rajka and Budapest,* anything that would *slow down the flow* of the river results in the increased *eutrophication* of the Danube.
* The *sedimentation of the heavy metal attached to the suspended material* is primarily expected on the section between Lábatlan and Nagymaros, should the Nagymaros barrage be set into operation

3. CZECHOSLOVAK STUDIES

1981: The Biological Aspects of the Construction of Barrages on the Danube (Imrich Daubner, Limnological Section, Institute of Experimental Biology and Ecology, Slovakian Academy of Sciences; lecture given 11th October 1979 on the meeting of the Department of Biological Sciences of HAS)

A. Impoundment at Dunakiliti

* 28% of the total forested area will be destroyed.
* Due to the planned 1-3 m drop in groundwater levels along the power canal, the entire area lying between the canal and the original riverbed will become unsuitable for the native forests.
* Due to the 1- 3 m rise in the ground water levels in the region of the dam at Hrušov, pollutants will seep through the infiltration zone causing a significant drop in groundwater quality.

B. The Project as a Whole

* The total fish fauna between Bratislava and Nagymaros are expected to incur losses of 57%,
* Fish production and fishing in the same reach are expected to incur losses of 57% and 87% respectively.

1982: Problems of the Danube Barrage from the ecological perspective (Juraj Holčik, in: Pamatky a priroda 1982, No 8 at pp 486-493)

A. Impoundment at Dunakiliti

* The abandoned riverbed of the Danube will drain the groundwater, thus causing a 0.5-4.0 m drop in the groundwater table by the banks.
* Inundations will cease to occur.
* The side branches will lose their connection with the Danube.
* Several isolated ecotypes arise from the area of the delta that have formed a homogenous ecosystem in the past.
* The structure of biocoenoses will change and the diversity of species will decrease.
* 30 species of mammals will disappear representing 75% of the population in this area, and 130 species of birds, representing 54%.
* The decrease in the groundwater level will desiccate 6,700 ha leading to fast mineralisation.

B. The project as a whole

* The implementation of the measures proposed in the Bioproject is not guaranteed and is postponed indefinitely after the completion of construction work.

18 February 1988: Viewpoint of the 10 member expert team of the Czechoslovak Academy of Sciences commissioned by the Czechoslovak Ministry of Forestry and Water Management

A. Impoundment at Dunakiliti

* Hydrological and hydrogeological conditions will substantially change.
* The canal system will affects groundwater levels.
* The canal dries out the area more than necessary and alters refined soil structure volumes causing cracks on the ground and on buildings.

* Unfavourable effects due to unsatisfactory levels of natural ground wetness are expected to be witnessed.
* Water levels decreased on 50,000 ha below Vojka due to the barrage system.
* Due to the dyke insulation cover groundwater recharge would have been only possible via the bottom.

<u>September 1988</u>: **Barrages on the Danube from the ecological perspective. Summary of warnings, prognoses and suggestions concerning the negative effects of GNBS** (Summary of the concerns raised by the Bratislava Municipal Committee of the Slovak Landscape and Environment Protection Association, Bratislava 1988)

A. Impoundment at Dunakiliti

* A large amount of often toxic alluvial sediment is expected to deposit in the reservoir.
* Eutrophication plus nitrogenisation and phosphorisation will occur.
* Sedimentation in the reservoir reduces infiltration thus jeopardising the supply of groundwater.
* Dredging of this sediment may harm the infiltration layer and worsen water quality as a result.
* The 50-200 m^3/s water discharge planned for the old Danube is insufficient, a minimum of 600 m^3/sec is needed.

B. The project as a whole

* Agricultural production will reduce by about 39,000 tons a year on the impacted area, converting the loss into the equivalent mass of wheat.
* The mass of fish fauna between Bratislava and Nagymaros will reduce by 57%.

<u>14 November 1988</u>: **Standpoint of Ecological Section, Czechoslovak Biological Society at Czechoslovak Academy of Sciences, to the water dams system Gabčíkovo-Nagymaros** (HC-M, Annexes, vol 3, annex 43)

A. Impoundment at Dunakiliti

* The reduced water levels in the Old Danube will disrupt aquatic ecosystems and severely complicate fish migration of fish.
* The alluvium will contain sediments that contain heavy metals and other pollutants which will be extracted from the bottom of the dams
* The Danube water quality will deteriorate and the drinking water stores in the Danube Basin area will be endangered.
* The decrease in the groundwater level will lead to the extinction of meadow forests in an area of at least 50 km^2.

B. Nagymaros Barrage

* There will be a decline of water levels downstream of Nagymaros which will also manifest itself by the loss of water in wells.
* There will be very significant negative consequences on the Czechoslovak side as well.
* Recommends abandoning Nagymaros in order to diminish the negative ecological impacts of the whole system.
* Recommends the immediate implementation of an efficient system of supervision, independent from designers and constructors.

C. The Project as a whole

* GNBS represents a considerable and unprecedented interference to the country, accompanied by marked ecological, economic, social, political and other consequences, which will manifest themselves throughout many decades or even centuries.
* It is necessary to re-evaluate the whole project and its realisation
* There will be direct damage, or even destruction, of a large part of natural ecosystems.
* There will be local social structural damage and endangerment or destruction of known and potential archaeological and cultural monuments.
* In general, negative effects will have a long-lasting or even permanent character.

July 1989: The Danube water works with the eyes of an Ecologist (Mikulás J. Lisicky)

A. Impoundment at Dunakiliti

* To prevent the drain effect of the Old Danube, the water level must be kept at the mean-water level, at least in the growing season.
* There will be increased sedimentation of organic matter, resulting in anaerobic decomposition on the bottom of the reservoir.

B. Nagymaros barrage

* Waterlogging of several thousand hectares of soil may occur
* In areas with mineralised groundwater, the soil may become oversalinated.

October 1989: Ecological Questions of the Gabčíkovo-Nagymaros Barrage System Seminar in Bratislava organized by Ministry of Forestry, Water Management and Wood Processing of the Slovak Republic and the Slovak Commission of the Czechoslovak Scientific-Technical Association (Reported in Hidrológiai Közlöny 1989, vol 69 No 5 at pp 309-311)

A. Impoundment at Dunakiliti

* The *quality of groundwater* is going to deteriorate as a result of the Barrage systems
* A discharge of *600 m^3/s* shall be discharged into the old riverbed of the Danube.

Annex 11

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-8/B/3/1994

Budapest, 6 September 1994

Sir,

Re: Case concerning the Gabcikovo-Nagymaros Project (Hungary/Slovakia)

I refer to your letter of 9 August 1994, forwarding a copy of a communication from the Agent of Slovakia dated 3 August 1994. In that letter the Agent of Slovakia declined to provide to Hungary any documents except through the channel of the Court, on the ground that "this is not the correct procedure for the submission of evidence in a case before the Court once both Memorials have been filed". This misconceives the purpose of the Hungarian request, which was to gain access to certain documents referred to by the other party with a view to determining whether those documents *should* be put in evidence before the Court as annexes to subsequent pleadings.

Having regard, however, to the attitude of the Agent of Slovakia, I would be grateful if you would ask him to provide, through you, a copy of each of the documents listed in the attachment to this letter. Those marked with an asterisk have already been requested from the Slovak Government but have not been provided. I would be grateful if you would ask him to provide each of the listed documents as soon as possible.

Accept, sir, the assurances of my highest consideration.

Dr György Szénási
Agent of the Republic of Hungary

Mr Eduardo Valencia-Ospiña

The Registrar

International Court of Justice

Palais de la Paix

2517 KJ The Hague

The Netherlands

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

List of Documents/ References Requested from the Slovak Party

* 1. The special reports presented in stages to the Hungarian Academy of Sciences on the Bioproject, referred to on page 52, footnote 10 of the Memorial.

*2. The study compiled by URBION (1986) updating the Bioproject, referred to in para .2.22, page 54 of the Memorial.

*3. The "Summary documentation on the G/N Project", study number 15 in Annex 24 of the Memorial.

*4. The following studies on forest ecosystem, groundwater, location alternatives, protection referred to in Annex 24 of the Memorial, and numbered: 14,23,77,106,107,108,109,110, 114, 118.

*5. The studies done by VITUKI, Budapest, on the regulation of groundwater levels in the areas adjacent to the old riverbed, referred to in para.2.16, page 51 of the Memorial.

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6. In the event that the special reports referred to in page 52 footnote 10 of the Slovak Memorial (item 1 above) are summaries of the Bioproject, a list of the closing reports, published volumes, articles, unpublished works which are said to constitute the Bioproject.(Slovak Memorial page 51, paragraph 2.18).

7. Gabcikovo hydroelectric power plant on the Danube river (CSSR), conclusions of consultations on technical project, Gidroproject, Moscow, 1972 (cited in Slovak Memorial, p. 74).

8. Hrasko, Final layout of the Gabcikovo project with regard to tectonic conditions. HYCO Bratislava, 1974 (cited in Slovak Memorial, Volume III., page 154).

9. Dr. J. Janacek, Dionyz Stu˘r Geological Institute, Bratislava: Geologic assessment and evaluation of definitive siting of the Gabcikovo step (cited in Slovak Memorial, p. 73).

10. Dr. I. Broucek (ed.), Geophysical Institute, Slovak Academy of Sciences, Bratislava(1975): Seismicity of Slovakia and its relation to the structure of the Carpathian region. Final report, (cited in Slovak Memorial, p. 73.).

11. Ing. A.Molnar, Geophysical Institute, Slovak Academy of Sciences, Bratislava(1977): On potential earthquake hazard at the Gabcikovo water work (cited in the Slovak Memorial, p.73) .

12. Hobst: Investigation of dynamic characteristics of headwater canal dykes (consultations with Soviet Union). HYCO Bratislava, 1979 (cited in Slovak Memorial, Volume III, page 151).

13. Gabcikovo hydroelectric power plant on the Danube river(CSSR), Conclusions of consultations. Assessment of seismic safety and resistance of dykes of power canal in Gabcikovo hydropower plant on the Danube river, Gidroproject, Moscow, 1981 (cited in Slovak Memorial, p.74).

14. Gabcikovo hydroelectric power plant on the Danube river(CSSR). Conclusions of consultations. Geotechnic assessment of soil underlying a base of dyke of power canal and assessment of stress condition and deformations of dyke and subsoil of power canal in the Gabcikovo hydroelectric power plant on the Danube river taking seismic aspects into account, Gidroproject Moscow, 1982 (cited in Slovak Memorial, p.74).

15. Ing. I. Klapetec, Research Institute of Civil Engineering, Bratislava(1982), Instructions for designing hydrotechnic building structures in seismic regions. State research report No. P-12-526-266, (cited in Slovak Memorial, p. 73).

In addition, we request that a nominee of the Hungarian Government be given access in Bratislava to the reports listed in Annex 36 of the Slovak Memorial.

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-8/B/18/1994

Budapest, December 1, 1994

Sir,

Re.: Case concerning the Gabcikovo-Nagymaros Project
(Hungary/Slovakia)

As Agent for the Government of the Republic of Hungary in the case concerning the Gabcikovo-Nagymaros Project and in accordance with the Order of July 14, 1993, of the International Court of Justice, I have the honour to submit hereby to the Court the Counter Memorial of Hungary in one hundred and twenty five copies as requested by the Court.

Accept, Sir, the assurances of my highest consideration.

(György Szénási)
Agent of the Government of
the Republic of Hungary

Mr. Eduardo Valencia-Ospiña
The Registrar

International Court of Justice

The Hague

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Annex 13

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-8/B/22/1994

Budapest, December 1, 1994

Sir,

Re.: Case concerning the Gabcikovo-Nagymaros Project (Hungary/Slovakia)

I have the honour to submit herewith twenty-five copies of the Hungarian Counter-Memorial. These are additional to the copies which will be provided by the Court.

I also enclose copies of letters sent to the Registrar of the International Court of Justice together with a duplicate set of the original documents referred to in the annexes of the Hungarian Counter Memorial.

For your information we are also providing 3 copies of the book "Szigetköz" by Zoltán Alexay. Further copies of this book are available at your request.

Accept, Sir, the assurances of my highest consideration.

(György Szénási)
Agent for the Government of
the Republic of Hungary

Dr Peter Tomka
Agent of the Slovak Republic
Embassy of the Slovak Republic at The Hague
The Netherlands

1394 Budapest 62, Pf. 423
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Annex 14

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT
J-8/B/20/1994

Budapest, December 1, 1994

Sir,

Re.: Case concerning the Gabcikovo-Nagymaros Project
(Hungary/Slovakia)

I have the honour to present to the Court copies of the original documents referred to in the annexes of the Hungarian Counter Memorial. A duplicate set of these documents has been forwarded to the Agent of Slovakia. The submission of these documents is in order to comply with the requirements of Article 50, paragraph 2 of the Rules of Court.

We also provide the following documents for the Library of the Court.

1) IAEA, Operational Safety of Nuclear Installations; Hungary (IAEA - NENS/OSART/89/19 February 1989.)

2) The Danube Environmental and Navigation Project. Feasibility Study Rajka-Budapest, Final Report, Stretch BI: Szap-Ipoly Mouth (August 1994)

3) The 'Annuaire Statistique de la Commission du Danube'.

A duplicate set of these documents has also been forwarded to the Agent for Slovakia.

Please Accept, Sir, the assurances of my highest consideration.

(György Szénási)
Agent for the Government of
the Republic of Hungary

Mr Eduardo Valencia-Ospiña
The Registrar
International Court of Justice
Palais de la Paix
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Annex 15

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-8/B/21/1994

Budapest, December 1, 1994

Dear Mr. Registrar,

I have the honour to submit to the Court, for their information seventeen copies of the book "Szigetköz" by Zoltán Alexay. A further three copies are provided for the Library of the Court.

Copies of this book have also been forwarded to the Agent for Slovakia.

Accept, Sir, the assurances of my highest consideration.

(György Szénási)
Agent for the Government of
the Republic of Hungary

Mr. Eduardo Valencia-Ospiña
The Registrar

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Annex 16

COUR INTERNATIONALE DE JUSTICE

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92258

6 December 1994

Sir,

I have the honour to acknowledge the filing by the Co-Agent of Hungary on 5 December 1994, within the time-limit fixed by the Court's Order of 14 July 1993, of the Counter-Memorial of your Government in the case concerning the Gabcíkovo-Nagymaros Project (Hungary/Slovakia), in two signed copies and 125 further copies. The Counter-Memorial consists of six volumes altogether, five of which constitute Annexes (Vols. 2, 3, 4 (Part 1), 4 (Part 2) and 5).

I further acknowledge the receipt of two signed copies of four letters dated 1 December 1994 from you: a letter No. J-8/B/18/1994 transmitting the Counter-Memorial; a letter No. J-8/B/19/1994 certifying that the documents annexed to the Counter-Memorial are true copies of the originals and that the translations thereof are accurate; a letter No. J-8/B/20/1994 submitting, in accordance with Article 50, paragraph 2, of the Rules of Court, one set of copies of the original documents referred to in the Annexes to the Counter-Memorial, and which provides one copy of three documents, therein listed, for the Library of the Court, while stating that a duplicate set of all those documents has been forwarded to the Agent of Slovakia; and a letter No. J-8/B/21/1994 submitting, for the Court's information, 17 copies of a book entitled "Szigetköz", by Zoltán Alexay, providing three further copies thereof for the Court's Library and stating that copies of that book have been forwarded to the Agent of Slovakia. All the documents referred to in those letters were duly received in the Registry.

./.

Mr. György Szénási
Agent of the Republic of Hungary
before the International Court of Justice
Embassy of the Republic of Hungary
The Hague

During the meeting held in my office on the afternoon of 5 December 1994 with the Representatives of both Parties, I had furthermore the honour of transmitting to the Agent of Slovakia one signed copy of Hungary's Counter-Memorial together with 25 further copies thereof, as well as one signed copy of each of the above-mentioned letters. Moreover, the Co-Agent of Hungary was given one signed copy of the Counter-Memorial of Slovakia in the case, comprising two volumes (one of which contained certified Annexes), together with 25 further copies thereof, as well as one set of complete copies, in the original language, of unpublished and not readily available documents, furnished by Slovakia pursuant to Article 50, paragraph 2, of the Rules of Court, and one set of the documents referred to in paragraph 7.106 and at footnote 146 in Chapter VII and footnote 48 in Chapter VIII of Slovakia's Counter-Memorial. The Co-Agent of Hungary was also provided with a copy of a letter dated 5 December 1994 from the Agent of Slovakia under cover of which all those documents were filed.

It appeared from a summary examination of the Counter-Memorials presented by the Parties that they prima facie comply with the requirements set out in the Rules of Court in that respect.

Accept, Sir, the assurances of my highest consideration.

Eduardo Valencia O

Eduardo Valencia-Ospina
Registrar

Annex 17

INTERNATIONAL COURT OF JUSTICE

YEAR 1994

20 December 1994

1994
20 December
General List
No. 92

CASE CONCERNING THE GABČÍKOVO-NAGYMAROS PROJECT

(HUNGARY/SLOVAKIA)

ORDER

The President of the International Court of Justice,

Having regard to Article 48 of the Statute of the Court and to Articles 44 and 46, paragraph 1, of the Rules of Court,

Having regard to the Special Agreement between the Republic of Hungary and the Slovak Republic, signed in Brussels on 7 April 1993 and notified jointly to the Court on 2 July 1993, whereby the Parties submitted to the Court the differences between them concerning the Gabčíkovo-Nagymaros Project,

Having regard to the Order of the Court dated 14 July 1993, fixing 2 May 1994 as the time-limit for the filing of a Memorial by each of the Parties and 5 December 1994 as the time-limit for the filing of a Counter-Memorial by each of the Parties, and reserving the subsequent procedure for further decision;

Whereas the Memorials and Counter-Memorials of the Parties were duly filed within the time-limits thus fixed;

Whereas in Article 3, paragraph 2 *(c)*, of the aforementioned Special Agreement the Parties request the Court to order the presentation, by each of the Parties, of a Reply within such time-limits as the Court may order;

Taking into account the views expressed on those time-limits by the Agents of the Parties, in the course of a meeting that the President of the Court held with them on 19 December 1994, *Fixes* 20 June 1995 as the time-limit for the filing of a Reply by each of the Parties; and

Reserves the subsequent procedure for further decision.

Done in French and in English, the French text being authoritative, at the Peace Palace, The Hague, this twentieth day of December, one thousand nine hundred and ninety-four, in three copies, one of which will be placed in the archives of the Court and the others transmitted to the Government of the Republic of Hungary and the Government of the Slovak Republic, respectively.

(Signed) Mohammed BEDJAOUI,
President.

(Signed) Eduardo VALENCIA-OSPINA,
Registrar.

Annex 18

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-2/B/3/1995

Budapest, January 25, 1995

Sir,

Re: Case concerning the Gabcikovo-Nagymaros Project
(Hungary/Slovakia)

I have the honour to make a further request through you, from the Slovak Party, for copies of a number of documents, a list of which is enclosed with this letter. These documents were originally requested through the offices of the Court in our letter of 6 September 1994. We had earlier requested some of these documents directly from the Slovak Agent in our letter of 11 August 1994, a copy of which was forwarded to you at the time. In our letter of 29 September 1994, a copy of which is enclosed, we additionally requested certain dredging information.

All of these requests were in accordance with the comment by the Agent for Slovakia in his letters of 3 August 1994 that it is " inappropriate for requests for documents to be made except throught the Registry" and that "the proper channel through the Registry must be vigorously maintained". To date neither documents nor information has been provided.

In addition to the above, I also request through you a copy of a further document. In its Counter Memorial (Vol. I page 196, footnote 146) Slovakia refers to Annex 26 and states that the "entire original document" has been submitted. In fact a summary version only was provided. May we request through your kind offices the provision of the "entire original document" of which Annex 26 was a summary.

.../...

Mr. Eduardo Valencia-Ospiña
The Registrar

International Court of Justice

The Hague

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

I note that on a previous occasion when documents were in question Hungary immediately forwarded to the Agent of Slovakia some fourteen documents and offered in our letter of 23 June to you our full co-operation in providing to the Court and the Agent for Slovakia any document which is considered necessary.

Accept, Sir, the assurances of my highest consideration.

(György Szénási)
Agent of the Government of
the Republic of Hungary

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-8/B/5/1994.

Budapest, 29 September 1994

Sir,

Re: Case concerning the Gabcikovo-Nagymaros Project
(Hungary/Slovakia)

I have the honour to request through the channel of the Court, from the Agent for Slovakia, detailed data on dredging in the Slovakian Danube section. We require information referring to the Danube reach from the Austrian border down to Rajka (rkm-1850).

Specifically we request information regarding the yearly gravel volumes dredged off the riverbed for the period 1950-1992 distinguishing between navigational (ford) dredging, industrial dredging and dredging for other purposes.

I would be grateful if you would ask the Agent for Slovakia to provide the above information at his earliest opportunity.

Accept, Sir, the assurances of my highest consideration.

Dr. György Szénási
Agent of the Republic of Hungary

Mr Eduardo Valencia-Ospiña
The Registrar
International Court of Justice

Palais de le Paix
2517 KJ The Hague
The Netherlands

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

List of Documents/References Requested from the Slovak Party

1. The special reports presented in stages to the Hungarian Academy of Sciences on the Bioproject, referred to on page 52, footnote 10 of the Memorial.

2. The study compiled by URBION (1986) updating the Bioproject, referred to in paragraph 2.22, page 54 of the Memorial.

3. The "Summary documentation on the G/N Project", study number 15 in Annex 24 of the Memorial.

4. The studies on forest ecosystems, groundwater, location alternatives, protection measures and water quality (10 studies total), referred to in Annex 24 of the Memorial. Specifically, the studies numbered: 14, 23, 77, 106, 107, 108, 109, 110, 114, 118.

5. The studies done by VITUKI, Budapest, on the regulation of groundwater levels in the areas adjacent to the old riverbed, referred to in paragraph 2.16, page 51 of the Memorial.

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6. In the event that the special reports referred to in page 52, footnote 10, of the Slovak Memorial (item 1, above) are summaries of the Bioproject, a list of the closing reports, published volumes, articles, unpublished works which are said to constitute the Bioproject. (Slovak Memorial, page 51, paragraph 2.18).

7. Gabčíkovo hydroelectric power plant on the Danube river (CSSR), conclusions of consultations on technical project, Gidoproject, Moscow, 1972 (cited in Slovak Memorial, p. 74).

8. Hrasko, Final layout of the Gabčíkovo project with regard to tectonic conditions, HYCO Bratislava, 1974 (cited in Slovak Memorial, Volume III, p. 154).

9. Dr. J. Janacek, Dionyz Stur Geological Institute, Bratislava: Geologic assessment and evaluation of definitive siting of the Gabčíkovo step (cited in Slovak Memorial, p. 73).

10. Dr. I. Broucek (ed.), Geophysical Institute, Slovak Academy of Sciences, Bratislava (1975): Seismicity of Slovakia and its relation to the structure of the Carpathian region, Final report (cited in Slovak Memorial, p. 73).

11. Ing. A. Molnař, Geophysical Institute, Slovak Academy of Sciences, Bratislava (1977): On potential earthquake hazard at the Gabčíkovo water work (cited in the Slovak Memorial, p. 73).

12. Hobst: Investigation of dynamic characteristics of headwater canal dykes (consultations with Soviet Union). HYCO Bratislava, 1979 (cited in Slovak Memorial, Volume III, page 151).

13. Gabčíkovo hydroelectric power plant on the Danube River (CSSR), Conclusions of consultations. Assessment of seismic safety and resistance of dykes of power canal in Gabčíkovo hydropower plant on the Danube river, Gidoproject, Moscow, 1981 (cited in Slovak Memorial, p. 74).

14. Gabčíkovo hydroelectric power plant on the Danube river (CSSR), Conclusions of consultations. Geotechnic assessment of soil underlying a base of dyke of power canal and assessment of stress condition and deformations of dyke and subsoil of power canal in the Gabčíkovo hydroelectric power plant on the Danube river taking seismic aspects into account, Gidoproject, Moscow, 1982 (cited in Slovak Memorial, p. 73).

In addition we request that a nominee of the Hungarian Government be given access in Bratislava to the reports listed in Annex 36 of the Slovak Memorial.

Annex 19

Permanent Mission of the Slovak Republic to the United Nations
866 United Nations Plaza, Suite 585, New York, N.Y. 10017
Phone: 212-980 1558 Fax: 212-980 3295

2 February 1995

Dear Dr. Szénási,

Please find enclosed the copy of the correspondance concerning the appointment of Dr. Václav Mikulka as the Co-Agent of the Slovak Republic for the purpose of the proceedings in the case concerning the Gabčíkovo - Nagymaros Project.

Yours sincerely,

Peter Tomka

Annexes: 2 pages

Dr. György Szénási
Agent of the Republic of Hungary
Head of the International Law Department
Ministry of Foreign Affairs
Budapest

VEĽVYSLANECTVO SLOVENSKEJ REPUBLIKY

EMBASSY OF THE SLOVAK REPUBLIC

The Hague, July 14, 1993

Sir,

I have the honour to inform you that Dr. Václav Mikulka, Member of the International Law Commission, has been appointed Co-Agent of the Slovak Republic before the International Court of Justice for the purpose of the proceedings concerning the Gabčíkovo-Nagymaros Project.

Accept, Sir, the assurances of my highest consideration.

Peter Tomka
Agent of the Slovak Republic

Mr. Eduardo Valencia-Ospina
Registrar of the International
Court of Justice
T h e H a g u e

COUR INTERNATIONALE DE JUSTICE

PALAIS DE LA PAIX 2517 KJ LA HAYE PAYS-BAS
TÉLÉPHONE: (070) 392 44 41 TÉLEX: 32323
TÉLÉGR.: INTERCOURT LAHAYE
TÉLÉFAX: (070) 364 99 28

INTERNATIONAL COURT OF JUSTICE

PEACE PALACE 2517 KJ THE HAGUE NETHERLANDS
TELEPHONE: (070) 392 44 41 TELEX: 32323
CABLES: INTERCOURT THEHAGUE
TELEFAX: (070) 364 99 28

89115

14 July 1993

Sir,

I have the honour to acknowledge receipt of your letter of today's date, informing the Court of the appointment of Dr. Václav Mikulka as the Co-Agent of the Slovak Republic for the purpose of the proceedings instituted on 2 July 1993 in the case concerning the Gabcikovo-Nagymaros Project (Hungary/Slovakia).

Accept, Sir, the assurances of my highest consideration.

Eduardo Valencia O

Eduardo Valencia-Ospina
Registrar

Dr. Peter Tomka
Agent of the Slovak Republic
before the International Court of Justice
Embassy of the Slovak Republic
Parkweg 1
2585 JG The Hague

Annex 20

UNITED NATIONS NATIONS UNIES

POSTAL ADDRESS—ADRESSE POSTALE UNITED NATIONS, N.Y. 10017
CABLE ADDRESS—ADRESSE TELEGRAPHIQUE UNATIONS NEWYORK

REFERENCE: LA 41 TR/300693/I-30113

The Secretariat of the United Nations presents its compliments to the Permanent Mission of Hungary to the United Nations and has the honour to refer to the Special Agreement of 7 April 1993 between Hungary and Slovakia for submission to the International Court of Justice of differences concerning the Gabcikovo - Nagymaros Project, registered on 30 June 1993 under No. 30113.

On 16 November 1994, the Secretariat transmitted the certificate of registration No. 39414 relating to the said Special Agreement stating erroneously that the Special Agreement was registered on 30 June 1993 by Hungary. Since the Special Agreement was in fact registered by Slovakia, the Permanent Mission will kindly disregard the certificate of registration No. 39414 of 16 November 1994, which is to be considered as null and void.

The Secretariat regrets any inconvenience this may have caused.

14 February 1995

Annex 21

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

HEAD
OF THE INTERNATIONAL LAW DEPARTMENT

J-2/B/8/1995

Budapest, April 19, 1995

Sir,

Re: Case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia)

I have the honour to inform you that an Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic has been signed today concerning certain temporary technical measures and discharges in the Danube and Mosoni Branch of the Danube.

Please find enclosed herewith a copy of the English version of the Agreement as well as a declaration by the Government of the Republic of Hungary in connection with the signing of the aforesaid Agreement.

Accept, Sir, the assurances of my highest consideration.

György Szénási
Agent of the Republic of Hungary

Mr Eduardo Valencia-Ospina
The Registrar
International Court of Justice

Palais de la Paix

2517 KJ The Hague
The Netherlands

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

Declaration

by the Government of the Republic of Hungary in connection with the signing of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube

The Government of the Republic of Hungary declares, in connection with the signing of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube, that the conclusion of this Agreement shall not be considered as a fulfillment of the obligation of the Parties, pursuant to Article 4 of the Special Agreement for the Submission to the International Court of Justice of the Differences between the Republic of Hungary and the Slovak Republic concerning the Gabčíkovo-Nagymaros Project, to establish a temporary water management regime.

The Government of the Republic of Hungary hereby reaffirms its position it has represented during the negotiations that the Agreement signed today is intended to introduce a temporary mitigation measure in order to alleviate damage in the Szigetköz region. The Agreement is without prejudice to the position of Hungary in the dispute before the International Court of Justice and is applicable pending the judgment of the Court or until an agreement on a temporary water management regime under Article 4 of the Special Agreement is concluded between the two Parties.

Budapest, April 19, 1995

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

AGREEMENT

BETWEEN THE GOVERNMENT OF THE REPUBLIC OF HUNGARY

AND THE GOVERNMENT OF THE SLOVAK REPUBLIC CONCERNING

CERTAIN TEMPORARY TECHNICAL MEASURES AND DISCHARGES

IN THE DANUBE AND MOSONI BRANCH OF THE DANUBE

[Omitted: For text of the Agreement, see HR, vol 3, annex 24]

Annex 22

COUR INTERNATIONALE DE JUSTICE

PALAIS DE LA PAIX 2517 KJ LA HAYE PAYS-BAS
TÉLÉPHONE: (070) 3022323 TÉLEX: 32323
TÉLÉGR.: INTERCOURT LAHAYE
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INTERNATIONAL COURT OF JUSTICE

PEACE PALACE 2517 KJ THE HAGUE NETHERLANDS
TELEPHONE: (070) 3022323 TELEX: 32323
CABLES: INTERCOURT THEHAGUE
TELEFAX: (070) 3649928

92983 24 April 1995

Sir,

/. I have the honour to transmit to you herewith a copy of a letter with enclosure dated 19 April 1995, as received today in the Registry, from the Agent of Slovakia in the case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia). Under cover of this letter, the Agent of Slovakia forwarded to the Court the text of the "Agreement concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube", concluded by Slovakia and Hungary on 19 April 1995.

Accept, Sir, the assurances of my highest consideration.

Eduardo Valencia O

Eduardo Valencia-Ospina
Registrar

Mr. György Szénási
Agent of the Republic of Hungary
before the International Court of Justice
Embassy of the Republic of Hungary
The Hague

MINISTRY OF FOREIGN AFFAIRS
OF THE SLOVAK REPUBLIC

19 April 1995

Sir,

I have the honour to inform you that Slovakia and Hungary signed today the Agreement concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube. The copy of this Agreement is herewith enclosed for the information of the Court. As article 6 provides for, the Agreement has a temporary character, pending the judgement of the International Court of Justice in the case concerning the Gabčíkovo-Nagymaros Project.

May I recall, at this occasion, that the conclusion of an agreement of this kind was envisaged in the Preamble and Article 4 of the Special Agreement for Submission to the International Court of Justice of the differences concerning the Gabčíkovo-Nagymaros Project, signed on April 7, 1993.

Accept, Sir, the assurances of my highest consideration.

Peter Tomka

Dr. Peter Tomka
Agent of the Slovak Republic

Mr. Eduardo Valencia-Ospina
Registrar
International Court of Justice

The Hague

Annex 23

Treaty between the Republic of Hungary and the Slovak Republic on Good-neighbourly Relations and Friendly Co-operation.

The Republic of Hungary and the Slovak Republic (hereinafter: the Contracting Parties):

convinced that the historic changes in Europe and its countries provide unprecedented opportunities for resolving the common tasks that derive from development of their bilateral relations in a spirit of good-neighbourliness and friendly co-operation,

making efforts, within the frames of the processes of integration taking place, to contribute to the promotion of Europe as a continent of peace, security and prosperity,

affirming that respect for and application of the principles of human rights and fundamental freedoms, democracy, constitutionalism and humanism constitute the basis of liberty, justice and peace,

recognising that persons belonging to national minorities constitute an integral part of the society and state of the Contracting Party whose territory they inhabit, and concurrently contribute to the enrichment of life and to deepening the confidence, friendship and co-operation between their countries, and declaring that they feel a responsibility to extend protection to and promote the preservation and intensification of the national or ethnic, cultural, religious and linguistic identity of the minorities inhabiting their territory,

affirming that they are guided by the principles of the Charter of the United Nations, the Helsinki Final Act of the Conference on Security and Co-operation in Europe, the Paris Charter for a New Europe of the Conference on Security and Co-operation in Europe, and other documents adopted by the Organisation for Security and Co-operation in Europe,

convinced that further development of their friendly relations and co-operation on new foundations corresponds with the vital interests of their countries and nations,

have agreed on the following:

Article 1

The Contracting Parties shall develop their relations in a spirit of good-neighbourliness, confidence and friendly co-operation, and maintain a dialogue in all fields of mutual interest.

Article 2

The Contracting Parties shall respect in their mutual relations, as in their relations with other countries, the generally recognised principles of international law, primarily the principles contained in the Charter of the United Nations, the Helsinki Final Act of the Conference on Security and Co-operation in Europe, the Paris Charter for a New Europe, and other documents adopted by the Organisation for Security and Co-operation in Europe.

Article 3

(1) The Contracting Parties affirm, in accordance with the fundamental principles and norms of international law, that they shall respect the inviolability of their common state border and each other's territorial integrity. They affirm that they have no territorial claims on each other and will advance no such claims in the future.

(2) The Contracting Parties declare that, in their mutual relations, they shall refrain from the use of force or the threat of force against the other Party's territorial integrity or political independence, or from other acts contrary to the United Nations Charter or international law, or from support for such acts, and that they will not permit a third party to use their territory for conducting similar acts against the other Party. They shall settle disputed questions arising between them exclusively by peaceful means.

Article 4

(1) If, in the opinion of one of the Contracting Parties, a situation which has developed in international relations may endanger international peace and security or its own security interests, this Party may request a consultation with the other Party, so that they can examine what they might do towards easing or eliminating the tension, in accordance with the principles contained in the United Nations Charter and applied in the framework of the Organisation for Security and Co-operation in Europe.

(2) The Contracting Parties shall hold regular consultations at various levels on questions of mutual interest concerning security and defence. At the request of either Party, they will inform each other on fulfilment of their international obligations concerning security and disarmament. They shall regulate their bilateral relations in the military field in a separate agreement.

Article 5

(1) The Contracting Parties, in order to realise the objectives of this Treaty, shall establish the appropriate frames of co-operation in every field of mutual interest.

(2) The Contracting Parties attach special significance to co-operation and the development of relations between their legislative and executive institutions.

(3) The Contracting Parties shall hold regular consultations at various levels for the purpose of further development and intensification of their bilateral relations and of mutual acquaintance with their positions on international issues. Within this framework there will be a meeting of prime ministers at least once a year, and in addition the foreign ministers will review the implementation of this Treaty on at least one occasion a year.

(4) They will regulate the co-operation between other branches, including the regular meetings between the leaders of these, in agreements concluded between these branches.

Article 6

The Contracting Parties affirm that their interests and endeavours are identical in relation to their integration into the European Union, the North Atlantic Treaty Organisation and the Western European Union and in relation to the Organisation for Security and Co-operation in Europe, and they give expression to their resolve to extend each other support in this direction.

Article 7

(1) The Contracting Parties, in the framework of developing their bilateral relations and in the process of their integration into the European Union, shall develop their mutually advantageous co-operation in the field of the economy, above all in industry, agriculture, commerce, transport and haulage, telecommunications and services.

(2) The Contracting Parties shall establish conditions for developing various forms of economic co-operation in the border region at regional and local levels, including co-operation between legal entities and individuals.

(3) The Contracting Parties attach importance to co-operation between higher units of local government, towns and villages, in accordance with the competence of authority assigned to these and with the principle of subsidiarity.

Article 8

The Contracting Parties support co-operation in the field of science and technology. They shall promote the creation of the conditions required for effective co-operation in the field of basic and applied research, with special heed to up-to-date techniques and technology, and they shall support direct contacts and joint initiatives between the scientists and scientific and research institutes of the two countries.

Article 9

(1) The Contracting Parties, motivated by their interests concerning care for the natural environment and preservation of acceptable living conditions for future generations, shall cooperage on environmental and nature protection with the purpose of preventing and reducing pollution of the environment, particularly as regards trans-frontier pollution .

(2) The Contracting Parties, in accordance with relevant agreements and above all by co-operating with the European Union and its member-states, shall develop their co-operation in the field of environmental protection, and take part in the development and implementation of the Union's co-ordinated international strategy and concept.

(3) The Contracting Parties, for the purpose of accepting specific measures aimed at enhancing the protection of the environment, shall conclude a separate, government-level agreement to provide for co-operation concerning reduction of accident risks, maintenance of an early-warning system for accidents that occur, and elimination of the consequences of these.

Article 10

(1) The Contracting Parties, employing the most up-to-date technology, will expand their co-operation on developing the infrastructure for air, rail, road, waterway, maritime, pipeline and combined transports and for postal and telecommunications services.

(2) The Contracting Parties affirm that landlocked states have a right of access to the sea and to freedom of transit in connection with this right, and they are prepared to cooperage with other states in this field.

Article 11

The Contracting Parties, in accordance with the development of their manifold co-operation, are prepared to improve the transparency of their borders, including the opening of new border crossing points in accordance with the means and requirements of both Contracting Parties.

Article 12

(1) The Contracting Parties shall develop their co-operation in the field of culture, science and education.

(2) The Contracting Parties consider as the basic form of cultural, scientific and educational co-operation between their countries such co-operation as is based upon the mutual demands and interests of groups founded on the initiative of institutions, organisations, associations, federations, communities, local-government authorities or citizens, or upon those of the individuals themselves. They shall support on the basis of the requisite agreements and programmes initiatives designed to promote mutual acquaintance and closer ties between state, social and private institutions, organisations, associations and private persons.

(3) The Contracting Parties support co-operation between educational and other cultural institutions and scientific research institutes, and exchanges of primary and secondary-school pupils, university and college students, teachers and scientific workers.

(4) The Contracting Parties shall foster scientific research in the record offices, libraries, museums and similar institutions on their territories, including access to materials found in these institutions.

(5) The Contracting Parties, on the basis of requisite agreements, shall recognise the documents of the other Contracting Party made out in accordance with domestic legal regulations and certifying as to school educational attainments and professional qualifications and to the attainment of scientific degrees.

(6) The Contracting Parties shall support instruction in the language of the other state in schools and other educational institutes alike. To this end they will extend reciprocal assistance in the linguistic training and extension training of teachers.

(7) The Contracting Parties shall strive to expand the opportunities in their institutes of higher education for gaining acquaintance with the culture, literature and language of the other Contracting Party and for pursuing Hungarian and Slovak studies.

(8) The Contracting Parties, on a basis of mutual agreement, will ensure the conditions for operation of the other Contracting Party's cultural centres.

Article 13

(1) The Contracting Parties shall strive to ensure the preservation of the other Contracting Party's historical and cultural memorials and memorial sites on their own territory.

(2) The Contracting Parties shall carry out exchanges of items of cultural value and archive materials on a basis of agreement between the ministries concerned.

Article 14

The Contracting Parties shall uphold an atmosphere of tolerance and understanding among citizens of their countries of diverse ethnic, religious, cultural and linguistic origins. The Contracting Parties, in accordance with their obligations under international law, will provide for every person on their territories identical and effective legal protection irrespective of race, skin colour, sex, language and religious, political or other conviction, and of national or social origin.

Article 15

(1) The Contracting Parties affirm that protection of national minorities and of the rights and freedoms of persons belonging to them an integral part of the international protection of human rights, and as such comes into the framework of international co-operation, and therefore in this sense it is not exclusively an internal affair and also constitutes a subject of legitimate attention by the international community. The Contracting Parties recognise that their co-operation in this field contributes to strengthening good-neighbourly relations, mutual understanding, friendship and

confidence between their countries and thereby to consolidating international security, stability and European integration.

(2) The Contracting Parties are guided in the field of protection of national minorities and the persons belonging to them by the following principles:

(a) Membership of a national minorities shall be a matter of free personal choice and no disadvantage shall result from the choice of such membership.

(b) All persons belonging to a national minority shall be equal before the law and have equal protection of the law. In this respect all discrimination based on belonging to a national minority shall be prohibited.

(c) Persons belonging to a national minority shall have the right individually or in community with other members of their group to express freely, preserve and develop their own ethnic, cultural, linguistic or religious identity and to preserve and develop their culture in every aspect thereof.

(d) Confirming their general integration policy, the Contracting Parties shall refrain from policies and practices aimed at assimilation of persons belonging to minorities against their will, and shall protect these persons from any action aimed at such assimilation. The Contracting Parties will refrain from measures that would alter the numerical proportions of the population in areas inhabited by persons belonging to national minorities and that would restrict the rights and freedoms of such persons in the event of these being to the detriment of the national minorities.

(e) Persons belonging to national minorities have the right, for the purpose of nurturing, developing and imparting their identity within the requisite legal frames, to establish and operate their own organisations and associations, including political parties and educational, cultural and religious institutions. For this the two governments for their part shall ensure the legal conditions.

(f) Persons belonging to national minorities have the right to take an effective part nationally, and where appropriate on a regional level, in decisions that affect the minorities to which they belong, or the region which they inhabit, in ways that do not conflict with the domestic legal system.

(g) Persons belonging to the Slovak minority in the Republic of Hungary and the Hungarian minority in the Slovak Republic have a right individually or in community with members of their group freely to use their mother tongue orally and in writing, in public or private life. They have a right, moreover, in conformity with domestic law and with the international commitments undertaken by the two Contracting Parties, to use their mother tongue in contacts with official authorities, including the public administration, and in judicial proceedings, to display in their mother tongue the names of the communities in which they dwell, the names of streets and other public areas, geographical indications, inscriptions and items of information in public places, to register and use first names and surnames in this language, and to receive under the state system of education and instruction adequate opportunities for instruction in their mother tongue and instruction through the medium of their mother tongue, without detriment to instruction in or through the medium of the official language, and they have likewise a right to access without discrimination to public means of mass communication and access without discrimination to their own means of mass communication and a right to their own means of mass communication. The Contracting Parties, in accordance with the international commitments which they have undertaken, shall take every legal, administrative and other measure necessary to ensure the implementation of the items listed in cases where there is not already such a regulation in their legal systems.

(h) In accordance with point (c) of this Article, they shall establish the necessary conditions for persons belonging to national minorities to be able to preserve their material and architectural memorials and memorial sites, which embody their cultural heritage, history and traditions.

(3) The Contracting Parties agree that exactly the same rights and duties concomitant on their citizenship apply to persons belonging to national minorities as to other citizens of the state concerned.

(4) The Contracting Parties declare:

(a) that in the field of regulation of the rights and duties of persons belonging to national minorities in their territory, they shall apply the Framework Convention for the protection of national minorities adopted by the Council of Europe and signed by the Contracting Parties on February 1, 1995, provided their domestic legal system does not already stipulate more favourable terms than the Framework Convention in connection with the rights of persons belonging to national minorities, starting from the date when the present Treaty and the aforementioned Framework Convention have been ratified in the countries of the Contracting Parties;

(b) that without affecting the contents of the foregoing point (a), they shall apply as a legal obligation in defending the rights of persons belonging to the Slovak minority in the Republic of Hungary and the Hungarian minority in the Slovak Republic the norms and political commitments laid down in the following documents:

- Document of June 29, 1990 of the Copenhagen Meeting of the Conference on the Human Dimension of the Conference on Security and Co-operation in Europe;
- Declaration 47/135 of the General Assembly of the United Nations on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities;
- Recommendation 1201 (1993) of the Parliamentary Assembly of the Council of Europe, on an additional protocol on the rights of national minorities to the European Convention on Human Rights, respecting individual human and civil rights, including the rights of persons belonging to national minorities.

(5) Nothing in this Article may be interpreted as authorising any activity or deed in conflict with the fundamental principles of international law, and in particular with the sovereign equality, territorial integrity and political independence of states.

(6) The Contracting Parties in their mutual co-operation shall assist each other in following with attention the implementation of the content of this Article. They shall therefore consider the method by which, in the framework of their mutual co-operation, they can exchange, on the basis of Paragraph (1) of Article 5 of the present Treaty and in a spirit of mutual understanding and confidence, information and experience on questions of applying the present Article. For this purpose they will establish an inter-governmental joint committee consisting of the sections they consider necessary and invested with the right of recommendation. The Contracting

Parties, in monitoring fulfilment of the obligations undertaken in the field of protection of national minorities, will act in accordance with the rules of the Council of Europe and the Organisation for Security and Co-operation in Europe, which are binding upon both Contracting Parties.

Article 16

(1) The Contracting Parties shall support manifold co-operation in the field of health care, health and hygiene, and pharmaceuticals, above all in the campaign to prevent and overcome civilisation-related and infectious diseases.

(2) The Contracting Parties shall develop their co-operation in the field of social insurance and social welfare, and the competent bodies will conclude agreements for this purpose.

Article 17

(1) The Contracting Parties, based on the requisite agreements shall cooperage in the field of legal and consular relations and in police activity.

(2) The Contracting Parties shall develop their co-operation in the struggle against organised crime, with special regard to terrorism, abuse of drugs, air piracy, and illegal exports of cultural, historical and museum items and articles of value.

Article 18

The Contracting Parties consider co-operation between the means of mass communication to be important, and support the free exchange of information and all efforts directed at providing objective information that will promote better knowledge and understanding of each other.

Article 19

The Contracting Parties support the expansion of relations between political and social bodies, trade unions, churches, religious and other organisations, and youth, sport and other federations.

Article 20

The present Treaty is not aimed against any third country. It does not affect the rights and obligations of the Contracting Parties deriving from other bilateral and multilateral treaties.

Article 21

(1) The Contracting Parties, in the event of a difference of view between them in connection with the interpretation and application of the present Treaty, shall consult with each other in accordance with the terms of Article 5 of this Treaty.

(2) Where such consultation does not lead within a reasonable length of time to elimination of such a difference of view, the Contracting Parties shall consider by what other means in accordance with the principles and norms of international law this can be achieved.

Article 22

(1) The present Treaty is concluded for a period of ten years. In the event of neither Contracting Party denouncing the Treaty in writing at least one year before the period of validity expires, the validity of the Treaty shall be extended for the following periods of five years.

(2) The present Treaty is subject to ratification and shall enter into force on the day the instruments of ratification are exchanged.

(3) The Contracting Parties shall register the present Treaty in accordance with Article 102 of the United Nations Charter.

Done at Paris this 19th day of March, 1995 in two copies, each in the Hungarian and Slovak languages, the text in each language being equally authentic.

Annex 24

AGREEMENT BETWEEN THE GOVERNMENT OF THE REPUBLIC OF HUNGARY AND THE GOVERNMENT OF THE SLOVAK REPUBLIC CONCERNING CERTAIN TEMPORARY TECHNICAL MEASURES AND DISCHARGES IN THE DANUBE AND MOSONI BRANCH OF THE DANUBE

The Government of the Republic of Hungary

and

the Government of the Slovak Republic

have agreed as follows:

Article 1

1. Immediately following the conclusion of this Agreement, the Slovak Party will increase the discharge of water through the intake structure at Čunovo into the Mosoni branch of the Danube to 43 m3/s subject to hydrological and technical conditions specified in Annex 1 to this Agreement. This value includes the flow of water through the seepage canal on the right side of the reservoir from Slovak territory into Hungarian territory.

2. The competent Hungarian and Slovak authorities shall take all necessary measures on their respective territories to enable the continuous flow of the increased discharge of water from Slovak territory into Hungarian territory.

3. The water will be distributed, on Hungarian territory, between the branch system on the right side of the Danube, the protected area and the Mosoni branch of the Danube.

Article 2

1. The day following the conclusion of this Agreement the discharge into the main riverbed of the Danube below the Čunovo weir will be increased to an annual average of 400 m3/s, in accordance with the rules of operation contained in Annex 2 to this Agreement. Discharges entering the main riverbed of the Danube through the inundation weir are excluded from the average calculation.

2. During the construction of the weir pursuant to Article 3 the discharge into the main riverbed of the Danube below the Čunovo weir will be regulated in accordance with Annex 3 to this Agreement.

Article 3

1. There will be a weir partly overflowed by water and constructed by the Hungarian Party in the main riverbed of the Danube, at rkm 1843. The main parameters of the weir are specified in Annex 4 to this Agreement.

2. The Parties undertake to ensure the issuance, without delay, of the administrative authorization required by their respective national legislation for the construction and maintenance of the weir in accordance with this Agreement.

3. The costs of the construction and maintenance of the weir will be borne by the Republic of Hungary.

4. The construction of the weir will begin not later that 10 days following the conclusion of this Agreement and is anticipated to be completed within a period of 50 days from the commencement of works.

Article 4

The Parties undertake to exchange those data of their environmental monitoring systems operating in the area that are necessary to assess the impacts of the measures envisaged in Articles 1-3. Collected data will be regularly exchanged and jointly and periodically evaluated with a view to making recommendations to the Parties. The observation sites, parameters observed, periodicity of data exchange, the methodology and periodicity of joint assessment are contained in Annex 5 to this Agreement.

Article 5

1. In the event that either Party believes the other Party is not complying with this Agreement, and fails to persuade the other Party that it is in breach, the Party may invoke the good offices of the Commission of the European Union and both Parties agree to give close co-operation to the Experts of the Commission and to take duly into consideration any opinion rendered by them.

2. If, for whatever reason, the good offices are not provided or are unsuccessful and the material breach continues to exist, the Party affected will be entitled to terminate this Agreement with a one month notice.

Article 6

This Agreement has a temporary character, pending the judgement of the International Court of Justice in the case concerning the Gabčikovo-Nagymaros Project and is without prejudice to existing rights and obligations of the Parties as well as to their respective positions in the dispute before the Court and, in any event, unless otherwise agreed, it shall terminate 14 days after the judgement of the International Court of Justice in the case concerning the Gabčíkovo-Nagymaros Project.

Article 7

On the termination of this Agreement and unless otherwise agreed or decided, Hungary shall at its own expense remove the weir referred to in Article 3.

Article 8

This Agreement shall enter into force on the date of its signature.

Done in Budapest on the 19th day of April, 1995, in duplicate, in the Hungarian, Slovak and English languages, the English text to prevail in the event of any discrepancy.

For the Government
of the Republic of Hungary

For the Government
of the Slovak Republic

Annex No. 1

HYDROLOGICAL AND TECHNICAL CONDITIONS FOR THE INCREASE OF THE DISCHARGES INTO THE MOSONI DANUBE

1/ The increase of the discharge into the Mosoni Danube and into the right side seepage canal of the Hrušov reservoir from 20 m^3/sec up to 43 m^3/sec will be ensured subject to the following hydrological and technical conditions:

1.1 Provided that minimum difference between the water-level of the Mosoni Danube and the Hrušov reservoir is 5.10 m.

1.2 Provided that the minimum water level of the Hrušov reservoir is 130.40 m above sea level.

1.3 Provided that the water-level of the Mosoni Danube does not exceed 125.30 m above sea level.

1.4 Provided that the entrances to the intake structure are unobstructed. Whenever the discharges of the Danube exceed 4000 m^3/sec (involving the inundation of the floodplain), the water-borne materials will move to a greater extent this may restrict the amount of water which can be provided.

1.5 Provided that there is no failure in the electricity network system. If the network system is damaged or in the event of any other failure of the generating capacity, the energy system will turn off automatically and the capacity of the intake structure will be reduced to half of the original.

2/ At the request of the Hungarian party the Slovak party will moderate the discharge for a period specified by the Hungarian party.

3/ The selected site for the measuring of the discharge of the Mosoni Danube is a gauge at 0.160 km on the left bank of the canal on the territory of the Slovak Republic. The selected site for the measuring of the discharge of the right side canal of the Hrušov reservoir is on the regulating weir at 1.100 km on the territory of the Hungarian Republic.

Annex No. 2

Rules of operation

The volume of water discharged through the Čunovo weir into the main river bed of the Danube to correspond to the annual average of 400 m^3/sec.

The annual average discharge in Bratislava corresponds to 2025 m^3/sec. The annual average discharge into the main Danube river bed in each specific year will correspond to the formula:

$$V_{Danube} = \frac{(V_{Devín} \times 400)}{2025}$$

where $V_{Devín}$ is the average yearly discharge in the Devín profile in the specific year.

V_{Danube} is the average yearly discharge to the main Danube river bed in the specific year.

- During the growing season the discharge into the main river bed will be higher than during the dormant season.
- The discharge into the main river bed of the Danube will correspond to actual discharges in the Devín profile.
- The discharges released through the inundation weir during flood will not be included in the calculation.

The discharges in the Devín profile together with the corresponding discharges at the Čunovo weir.

January		February		March		April		May		June	
600	250	600	250	600	250	600	400	600	400	600	400
2200	250	2000	250	1500	250	1100	400	700	400	700	400
2300	251	2100	258	1600	250	1200	400	800	400	800	400
2400	273	2200	280	1700	271	1300	400	900	400	900	400
2500	295	2300	301	1800	392	1400	400	1000	400	1000	418
2600	317	2400	323	1900	314	1500	400	1100	400	1100	440
2700	339	2500	345	2000	336	1600	400	1200	400	1200	462
2800	360	2600	367	2100	358	1700	400	1300	400	1300	483
2900	382	2700	389	2200	380	1800	400	1400	405	1400	505
3000	404	2800	410	2300	401	1900	414	1500	427	1500	527
3100	426	2900	432	2400	423	2000	436	1600	449	1600	549
3200	448	3000	454	2500	445	2100	458	1700	471	1700	571
3300	469	3100	476	2600	467	2200	480	1800	592	1800	592
3400	591	3200	498	2700	489	2300	501	1900	514	1900	600
3500	513	3300	519	2800	510	2400	523	2000	536	4600	600
3600	535	3400	541	2900	532	2500	545	2100	558		
3700	557	3500	563	3000	554	2600	567	2200	580		
3800	578	3600	585	3100	576	2700	589	2300	600		
3900	600	3700	600	3200	600	2800	600	4600	600		
4600	600	4600	600	4600	600	4600	600				

July		August		September		October		November		December	
600	400	600	400	600	250	600	250	600	250	600	250
700	400	900	400	1100	250	1500	250	1800	250	2000	250
800	400	1000	400	1200	262	1600	250	1900	264	2100	258
900	400	1100	400	1300	283	1700	271	2000	286	2200	280
1000	400	1200	400	1400	305	1800	292	2100	308	2300	301
1100	400	1300	400	1500	327	1900	314	2200	330	2400	323
1200	400	1400	400	1600	349	2000	336	2300	351	2500	345
1300	400	1500	400	1700	371	2100	358	2400	373	2600	367
1400	405	1600	400	1800	392	2200	380	2500	395	2700	389
1500	427	1700	421	1900	414	2300	401	2600	417	2800	410
1600	449	1800	442	2000	436	2400	423	2700	439	2900	432
1700	471	1900	464	2100	458	2500	445	2800	460	3000	454
1800	492	2000	486	2200	480	2600	467	2900	482	3100	476
1900	514	2100	508	2300	501	2700	489	3000	504	3200	498
2000	536	2200	530	2400	523	2800	510	3100	526	3300	519
2100	558	2300	551	2500	545	2900	532	3200	548	3400	541
2200	580	2400	573	2600	567	3000	554	3300	569	3500	563
2300	600	2500	595	2700	589	3100	576	3400	591	3600	585
4600	600	2600	600	2800	600	3200	600	3500	600	3700	600
		4600	600	4600	600	4600	600	4600	600	4600	600

The capacity of the by-pass weir when open under conditions of a minimum water level in the reservoir (which is 128.2 m above sea level), is 290 m^3/sec. The discharge of 400 m^3/s can be assured under the condition that the water level in the reservoir is 128.45 m above sea level, and 600 m^3/sec under conditions of a water level of 129.05 m above sea level.

The water level in the reservoir is lowered only when required for construction or reparation works or when the discharge in Devín is below 925 m^3/sec.

The possible differences in discharges which will be ascertained through monitoring by 31 Oct. will be adjusted within the shortest possible period by the end of the same year so that the average of 400 m^3/sec is attained.

The changes in the discharges through the Čunovo weir will occur at intervals of 200 m^3/sec. measured at the Devín site. Thus for instance at 800, 1000, 1200, 1400.... 2000, 2200 m^3/sec.

This distribution of the water resources shall be in force for 1995 and will be adjusted before the 1996 growing season on the basis of the results of a joint evaluation of the monitoring.

Annex No III.

Time table of planned underwater weir's construction at rkm 1843

No	Items	Days, weeks 1 (days 1–7)	2 (days 8–14)	3 (days 15–21)	4 (days 22–28)	5 (days 29–35)	6 (days 36–42)	7 (days 43–50)
1	Preparation							
2	Demolition of guide bank							
3	Dredging of upstream guide channel							
4	Bank and river bed protection							
5	Construction of dam and energy dissipater							
6	Protection of bridgeplate of Dunakiliti weir							
7	Putting into operation							
8	Completing of bank protection and demolition of temp. energy supply							
9	Water discharge during the construction m3/s	400 / 200	200	150 - 100	* / 150 - 100	150 - 100	150 - 100 / 400 - 600	150 > / 400 <

* ecological minimum 50 m3/s

Annex No. 4

*** Main parameters of the weir to be constructed at rkm 1843 of the Danube**

1. The weir which is partly overflowed by water will be constructed at rkm 1843 of the Danube.

2. Main parameters of the weir:

width between banks	300 m
width of the crest	5 m
width of the overflowed section	100 m
height of the centre point of the overflowed section	121,80 B.s.l.
gradient of the downstream slope	1 : 10
gradient of the upstream slope	1 : 3

3. The elevation of the weir crest will be established in such a way that at the discharge of 600 m^3/s, the backwater at rkm 1851,7 of the Danube would not exceed an elevation of 124,00 Bsl.

4. The water level regulation at rkm 1843 take place when the discharge of the Danube is between 250-1300 m^3/s.

5. A maximum quantity of 150 m^3/s will be discharged into the right side branch system on the Hungarian side.

* Based on the documentation approved under the numbers
No. VOD 161/A 28/1993-V
No. 21.663/17/1993

Annex No. 5

Matters relating to monitoring of environmental impacts .

Monitoring is divided into the following monitoring items:

Monitoring of surface water levels and discharges

the Danube:
profile at Devín
profile at Medvedov
profile at Komárno - Komárom
profile at Štúrovo - Esztergom
profile at Rajka
profile at Dobrohošť
profile at Dunaremete
profile downstream and upstream of overflowed weir at rkm 1843, (water level only)
Reservoir at Čunovo and the Danube downstream and upstream of the by-pass weir (water level only)
Reservoir at Gabčíkovo (water level only)
Tailrace canal downstream of Gabčíkovo (water level only)

Malý Danube:
at Bratislava
at Kolárovo

Mosoni Duna:
downstream of the intake structure at Čunovo
at Mecser
at Györ

Structures at Rajka
Seepage canal at Čunovo (on the Slovak territory)
No. 1. Lock of the outlet
No. 2. Lock of the water level control
No. 6. Lock of the water level control - Mosoni Duna
No. 1. Lock of the side branch Kiliti - Cikolai, Zátonyi Duna
No. 5. Lock at the seepage canal

Frequency of measurements: continuous on a daily basis

Monitoring of surface water quality

the Danube:

upstream Bratislava *
at Dobrohošť
at Gabčíkovo
at Medvedov *
at Gönyü
at Komárno - Komárom
at Štúrovo - Esztergom

Reservoir, bypass canal, seepage canals, river branches:

upper part of the reservoir at Rusovce *
the reservoir at Kalinkovo (left and right side)
downstream of Mosoni Danube the intake structure
the profile at Šamorín (left, middle and right side)
the power canal at the ferry station
the tailwater canal downstream of Gabčíkovo *
the seepage canal at Čunovo *
the seepage canal at Hamuliakovo
the Mosoni Duna at Rajka
the Mosoni Duna at Mecser
the Mosoni Duna at Vének
the Malý Dunaj at Kolárovo
the river branches Helena and Doborgaz
the Šulianske river branch

Frequency of measurement:

- stations marked by * - 12 times per year, between the 10th and 20th of each month,
- all other stations in: January, March, April, May, June, July, September, November, between the 10th and 20th of each month.

List of parameters:

- temperature, pH value, conductivity at 25°C, O_2
- cations: Li, Na, K, Ca, NH4, Mn, Mg, Fe
- anions: HCO3, Cl, SO4, NO3, NO2, PO4, P
- trace elements: Hg, Zn, As, Cu, Pb, Cr, Cd Ni, Vanadium
- COD, BOD, dissolved materials (mineralization)
- biological parameters: Saprobity index, bioseston, chlorophyll,

- number of algae, zooplancton, macrobenthos, according to the decision of the monitoring group,
- microbiological parameters, coliform bacteria, mezophilic bacteria, psychrophilic bacteria
- organic matters, TOC, Nonpolar extractable - UV, - IR, EOX, AOX, phenols, humic acids,
- organic micropollutants, polyaromatic hydrocarbons, polychlorobiphenyls (and others, to be agreed)

Sediments:

- at jointly selected stations, e.g. at places of surface water quality sampling,
- three places in the Slovak and three in the Hungarian flood plain

Extent of parameters:

granulometric curves, organic matters and other selected parameters

Frequency of measurement: once per year in autumn

Monitoring of ground water levels

Monitoring of ground water levels will be carried out on wells between the Malý Danube and the Lajta - Mosoni Danube. Wells to be chosen in profiles based on maps containing all observation wells. [At least at 150 wells on the Slovak territory and at least at 100 wells on the Hungarian territory to be chosen.]

Frequency of measurement: once per week

Monitoring of ground water quality

Ground water quality will be monitored on the municipal water supply [and ground water] wells between the Malý Danube and the Laita - Mosoni Danube, [at least 10 localities on each territory. In addition to this other at least 10 selected ground water quality wells on each territory] should be monitored. These wells should be those which satisfy hygiene criteria for drinking water wells and sampling should be commonly agreed.

Frequency of measurement: once per month.

Quality should be evaluated according to the standards for drinking water in force in both countries.

Monitoring of soil moisture (aeration zone)

[At least 10] monitoring areas to be selected on each territory from among the localities already monitored.

Frequency of measurement: once every 10 days, but in winter (November, December, January and February) twice a month. Each locality should also include a ground water level monitoring well.

Monitoring of biota:

- microbenthos and macrobenthos in the Danube and river branches at places of water level measurements
- fish, in all surface waters
- [Forestry, on at least 8 selected places from among existing monitoring localities on each side]
- Special water related organisms as for example: Odonata, Ephemeroptera, Trichopetra, Braconidea and others, jointly selected.

Special monitoring

For the estimation of the impact of the overflowed weir special monitoring to be carried out. This will include measurements of flow velocities, water levels, water quality, micro and macro benthos, sediments, ground water quality in the impounded reach etc.

Submitting of data and reports:

Both sides will use data jointly agreed and will use jointly agreed methods of evaluation. All monitoring items and locations, and methods of measurements to be jointly agreed. Annual reports will include only measured data in tabulated, graphical and map forms with short explanations.

Joint and verification measurements will be carried out at any location where a discrepancy occurs.

Data exchange will be carried out at three month intervals. Annual reports to be submitted as joint reports by the end of each calendar year and covering a period of a hydrological year.

Annual reports will be issued in English language with standardised graphical annexes in Hungarian or Slovak languages.

Statute

Monitoring will be carried out in accordance with the Statute of nominated Monitoring Agents.

Statute will be prepared by: Ing. Árpád Kovács, Ministry of Environment (Hungary), Ing. Dominik Kocinger, Government plenipotentiary for the GNP (Slovakia)

Draft statute will be prepared jointly following the signing of this document and before 31st May 1995.

Text in square brackets [ ] contains Slovak proposals subject to agreement by the Monitoring Agents.

Annex 25

ANNEXE

ACCORD ENTRE LE GOUVT. DE LA RÉPUBLIQUE FRANÇAISE ET LE CONSEIL NATIONAL TCHÉCO-SLOVAQUE CONCERNANT LE STATUT DE LA NATION TCHÉCO-SLOVAQUE EN FRANCE[2]

Paris, 28 septembre 1918.

Secret.

ART. 1.

La nation tchéco-slovaque continuera à prêter au Gouvt. de la République Française, pour la poursuite de la présente guerre, le concours de ses armées, dont la haute direction politique appartient au Conseil national tchécoslovaque et dont l'emploi sur les différents théâtres d'opérations est réglé d'après la situation militaire, pour entente entre le Gouvt. français et le Conseil National.

[1] Voir l'Annexe.

[2] L'accord a été signé: au nom du Conseil National tchécoslovaque: Édouard Benès, Ministère des Aff. Étrang. République française: S. Pichon, ensuite Laroche.

4

ART. 2.

De son côté, le Gouvt. de la République Française, reconnaissant, dans les même termes et conditions que les autres États ses alliés ou associés, comme nation alliée et belligérante, la Nation tchécoslovaque, dont la souveraineté est représentée par le Conseil national tchécoslovaque comme Gouvt. de fait et siégeant en France, s'engage à lui continuer son concours pour lui permettre de recouvrer sa liberté et de réaliser la reconstitution d'un État tchécoslovaque indépendant dans les limites de ses anciennes provinces historiques.

ART. 3.

Le Gouvt. de la République française et le Conseil national tchécoslovaque entretiendront des relations officielles. Le Gouvt. de la République française reconnaît à la Nation tchécoslovaque le droit d'être représentée aux conférences interalliées, où serait traitées les questions touchant les intérêts des Tchécoslovaques.

ART. 4.

Les nationaux tchécoslovaques, reconnus comme tels par le Conseil national tchécoslovaque et résidant en France, auront les mêmes droits et obligations que ceux généralement reconnus aux ressortissants des pays amis; ils bénéficieront également des avantages particuliers accordés, en raison de l'état de guerre, aux ressortissants des pays alliés.

ART. 5.

Une convention spéciale sera substituée au décret français du 16 décembre 1917, publié au Journal Officiel de la République française du 19 décembre 1917 et relatif à la constitution en France de l'armée tchécoslovaque, ainsi qu'au décret français du 31 mai 1918, publié au Journal Officiel de la République Française du 3 juin 1918 et concernant la justice militaire dans l'armée tchéco-slovaque: jusqu'à la conclusion de la convention ci-dessus envisagée ces deux décrets restent provisoirement vigueur.

ART. 6.

Le Conseil National tchécoslovaque déclare que les sommes qui ont été et seront affectées par le Gouvt. de la République Française aux dépenses militaires, politiques et administratives constituent des avances, dont la nation tchécoslovaque assurera le remboursement dans l'année qui suivra la signature du traité de paix, au moyen d'un emprunt. Les conditions et garanties de cet emprunt feront l'objet d'un accord ultérieur.

AD.Europe 1918-40. Tchécoslovaquie vol. 7, ff. 170-173.

Annex 26

80

LE GÉNÉRAL FRANCHET D'ESPEREY, COMMANDANT EN CHEF DES ARMÉES ALLIÉES D'ORIENT AU GÉNÉRAL HENRYS, COMMANDANT L'ARMÉE FRANÇAISE D'ORIENT

T. N° 6262/3. Secret

Salonique, 13 décembre 1918, 8 h.
(Reçu: 13 décembre, 12h. 15.)

En réponse à 258/2B[1] et à 276/2B[2] du 9 Décembre.

1. Je connais parfaitement difficultés de toutes sortes que vous rencontrerez et les juge d'autant mieux que me trouve moi-même en présence de difficultés encore plus considérables et nombreuses.

2. Situation actuelle en ce qui vous concerne peut se résumer ainsi:

I. Certaines conditions armistice Hongrie présentent difficultés application en raison situation particulière Général Berthelot opérant au Nord du Danube en territoire Roumain et liaison précaire avec lui: il y a gros intérêt, que j'ai signalé à Général Berthelot, à ce que liaison directe soit permanente entre ses délégués et commission contrôle ... pour règlement direct et rapide détails intéressant Roumanie, en particulier dans question wagons pétroliers à laquelle faites allusion Mission Lt-Colonel Landrot a dû être envoyée dans ce but par Général Berthelot. Mission Capitaine Burlat envoyée sur seule initiative Berthelot.

II. Je suis informé seulement aujourd'hui par Général Berthelot qu'il n'a signé aucune convention avec Mackensen. Envoyez, comme le proposez par 276/2B[3] du 9, Officier de liaison auprès de Armée du Danube, dont la présence hâtera solution de bien des questions et permettra à Commission Budapest connaître avis Général Berthelot et de prendre décision en dernier ressort en toute connaissance de cause.

III. Comte Karolyi représente autorité locale en pays ennemi: Autriche-Hongrie, et doit s'employer à satisfaire à toutes exigences résultant situation reconnue, sinon devra y être contraint; ses plaintes doivent être accueillies avec réserve. Il y a lieu de lui savoir gré de son empressement et de sa bonne volonté. Vous avez raison de ne pas poussé avec lui les choses à l'extrême afin d'avoir devant nous une autorité et non une anarchie (littéralement: choses à l'afin de devant nous...) mais agissons à temps à son égard dans limite stricte précisée dans télégramme 12.935/2CH[4] du 5 décembre. La Hongrie est battue et avant de nous demander la paix elle a été un de nos plus acharnés adversaires: elle doit donc payer comme autres États de la Monarchie Dualiste.

IV. Question Tchéco-Slovaque vous a été précisée en particulier par télégramme 6216/3[5] et 6134/4[6] du 9 Décembre. Exigences Tchéco-Slovaques ne sont pas nouvelles

[1] Document reproduit ci-dessus N° 74.

[2] Document non reproduit.

[3] Ibid.

[4] Document non reproduit.

[5] Document reproduit ci-dessus N° 76.

[6] Document non reproduit.

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et s'appuyent sur principe reconnu par entente, droit à voir son territoire évacué; troupes hongroises doivent donc être retirées et territoires évacués être occupés par Armée Tchéco-Slovaque. Il ne saurait être question revenir sur décisions prises à Paris. Je n'ai pas encore reçu de Paris réponse à ma demande fixer limites tchéco-slovaques, qui est question essentielle pour régler toutes difficultés.

V. J'ai envoyé mes propositions limitations *zone militaire* occupation respective serbe et roumaine au ministre 9 Décembre[1]. De sa réponse dépendra limite entre A.F.O. et Armée du Danube et question Banat sera réglée. Toute décision prise d'ici n'aurait qu'un caractère temporaire.

VI. Toute enquête sur territoire hongrois ou tchéco-slovaque et du ressort de la Commission de Budapest instituée dans ce but.

VII. Amiral Troubridje [Troubridge] a demandé et reçu autorisation envoyer marins à Budapest.

VIII. Dans plusieurs télégrammes j'ai fait ressortir à Paris intérêt que nous aurions à occuper Budapest. Des raisons politiques que j'ignore doivent s'opposer à cet envoi.

IX. Décisions que vous qualifiez imprévues et contradictoires m'ont été imposées par Paris qui doit avoir ses raisons pour agir ainsi.

3. J'attire de nouveau votre attention sur votre mission qui comporte uniquement occupation militaire et ne vous faites intervenir en aucune façon dans questions de revendications territoriales ou politiques qui ne sont absolument pas de votre ressort.

AG.20N497 c/75. d/2.

Annex 27

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M. CLEMENCEAU, PRÉSIDENT DU CONSEIL, MINISTRE DE LA GUERRE AU GÉNÉRAL FRANCHET D'ESPEREY, COMMANDANT EN CHEF DES ARMÉES ALLIÉES D'ORIENT

T. N° 15.373 BS/3. *Paris, 19 décembre 1918.*

Réponse à votre 6257/3 du 12 Déc.[1] paragraphe 4.

Renseignement fournis par Affaires Étrangères:

Primo.- „Limites historiques Slovaquie revendiquées par république tchéco-slovaque sont les suivantes:

a) Frontières Ouest et Nord se confondent avec celles de Hongrie actuelle;

b) Frontières Sud suivent Danube jusqu'à rivière Eipel, puis cours Eipel jusqu'à ville Rima Szombat, ensuite en ligne droite de Ouest à Est jusqu'à rivière Ung;

c) Frontières Est se confondent avec cours de Ung, jusqu'à frontière de Galicie."

Secundo.- Frontières définitives ne pourront être précisées que d'accord entre Alliées à Conférence de Paix.

AG.4N57 c/63. d/11.

Annex 28

PROPOSITIONS ET OBSERVATIONS DU GOUVERNEMENT TCHÉCOSLOVAQUE CONCERNANT LE TRAITÉ DE LA PAIX AVEC LA HONGRIE (WITH ANNEX 2: LA TÊTE DE PONT DE BRATISLAVA), 1946

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a/ L'extension de la superficie de la ville par suite de l'accroissement continuel du nombre des habitants /depuis 1918 il a doublé/ n'est possible que dans la direction du sud, parce que vers l'ouest et le nord-ouest nous nous heurtons aux monts des Petites Carpathes et vers l'est à des terrains en contre-bas ingrats au point de vue architectonique, étant composés d'alluvions macérageuses et sableuses, dues à leur basse situation qui les rend chaque année sujettes à l'inondation par les eaux souterraines. Pour l'agrandissement de la ville, il faut prendre en considération une bande de terrain d'environ 1 Km de large s'étendant entre ces obstacles, bande qui s'éloigne du Danube dans la direction du nord-est;

b/ une ville agrandie a besoin d'un arrière-pays pour en tirer son ravitaillement en denrées comestibles;

c/ le canal projeté Elbe-Oder-Danube débouchera dans le Danube près de Bratislava et constituera une communication fluviatile directe entre la Mer du Nord, la Baltique et la Mer Noire. Le port de Bratislava - qui a été complètement détruit pendant la guerre par les bombardements - sera reconstruit de façon à pouvoir servir en tant que port principal où débouchera ce système de communication, au trafic des marchandises avec l'Europe méridionale et de port principal de transbordement dans la direction de Trieste/port méditerranéen le plus proche /. Il comprendra un port commercial indépendant, un bassin industriel, des ports francs pour les divers pavillons nationaux, et pour des motifs de sécurité, un port spécial pour les huiles minérales. La superficie de l'ancien port était déjà insuffisante en 1938 /de 1918 à 1938, le mouvement du port de Bratislava avait vingtuplé: les 40.000 tonnes manutentionnées en 1918 avaient dépassé 1,000.000 de tonnes en 1938/. L'extension de la superficie du port, l'établissement de voies de communications ferroviaires, routières et aériennes ainsi que la construction d'ateliers et de bâtiments administratifs sont impossibles sur la rive nord pour les motifs exposés sous a/ et l'étendue de la tête de pont actuelle est insuffisante.

d/ Le barrage projeté pour l'hydrocentrale sur le Danube empiète sur le territoire appartenant actuellement à la Hongrie.

e/ Le Grand-Bratislava résultant de l'annexion des communes de Petržalka, de Devin et de Prievoz est entièrement à la frontière du territoire actuel de l'Etat. La profondeur actuelle de la tête de pont de Bratislava / 5 à 6 Km/ empêche de prendre les mesures les plus élémentaires pour la défense de la ville, des ponts, du port et de la station de pompage sur l'île de Kösmacher.

La tête de pont de Bratislava

/Annexe No 2/

Données sur les communes de Horváthjárfalu, Oroszvár, Dunacsún, Rajka et Bezenye:

Commune	Superficie en hectares	Population
Horváthjárfalu	2.104	889
Oroszvár	2.532	1.678
Dunacsún	1.521	782
Rajka	5.517	3.084
Bezenye	2.997	1.426
Au total	14.671 hectares	7.839 habitants

A l'époque où s'élaborait le traité de paix, on voyait déjà clairement que la ville de Bratislava, par suite de son importance au point de vue des communications et de sa future mission politique et économique, en tant que capitale de la Slovaquie, et en qualité de principal port tchécoslovaque, avait droit à un certain territoire pour pouvoir se développer à l'avenir. Cela fut reconnu par les représentants internationaux alors en session et la possibilité de reconstruction fut donnée à la ville.

Le traité de paix nous a attribué la commune de Petržalka située sur un territoire d'environ 5 kilomètres de profondeur au sud de Bratislava, en partant, à juste titre, du point de vue que cette ville en plein développement avait besoin d'espace et que l'autre rive du Danube convenait le mieux à cet effet, comme c'est le cas pour toutes les grandes localités situées sur des fleuves. Bratislava était en 1918, en effet, une ville peu considérable de 80.000 habitants à peine et la tête de pont qui lui était attribuée par le traité de paix de Trianon semblait appropriée à son étendue. La superficie de la ville ne correspondait pas toutefois à sa véritable importance historique et économique. Après 1867 la centralisation progressive en faveur de Budapest avait occasionné une stagnation

Annex 29

BRITISH FOREIGN OFFICE: NOTES ON *PROPOSITIONS ET OBSERVATIONS DU GOUVERNEMENT TCHÉCOSLOVAQUE CONCERNANT LE TRAITÉ DE LA PAIX AVEC LA HONGRIE*, 5 APRIL 1946

B (and annex 2). The ethnic figures given for the 5 villages claimed seem to be correct. The figures according to the Hungarian census of 1930 were as follows:

	Magyars	Germans	Croats	Sovaks	Others	Total
1. Bezenye	224	199	956	0	2	1,381
2. Dunacsun	160	126	400	1	0	687
3. Horváthdárfalu	182	139	502	21	1	845
4. Oroszvár	435	1,212	13	11	7	1,678
5. Rajka	609	2,287	22	13	1	2,932

The German element has presumably left, wholly or mainly! The survivors are chiefly Croats and Magyars in three villages. Magyars in the other two. Obviously the Czechoslovak claim is not ethnic. The Croats are descendants of 16th century colonists. They are Croats, not Slovaks, and so far as I know, have always been good Hungarian citizens. The name Oroszvar, which means Russian Fortress, is mentioned by the Hungarian Chronicler, the Anonymous notorious Regis Belae (circa 1200 A.D.) as evidence that the Magyar Conquerors of 846 A.D. settled prisoners of war from Kiev in the village. It is hardly good support from a Slovak claim today. The area is, however, in fact a small one and depends economically on Bratislava; although whether it will form a useful strategic glacis to that city in the present age (particularly after Hungary has solemnly and eternally pledged her acceptance of the frontier) or a useful terrain for constructing a dam - the whole area, from the Little Carpathians to the Croat frontier, being as flat as a billiard-table, it would require a specialist to say. As said, however, the area concerned is a small one; but if the Trianon frontier is really not sacrosanct but susceptible to change where such change seems useful and desirable, it may be suggested that there are many plans where a still much stronger case could be made out for change in favour of Hungary.

C, D, E. No comment.

F. If the Treaty of Trianon is to remain in force why should the Czechoslovak Minorities Treaties be abrogated? The Hungarians, when they protested against the draft treaty, were consoled with the assurance that the minorities treaties would secure the position of the Magyar minorities in the Successor States.

G. No comment.

H/

Annex 30

ANNEX 3 TO CLOSING PROTOCOL OF THE HUNGARIAN-CZECHOSLOVAK NEGOTIATIONS CONCERNING THE UTILISATION OF THE HYDROPOWER OF THE DANUBE ALONG THE REACH FROM THE MOUTH OF THE MORVA TO VISEGRÁD, BUDAPEST, 18 JULY-2 AUGUST 1952

[Translation]

Annex 3

Lecture of Ing. Dr. Petr Danisovic on the plan of the utilisation of the hydropower prepared by the Czechoslovak Party.

[Excerpts]

As an introduction to my lecture I have to state that a large part of the figures and data presented here are taken from the preparatory plans, which can only be finalised after the approval of the programme of works, and especially on the basis of the final plan, so they are susceptible to changes. However, until our plan is accepted by the Hungarian side, we will not detail the plans. In the meantime, the programme of works is being determined.

[...]

Proposal for the utilisation of energy

We have tried to find such a solution for the section of the Danube between rkm 1880.2 and 1708.2 by the Czechoslovak frontier that would utilise the hydropower of the Danube to its maximum extent and would completely satisfy the demands of international navigation and of the agriculture in the Szigetköz and the Žitný Ostrov in addition to the needs of the towns and villages situated by the Danube.

We divided the section considered into two parts based on the peculiar longitudinal profile of the Danube:

the upper section between Devín and Palkovičovo, between rkm 1880.2 and 1810, where the gradient is relatively large: the bed drops 24.27 m, in 70.2 km, and

the lower section between rkm 1810 and 1708, between Palkovičovo and Szob, where the gradient is relatively small: the bed drops 9.46 m, in 101.8 km.

We propose to utilise the hydro-energy of the upper section in the canal system, and the lower in a river system.

On the upper section at rkm 1864.5, we propose to construct an impoundment between the two bends curving in opposite directions. This impoundment would dam the water level of the Danube to a maximum of 136.00 m a.s.l. In the bend above the impoundment, at approximately rkm 1865.5, a by-pass canal would fork off, which would lead directly to the lower, concave section of the elbow at 1810 rkm. We propose to utilise the difference between the dammed water level at Bratislava (136 m a.s.l.) and the mean stage at Palkovičovo (112.86 a.s.l.) at two places:

At Šamorin, the net gradient of the 17.0 km long by-pass canal is 135.37/124.76, at Gabčíkovo the net gradient of the 30 km long canal is 123.81/113.32. The length of the by-pass canal is 48 km, its dimensions allow for a 2100 m^3/sec discharge and it has a trapezoid cross-section. The planned mean velocity of the water flow is v=1.3 m/sec. The depth of the canal varies between 7.20-14.14 m, and, consequently, the width of the canal varies between 183 m and 102 m.

The amount of water utilised energetically is 2000 m^3/sec maximum. A maximum of 100 m^3/sec is anticipated to be used for irrigation.

For 50 years, there has been a 2000 m^3/sec discharge at Bratislava 155 days per year, in 1947 this was the case for only 50 days, and in 1926 for 197 days.

We propose to utilise as far as possible all of the discharge of the river up to 2400 m^3/sec which flows past Bratislava 106 days per year, calculated on the basis of the period mentioned above.

It is advisable to construct the power plants and navigation locks of the Šamorin and Gabčíkovo barrages with the same parameters, with the same gradient (H_{ef}=10.60 m) and for the same discharge to be utilised: Q=2000 m^3/sec and 2400 m^3/sec respectively. At a discharge of Q=2000 m^3/sec the maximum overall capacity of both barrages together is 344 MW, and the average annual production is 2510 million kWh in total.

With the alternative Q=2400 m^3/sec utilisation, the maximum capacity of both barrages together would be 402 MW, and the average annual production would reach 2710 million kWh.

The lower section between rkm 1810 and 1708.2 is proposed to be utilised in a river system with two barrages: one at Chľaba (Helemba) at 1712 rkm with a 107.50 m a.s.l. impounded water level, and one at Komárno at rkm 1770.6 with a 112.00 m a.s.l. impounded water level. The border of the upper limit of the impoundment of the Komárno barrage would be at Palkovičovo (rkm 1810) at the tailrace canal. We propose to utilise the river at both barrages for up to 5000 m^3/sec, which occurs on approx. 91 days per year. The maximum capacity of the power plant at Chľaba would be 81 MW, and the average annual production 589 million kWh.

The maximum capacity of the Komárno power plant would be 76 MW, and the average annual production 497 million kWh.

Therefore the following utilisation is possible on the whole Czechoslovak section of the Danube on the frontier:

Section	length (km)	drop (m)	max. water discharge (m^3/sec)	max. capacity (MW)	max. output (10^3 MWh) (mill. kWh)
Devín- Palkovičovo	70.2	24.27	2.400	402	2.714
Palkovičovo- Chľaba	101.8	9.46	3 000	157	1.086
			Total:	559	3.800

A brief justification for the framework of the solution outlined above:

The gradient of the section of the river between Devín and Palkovičovo is relatively significant. It does not have, however, a homogeneous bed, as is immediately visible glancing at the map. The natural bed is divided into countless branches, and even an artificial measure could not create a uniform riverbed. Even though low water levels flow in the main branch, the mean and high water levels flow into the side branch system. The riverbed of the main branch is shallow on this section and the bed between Dobrohošť and Gönyű is constantly rising as a result of the sediment deposition. Consequently, the utilisation of the water energy in a river system would be very unfavourable. In a river system, only rather small barrages could be constructed. Navigation locks and inundation weirs would have to be built at each barrage – especially because of the so-called catastrophic high water levels (Q_c=14000 m^3/sec) – which would be rather costly. The foundation of the construction itself in the bed would also be extraordinarily difficult and expensive (floods, ice floes, impossibility of access etc.). In the case of floods, when impoundment locks have to be opened, the turbines are left without water discharge and thus, the entire river system would stop electricity production, which, regarding the size of this source of energy, would not be profitable for our economy.

The solution with the canal, however, makes it possible to conduct the construction works away from the riverbed, independent of the water flow, floods or ice floes. Only one dam needs to be built to carry off floods and ice flows, which would be easily accessible. Only a limited number of navigation locks are necessary. With such a solution, even during floods, considerable discharge would be available and there would be no interruption in electricity production. In the canal system, international navigation is allowed perfect navigational way.

Therefore, we propose the solution with a canal system for the Devín-Palkovičovo section.

The gradient of the Danube on the Palkovičovo-Szob section is relatively small and even; the bed is flat and well formed. In general, the bed is stable and is not changing, except in the Palkovičovo-Gönyü section, where the bed is also presently at a gradient.

Because of the small gradient of the river (9 cm/km), we would gain relatively small gradients with a by-pass canal on the section between Palkovičovo and Szob, and the small gradient would not be proportionate to the huge earthwork that would be necessary to construct a new artificial bed. As opposed to this, the section could be used as a canal without any major earthworks, because, as mentioned above, this reach provides us with a well-formed natural riverbed.

For this reason, we chose the river-system for the utilisation of the water energy on this section. The relatively small drop (9.46 m) of the entire Palkovičovo-Szob section should be utilised at one place, Chl'aba. This solution would be the most economic, if the large region to the north and northwest of Komárno at the junction of the Vág and the Danube were not at such a low elevation. This area would lose its natural run-off possibility, and all the inland waters and seepage waters would have to be artificially removed.

The drain pumps now operating in this region start to work when the water level of the Danube reaches a level of approximately 107.50 m a.s.l.

This fact made us propose that the impounded water level at Chl'aba be set at a maximum of 107.50 m a.s.l. and the difference in the gradients be utilised with a further barrage at the conjunction of the Vág and the Danube.

That is why we proposed to construct two barrages instead of one, namely one at Chl'aba at rkm 1712.2 with a 107.56 m a.s.l. impounded water level, and the other above Komárno at 1770.6 rkm with a 112.00 m a.s.l. impounded water level. According to our proposal, Q_{max}=3000 m^3/s at both barrages, which is the equivalent of 90 days utilisation. More detailed research has to be conducted on the size of the turbines. We propose increased utilisation of the Danube with a river barrage as opposed to the solution of a canal because the major part of the costs of construction of a river barrage are spent on the dam and the navigation lock, and these costs are the same for any water discharge. The sites chosen are convenient as regards geoscience and geography, as well as the favourable implementation of the construction. This statement especially applies to the section chosen at Chl'aba.

The river solution mentioned above has certain drawbacks: the lower regions at Komárno would become inundated as a result of the barrages on the section between Palkovičovo and Szob. The drain pumps would operate throughout the year because of the barrage at Chl'aba.

The barrage above Komárno would also cause seepage on the protected areas and thus the pumping would have to be increased. These reasons forced us to search for more suitable solutions. We planned a by-pass canal between Bratislava and Kliszka Nemá, and, as an alternative, a by-pass canal down to Zlatná. With this solution, the barrage above Komárno would be omitted, and thus the seepage into the protected area. Moreover, the tailrace canal of the power plant could also serve as a draining canal, but this solution would leave a certain section of the Danube unutilised if the water was dammed to a height of 107.5 m a.s.l. at Chl'aba.

Annex 31

REPORT OF IMRE HORVÁTH, HUNGARIAN AMBASSADOR TO CZECHOSLOVAKIA, REGARDING A MEETING WITH RUDOLF STRECHAJ, CHAIRMAN OF THE BODY OF REPRESENTATIVES IN SLOVAKIA, 29 JULY 1955

[Translation]

Copy of the report received from the Embassy of Hungary in Prague,

dated 29 July 1955

Re.: Visit to Comrade Strechaj

On 9 July 1955, I made a farewell visit to Rudolf Strechaj, the Chairman of the Body of Representatives in Slovakia.

Although my arrival interrupted a meeting of the Body of Representatives, Comrade Strechaj welcomed me and immediately expressed his desire to inform me of the following issue:

In Bratislava and Kosice, there has recently begun a movement to launch eleventh grade Hungarian schools. Comrade Strechaj told me that he investigated the motive behind this movement and discovered it was initiated by class-alien, petty bourgeois elements. In Comrade Strechaj's opinion, it would not be proper to establish these schools in Bratislava and Kosice because these cities have no Hungarian worker masses and therefore the situation would only benefit the petty bourgeois, class-alien elements, since primarily their children would be sent to these schools. His suggestion to prevent this from occurring is to establish the two new Hungarian eleventh grade schools – which are required in his view – in the vicinity of Rozsnyó and the other probably in Gbelnice, since these are places where a large number of Hungarian workers are supposed to live. He asked me to inform the "comrades in Budapest" about this and asked for my personal comment: whether he was right or not. I responded by saying that if his goal is to prevent the children of class-alien, petty bourgeois elements from attending these schools, then his suggestion is entirely correct. However, I did not make a statement about where or in which city the schools should be organised. It is quite clear that they do not want to see a Hungarian eleventh-grade school in Bratislava and Kosice, and Comrade Strechaj probably expected me to express my agreement with this view.

In the course of discussing the Consulate General and Comrade Mányik, I inquired as to what his opinion of Comrade Mányik was. He responded that they have rarely met due to a shortage of time. Responding to the question of whether differences occur between them as they did at the time of Comrade Füredi, Comrade Strechaj shrugged and said: "I do not know about it, although they usually still come together at Comrade Mányik's place" (i.e., visitors do come). This clearly shows that he does not like Comrade Mányik's practice of sometimes inviting guests, regardless of the fact that they are not Hungarians living in Slovakia. I noted in response that, in my opinion, it would do no harm to friendly relations if Comrade Mányik sometimes hosted Slovakian comrades. Comrade Strechaj's answer was only "well, of course, of course...", and then he changed the subject and started to discuss the relations between Czechoslovakia and Hungary.

Towards the end of the discussion he said that there were other issues where cooperation was insufficient. He talked with indignation about us being wrong when, in the case of the Danube Power Plant, we insisted that the new bed of the Danube be the border line because, looking at this issue in perspective, the frontiers do not have high significance. Hence, by insisting on this standpoint, we are delaying the construction of the Danube Power Plant. However, he is aware that we also need the power generated, as do they. For example, they are currently missing at least 175 MW. Finally, he added that if there was no other alternative, then during the second Five Year Plan they would construct the Danube Power Plant on their own. In response, I expressed my hope that we would find common ground (by the way, Karol Bacilek, the First Secretary of the Central Committee of the Slovakian Communist Party, also hinted to Comrade Mányik – although jokingly – that "we shall build the Danube Power Plant on our own").

The discussion which lasted 35 minutes, came to an end on that note and Comrade Strechaj said a very kind farewell.

Imre Horváth
Ambassador

Annex 32

MEMORANDUM ON THE HUNGARIAN-CZECHOSLOVAK NEGOTIATIONS CONCERNING THE UTILISATION OF THE UPPER DANUBE, 27-28 SEPTEMBER 1955

[Translation]

The following persons attended the negotiation:

On behalf of the Hungarian party: **[omitted]**

On behalf of the Czechoslovak Party: **[omitted]**

First day of the negotiation

In opening the negotiation process, Comrade Barák set forth the following Czechoslovak opinion:

The parties have been negotiating on the utilisation of the water energy of the upper Danube since 1952. Since that time, both parties have considered the utilisation of the Devín-Visegrád Danube section as a complex unit. The Czechoslovak Party has elaborated 13 versions during the past 3 years, the primary solutions of which have been discussed by the experts of both parties. In the course of the negotiations held in 1954, the government committees reconciled their standpoints on many issues, but the fundamental demand of the Hungarian Party, i.e., to transfer the border between the two countries to the axis of the power canal, has not been resolved yet. Taking into consideration the urgent need to utilise the Danube, the Czechoslovak Party went to the Soviet Union in order to discuss the version which would exclusively be built on the territory of the Czechoslovak Party (Hamuliakovo). On that occasion, the Soviet experts studied all versions and suggested that the Czechoslovak Party discuss the Čilistovo version as the best first construction phase with the Hungarian Party.

The Czechoslovak Party announces its intention to construct scheme 1 on its own territory and by its own means, in accordance with the Čilistovo version. In addition, the Republic of Czechoslovakia guarantees the Hungarian People's Republic the transfer of an amount of energy equal to the Hungarian share in the part utilised, and simultaneously guarantees the water quantity necessary for the right side as well.

Comrade Barák further outlined the benefits of the Čilistovo version. The Czechoslovak Party requests the Hungarian Party to agree with the solution contained in scheme 1 outlined previously, and presumes that, in light of the shortness of the joint Danube-section to be utilised in this scheme, the Hungarian Party will not enforce its wish regarding the adjustment of the border.

If an agreement is reached to this effect, the negotiation of the government committees will begin as soon as possible, during which the details of scheme 1 of the utilisation of the Danube would be discussed.

Finally, Comrade Barák stated that the solution proposed will not delay the Czechoslovak Party from proceeding with construction of the utilisation of the upper section of the Danube referred to in scheme 2.

Comrade Gerö set forth the opinion of the Hungarian delegation:

In this way, the utilisation of the water energy of the upper Danube is an important political, economic, energetic, shipping and irrigation issue for both friendly countries. There are two reasons for not reaching an agreement within 3 years:

a/ The issue is very complicated and difficult, as it affects several countries and economic areas.

b/ The cooperation between the two countries is not close enough.

The issue of the upper Danube may only be examined in a complex manner, taking into consideration the right of the two nations to the international navigation route. Moreover, the separate examination of the individual details makes no sense. It is also demonstrated by the fact that, though an agreement was reached with regard to 17 important questions of detail until now, the following three basic issues remained open:

1/ Conduction of the power canal on the right or left side: (Item 1 of the closing protocol of the third negotiation of the government committee held on 2 December 1954): The Hungarian Party does not consider the extra cost of 5 to 7% of the conduction of the canal on the right side so significant that it could not absorb the extra charges resulting therefrom, especially if the cheaper solution to be effected on the left side would have disadvantageous political, economic, or technical consequences if the basic preconditions were not fulfilled.

2/ Issue of border: Contrary to the Czechoslovak opinion that the issue of the border is the main obstacle that has prevented the reaching of an agreement until now, it is the opinion of the Hungarian Party that the issue is no more than a derivative of the issue mentioned under Item 1. The Hungarian Party, which does not wish to acquire any territory, offered on the basis of reciprocity that the border be transferred to the medium line, even in the case of conducting the canal on the right side. Furthermore, it proposed compensation for the territory transferred by means of other territory possessing similar value. Finally, it proposed the publication of the border adjustment after the construction of the structure. Thus it is clear that in the case of conducting the canal on the right side, the issue of the border does not cause any problem.

3/ Interpretation of the energy share as per power plant which is connected with the time scheduling of the project.

The Hungarian Party declares that although it does not wish to delay the solution of the upper Danube issue, it may only accept a solution which does not infringe upon the interests of the Hungarian national economy and the Hungarian national emotions. Its opinion is that all three issues must be jointly decided before the discussions on the correctness of the whole Čilistovo version proposed by the Czechoslovak committee take place. Prior to deciding the basic issues, no agreement may be reached regarding the implementation of step 1 of the Čilistovo version. Doing so would determine the whole issue, since the establishment of both barrage systems on Czechoslovak territory would leave the feasibility of Visegrád power plant, which is very important for the Hungarian party, totally uncertain. Hungary may not give up a further Danube-section of 40 to 60 km following the transfer of the 11-kilometre Danube-section at Oroszvár.

The Hungarian committee deeply regrets that the joint and complex consultation of the issue did not take place together with the Soviet experts and that only certain versions have been introduced. The Hungarian opinion with regard to the issue of consultation is contained in items 1 and 2 of the minutes of the Technical Committee of 30 December 1954, as well as the letter of the Hungarian Government Committee of 20 January 1955. A proposal was made during the unilateral consultations, the content of which the Hungarian Party could not have participated in since it was not even present. Therefore, that proposal may not influence its present opinion.

Based on the above, the Hungarian committee does not consider expedient the proposals of the Czechoslovak committee made in the course of the dispute, i.e., to request further joint Soviet expert consultations on the Čilistovo solution without deciding the basic issues, and/or to start the construction of scheme 1.

Nor does it consider expedient a consultation on the border issue with the Soviet comrades, as this is a political issue which shall be decided between the two countries.

Regarding the border issue, the Czechoslovak committee proposed that the territorial strip in question remain Czechoslovak in the case of conducting the canal on the left side, but Hungary shall be granted a kind of right to use the territory in accordance with an agreement of the two parties. The Hungarian committee requested making the proposal concrete in order to examine the issue.

It is the opinion of the Czechoslovak committee not to link the construction of scheme 1 with the issue of the amendment of the border, and the issue of Hungary's access to the power canal shall be solved prior to the commencement of scheme 2.

The Hungarian and Czechoslovak committees agreed that the two Parties will submit the opinions set forth to their Political Committees, and the Czechoslovak Party will make available to the Hungarian Party its proposal concerning the administration of the territory separated by the canal as soon as possible. The Political Committee of the Hungarian Workers Party shall disclose its opinion on that proposal within 14 days of receipt.

Second day of negotiation.

Comrade Gerő made two announcements on behalf of the Hungarian Committee:

a.) He stated that the consultation material undertaken by the Hungarian Party had been consistent with the minutes of the technical committees dated on 30 December 1954, which also contained the right-side canal solution judged by the Hungarian Party as more favourable in many respects as compared to the best known left-side Czechoslovak proposal. He offers the handing over thereof and requests the handing over of the consultation material, the elaboration of which was undertaken by the Czechoslovak Party.

b.) The time at which the Hungarian Party can implement the construction in the case of the right-side canal option can not be answered until the Czechoslovak Party states at what time it is able to make available its partial contribution to the project.

(Items 4 and 5 of Appendix 1 to the closing minutes of the government committee of 21 December 1954) On behalf of the Hungarian Party there is no impediment to implement the structure as soon as possible.

The above statements are only answers to the questions raised by the Czechoslovak comrades yesterday, and do not change the Hungarian announcement of yesterday that if the indispensable conditions are fulfilled, then the Hungarian Party agrees to the left-side solution.

Comrade Barák proposed to take over the Hungarian draft material and to hand over the Czechoslovak material to the Hungarian Party within 14 days. He wishes to judge and conduct consultations with regard to both draft materials jointly. If no agreement is reached, the Czechoslovak Party is resolved to construct the hydroelectric power plant at Hamuliakov on Czechoslovak territory.

Budapest, 28 September 1955

Annex 33

WORK PROGRAM OF THE COMMITTEE ESTABLISHED FOR ELECTRICAL ENERGY EXCHANGE BETWEEN COUNTRIES PARTICIPATING IN COMECON AND ON THE DRAFT OF THE COMPREHENSIVE UTILISATION OF THE DANUBE, WITH ATTACHED MINUTES, MOSCOW, 8-9 MAY 1956

[Translation]

Notice

For Comrade Ernő Gerő

Subject: The discussion of the work program of the preliminary committee on the expansion of the electric power exchange between countries participating in COMECON and on the draft of the comprehensive utilisation of the Danube.

I.

Preliminaries

On the basis of the resolution of the January meeting, the above mentioned committee was founded on March 19, 1956 in Moscow, alongside the Secretariat of COMECON. It immediately dealt with the preparation of its own work program which will be submitted to the VIIth Session of COMECON. The participating countries in the session had requested the Soviet committee to compile the preliminary proposal of the program on the basis of materials submitted by the countries.

We received the preliminary proposal of the Soviet Committee on 28 April. The proposal elaborates the subject in two chapters:

- The first part handled the issue of the expansion of the exchange of electric power and the establishment of the system of cooperation between the countries. A concrete calendar plan of the work to be done was attached. The work will be essentially accomplished by the Moscow-based Teploenergoprojekt with the cooperation of the experts of the interested countries. The main stages of the work are: collecting data, preparing an outline proposal on the basis of the data, the discussion and approval of the proposal. In the next year, the work will be continued on the basis of the outline proposal and the discussion of the detailed program will be postponed;
- the second part handled the preparation of the outline plan regarding the comprehensive utilisation of the Danube and includes a draft program consisting of 5 phases over a 2 year period, the syllabus of which should be elaborated in 10 volumes published in an appendix.

The proposal prepared by the Soviet party was conveniently rather systematic and was a proposal which embraced the topic, but we had several comments from the Hungarian side in connection with the material. The most important points are the following:

- in the section of electrical energy, the quadrilateral energy cooperation (185 MW) under negotiation has not been mentioned, hence, with some tendentiousness, the material could have been understood in such a way whereby it would have been more expedient to precede with the practical implementation of cooperation by the drawing up of a more comprehensive plan of cooperation. In the long term this could have meant the further protraction of the transport of 185 MW within 1-2 years;
- they suggested the outline draft of the comprehensive utilisation of the Danube be prepared so that, in the division of labour, the Dévény-Visegrád section would have been drafted only by the Czechoslovak party;
- neither the relationship of the Committee, its activity with the International Danube Commission nor the participation of Yugoslavia in the project was clarified;
- the proposal has not been clear enough on the issue of whether they thought of the plan on the comprehensive utilisation of the Danube, or even more comprehensively on the design of the water management of the whole Danube basin.

Because of the lack of time it was impossible to submit the negotiation guidelines to GKB (Joint Economic Committee), therefore they were established by the Hungarian negotiating committee. The committee took into account the aspects of the conversation with Comrade Berei.

II.

The Negotiation and its Result

The negotiation was held between 8-9 May 1956 in Moscow, under the chairmanship of Comrade Ugorec, a Deputy Minister. The representatives on behalf of the countries are listed in the appendix.

Comrade Ugorec briefly summarised the material and the major tasks of planning. He emphasised the advantages of electric energy cooperation and the energy support needed in order to develop the Hungarian aluminium industry as an important principle to be implemented. He emphasised the importance of the balance of energy resources. He outlined the definite stages of preparation of the plan to utilise the Danube. In the end he suggested the Committee work in two workshops during this session: in the sections of energy and water management. His proposal was approved.

The most important problems and results of the plenary session and in the workshops were as follows:

1/ The division of planning

As I have already mentioned, the proposal on the division of planning was not desirable from the Hungarian point of view. In the course of the debate, Comrades Dorin and Osztrovszki shared the fundamental opinion that the objects to be established on the water in the border section should be jointly designed. This standpoint was accepted by everyone except Comrade Stoll in the first day of the debate. He proposed, in very general terms, that the planning of the implementation of works on the border territories be distributed on the basis of geographical and political aspects. Comrade Stoll probably thought here that Czechoslovaks could make achievements on a diplomatic level if they alone were to design the hydrotechnical equipment on the upper Danube section as opposed to all earlier practices followed in the relations of capitalist and friendly states. In the second day of the negotiations, the head of the Polish delegation also supported the Czechoslovak proposal, but in the end the Hungarian-Romanian standpoint was established on record and incorporated into the work schedule.

2/ In his several comments, Mr. Cioara, the Romanian Minister of Energy, expounded that the energy consumption per capita in Romania is very low and the energy-supply is on a rather poor level. He referred to their problem concerning fuel supply, and according to him, since 1956 they have had a shortage of 3-5 million tons of fuel. In 1960 their electric energy-requirement was 8 billion kWh, in 1965 15-16 billion kWh, in 1970 it would be increased to 24-26 billion kW/h, but their potential of the economically gained water energy supply is a total annual sum of 25 billion kWh/year , the majority of which can be obtained from the Danube. He also referred to the existing and increasing oil and gas export to the friendly states. He pointed out that for Romania, energy cooperation is only favourable at a zero energy balance; in other words, their energy import and export should be balanced. In his further comments, he argued against the implementation of energy cooperation, and he has not approved the detailed indication of the advantages of electric energy cooperation in the Committee's draft schedule.

In the opinion of the Hungarian committee, the Romanian negotiating committee conflicted with the proposal raised by Comrade Gheorgiu-Dej in the January session and further more with the information announced in the lecture of Professor Dorin in the committee meeting of March. He did not expressly mention, but from the comments it was implied that no Romanian transport of energy to the people's democracies from the Vaskapu (Iron Gate) power plant will be established without Yugoslav allowance.

3/ From our view, the main issue of the work schedule of electric energy was that under the new situation, the implementation of the four way energy cooperation should not be postponed. Hence we wanted this issue to be mentioned in a concrete way. In the course of the long discussion, this was not expressly put into the work schedule, but the president of the Committee, Comrade Ugorec, emphasised more than once that, on the one hand, there is a COMECON resolution of the VIIth session which does not need any further approval, on the other hand, the Hungarian expectations are fair and they have to be satisfied in such a way that they occur in the resolution. In a private conversation, Comrade Ugorchev informed Comrade Sebestyén that he was well aware of the materials of the Budapest sessions, since Soviet experts informed him precisely, and he announced that if it was necessary because of the hesitance of the partners after the VIIth session in June, he is ready upon our request to convene the committee in order to ensure and accelerate the energy quantity transported to Hungary. However, without getting down to facts, he referred to it in his final speech in the plenary session.

4/ We regard an important result of the negotiations to be the work schedule of the Committee on Electrical Energy, which refers not only to transmission line issues, but also includes the inspection of general energy balances. This circumstance is especially important for us because of the well known general energy shortage in Hungary which will be rather acute in the long run. The outline plan or study which will be prepared by the Committee will reveal the real situation that the supply of energy resource per capita is significantly larger in the neighbouring countries than in Hungary, and it will also make clear that their energy producing capability will also form an economic aspect which is much more beneficial. In consequence of this, with regard to energy and energy resources, Hungary should get further help from the friendly countries. A possible form of help might be a beneficiary participation in the design and building of the water managed equipment in the Danube and to gain beneficial participation from the development of hydro-energy.

5/ Regarding the large quantity of the material to be prepared and the rather tight schedule, it appeared to be necessary that the chairmen of each delegation, deputy chairmen of the committees, should be responsible and in charge of the implementation of the work plan. We approve this proposal.

III.

Further tasks:

1/ In the VIIth session of COMECON the Hungarian delegation shall approve the attached work schedule.

2/ The Ministry of Electric Energy and Energetics, the National Planning Office, and the General Directorate of Water Management should compile from the work schedule the tasks laid upon us and perhaps with the confirmation of the Council of Ministers they should ensure the accomplishments of the tasks on the schedule.

3/ The experts who will be thoroughly acquainted with this question should be selected; also they will participate in the design this year in Moscow to the necessary extent required.

4/ The detailed works of electrical energy and transmission lines will be co-ordinated by Ministry of Electric Energy and Energetics, and the issues related to the hydro-technological equipment in the Danube should be co-ordinated by the authorised bodies of the General Directorate of Water Management. The coordination between the two areas should be accomplished by the members of the committee appointed by the Joint Economic Committee.

György Osztrovszki

[Attachment 1]

Minutes

May 8-9 1956 session in Moscow of the Committee established for the electrical energy exchange and the utilisation of hydroelectrical power of the Danube among the participating COMECON countries.

Participants: **[Omitted]**

Mr. I. Ugorec chairs the meeting.

About the schedule of the Committee session

RESOLUTION

The schedule of the Committee session is the following:

1. The report of the chairman of the Committee on the work schedule of the Committee and its discussion;

2. The organising of the outline schedule of the Committee sessions and the selection of the heads of the sections;

3. Selection of the Editing Collegium for the elaboration of the final text of the program;

4. The approval of the program in the plenary session of the Committee;

5. The selection of the deputy chairmen of the committee.

Referring to the points of 1, 2, 3, and 4 of the schedule

Participants in the debate: comrades Ugorec, Popov, Cioara, Osztrovszki, Keck, Zadzsinszki, Stoll, Hamouz, Novikov

RESOLUTION

1. The Committee shall organise and complete the following jobs directed at the performance of basic works:

   a/ the examination of the issues related to increasing electric energy exchange between the participant countries and to the construction of new electric energy-transferring conductors;

   b/ the elaboration of measurements connected with the draft of the research and design and comprehensive utilisation scheme of the hydroelectric utilisation of the Danube, the improvement of the navigational conditions of the Danube, and the irrigation of the fields beside the river;

c/ elaboration of suggestions and proposals for the governments of the participant countries for the implementation of the hydro-technical constructions of the Danube and the construction of new electrical energy transfer-conductors;

The mentioned suggestions and proposals should be submitted to the session of the Council of COMECON.

2. For the negotiation of the work program-draft of the Committee in the present session for the compilation of its final text:

a/ The Committee shall create a section for the exchange of electrical energy among the participant countries, and another section for the utilisation of the hydroenergy resources of the Danube.

The Committee selected J. Zadzsinszki to be the head of the first section and Comrade Cs. Stoll was selected to be the head of the second section,

b/ The Committee selected the Editorial Collegium for the elaboration of the final text of the work program, which included the following people: Comrades I. Ugorec, K. Popov, Osztrovszki Gy., J. Zadzsinszki, G. Cioara and Cs. Stoll.

3. The Committee adopted the work proposal submitted by the Editorial Collegium.

4. The Committee called upon the session of the representatives of the planning bodies of the participating countries for July of this year in order to compare methodological questions in connection with supplying uniform materials in accordance with the accepted program.

Concerning point 5 of the agenda:

The participants of the debate are Comrades Osztrovszki, Ugorec, Stoll, Popov, Cioara

RESOLUTION

1. On the basis of the accepted program, The Committee shall select the permanent deputy chairmen of the Committee in accordance with the work to be completed in the certain countries. From the Bulgarian side: K. Popov, From the Hungarian side: Osztrovszky Gy., From the Polish side: J. Zadzsinszki, from Romanian side: G. Cioara and from the Czechoslovakian side: Cs. Stoll.

2. The Committee requests the Secretariat of COMECON to check with the GDR about the selection of the permanent deputy chairmen of the Committee.

May 9, 1956

I. Ugorec
Chairman

May 12, 1956
Hungarian National Archives

Annex 34

LETTER FROM V. SIROKY, PRIME MINISTER OF THE CZECHOSLOVAK REPUBLIC, TO JÁNOS KÁDÁR, PRIME MINISTER OF THE REPUBLIC OF HUNGARY, 11 DECEMBER 1957

[Translation]

Prague, 11 December 1957

The Prime Minister of the
Czechoslovak Republic

Dear Comrade Prime Minister,

In answer to your letter dated 27 November 1957, I agree with your proposal to hold a joint meeting of Hungarian and Czechoslovak experts on harnessing Danube's water potential in Budapest on 17 December 1957 with the participation of Soviet experts. Afterwards, the next meeting of our Hungarian experts should take place in Prague on 6 January 1958. On the expert discussions the head of the Czechoslovak side will be Dr. Ing. Čestmir Štoll the director of the Central Water Management Directorate. At these expert discussions the Czechoslovak Party shall become acquainted with the Hungarian side's proposals on the harnessing of the Danube on the intersection between the Wolfstahl power plant and Nagymaros/Visegrád.

The Czechoslovak Government delegation will be able to take a standpoint for discussions with your government delegations only after examining Hungarian proposals, especially their technical and economic side. In the light of these considerations I am of the opinion, that the two state's government delegations can start discussion concerning the issue possibly only at the end of January 1958. I would give a proposal on the exact date of government delegations and on the composition of the Czechoslovak delegation after the completion of expert committee discussions.

I think, you will agree, Honoured Prime Minister, on this procedure.

Comradely greetings,

V. Siroky

Annex 35

PROPOSAL TO THE COMMITTEE OF ECONOMICS ON THE PROPOSALS TO BE MADE ON BEHALF OF THE HUNGARIAN PARTY DURING HUNGARIAN-CZECHOSLOVAK GOVERNMENT NEGOTIATIONS CONCERNING THE JOINT HYDROELECTRIC UTILISATION OF THE DANUBE, FEBRUARY 1958

[Translation]

National General Directorate of Water Management
Ministry of Heavy Industry

DRAFT RESOLUTIONS

1/ The Committee of Economics acknowledges the resolutions of the COMECON meeting held in Moscow in September 1957 in connection with the complex utilisation of the Danube.

2/ The Committee of Economics approves the contents of the minutes drawn up on the negotiation of the Hungarian-Czechoslovak Technical Committee held in Budapest from 10 to 15 February 1958 with Soviet consultation, and acknowledges that the Hungarian-Czechoslovak government committee negotiation ordered by Government Decree No. 3480/1957 will take place in May 1958 after appropriate technical preparation.

3/ The following standpoints shall be represented in the course of the negotiations:

a/ the basic scheme of utilisation of the Wolfsthal-Nagymaros section of the Danube shall be approved in accordance with the proposal of the joint Czechoslovak-Hungarian Technical Committee (location of water intake, trace of power canal, impoundment level, final water discharge);

b/ it shall be guaranteed that both parties have free access to the power canal as a new international navigation route, either through territorial exchange or joint authority;

c/ it shall be agreed that the maintenance cost of the abandoned Danube river-bed shall be jointly borne by the two parties in proportion to the energy share in the power canal power plant;

d/ based on the reasons set forth in the proposal, the parties shall attempt to reach an agreement so that the proportion of division becomes 50-50%, with a share of the same proportion in construction costs, irrespective of the natural energy division;

e/ the method of calculating the secondary costs of the project shall be fixed on the basis of the recommendation and proposal of the Joint Hungarian-Czechoslovak Technical Committee, and will also include the annual industrial and maintenance costs;

f/ the point of view that long-term Soviet credit be obtained with regard to the mechanical equipment of the power plant shall be represented in the course of the negotiations.

4/ The Committee of Economics authorises the government committee to make a theoretical proposal to the Czechoslovak Party for the joint implementation of the Nagymaros power plant.

5/ In order to coordinate the design work of the Nagymaros hydroelectric power plant, in addition to any further hydroelectric power plants on the Danube, a Hungarian-Czechoslovak Joint Technical Committee shall be established with the participation of Soviet experts.

Official in charge: Director-General of Water Management
Budapest, February, 1958.

Sándor Czottner
Ministry of Heavy Industry

Imre Dégen
Director-General of Water Management

Annex 36

REPORT ON THE HYDROELECTRIC UTILISATION OF THE JOINT HUNGARIAN-CZECHOSLOVAKIAN DANUBE SECTION, 5 JULY 1958

[Translation]

I.

HISTORY

Negotiations were commenced between the Hungarian People's Republic and the Republic of Czechoslovakia in 1952 on the utilisation of the hydropower of the shared section of the Danube section of joint interest. In the course of the first negotiation, both countries set forth their own previous concepts, then Czechoslovakia accepted the Hungarian proposal that the lowest step of the power plant system examined shall be Nagymaros power plant, and the utilisation of the upper section shall be constructed in connection with that. An agreement was reached in the same year on the utilisation of the total hydropower supply of the section of Danube between Dévény and Nagymaros in accordance with common technical designs. The joint negotiations successfully promoted the matter in several respects.

The negotiations were, however, interrupted in 1954 as a result of the uncertain and wait-and-see Hungarian policy on the one hand, and on the other hand because Czechoslovakia insisted on the left-side conduction of the power canal and referred to promises of the Hungarian party leaders in such a manner that, in return for the above, it was not willing to grant benefits which would have compensated Hungary for changing the international navigation route.

In the meantime, the Republic of Czechoslovakia conducted negotiations and reached an agreement with the Federal Republic of Austria for the purpose of utilising its own hydro-energy supply. These negotiations were conducted in order to build Wolfsthal power plant, which was to be established at the Austrian-Czechoslovakian border section of the Danube. This changed the former joint Hungarian-Czechoslovakian concept and created a totally new situation in the field of utilisation. We were subsequently informed of the Czechoslovakian negotiations.

The grounds for the interruption of the negotiations was the resolution made at the plenary session of COMECON held in Berlin in April 1956. In accordance with the meeting's resolution, the water power utilisation of the Wolfsthal-Nagymaros section of the Danube shall be dealt with within the framework of the complex utilisation of the full Danube section between Dévény and the Black Sea. Based on the resolution, the design offices of the Danube States concerned compiled the design material regarding the utilisation of Danube sections coming under their own sphere of interest, and handed it over to the Soviet Hydroprojekt Institute commissioned with coordination on behalf of the COMECON.

The complex utilisation plan was negotiated by the Standing Committee of Energy of COMECON in the course of its session held in Moscow in September 1957. This committee made a resolution regarding the principles and work programme of the preliminary research and design connected with the water power utilisation in the section of the Danube between Dévény and the Black Sea, and stated that as a result of the excellent geographical and geological conditions, the water power utilisation possibilities to be primarily implemented in the Danube section mentioned above are the power plants at Wolfsthal, Nagymaros and Vaskapu.

In accordance with the resolution which was adopted by the Hungarian Revolutionary Workers-Peasants Government, the development of the utilisation scheme of the Hungarian-Czechoslovakian Danube section of joint interest shall be based on the principal agreement between the governments of the two States. In the interest thereof, the Hungarian Revolutionary Workers-Peasants Government, by its resolution No. 3480/1957, appointed a government committee under the leadership of Comrade Antal Apró. The Republic of Czechoslovakia also appointed its government committee, the head of which was Deputy Prime Minister of the Republic of Czechoslovakia, Comrade Karel Polacsek.

In order to prepare the negotiations of the government committees, the two States delegated a technical expert committee which commenced the preparatory negotiations in January of this year in Budapest, continued them in March in Bratislava, then again in Budapest, and finally completed the preparatory negotiations in May in Prague.

In the meantime, the Standing Committee of Energy of COMECON passed a resolution at its session IV held in Bucharest in April 1958, stating that the principle arrangement of the hydroelectric power plant and power canal, to be established at Dévény-Nagymaros section of the Danube and Nagymaros hydroelectric power plant, reconciled and approved by the government committees, shall be handed over to COMECON by 1 October 1958.

II.

Technical description and profitability of the power plant system

The section of the Danube between Dévény and Nagymaros may be divided into two parts with consideration to the utilisation of the water plant. The upper section will be utilised by the hydroelectric power plant and power canal, and the lower section by Nagymaros power plant:

a/ Upper section. 1873 river kilometres (Wolfsthal-Bratislava) – 1780 river kilometres Dunaaranyos (Zlatná na Ostrove).

In this section, the Danube flows steeply (35 cm per kilometre), is slightly embedded in sandy gravel layers which are several hundred meters thick, and falls into many branches, thus its utilisation is only possible by a hydroelectric power plant with a power canal.

The water extraction works of the power canal will be established at the 1853.2 river kilometre-section, and the old Danube riverbed beside that will be closed by a weir. The impoundment level is 131.50 m above the Adriatic. The weir shall be measured out to be able to pass through the flood wave of the frequency of 1000 years. In addition to that, it shall be made possible that a part of the catastrophic floodwave shall go down through the flood plain.

The power canal may be conducted both on the Hungarian and the Czechoslovakian side. Its water discharge output at construction is 2.400 m^3 per second. A hydroelectric power plant and a double navigation lock is built at the canal.

With consideration to the fact that after the construction of the power canal, the old Danube bed will only conduct water in the case of the flow of a water quantity bigger than the water discharge output of 2.400 m^3/sec, at least a quantity of 100 m^3/sec shall be left in the old

Danube bed for hygiene, fishing, and maintenance purposes. In winter, the above quantity may be reduced in order to prevent ice formation, or may even be eliminated if necessary.

Following the construction of the power canal, changes will take place in the groundwater conditions of the neighbouring area, should the canal be conducted on either side. The ground water level will be considerably lower in a part of Szigetköz and Žitný Ostrov in comparison with the conditions existing up to the present, and this will have influence on agricultural production. Thus, the unchanged condition of the present circumstances shall be provided for, if possible (construction of irrigation canals, ground water supply, etc.).

b/ Lower section, 1780 river kilometres Dunaaranyos (Zlatná na Ostrove) – 1696 river kilometre Nagymaros.

The fall of the Danube is low at this section (7 to 9 cm per kilometre) and it is well embedded, thus its utilisation is possible primarily through a river barrage. The sandy, gravel bed of the Danube is cut by andesite rock at the Nagymaros-Visegrád Danube bend. The bank is unified here, and is excellently appropriate for the establishment of a big-river structure. As a result of its excellent geological structure, the lower section will be utilised by Nagymaros barrage to be established at 1696 river kilometre section. The barrage consists of a weir, a hydroelectric power plant and a navigation lock.

For the time being, the impoundment level of the weir shall be established at the value of 108.00 metres above the Adriatic. It shall, however, be endeavoured that the impoundment level – in the interest of the extra energy to be gained this way – could be increased at least up to the value of 108.50 metres above the Adriatic following the performance of the research and exploration work.

The topographical, geological and hydro-geological level of exploration of the left-depression, particularly the areas near Vág, Nyitra, and Zsitva, is not satisfactory yet, and the details presently available do not make possible the establishment of the impoundment level at a higher value. In our opinion, following the performance of the work of research, exploration and experiment, the possibility of increasing the impoundment level up to at least 108.50 meters above the Adriatic shall be examined once again.

The construction of Nagymaros power plant will essentially change the conditions of water level at the concerned sections of the Danube and its tributaries (Ipoly, Garam, Vág, Nyitra, and Zsitva). Protective measures shall be taken (dyke increase, construction of closing curtain, infiltration systems, and pumping plants) in order that the impounded water level causes no damage on the area protected by flood structures, and if possible, so no changes take place in the present conditions of agricultural production as a result of the increase in groundwater level.

Impoundment reacts at the Danube up to about 1780 river kilometre (until Dunaaranyos). The section of the Danube of about 30 km between 1780 river kilometre and the estuary of the power canal shall be dredged for the purpose of better utilisation up to the economically advantageous extent, which will, simultaneously, improve the conditions of navigation.

The details of profitability of the power plant system are given as follows:

The specific indices of the power canal power plant are as follows in Kcs based on the Czechoslovakian evaluation, while the indices of Nagymaros power plant are as follows in HUF based on Hungarian calculations (for the sake of comparison, at the price level of 1952):

	Power canal power plant	Nagymaros power plant
Built-in performance:	372 MW	120 MW
Medium annual energy production:	2422 GWh	800 GWh
Total costs of investment:	Kcs 3755 million	HUF 2034 million
Specific cost:	Kcs 11 100 per kW	HUF 16 950 per kW

It is obvious that Nagymaros power plant is more favourable than the power canal. Despite thereof, this plant is also economical. Considerably more unfavourable opportunities than that are also utilised in Europe. Moreover, it is the Republic of Czechoslovakia which is building at present a less economical hydroelectric power plant at Vág.

Under domestic conditions, also for the sake of comparison with thermal power plants, the indices of Nagymaros power plant are given at the new price level of 1959.

Total cost of investment: HUF 3040 million

Specific cost: HUF 25 400 per kW.

Calculating on the basis of the above values, the production unit cost of Nagymaros power plant is HUF 0.304 per kWh charged with a capital interest rate of 8%.

Simultaneously, at thermal power plants of similar performance, the current produced to network may be taken into consideration at the average cost of HUF 0.67 per kWh in the new price system. This price does not include any interest charge. Thus, the difference between unit prices is HUF 0.255 per kWh. Consequently, the annual saving is HUF 204 million. Based on the production unit cost of thermal power plants not charged with interest, the hydroelectric power plant is able to recover the total project separately, within exactly 15 years, even under an interest charge of 8%.

If the unit cost of the thermal power plant is also calculated with an interest of 8%, the period of recovery is reduced to 7 years.

Performing the examination on profitability in connection with a newly established thermal power plant, and taking into consideration the mine investment too – which corresponds with the actual situation – the difference of investment cost between the thermal power plant and the hydroelectric power plant is HUF 593 million. The difference of production unit price is, simultaneously, HUF.439 per kWh. Thus, annual saving in favour of the hydroelectric power plant is HUF 352 million. Consequently, the period of recovery of the investment difference of HUF 594 million is 1.7 years.

Therefore, the establishment of the hydroelectric power plant is promised to be extraordinarily economical, and taking into consideration the current price system, the period of construction may also be considered identical with that of the thermal power plant.

At the same time, economic benefits which may not be shown numerically at present also occur at the establishment of the hydroelectric power plant, but the significance thereof shall be taken into account by all means (navigation, more favourable irrigation possibilities, etc.).

III.

In order to meet the obligation imposed on us by COMECON, the government committees shall approve the theoretical arrangement of the Danube section between Dévény and Nagymaros which has already been agreed upon by the technical committees, without discussing the following:

1/ Whether to build the hydroelectric power plant below Bratislava on the Hungarian or the Czechoslovakian side, since the power canal may be conducted on either side. It turned out in the course of the preparatory negotiations that there is no difference between the two versions from technical and economical standpoints, thus the conduction of the line requires a political decision.

2/ The time of construction of the two hydroelectric power plants to be established at the section of the Danube between Dévény and Nagymaros (the one with the power canal under Bratislava and the hydroelectric power plant at Nagymaros).

3/ The establishment of the power plants within the framework of a joint project and operation.

Based on the above, we suggest three items for the negotiation agenda of the government committee:

A/ Approval of the scheme of joint utilisation of the section of the Danube extending from Dévény to Nagymaros.

B/ Formulating a theoretical opinion on the joint utilisation of the Hungarian-Czechoslovakian Danube section of joint interest.

C/ Developing a standpoint on the inclusion of both hydroelectric power plants into the 15-year development plan of the national economy.

We have to add the following as explanation to Items A and B of the agenda:

ad. A/ The utilisation of the upper section takes place by a power canal conducted on the left side. A weir is established at 1853.2 river kilometre section at the impoundment level of 131.50 metre above the Adriatic. A water extraction lock is constructed near that. The water supply of the power canal is 2400 m^3 per sec. A hydroelectric power plant and a double navigation lock is built at the canal. The canal discharges into the old Danube bed at 1810 river kilometre.

The lower section will be utilised by Nagymaros barrage, to be established at 1696 river kilometre. The barrage consists of a weir, a hydroelectric power plant and a navigation lock. The impoundment level of the weir shall be established for the time being at the level of 108.00 metre above the Adriatic. It shall, however, be endeavoured to increase the impoundment level to at least the value of 108.50 metre above the Adriatic – in the interest of the surplus energy that may be gained this way – after the performance of the research and exploration work.

Concerning the trace of the power canal, a version of right-side conduction – i.e., located on the Hungarian territory – has also been prepared. This version is totally equal with the left-side conduction both technically and economically. Consequently, it may not be decided with consideration to the technical and economic standpoints on which side the canal should be placed. However, since Nagymaros hydroelectric power plant, though it will be utilised by both parties, is totally constructed on Hungarian territory, it is reasonable that the power canal of the upper hydroelectric power plant remain on Czechoslovakian territory. On the other hand, by the construction of the power canal, Hungary loses all river bank rights, also including the possibility of water extraction eventually needed in the interest of industrial and agricultural utilisation, provided by the nearly 35 km long international navigation route. Thus it is clear that the agreement to conduct the canal on the left side will be subjected to certain conditions which are as follows:

a/ The new situation caused by the conduction of the power canal on the left side could be solved by a territory exchange in the most appropriate manner, by placing the border of the country extending in the current line of the main bed of the Danube in the medium line of the canal to be constructed. In this case, the exercise of rights would take place in an unchanged manner. The territory ceding to Hungary as a result of the removal of the country's border could be compensated through an exchange which has already been proposed by the former Hungarian government committees. Czechoslovakia refuses this solution, justifying this by saying that in its opinion the exchange of the territory, which would set a precedence for similar measures, may not be executed in the present international situation. Despite this, we suggest to commencing the negotiations from this starting point.

Another possible solution is an exchange of the small area between the tail race canal located under the power plant and the old Danube-bed. If no agreement is reached and no solution found, then a minimum of two corridors should be ensured to Hungary. The first corridor should be at the power plant (which would also include the territorial strip necessary for the establishment of a port near the tail-race canal), while the other corridor should be at the head-race canal.

b/ The energy share of Hungary from the two power plants will be 43% in accordance with the natural division ratios. As a precondition to trace conduction on the left side, energy shall be divided in proportion to 50-50%, undertaking equal costs of investment and joint administration at par.

c/ The maintenance costs of the old Danube bed left as a result of the construction of the power canal shall be jointly borne by the two parties.

d/ From among the two power plants, Nagymaros power plant shall be first constructed.

ad. B/ In accordance with the impressions acquired in the course of the previous negotiations, the Republic of Czechoslovakia wants to utilise the water power of the Danube by all means, and as soon as possible. The Czechoslovakian opinion is that if Hungary does not wish to utilise the Danube jointly or keeps delaying the utilisation, the Republic of Czechoslovakia wishes to implement the hydroelectric power plant and power canal alone.

In our opinion the Hungarian People's Republic is in a pressing need for electrical energy, thus the utilisation of the water energy of the Danube must not be given up.

Thus, we suggest the government committee to agree with the Czechoslovakian government committee as follows:

1/ We wish to implement and utilise the hydroelectric power plant and power canal below Bratislava and the hydroelectric power plant at Nagymaros jointly, undertaking investment and administration in proportion to 50-50%, and dividing the energy produced in proportion to 50-50% as well.

2/ In the interest thereof, both the Hungarian People's Republic, and the Republic of Czechoslovakia, shall estimate the implementation of both power plants in their electrical energy development plans (15-year plan under Hungarian conditions).

Budapest, 5 July 1958

Annex 37

INFORMATION DOCUMENT FOR THE POLITICAL COMMITTEE OF THE HUNGARIAN SOCIALIST WORKERS PARTY ON THE GOVERNMENT COMMITTEE NEGOTIATION, PRAGUE, 6-7 OCTOBER 1958

[Translation]

Re.: Danube Power Station

At its 5 August 1958 meeting, the Political Committee made a resolution on utilising the hydropower of the Hungarian-Czechoslovak Danube section, on the basis of shared interest. Comrade János Kádár sent information about the resolution in a letter to the First Secretary of the Central Committee of the Czechoslovak Communist Party.

As a result of the negotiations held in Prague on 6 and 7 of October by the committees assigned by the government of the two countries, an agreement was reached on the necessity of building hydroelectric power plants on the common section of the Danube between Bratislava and Nagymaros through joint investment and construction.

The government committees agreed that a construction of the Danube hydroelectric power plants would be envisaged by both countries in their long range national economic plans prior to 1975. As the first structure, the Nagymaros Power Plant is to be built in the years 1961-65. Construction activities should already be started by 1960, provided that this is permitted by the progress of planning.

No decision has been made on the method of utilising the Danube section upstream of Nagymaros (concerning this issue the special committees must work out the four scenarios more precisely, on the basis of a Czechoslovak proposal) or on the division of the energy reserves from this section.

In the latter issue, no numerical proposal was made by the Czechoslovak side. They said only that in their preliminary view, the appropriate distribution ratio is based on the natural energy reserves (according to which the Hungarian share from the energy generated along the whole section is 46.3% and that of the Czechoslovak side is 53.7 %), but they are willing to negotiate the Hungarian recommendation of a 50 % share each.

Acknowledging the Czechoslovak standpoint – according to which the protocol should only define the agreements, but should not dwell on issues as yet undecided because of an insufficiency in the relevant fundamental data – and furthermore with the significant movement of the Czechoslovak Party toward the Hungarian standpoint, the Hungarian Government Committee considered it sufficient to verbally declare the Hungarian view on the two undecided issues which had already been explained in writing. The Hungarian Party, however, did not insist on putting this into the protocol. The two pending issues will be decided at the government committee meeting to be held next year.

<u>The main results of discussions can be summarised as follows:</u>

1. According to the Hungarian point of view explained so far, the Nagymaros Hydroelectric-Power Plant will be built first, contrary to the earlier Czechoslovak wishes which were aimed at the construction of the upper Danube hydroelectric power plant.

2. Contrary to the opinion formed during the earlier Czechoslovak-Hungarian negotiations, in which it was stated that both countries will separately design and construct the power plants in their respective territories, according to the current agreement, all hydro-electric power plants – including the one at Nagymaros – will be jointly produced in all respects, that is, in all fields of planning, investment and construction. This will ensure that a full common interest is realised in all phases of the construction and utilisation.

3. Through the construction of the Nagymaros hydroelectric power plant – which is a favourable hydropower harnessing project even by world standards – Hungary will have available an output of 60 MW by 1965, that is on average 415 million kWh of electric power per annum. Through the construction of the hydroelectric power station on the upper Danube, Hungary will have an output of about 170 MW that is on average 1200 million kWh of electric power per annum by 1972. At the same time, on the Hungarian Danube section, which is the least navigable, the conditions for shipping will be substantially improved.

4. The joint production of power plants is an outstanding example of economic cooperation among socialist countries. It is proof that the cooperation implemented within the framework of COMECON is efficient, because after the suspension of fruitless negotiations conducted for many years between the two countries on this issue, the relevant resolutions of COMECON provided a basis for continuing the negotiations and for arriving at a mutual understanding.

In addition to the work carried out within the framework of CMEA and the standpoint formed there, the turning point in this matter came when, contrary to the uncertain and procrastinating behaviour shown earlier, on the basis of the Political Committee's resolution an open-minded and consistent standpoint was established which created an atmosphere of confidence and provided the basis for an agreement.

The negotiations were carried out in a cordial and friendly atmosphere throughout, and were characterised by the willingness to arrive at an agreement on both sides.

Having made the resolutions, the commencement of the construction of the Nagymaros hydroelectric power plant depends primarily on the drafting of the plans at the proper time. The schedule of construction must be made in a way that the power plant is built at an economically optimum period.

Antal Apró

Attached:
Protocol **[omitted]**

Annex 38

LETTER FROM ANTAL APRÓ, FIRST DEPUTY PRIME MINISTER OF THE HUNGARIAN GOVERNMENT, TO COMRADE MÜNNICH, 24 JUNE 1959

[Translation]

Dear Comrade Münnich!

Comrade Simunek, the chairman of the Czechoslovak Planning Office and member of the Political Committee of the Czechoslovak Communist Party, paid a visit to me today. In connection with the negotiations on other economic questions, he also mentioned the issue of the construction of the hydroelectric dam on the Danube. He insisted that the calculations made to date indicate the solution to be very costly, but the final calculations are neither in his possession nor in ours, hence a decision cannot be made about further steps on the basis of available calculations. I mentioned to him that it was also a significant political question. The agreement between the two governments and the two countries was reached in public, the people welcomed this cooperation, and consequently we have to consider a decision to postpone the construction very carefully.

We agreed on the following:

1/ We will order the experts to complete the final calculations before the end of October.

2/ On behalf of both countries, we will request the Soviet government to supervise the technical conceptions and plans, as they have the most qualified expert group with the greatest experience.

3/ The governmental committee will sit together in October when we will establish proposals which will be submitted to the political committees of our parties and governments.

I will start my three day long holiday this afternoon. I will spend this evening in Gyula, in Békés county. Later I will probably pay a visit to the anglers at Lake Balaton.

Budapest, 24 June 1959

With a comradely greeting:

Antal Apró

Annex 39

MINUTES OF THE CONSULTATION OF THE LEADERS OF THE HUNGARIAN-CZECHOSLOVAK EXPERT COMMITTEE DEALING WITH THE UTILISATION OF THE DANUBE, 22-23 JANUARY 1960

[Translation]

Director General
of National Water Management

To Comrade Antal Apró
First Deputy to the Hungarian
Revolutionary Worker-Peasant Party

Budapest

In my report of 28 December last year on the subject of the water power utilisation of the Danube, I proposed to Comrade Deputy Prime Minister that I would prepare a draft proposal on the situation of the preparatory works on the hydroelectric power plants in our common interest on the Danube. In the meanwhile, the first stage of the planned Soviet consultation has been finished. On the basis of the conclusions of the consultation, we have to redraft the plans and the budget which will presumably result in further simplifications and a decrease in the budget. The redrafted plan and budget will be negotiated at the end of April by the Czechoslovak-Hungarian joint technical committee, and then in Moscow during June the Soviet consultation will be concluded.

Regarding the result of the elaboration of the Soviet consultation proposal, it is possible to count on the further beneficial modification of budget figures. I deem it advisable to prepare the planned report to the political Committee at a time when it is possible to brief the figures of the redrafted plan and budget.

Hence, I would ask for Comrade Deputy Prime Minister's contribution to prepare the draft proposal on the preliminary works of the hydroelectric power plant on the Danube only later with the knowledge of the redrafted plans based on Soviet consultation in the course of May.

For your information I attach the minutes on the consultation of the leaders of the Hungarian-Czechoslovak special committee held between 22-23 January, 1960 in Bratislava.

Budapest, February 25, 1960.

Imre Dégen

MINUTES

on the consultation of the leaders of the Hungarian-Czechoslovak Professional Committee dealing with the utilisation of the Danube, Bratislava, 22-23 January 1960

The Participants of the consultations:

<u>On behalf of the Hungarian Party:</u>

Imre Dégen	head of the Hungarian section of the Special Committee;
Dr. Emil Mosonyi	representative of OVF (General Directorate of Water Management).

<u>The participants from Czechoslovak part:</u>

Ladislav Mertl	head of the Czechoslovak section of the Special Committee;
Jan Málek	First Deputy of the Minister of Energy and Water Management;
Anton Ziak	chairman of the Directorate of Water Management;
Miroslav Bartolcic	employee of the Directorate of Water Management;
Peter Danisovic	employed by the Hydroprojekt of Bratislava, Expert.

The subject of the consultation is the examination of the conclusion of certain problems arising from the joint consultation in connection with the shortened task plan of the Nagymaros Hydroelectric Power Plant (with the technical and economic study) and with the utilisation scheme of the Danube section between Bratislava and Nagymaros.

Pursuant to the Minutes of August 31, 1959 of the Hungarian-Czechoslovak Special Committee on the utilisation of the Danube section between Bratislava and Nagymaros, the Hungarian Party in conjunction with the Czechoslovak Party invited the experts of the Soviet Party to the joint consultation on certain questions of the plans of the Nagymaros hydroelectric power plant and on the utilisation scheme of the Bratislava-Nagymaros Danube section.

The joint consultation was held between January 12-23, 1960.

The participants of the consultation:

As experts:

V. R. Kazak	representative of COMECON, Moscow,
S.V. Titov	representative of the Institute of Hydroprojekt of the Soviet Union
V.V. Bogatyrev	representative of the Institute of Hydroprojekt, of the Soviet union

On behalf of the Hungarian Party:

Dr. Emil Mosonyi	representative of OVF (General Directorate of the National Institute of Water Management);
János Pichler	representative of OVF;
Miklós Breinich	representative of OVF;
István György	representative of VIZITERV;
Vilmos Illei	representative of VIZITERV;
Gyula Melegh	representative of VÍZITERV

and invited experts.

On behalf of the Czechoslovak party:

Dr. Peter Danisovic	representative of Hydroprojekt;
Miroslav Bartolcic	representative of SVH;
Stefan Fojtik	representative of the Authorised Bureau of Agriculture;
Vladimir Lokvenc	representative of Hydroprojekt

and invited experts.

In the consultation they discussed the topics under point 3/3/a of the Minutes of the Committee of October 29, 1959.

The negotiation of the consultation held on January 29 in Budapest and between January 16-23 in Bratislava.

In Budapest the following topics were considered:

a/ The variations of the arrangement of the Nagymaros Barrage, the organisation of the construction and the improvement of efficiency (the possibility of decreasing the investment costs, the possible increasing of fall through dredging the riverbed);

b/ The implementation into the complete utilisation scheme and the role of the Hungarian-Czechoslovak Danube section of the Nagymaros Hydroelectric Power Plant;

c/ The impact study of the impoundment on the lower strata Hungarian ground and the examination of the proposed defence establishments.

In Bratislava, the following consultation topics were discussed:

d/ The impact study of the impoundment on the lower strata situated in Czechoslovak territories and the examination of the proposed defence establishments;

e/ The examination of the preliminary draft on the utilisation scheme of the Bratislava Nagymaros Danube section and of the possibilities of peak operation;

f/ The technical-economic figures of the Nagymaros Hydroelectric Power Plant.

On January 14, 1960, the participants of the consultation saw the location of the Nagymaros Barrage on the site and also have seen the Hungarian territories concerned as a consequence of the impoundment of the Nagymaros Hydroelectric Power Plant.

The opinion of the Soviet consultants appears in the appendix of the Minutes. On the basis of the consultation concerning further works, they agreed on the following program:

1. In order to discover the impact of agricultural production on the planned impoundment of the Gabčíkovo Power Plant, an examination at greater lengths of all the available hydrological and hydrogeological observation data relating to the lower Žitný Ostrov and the bays of Vág-Nitra, Iza, Kravany, and lower Hron-Sturovo is necessary. The connections between ground water balance, precipitation, evaporation and transpiration conditions with the down flow conditions in the canals and in the riverbeds have to be defined, as well as the connection between the crop productivity per hectare, the ground water level and other factors.

This project will be accomplished before the end of March, 1960 by the Hydroprojekt of Bratislava in cooperation with the authorised Hungarian-Czechoslovak research institutes.

2. On the basis of the consultative opinion, the planning institutes of the two countries will supervise and supplement the documentation plan of the Nagymaros Hydroelectric Power System before the end of April, 1960. First, it will examine the possibility of decreasing the labour quantity concerning the barrage and the protection projects designed on both sides. Second, it will examine the possibility of applying more economic methods relating the mechanisation of field and concrete works, e.g. without transportation by land etc. In the end, it will examine the possibility and expediency of the short time peak operation of the Nagymaros Hydroelectric Power Plant.

In the meantime, both parties will authorise an expert group dealing with budget and economic calculations to examine, before the April of 1960, the possibility of decreasing the amortisation norms and the employment of individual cost calculations in connection with the construction works of the Nagymaros Hydroelectric Power Plant.

3. The outline studies of the variants concerning the utilisation scheme of the Danube section between Bratislava and Nagymaros have to be modified on the basis of the opinion of the consultation. The planning institute of both parties shall make their best efforts to submit this scheme to consultation in the course of June and July of 1960 and to make it final before the end of 1960.

Annex 40

DRAFT LETTER FROM ANTAL APRÓ, FIRST DEPUTY PRIME MINISTER OF THE HUNGARIAN GOVERNMENT, TO THE CZECHOSLOVAK DEPUTY PRIME MINISTER, 30 APRIL 1960

[Translation]

Dear Comrade Deputy Prime Minister!

The consultation with the Soviet experts and the information on the results of the latest session of the Czechoslovak-Hungarian joint committee completely support the content of your latest letter, according to which real preconditions exist for the economic improvement of the Nagymaros hydroelectric dam and for the elaboration of the most beneficial variants concerning the Bratislava power plant. On the basis of the work schedule established by the expert committee it is foreseeable that in line with the proposal of the Soviet consultation the redrafting of the plans and budget will be accomplished before July, and then the second stage of the consultation with the Soviet experts can be held in August. In my opinion, on the basis of this, the most suitable time for the next meeting of the governmental delegations is October 1960 in Budapest. On this occasion we might examine the final results of the consultation and the further tasks in connection with the design and preparation for the construction of the hydroelectric power plants on the Danube in our common interest.

I would like to know Comrade Prime Minister's point of view regarding my proposal.

Budapest, 30 April 1960

With a comradely greeting:

Antal Apró

Annex 41

LETTER FROM IMRE DÉGEN, DIRECTOR GENERAL OF WATER MANAGEMENT, TO ANTAL APRÓ, DEPUTY CHAIRMAN OF THE HUNGARIAN REVOLUTIONARY WORKER-PEASANT PARTY, 2 MAY 1960

[Translation]

Executive Director of Water Management
Budapest

The Hungarian-Czechoslovak Joint Technical Committee delegation in connection with the hydropower utilisation of the Danube, held its latest session in Prague between March 27-April 1.

With knowledge of the established standpoint and the further program of design work, it would be possible to give an answer to the letter of Comrade Simunek. Comrade Simunek suggested that the next session of the governmental committee be held this year in August. Since the final stage of the Soviet consultation will be managed only in August the conclusions of which still have to be elaborated, it seems practical to hold the next session of the governmental committee in Budapest, in October of this year.

We shall present our proposal concerning the agenda later. I attach the draft of the response. In the meantime I will give some information on the latest developments connected with the hydropower utilisation of the Danube.

In my letter of December 28, I informed Comrade Prime Minister that in accordance with the resolution of the governmental committee, the planning institutes have prepared the summarised task plan of the Nagymaros hydroelectric power plant. On the basis of the task plan it could be established that the construction of the Nagymaros hydroelectric power plant was economically justified.

The Council of Hydroelectric Power Utilisation of the Danube in its session of January 13, 1960 admitted the report on the abbreviated task plan of the Nagymaros hydroelectric power plant. The Council ordered the head of the General Directorate of National Water Management to arrange the preparation of the collated cost estimation of the hydroelectric power plant with the further assessment of the surveys and research carried out to date, following the consultation with the Soviet experts.

Between 14-18 of January the first stage of the consultation with the Soviet experts took place. I submitted information concerning this in my letter of February 25.

The consultation led to significant results in the fields of more up-to-date technical solutions, the improvements of the efficiency and economic figures of the power plant, the organisation of the construction, and the decreasing of the costs of collateral defence equipment.

The more significant conclusions of the consultation can be summarised in this way:

1/ The efficiency of the power plant is suitable for expansion by 25 MW through deepening the downstream riverbed by dredging. This would make it possible to increase the efficiency level of the constructed power plant from 120 MW to 145 MW. Together with the daily peak mode operation that is achieved by waterbed storage, output can be increased to 170 MW.

2/ The consultation concluded that the concerns from the Czechoslovak party are exorbitant with regards to the impact of the impoundment of the power plant on the ground water balance of neighbouring fields and on agricultural production. The previously designed collateral defence establishments might be significantly simplified and decreased. The Hungarian standpoint maintained that to withhold the water infiltration into the dyked territory a draining canal system drawn parallel with the dykes is completely satisfactory, from which the water is returned to the riverbed by infiltration plants. In spite of this the standpoint indicated that this system of defence establishments is not only advantageous for the agricultural production of the neighbouring territories, but it creates a generally more favourable situation since it makes possible the artificial regulation of ground water level based upon the requirements of agricultural production. During the consultation it was observed that protective measures would be greatly simplified by scrapping the inland water protecting structures that are not directly related to the construction of the power plant.

3/ Considering that the most up-to-date machinery is used, the planned building organisation should be improved on and the size of the concrete blocks to be used in the plant should be reduced.

4/ In cost calculations, considering the size and the special features of the project, instead of applying general building norms the use of special cost norms is advisable.

The recommendations of the consultation was accepted by both parties as a basis for the restructured plans and budget, and they agreed that the next consultation on the restructured plans be held in Moscow in the Soviet Gidroprojekt Institute this July.

However, there was very little progress in the restructuring process. Therefore it seemed necessary to hasten the pace of work and to improve organisation. The 27 March-1 April Prague meeting of the Hungarian Czechoslovak Joint Technical Committee made appropriate decisions concerning these problems and other matters relating to the joint scheme of the power plant system.

a/ It approved the detailed schedule of the planning to be carried out on the basis of the Soviet consultations. Accordingly, the restructured plans and budget shall be submitted to the next meeting of the Joint Technical Committee held in Budapest in the second half of July. Following that, in August another consultation has to be held in Moscow in order to summarise and evaluate the results of the work completed so far, and to define the final version of the technical solution for the Nagymaros power plant and all the measures that are to be considered from the point of view of improving the economic efficiency of the plant.

b/ It approved the application of special cost norms for the large-scale works (excavation, concrete, and rock works).

c/ appropriate organisational measures were taken in order to create a more unified control over planning. It was suggested that the next meeting of the Government Committee be held in October this year.

During the meeting the following confidential revelations came to my knowledge:

The Collegiate of the Czechoslovak Planning Office have allegedly considered the question as to whether the Wolfstahl or the Bratislava-Nagymaros Water Barrage should be built first. According to certain indirect information, the economic index of the Wolfstahl barrage is not a lot more favourable than that of the Nagymaros Barrage. The Austrians show a certain reserve towards construction of the barrage, while the Czechoslovak party is pressing for the start of construction.

The Czechoslovak party observed that they had received information from certain employees of the Hungarian Planning Office which point to a change of the Hungarian stance relating to the construction of the Nagymaros barrage, i.e., in spite of the inter-governmental agreement, the Hungarians do not find the construction of the barrage desirable.

The leader of the Czechoslovak delegation has unofficially revealed that according to their information, the Hungarians do not pay enough attention to the research and planning work of the barrage to be built on the Upper-Danube. That indicates that they do not consider the two barrages (the Nagymaros and the Bratislava barrage) to be an interrelated, unified power plant system, and that the Hungarians are not interested in the construction of the Upper Danube barrage.

As to future tasks, the following conclusions can be drawn:

1/ The uncertainty of the Hungarian standpoint experienced recently, and some unconsidered statements of certain people have created a very disadvantageous situation for the Hungarian delegation taking part in the negotiations relating to the preparations of the construction of the water power plant. Therefore we have to make sure that on the subject of the utilisation of the Czechoslovak-Hungarian stretch of the Danube, the representatives of our administrative organs take a unified view that is in accordance with the decisions of the Party and the State. They have to refrain from voicing any individual view that in reality the Hungarians do not consider the agreement for the joint utilisation of the Bratislava-Nagymaros Danube stretch between the Czechoslovak and the Hungarian Governments valid.

2/ The next meeting of the Government Committee delegated to solving the task of the utilisation of the Czechoslovak-Hungarian section of the Danube should be held in Budapest in October this year.

3/ On the basis of the results of the Soviet consultations that will be held in August, a proposal should be prepared for the Political Committee. That would contain a report on the work that has been completed so far in accordance with the intergovernmental agreement, and the economic consequences of the construction of the Nagymaros power plant. Guiding rules should also be requested for the Government Committee meeting which is to be held in October.

At the October Government Committee meeting we should request that official information be provided by the Czechoslovak party concerning the Czechoslovak-Austrian negotiations on the Wolfstahl power plant.

I request that Comrade Deputy Prime Minister state his standpoint relating to these recommendations.

Budapest 2 May 1960

Imre Dégen

Annex 42

HUNGARIAN-CZECHOSLOVAK-SOVIET NEGOTIATIONS CONCERNING THE HYDROELECTRIC POWER PLANT SYSTEM ON THE DANUBE, MOSCOW, 16 NOVEMBER 1963

[Translation]

Hungarian Delegation members **[omitted]**

Table of Contents **[omitted]**

Summary on the documents of Hungarian-Czechoslovak-Soviet negotiations to be commenced in Moscow on 16 November 1963

The following subjects will be discussed:

I Hydro-engineering and electro-technical consultation

II Construction and organisation consultation

III Other issues

Processing of the subjects to be discussed:

I Hydro-engineering and electro-technical consultation

1. The consultation material approved by the joint Hungarian-Czechoslovak expert committee at its meeting held on 4 to 11 September 1963 was submitted by the Hungarian Party in two Russian language copies to Gidroprojekt (Hydro Project) Planning Institution (Moscow). The issues for consultation are included in Annex 1.

2a) On the basis of a preliminary agreement with the Czechoslovak Party (Annex 2) we recommend the splitting of the consultation into two phases. In the first phase, only those issues are to be discussed which are directly associated with the investment programme, and with the economic negotiations envisaged between the planning offices. In the first phase, consultation is to be made on the following issues:

Issue I/1:
Comparison of Czechoslovak and Soviet turbines at the power station of Gabčikovo.

Issue I/2:
Comparison of Hungarian, Czechoslovak and Soviet turbines at the hydroelectric power station of Nagymaros.

Issue I/4:
General layout and installation of hydro-engineering equipment

Issue I/6:
Advisable layout of overflows and their synchronisation with the turbines.

Issue II/1:
Method of operating the power plant

Issue II/2:
Wattage and reactive group control of machine groups

Issue II/3:
Auto-operators

Issue II/6:
Frequency control

Issue II/10:
Remote control of the Nagymaros hydroelectric power plant from the Gabčíkovo power plant.

b) The list of consultation issues to be discussed in the second phase are given in Annex 3. It is recommended that consultation about these matters should only be made after the final identification of the schedule for machine deliveries.

c) We recommend the implementation of the first phase of consultation within 17 days (Annex 4). At the consultation, altogether 21 Hungarian experts plus 3 interpreters will participate. (Annex 4).

Note: According to Annex 2, preliminary agreement has been reached with the Czechoslovak Party to cover the matter in 23 days; the number of Czechoslovak experts is 27 (Annex 5).

d) In accordance with the preliminary agreement, we recommend the visiting of LMZ, Electrosila and the tubular turbine manufacturer Harkov Plant during the consultation period.

3. Purpose of the first phase of consultation III

a) Selecting the machine types to be fitted into the hydroelectric power plant system, on the basis of the alternatives detailed, by paying due consideration to the current world standard.

b) Clarification of basic technical data necessary for making preparations for the machine manufacturing and for the plant itself.

ad.a) The turbines to be installed in the Nagymaros hydroelectric- power plant should be selected primarily on the basis of economic policy considerations, because according to the comparative tests performed, the applicable types of Ganz Mávag, LMZ and CKD turbines are nearly equal with regard to power generation and performance.

The difference in energy production among the variants giving the best speed varies between 0.1 and 2.2 % of the total annual production and the difference of maximum outputs achievable in the two-hour peak is within 0.5 % (Annex 6).

II Consultation on construction organisation (Consultation IV)

a) In compliance with the resolution of the joint expert committee, the two parties came to a preliminary understanding on 5 November 1963 that the consultation will be held in April 1964 in Moscow (Annex 7).

Accordingly, the subject of the consultation will be the planning of the by-pass canal hydroelectric power plant in Dunakiliti-Gabčíkovo, with special regard to the organisation of construction, the method of implementing construction and the selection of machines and machine lines to be used during construction.

Contrary to the preliminary agreement, we recommend the supplementation of consultation with the organisation of Nagymaros construction, and with the material related to the implementation of the construction and to the selection of main machines and machine lines to be used . The material detailed by the planning institutions shall be submitted to the head of the appointed Soviet consultant organisation in March 1964.

The main subjects of the consultation are given in the above mentioned material (Annex 7). This will, of course, be supplemented with the subjects relating to the Nagymaros hydroelectric power plant .

III

1. We consider it desirable that after the first phase of hydro-engineering and electro-technical consultation, a meeting between the planning offices should take place in Moscow – possibly in December this year – to appoint the suppliers of technical equipment.
2. It is necessary that after the consultation on construction organisation, the planning offices should have another joint discussion on sharing the supply of main construction machines.

[Annexes Omitted]

Annex 43

MEMORANDUM ON THE DISCUSSION BETWEEN HUNGARIAN AND CZECHOSLOVAK EXPERTS CONCERNING THE IDENTIFICATION AND MAPPING OF SEISMIC ZONES ON THE TERRITORY OF THE JOINT DANUBE BARRAGE SYSTEM, BRATISLAVA, 23-25 NOVEMBER 1965

[Translation]

Participants of the discussions:

On behalf of the Hungarian party: **[Omitted]**

On behalf of the Czechoslovakian party: **[Omitted]**

The discussion was held in compliance with item I/2/e of the minutes taken at the discussions of the representatives of the MZLVH-Praha and OVF-Budapest in Praha, between 27 September and 5 October, 1965.

1/ Based on the discussions of the geophysicists and geologists, the attached map was set up on the seismic zones for the scheme and the project programme, of which the data serving the design work is shown below in the table according to river kilometres:

Between Morva mouth and 1861	7°MCS	a= 0.025g
1861-1825	6°MCS	a=0.01 g
1825-1808	7°MCS	a=0.025 g
1808-1797	8°MCS	a=0.05 g
1797-1770	8.5°MCS	a=0.08 g
1770-1764	9°MCS	a=0.10 g
1764-1752	8.5°MCS	a=0.08 g
1752-1740	8°MCS	a=0.05 g
1740-1720	7°MCS	a=0.025 g
1720-boundary	6°MCS	a=0.01 g

Calculations of the structures will be done with regard to the MCS grades and accelerations and security factor will be assumed to be n=1 ; i.e. that it is regarded as being within the limit state of load value.

2/ In order to set up the map of seismic zones, the following assumptions were taken into account:

a/ The epicentral intensity of the Komárom earthquake in 1763 was established as 8.5 ± 0.5 MCS grade.

b/ The epicentral area (focal point zone) lies along the Danube between two fault lines in a direction of NE-SW. The first of these crosses the Danube in the region of Komárom, while the second one between Gönyü and Kliška Nema settlements (Rába fault line). Between these boundaries the intensity is 8° MCS. The entire territory must be regarded from the point of view of earthquakes as a potentially active area.

c/ In Győr, the seismic intensity is assumed to be 7°MCS, according to the statements made by Prof. Egyed and based on the discussion. Written materials of previous times, telling us about collapsing houses in Győr and its surrounding area, and the death of people are exaggerated, and therefore unreliable. This statement is justified by the fact that the documents describing these were written at least hundred years later, and the description of eyewitnesses don't justify these statements.

d/ The isoseismic map drawn by the experts refers to average subsoil conditions. A difference of ± 1° MCS might arise from the local conditions, based on the detailed geological exploration made in accordance with the Joint Contractual Plan.

e/ The isolines of seismic intensity were drawn on the maps with an accuracy of ± 0.5 km.

f/ When setting up the maps, it was assumed that shocks propagate mostly along tectonic lines in NW-SE direction.

g/ For design purposes on the level of the scheme and the investment programme, the only competent table is the one in item 1/, taking into account items 2/a through 2/e.

3/ During the discussion of seismicity, the issue regarding the difference between the Hungarian and Czechoslovakian standards was raised. Considering the great importance of the hydrotechnical structures on the Danube, the parties suggest that the best informed experts be used in the preparation phase as well, who will make exemption from Hungarian or Czechoslovakian standards if required, in cases when they cannot be applied to the same structure simultaneously. This is justified by the international nature of the structures as well.

This memorandum was prepared in both Hungarian and Slovakian language and both versions are equally valid. The attached map is an inseparable part of the memorandum.

Bratislava, 25 November 1965

On behalf of the OVF:

(István Mátrai)

engineer

On behalf of the RVR Bratislava:

(Josef Obložinský)

engineer

Annex 44

JOINT DECREE 3/1974 (VIII. 16.) OF THE NATIONAL PLANNING OFFICE AND THE MINISTER OF FINANCE ON INVESTMENTS, 16 AUGUST 1974

[Excerpts]

[Translation]

13. Evaluation of the profitability and the economic efficiency of the development

13.3. The economic efficiency of investments from a people's economy point of view must be evaluated according to the following method of calculation:

For the evaluation from a people's economy point of view, the pure income created by the investment must be determined, and it must be related to the cost of the development. This indicator – employing the uniformly determined interest, which is considered to be the minimal yearly revenue – expresses the number of times, the costs of the investment yield revenue, in the chosen unified time span, from the pure social revenue created.

The realisation of pure revenue, and the expense input to the development, take place in different years as well. For this reason, comparison must be made by employing the method of compound interest (discounting). The value of the interest to be employed in all cases is 12%.

Because we consider the allowance for depreciation as income, when we determine the indicator, the costs of the substitute investments must be taken into account as weighing on the income. On the other hand, the input expenses should be diminished by the remainder values of the tools created by original and substitute investments.

The time frame of the economic study, to be employed throughout, is the 15 years following the commencement of the implementation (realisation). For the calculation of the indicator, the yearly values of the basic data must be determined for this period, taking into account those changes which can be realistically expected.

The following indicator is to be determined:

$$D = \frac{\sum_{i=1}^{15}[J_i - E_{pi}] \cdot 0{,}89_i}{\sum_{i=1}^{15}[E_{fi} \cdot 0{,}89_i] - E_m \cdot 0{,}18} Ft/Et$$

where

J_i the pure income in year i,

E_{pi} cost of substitute investments in year i,

E_{fi} development cost in year i,

E_m the remainder value of tools at the end of year 15.

The discount calculation appears with values substituted in the formula $\left(\frac{1}{1+j}\right)$

in accordance with the 12% interest rate (j=0.12) it is 0.89^i, and in the 15th year the coefficient is 0.18.

The larger part of the basic data are – determined in accordance with prescriptions for content – data from an entrepreneurial point of view. Further data are to determined according to the following formulae.

The determination of pure income (J_i)

The realised pure income is to be determined according to the following formula:

$J_i = T_i - (A_i + M_i + C_i)$ *Ft/year*

where

T_i is the income from sales in year i,

A_i is the cost of materials in year i,

M_i is the cost of labour in year i,

C_i other costs without elements of a non- pure income character and without amortisation in year i.

The values of particular factors must be determined according to the following:

Income from sales and material expenditures (T_i and A_i).

The income from sales resulting from the production created by the investment, and the costs of the materials needed for production, must be taken into account with the expected setting prices to be employed in domestic production in the framework of actual export and import (in lieu of this: presumably employable prices).

Those products and materials which cannot be objects of international division of labour for practical reasons, must be evaluated at domestic prices.

The following must be considered as dollar relation sales, and must be evaluated on hard currency export prices:

- any sales in capitalist relations,
- those domestic sales, the demands concerning which could not have been satisfied without the given investment neither domestically, nor from socialist import (capitalist import substitution).

The following must be considered as Ruble relation sales, and must be evaluated on socialist export prices:

- any sales in socialist relation,

- those domestic sales, the demands concerning which could be satisfied from socialist relation import (socialist import substitution).

The above are to be employed, when reasonable, in the determination of import prices of materials, with the expected relations taken into consideration.

The expected setting prices should be converted into forints using the uniform conversion key.

Subvention, product taxes, duty and import sales tax need not be taken into consideration in the calculations.

The cost of labour (M_i)

Prognosticated changes in staff numbers and work structures should be taken into consideration in the calculations with a uniform 4% average wage increase. At the same time, with the given investment, calculations must work with an absolute or relative diminishment of staff numbers, resulting from increases in productivity without further development investments.

Other costs (C_i)

Only those costs should be taken into account as other costs which qualify as input expenses, even from a people's economy point of view. For example, expenses for engagement of tools, wage expenses, taxes, duties, costs for using land and domestic interest do not qualify as expenses from a people's economy point of view. The allowance for depreciation also need not be taken into account among expenditures.

Costs of substitute investments (E_{pi})

The realistically planned costs of substitute investments which are expected to arise in the time frame, must be carefully analysed and justified. A Table should show the size of the costs, and which year they were employed under this heading.

The cost of development (E_{fi})

According to the provisions of the investment proposal, the input expenses, and the expenses for the long term engagement of tools, as well as the amount of reserves are to be taken into account as development costs.

Investment expenses are to be deducted from the sum of investment costs.

In case of investments to be realised by foreign tools (e.g., joint implementation, investments realised from foreign loans) calculations must be done using concrete data. For instance, in case of foreign loans, not the global loan sum, but the repayment sum and the interest obligations arising at the moment of remittance should be taken into account as input expenses, independent of the time frame.

The determination of the yearly sum of development costs should be attached to the document in the form of a Table.

The remainder value of the tools (E_m)

The chosen time frame of the economic calculation lasts until the end of the 15th year after the commencement of the implementation (realisation). The remainder value of the tools at this time is the sum of the net value of the tools and the tools subject to long term engagement.

The net value of the tools should be determined by deducting the costs of all allowances for depreciation that took place until the end of the time frame, from the gross value of all the tools created as a result of the original and substitute investments.

The expansion of the area of investment.

For evaluation at the people's economy level, the expansion of the area beyond basic investment is necessary, so as a consequence, the development cost of the basic investment must be incremented by the sums of the related investments shown on *worksheet no. V/a.* In case the related investment satisfies other demands, the sum should be diminished in that proportion.

The other factors of the indicator should be determined according to the expansion of the investment area as well.

Prognosis of prices and taking into account of risks.

In determining the factors of the indicator, starting from information which can be acquired under the conditions corresponding to the time of production, the expected future prices have to be taken into account (e.g., determining and checking the prognosis for the prices of materials and the product, employing specialists – in case of need, foreign specialists).

Determination of data on future circumstances can take place only with a certain margin of error. For this reason, the magnitude of uncertainty and the value of the expected risk must be carefully analysed.

In case of basic data, the related uncertainties must be shown individually or by groups.

Of special importance are the careful estimations of the uncertainty limits of the development costs, the income from sales, and the expected costs of the more important basic materials over the planned period of growth of implementation and production.

As a result of the calculations, the most probable expected value of the "D" indicator and its realistically expected worst and best values must be determined and presented on the prognosticated prices.

Annex 45

MINUTES OF THE MEETING OF THE HUNGARIAN-CZECHOSLOVAK-SOVIET CONSULTATIONS IN THE PREPARATION FOR REALISATION OF THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, 16 JANUARY 1975

[Translation]

Parties to the consultations hold the joint Hungarian-Czechoslovak Gabčíkovo-Nagymaros Barrage system of great importance from the point of view of navigation, energy production, and flood control, as well as other considerations of water-management. In addition to the advantages to the Hungarian and Czechoslovak economies, the Barrage system is advantageous for all countries along the Danube as well.

The Hungarian and Czechoslovak governments are carrying out the preparation of the investment in accordance with the program and its schedule in such a way that the construction should start in 1978. The prerequisite for implementation according to the schedule is the securing of domestic and foreign financial resources.

The Hungarian and Czechoslovak parties plan to cover the larger portion of the financing from their own resources, but because of the size of the investment, an intake of foreign investment to the amount of 300 million convertible rubles is necessary.

In connection with the above, the Hungarian and Czechoslovak Parties turn to the government of the Union of Soviet Socialist Republics with a request on behalf of both parties for a long-term loan with advantageous interest conditions from the year 1977 on, for the realisation of the investment project, to the total amount of 300 million rubles.

The Soviet Party announces ....

The Parties to this meeting agree that for working out the details of the loan, the conciliation of the composition of related deliveries, and for the formation of a structure satisfactory for all three countries, a trilateral committee should be formed with the participation of economical, financial, hydraulics and foreign trade representatives.

Responsibility for the committee

Representing the Soviet party ....

Representing the Czechoslovakian party ....

Representing the Hungarian party...

The Committee will hold its first meeting in Budapest between the 3rd and 7th of February, 1975. The Committee will prepare its joint statement by 15th March, 1975.

Based on the statement of the Committee, the Parties will form their common stand by 15th April 1975.

Prague, 16 January 1975

István Huszár	Mihail Leszecsko	Dr. Rudolf Rohlicek
Deputy-chairman	Deputy-chairman	Deputy-chairman
Council of Ministers of the HPR	Council of Ministers of the USSR	Govt. of the CSSR

Annex 46

LETTER FROM A. KOSSYGIN, SOVIET PRIME MINISTER, TO LUBOMIR STROUGAL, CZECHOSLOVAK PRIME MINISTER, 23 MARCH 1978

[Translation]

Prague, 23 March 1978

Re: Comrade Kossygin's letter responding to Comrade Strougal about equipment requested for the Gabčíkovo barrage

We have received information that Comrade Kossygin has answered Comrade Strougal's letter on March 10 in response to the question of credit and equipment requested from the Soviet Union for the Gabčíkovo barrage. (We reported the preliminaries in more detail under No. 34/2.) We communicate below the translation of the Czech language translation of the letter:

Honourable Comrade Strougal! Moscow, 10 March 1978

We have carefully discussed those questions which were dealt with in your letter of 12 January 1978.

We realise with satisfaction that agreement was reached on the basic questions of the planned cooperation between our countries in the construction of the Gabčíkovo barrage. In the course of this, the position of the Soviet Government – having confirmed that it has the possibility to deliver the equipment necessary for the Gabčíkovo hydroelectric plant that is contained in the draft agreement handed over earlier to the Czechoslovak side – is based on the understanding that the settlement of the aid granted to the CSSR for the construction of the above mentioned barrage will take place in the context of the exchange of goods.

With respect to the delivery of construction machinery and equipment necessary for the Gabčíkovo barrage to take place in 1981, we are not in the position to solve this question positively. In our opinion, it would be expedient if the Czechoslovak party's request for the Soviet-delivered construction machinery and equipment could be discussed in the course of the co-ordination between the Soviet Union's and Czechoslovakia's national economic plans for 1981-1985.

As a consequence of our companies being overburdened, the Soviet Union will have no possibility to produce the lock chambers for the Gabčíkovo barrage. The Soviet organisations, however, can provide assistance for the Czechoslovak side in technical planning and can also secure necessary consultations and technical assistance during manufacturing and installation, and in the course of putting the facilities of the lock chamber into operation.

Respectfully,

A. Kossygin
President of the Council of
Ministers of the Soviet Union

We are of the opinion that the Soviet Union, on this issue, has repeated the viewpoint adopted at the assessment of the Hungarian demands.

Annex 47

MINUTES OF THE CONSULTATION REGARDING THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM CONDUCTED WITH SOVIET EXPERTS, BUDAPEST, 7-22 FEBRUARY 1980

[Translation]

1. In accordance with Supplement No. 1 of Contract No. 53-032/62162 signed in Moscow between the "Technopromexport" (USSR) Federal Export-Import Association and the NIKEX (Hungarian People's Republic) Heavy Industry Foreign Trade Company, the Soviet and Hungarian experts in the attachment to the present minutes (list of participants) performed the work as detailed below:

   - In connection with the organisation and execution of the construction of the Gabčíkovo-Nagymaros Barrage System, they examined and discussed the supplementary expert opinion, compiled by the Soviet group of experts on the basis of the technical plan materials, in accordance with Supplement No. 1 of Contract No. 53-032/62162.

   - The Hungarian experts provided information about the schedule of the Gabčíkovo-Nagymaros Barrage System preliminary construction works, and about some changes to the deadline for work completed on certain projects.

   - The Hungarian experts provided information that, taking the original deadlines for operation and the expert recommendations into account, they had modified the construction organisation and deadlines of certain projects and informed the Soviet experts about those supplementary modifications as follows:

   a) the organisation of the excavation of the Gabčíkovo tail race canal;

   b) the organisation of works in connection with the drainage of the Dunakiliti barrage trench;

   c) the closure of the Danube bed during construction of the Dunakiliti barrage;

   d) hydraulic research on the technical solution for the coffer dam, and hydraulic research on the conditions for construction and the transmission of water flow during construction of the Nagymaros barrage;

   e) organisation of cement and stone works.

   - The Soviet experts became familiar with the on-site preliminary work on the Dunakiliti and Nagymaros barrages, the construction site near Vámosszabadi, and the preliminary work on the structural research of dams. They also surveyed the barrage built on the Sió canal.

2. The Hungarian experts believe that the supplementary expert opinion provides answers to the questions raised in the Minutes of 2-14 October 1978.

   The comments and suggestions expressed in sections 2 and 3 of the supplementary expert opinion in connection with construction organisation and machinery requirements are, in essence, correct and will be applied in the course of further planning.

3. The Hungarian and Soviet experts discussed and agreed on the number of necessary machines determined in the supplementary consultative expert opinion. At the same time, the Soviet experts consider the decision of the Hungarian experts justified that 8 units of 6 t/40 m tower-cranes are necessary.

4. The Soviet experts pointed out that, in the period after October 1978, the Hungarian experts had completed significant planning and research work concerning the most complicated questions of the construction of the Gabčíkovo-Nagymaros Barrage System.

5. In the course of the talks, consultations were held on the following issues:

   - construction of the Gabčíkovo barrage tail-race canal using combined methods, with the use of dry and river dredgers;
   - the planning and construction methods of the coffer dam at the Nagymaros Barrage according to the variations without the use of corrugated steel piling suggested in the supplementary expert opinion;
   - the closure of the Danube bed during the construction of the Dunakiliti barrage.

6. As a result of the consultations, the Hungarian experts will work out the issues listed in point 5 of the present minutes in more detail. They consider it necessary to discuss the results of their work jointly with the Soviet experts in order to reach a final decision.

7. The Hungarian experts also consider it useful to hold joint consultations on other questions arising in the course of the planning and construction of the Gabčíkovo-Nagymaros Barrage System.

8. In the course of the talks, the Czechoslovak experts gave information on the schedule of construction work of the Gabčíkovo-Nagymaros Barrage System performed by the Czechoslovak side. The Hungarian experts, on the other hand, gave information on the results of consultations conducted with Soviet experts.

9. In order to study the closure of large riverbeds, the Hungarian experts expressed their desire to visit the construction site of the Csebokszárü Hydroelectric Plant during the period of the final closure of the Volga bed.

   The Soviet experts informed them that- according to the standard procedure in this question – they must turn to the appropriate Soviet bodies with an official request.

The minutes were prepared in the Russian language, in six copies and completed on 21 February 1980 in Budapest.

Leader of the Soviet Group of Experts	Leader of the Hungarian Group of Experts
L. Sz. Podoplelov, sk.	Viktor Jurcsek sk.

Attachment 1

List of Participants in the Consultation

Group of Experts (People's Republic of Hungary): **[Omitted]**

USSR Group of Experts: **[Omitted]**

CSSR Group of Experts: **[Omitted]**

Annex 48

REPORT ON THE MEETING OF THE PRESIDENTS OF THE HUNGARIAN-CZECHOSLOVAK COMMITTEE FOR ECONOMIC AND TECHNICAL-SCIENTIFIC COOPERATION, PRAGUE, 30 SEPTEMBER 1981

[Translation]

On the invitation of the Co-president of the Hungarian-Czechoslovak Committee for Economic and Technical Scientific Cooperation, Rudolf Rohlicek, Deputy leader of the government, I continued negotiations in Prague on 21 September 1981–

- about the tasks arising from the 1-2 June 1981 negotiations between the heads of government of the two countries;
- about the further schedule of the joint construction of the GNBS;
- about certain timely questions of cooperation (briquette, coal, and coke deliveries and questions of tourism).

In order to implement the decisions made at the meeting of the heads of the government, we defined the tasks of the relevant members of the committee and of the leaders of the working group relating to the extension of the specialisation and cooperation contracts originally applicable from 1981 to 1985; we commissioned the deputy chairmen of the committee to finish the long-term (post-1985) economic cooperation programme between the two countries and defined the tasks for forming and specifying third market cooperation.

I gave a brief about the standpoint of our government relating to the Gabčíkovo Nagymaros construction. We set down in the memorandum that the government of the Hungarian Peoples Republic – in view of the present phase of the implementation of the treaty – and in the light of the changes that have occurred in the conditions and circumstances since the signing of the treaty – suggests to the government of the Czechoslovak Socialist Republic that, based on an agreement, the construction of the GNBS should be suspended until 1990.

The Czechoslovak party announced that due to the significantly advanced stage of the construction of the GNBS on Czechoslovak territory and for other economic reasons (agricultural areas used, the single-purpose machinery used, the technological character of the work carried out so far, the substitute solutions for flood protection, etc.) and because of the political significance of the construction for both countries and for the given area, it cannot accept the Hungarian suggestion that the construction should be suspended until 1990. It could agree to a possible slowing down of the pace of construction for three years.

We agreed to continue negotiations in that the experts would jointly examine by the end of the year the recommendations of the parties in order to define further specified tasks.

In relation to the construction of the barrage system, I continued negotiations in a close circle prior to their being taken to a plenary meeting. In my introduction I presented our reasons in a frank and determined manner. During the close circle meetings and the plenary meeting – as opposed to the previous negotiations of the Deputy Presidents- no comment was made by the Czechoslovaks in my presence – even in passing – that could be construed as condemnation or which envisaged measures that were to our disadvantage. The Czechoslovak party – including the Prime Minister – asked us to understand their position and "to find an optimal solution".

In the framework of topical issues of cooperation, we continued negotiations on the Hungarian commitments for the delivery of briquette and the problems with Czechoslovak cokeable coal and coke deliveries.

[section omitted]

We have agreed that the next session of the Committee will be held in the first quarter of 1982. Before that session, if necessary another presidential meeting will be held.

On the occasion of the negotiations, I was received by the President of the Czechoslovak Socialist Republic, Lubomir Strougal.

Budapest, 30 September 1981

József Marjai

Annex 49

JOURNAL OF GEOGRAPHICAL TRANSACTION: PAPER BY J TÓTH ON THE ENVIRONMENTAL IMPACTS AND SOME ECOLOGICAL PROBLEMS TO BE EXPECTED IN RELATION TO THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, 1983

[Excerpts]

[Translation]

Recommendations

In the light of all this the question is, what sort of recommendations and suggestions can be made to reduce the unfavourable circumstances of the new situation. These can be summarised as follows:

1. During the period the water barrage system is in operation very detailed and continuous hydrochemical, hydrobiological and applied public health examinations must be carried out, so that the effective changes can be spotted and in order to provide adequate information for the necessary measures. Capacity has to be provided for these examinations, and it would be advisable to carry them out by Slovak-Hungarian cooperation. This work should be started immediately after the Gabčíkovo water barrage is finished, as data and experience can then be used at the construction of the reservoir of the Nagymaros barrage.

2. When the system has been put into operation an economic efficiency balance should be made as to whether the value of excess energy created by peak-operation mode and the advantage of energy-use resulting from that is in proportion to the disadvantages that the artificial and natural environment is forced to endure.

3. It must be examined whether it is possible to operate the turbines built into the barrage continuously instead of periodically during the spawning season of the more valuable fish species that form the fish population, since this could eliminate the daily water-level fluctuation that affects the breeding ecology of the fish.

4. Nearly all the problems of the Szigetköz region would be solved by building – applying an appropriate technical solution – a damming facility in the deserted bed of the branch which would enable the ice-drift to move down, and also by creating an emergency navigation route that would maintain a high or medium water-level. This would provide a certain level of control over the biological processes taking place in the water.

5. During both the operation of the water barrage and the planning of other large scale schemes involving water, the continuous co-ordination and critical participation of inter-departmental committees should be organised which would align inter-branch, regional and management interests with respect to time and values, thus ensuring a harmonic relation between the interests of the national economy and environment protection even in the initial phase of the concept.

Annex 50

RUDÉ PRÁVO,

AUSTRIA'S UNILATERAL SOLUTION: THE DANGERS OF THE HAINBURG HYDROELECTRIC PLANT TO THE TERRITORY OF THE CZECHOSLOVAK SOCIALIST REPUBLIC, 28 NOVEMBER 1984

ECOLOGICAL BALANCE IS JEOPARDISED – IF THE PROJECT IS COMPLETED, CZECHOSLOVAKIA WILL CLAIM DAMAGES

[Translation[

Prague, 27 November (CTK) – The press was briefed in the Ministry of Foreign Affairs of the Czechoslovak Socialist Republic on Tuesday about the standpoint of the Czechoslovak Socialist Republic with respect to the expected negative effects of the Hainburg plant in Austria in the region of the border rivers Danube and Morva and the affected areas of the Czechoslovak Socialist Republic.

According to the statement of the delegation of the Austrian Republic issued in Bratislava on 2 November, 1984, the Austrian party will start preparations for the construction of the Hainburg plant on the Austrian section of the Danube, instead of the joint Czechoslovak-Austrian Wolfstahl-Bratislava hydroelectric plant whose construction was prepared between 1957-1960.

Evaluating the available documents, the Czechoslovak experts established that the Hainburg plant has grave negative effects on the border sections of the Danube and the Morva rivers and on the Czechoslovak area involved. The Czechoslovak delegation informed the Austrian delegation about these effects.

Construction of the Hainburg hydroelectric plant is a unilateral solution adopted by the Austrian party that will disrupt the accepted and smooth utilisation of the Danube as proposed by the Danube Committee. The completion of the Hainburg plant will also result in damages to the various construction measures taken by the Czechoslovak Socialist Republic on the related sections of the Morva and Danube rivers since 1957.

As a consequence of the new solution it will not be possible to create the planned interrelated system (cascade) of hydroelectric plants that would enable the utilisation of the hydroelectric potential of the Danube on the Czechoslovak-Austrian reaches, nor will it provide the navigability of the Danube according to the recommendations of the Danube Committee (3.5 m depth).

According to preliminary results of studies by Czechoslovak experts, the construction of the Hainburg hydroelectric plant will lead to the significant and substantial deterioration of the water management regime of the affected sections of the rivers Danube and Morva and the territory of the Czechoslovak Socialist Republic. Most important, the deepening of the bottom level of the Danube below Hainburg is to be expected, which will lead to a significant decrease in the water levels of the two rivers. This will damage Czechoslovak interests.

The Hainburg hydroelectric plant will make it impossible for the Czechoslovak party to have a share in the utilisation of the hydroelectric potential on the common section of the Danube, using at the same time, a Czechoslovak section of the river. The decrease of the water level of the Danube at the mouth of the river Morva will disrupt ecological conditions, will damage the weirs and bring about a significant decrease in drinking water supplies on a wide area of the Morva and the Danube. The alteration of the riverbed level will present a direct flood threat to Bratislava, the capital of the Slovak Socialist Republic. With the alteration of the Danube's gradient, and the baring of the rock bottom bed around Devín, navigational conditions will deteriorate on this international waterway.

The Czechoslovak party demands that Austria provide Czechoslovakia with all the essential technical data that is necessary to examine in detail the effects of the Hainburg Hydroelectric Power Plant on Czechoslovak territory and also on that section of the Danube and Morva which borders the frontier. The joint Czechoslovak-Austrian utilisation of the Danube is of intensive interest to the public, and will therefore be assessed with maximum thoroughness.

The Czechoslovak party has warned the Austrian party that in the event that the Hainburg plant is completed it will claim damages. The budget of the Hainburg hydroelectric plant will also have to include the costs of eliminating the negative effects of the plant to the Czechoslovak Socialist Republic.

The Czechoslovak party demands that the solution of these problems be laid down in agreements which precede the commencement of the Hainburg construction.

Annex 51

NOVE SLOVO,
THE SEARCH FOR THE WATER NOT YET LOST, 18 FEBRUARY 1988

[Translation]

DIVERSE VIEWS ON THE BARRAGE SYSTEM

It goes without saying that the Gabčíkovo-Nagymaros hydroelectric power plant is one of our most important investments. If completed, the barrage system will enable us to exploit comprehensively the Danube along a 220 km section between Bratislava and Budapest.

Ecological considerations along with economic ones were included in the planning of the barrage system as early as the preparatory phase of the project.

That the power plant is of primary importance in terms of economic efficiency is beyond all doubt as Hungary might, via the system, have access to 3675 GWh of "pure" electricity. To illustrate this, it is to be noted that the production of the same amount of energy in a thermal power station would necessitate the burning of 3.8 million tons of brown coal, which amount would in turn entail the employment of a work force of 5000 miners. Mention should also be made of a few negative effects of air pollution on the environment as a consequence of the technology of coal burning.

The improvement in terms of quality of the navigation route also has advantages of an economic nature; the navigation route will, after improvement measures have been taken, be 3.6-4.0 metres deep. As a result of the barrage system flood protection will equally become more efficient on the neighbouring areas. The further economic development of the Danube Lowland will become viable by making access to irrigation water possible through the gravitational process.

Large surfaces of reservoirs and regulated Danube branches will provide excellent facilities for sports and recreation, affecting the microclimate of neighbouring areas favourably.

The majority of the above data comes from a publication entitled "Gabčíkovo-Nagymaros Barrage System", of the Ministry of Forestry and Water Management. Construction-related problems have, at the same time, become a more frequent topic of conversation recently, given its effects on nature and the environment.

There is a great variety of opinions to consider with respect to the barrage system – some people are overwhelmed by a feeling of pessimism, others, by contrast, make a point of papering over black and white facts.

It is a well-known fact that every major investment has a drawback, which is associated with its negative effects on the environment. A construction of this magnitude is certainly one of these major investments...

The fact that the attitude to ecological problems of those mostly affected by them can by no means be described as indifferent is best illustrated by an official request submitted by the Ministry of Forestry and Water Management to the Academy of Science, for the elaboration on the

"Assessment of the side-effects of the Gabčíkovo-Nagymaros barrage system", an expert's opinion on the issue in question.

Following a commission by the Water Management Department of the Academy, a 4-member committee produced a written version of the position taken by a 10-member provisional team.

Below is a summary of the most important points in the draft version of the above-mentioned viewpoint, compiled by Professor P. Peter:

> *The extraction of Danube water results in the building up of energy potential, creating a new, approximately 160 km long navigation route.*
>
> *Hydrological and hydrogeological conditions will, however, substantially change as a consequence of the Danube's failure to feed soil waters at Žitný Ostrov in particular.*
>
> *The volume of construction work on the head race canal of the Gabčíkovo hydroelectric power plant, which is vital for the maintenance of ground water levels at Žitný Ostrov, has gradually reached a level which necessitated the removal of over 20 million cubic metres of soil from one place to another during the space of six years, while more than sixty percent of the distance along the canal length where dykes are to be found have been filled up, and infiltration canals have equally been dredged along the section between Hrušov and Gabčíkovo.*
>
> *The above mentioned system of canals plays an important part in drying out construction sites and the surrounding areas, which also affects ground water levels. Along the lower section of the canal, its negative effect is apparent as the area becomes dried out more than necessary and alters refined soil structure volumes (cracks become visible on the ground and upon buildings).*
>
> *The current situation is to be regarded as a kind of warning with respect to the dangers of unforeseeable damage that can be done to the agriculture and ecology of the neighbouring areas.*
>
> *Based on research results (carried out by the Brno Institute for Research in Water Construction and Water Management and the Bratislava Institute for Research in Water Management) and on expert opinion coming from groups of employees holding agriculture-related jobs, the area of lowering water-levels, developed below a settlement called Vojka as a result of the barrage system, is an estimated 50 thousand hectares.*
>
> *Based on the assumption that the full-scale insulation of the head-race canal will take place, preventing infiltration into the region's ground water, the chances are that soil on the regions concerned will dry out.*
>
> *In order to counter unfavourable effects on ground waters, which is the consequence of the lowering of ground water levels, irrigation improvements should be developed and operated continuously over the whole of the region concerned.*
>
> *The option to be outlined below is, as it were, of a higher degree of viability, being at the same time more economical and natural to follow; water infiltration via a head-race canal by a riverbed of adequate permeability.*
>
> *The realisation of plans, if it occurs in accordance with the plans of the technical designer, (i.e. the full-scale insulation via a PVC foil of the canal bottom), will entail the decrease of water recharge in the direction of ground water sources, which in turn will*

cause the proportional upsetting of the mixture of slightly mineralised waters coming from surface sources and those coming from subsurface reservoirs and being in a more or fairly advanced state of mineralisation.

The disappearance of groves will lead to the worsening of the situation as it will entail the elimination of an obstacle to the penetration of ground waters by nitrates, the consequences of which will be the acceleration of the process of mineralisation of organic matter and the intensification of nitrate emission, causing the amount of nitrate to accumulate to an undesirable degree in the waters of Žitný Ostrov.

Ecologically speaking, unfavourable effects due to unsatisfactory levels of natural soil moisture are expected to be witnessed; soil moisture is, from the point of view of refined soil structures, essential to prevent those structures from becoming cracked and shrunk. This phenomenon would unfavourably affect houses with foundations not very deep into ground level and would also be a potential danger for farm buildings, some of which have already become cracked.

The efficiency of the maintenance of groundwater levels will be determined by the insulation method applied for the canal section in question; from 1990 on, virtually all of the Danube water flow will pass through this section. The dykes are insulated by a cover made of asphaltic concrete, which partially covers the bottom itself. In accordance with recommendations by the Hydroconsult Bratislava, the next layer is that of a PVC foil, on top of which a layer of bottom insulation with a bed of clay is to be found. The Brno Institute for Research in Water Construction and Water Management submitted a proposal for the omission of the infiltration belt in the bottom insulation, which, if performed, would make water seepage into ground water reservoirs possible; otherwise water levels would decrease by 4 metres. As the dyke insulation cover, which has a leak capacity of only a few litres of water per second, is near completion, ground water feeding is only possible via the bottom.

The view taken by a team of experts of the Academy of Science of Czechoslovakia was affected by several considerations that cannot be disregarded, i.e., those related to energetics, navigation, agriculture, ecology, safety, as well as investment and operational costs, durability etc. The least acceptable alternative, the realisation of which is underway, is the one proposed by the technical designer. The objective here is the complete insulation of the canal section, irrespective of the agricultural and ecological aspects of the problem.

The barrage system would be a solution to problems related to ecology and navigation. It has, however, failed to resolve several problems pertaining to water management and ecology. Given the current state of affairs, some of these problems are impossible to eliminate. Among problems still to be rectified is the issue of how to maintain water levels at Žitný Ostrov as efficiently as possible.

Finally, it is to be noted that the technical designer has, in cooperation with the State Directorate of Melioration, found solutions to regulation-related problems while efforts were being made to overcome difficulties pertaining to the maintenance of ground water levels in the upper region between Bratislava and Vojka and in the lower region between Medveďov and Komárno.

As for the middle section and the head-race canal of the Gabčíkovo hydroelectric power plant in particular, the technical designer made a mistake by "terminating the permeability" of that section of the canal. In our view, this problem can be rectified by *the non-application of infiltration belt made of geotextile to the impermeable canal bottom, which makes water seepage to the foundation possible thus increasing ground water levels to a height which makes utilisation for agricultural purposes possible.*

It can be assumed in accordance with research findings that the regulation of water levels is possible via infiltration on 25-30 thousand hectares of area; the remaining 20-25 thousand hectares of area, the adequate level of soil moisture will have to be maintained through irrigation.

This draft version of the provisional work group raises some very serious problems. This, however, has no relevance for the technical designer as it is the designer who has the final word, given the fact that the designer is to assume responsibility for the whole structure of the device. The designer adheres to his original views, i.e., continues to support the idea of a non-permeable bottom. Finally, let's have the views of some of those concerned:

Professor P. Peter, member of a work group of the Academy of Science of Czechoslovakia:

"This progressive attitude to problem-solving in connection with ecological issues may seem to have been received favourably by investors, builders and the designer. Substantial damage can be prevented through simple measures of this sort. The situation, however, seems to prove the converse as all partners involved in construction work show reluctance to take this step, continuing to fight tooth and nail for the erroneous plan. Diverse arguments are brought as a means of rejecting the new proposal, irrespective of demonstrable economic losses. In my view, the dried out Danube branch in Chorvati, hundreds of dead trees, plants suffering from the lack of Danube water might serve as deterrent for the designer to prevent the damaging of the area surrounding the barrage system."

D. Miklánek, CSc., of the Ministry of Construction Industry of the Slovak Socialist Republic:

"What we builders do is merely the execution of plans. Should the designer change his mind and the investor procure the necessary geotextile, we will, of course, have no objection against the new proposal."

J. Cigánek, deputy minister of the Forestry and Water Management of the Slovak Socialist Republic:

"It would be wrong to accuse us of having an objection against the new solution as it was this ministry which requested the elaboration of the solution to these problems.

The position of the provisional work group is expressed in the form of diverse recommendations and proposal, disregarding safety considerations that the designer would be able to use as a starting point and which could, to some extent, protect the same designer. The top priority today is to stop the postponement of the further construction of the barrage system, which has to be completed by the original deadline. Under the current circumstances, it would be unwise to change the original plan with respect to the bottom insulation."

(Note: J. Cigánek has promised to present a more detailed version of his position on the problem, to be published in another issue.)

By Miloš Luknár

Annex 52

LETTER FROM DR. VLADIMIR SCHENK, CZECHOSLOVAK ACADEMY OF SCIENCES TO DR. GRACHOV, ACADEMY OF SCIENCES OF THE SOVIET UNION, 25 MAY 1988

[Translation]

Geophysical Survey
Boční II p. 1401 - 141 31 Prague 4 - Spořilov

Dr. A.F. Grachov,
O.Ju. Shmidt Institute of Earth Physics,
Academy of Sciences of the Soviet Union, Moscow

Honourable Dr. Grachov,

During my official visit to Hungary, I had the opportunity to read the "Report on the seismic risk of the Paks AEP", 1987, written by members of the Institute of Earth Physics. In Part 3 (concerned with Questions on the Structural Position of some Strong Earthquakes in the Pannonian Basin), written by you personally, it can be read, "Seismologists do not even agree on the intensity evaluation of some earthquakes. For example, Z. Schenkova, V. Schenk and V. Kárnik (see reference 143) exclude the Komárom region from the zone of high seismic activity". You refer to our paper (see appendix at p. 149), which states the exact opposite. The text of our paper is as follows:

> "In our territories, great importance is attached to the activity of the sources (epicentres) near Komárno and in particular to the possibility for earthquake propagation along the fault system, on which the Danube flows in this country. In 1763, the Komárno source generated the most powerful, known earthquake (I_0=9° grade) in our state. Because the Győr and Štúrovo areas are not devoid of weak earthquakes, this area can be interpreted as a possible zone of earthquake generation."

As you can see now, the meaning of the text is entirely opposed to that implied by your reference.

For this reason, we would be very grateful if (through official channels) you could inform the Hungarian client of this very important error and correct it in the above report. We would be glad if errors of this type were not repeated in the future, and especially in the present study which you are providing in contractual form to our organisation "ENERGOPROJECT Prague".

Sincerely yours,

Dr. Vladimir Schenk

Annex 53

MEMORANDUM PREPARED IN ACCORDANCE WITH POINT 7/A OF THE 62ND JOINT OPERATIONAL GROUP ON THE INTERMEDIARY CONSULTATION HELD IN BRATISLAVA, 6-7 DECEMBER, 1988

[Translation]

The participants of the consultation:

on behalf of the Hungarian party: **[Omitted]**

on behalf of the Czechoslovak party: **[Omitted]**

The schedule of the consultation:

1. Placement of seismological stations
2. Other issues

1. The parties discussed the placement of the seismological stations planned in the frame of the GNBS and the seismological prediction on the basis of microvibrations.

   Currently the Czechoslovak party doesn't plan to build a joint seismic network, hence it doesn't plan the construction of further stations in the frame of GNBS except the station near to Horny Bar. The station under construction in the Horny Bar region was selected by the Czechoslovak party on the basis of the suggestion of the Geophysical Institute of the Slovak Academy.

   The Hungarian party requests the following data from the Czechoslovak party in order to obtain the optimal location of the stations on the Hungarian side (between the Bratislava-Ipoly reach from a 10 m long section to the Danube):
   - gravity anomaly map (Bouguer)
   - magnetic anomaly map
   - seismic sections
   - map of electric conductivity
   - Neogene Quaternary formations
   - evaluated space images
   - geomorphological- and the neo-tectonic data
   - data of surface damages of seismic origin (primary and secondary seismo-allocations)
   - depth structure and data of the geophysical characters
   - deep borehole data
   - the map of the current movement of the earth crust
   - groundwater-level maps

   The Czechoslovak party will respond to the request of the Hungarian party in the 64 JOG (Joint Operational Group) negotiations.

The Hungarian party (The Geodetic and Geophysical Research Institute of the HAS (Hungarian Academy of Science)) will allocate the place of the stations up to 30 April 1989, and gives a notice to the Czechoslovak party.

2. Others

The Czechoslovak party submitted one copy of the following documents of the JCP (Joint Contractual Plan) for harmonisation "Preliminary operational order (0-1-A); The modernised plan of the commencement into operation of the Gabčíkovo Barrage; The drain of floods on the Gabčíkovo Barrage" (Plan number: 23673-476144).

The Hungarian party submitted one copy of the reports of "The specification of hydrological predictions; Water discharge predictions in the planning of operational orders".

Bratislava, 7 December, 1988

from Hungarian side:

Dr. Zsilák Endre

from Czechoslovak side:

Ing. Rudolf Rosina

Annex 54

AIDE MEMOIRE
ON THE DISCUSSION BETWEEN LÁSZLÓ MARÓTHY, HUNGARIAN MINISTER OF ENVIRONMENT AND WATER MANAGEMENT AND VLADIMIR MARGETIN, SLOVAK MINISTER OF FORESTRY, WATER MANAGEMENT AND WOOD PROCESSING, 19-21 JANUARY 1989.

[Translation]

Further participants in the discussion:

on behalf of the Hungarian party:
Counsellor of the Embassy of the Hungarian People's Republic, Gergely Mező
On behalf of the Ministry of Environment and Water Management, Zoltán Zorkóczy
On behalf of the Ministry of Environment and Water Management, Kálmán Papp
On behalf of the Ministry of Environment and Water Management, István Réthy
Mrs. Sándor Réti, interpreter

on behalf of the Czechoslovak party:
Vladimir Mikus, MLVD- SSR
Jaroslav Huszárik, MLVD-SSR
Frantisek Dohnalík, MLVD-SSR
Eleonóra Hellerová, interpreter

The Ministers discussed the following issues:

1. Water quality cooperation in connection with the establishment of Gabčíkovo-Nagymaros Barrage System, and the sewage programme of the area affected by the construction of GNBS.

2. Other issues.

In the course of the discussion, the Minister of Environment and Water Management of the Hungarian People's Republic, László Maróthy was received by the first Deputy Prime Minister of the Slovak government, comrade Stefan Murin. Comrade Stefan Murin put forward the point of view of the Slovak government during the discussion, stating that the operation of the Gabčíkovo-Nagymaros Barrage System may only be permitted if the environmental conditions are guaranteed. Comrade László Maróthy was pleased to acknowledge that view, as the opinion of the Hungarian and the Slovak governments is the same with respect to that basic requirement.

1. Water quality cooperation in connection with the establishment of Gabčíkovo-Nagymaros Barrage System, and the sewage programme of the area affected by the construction of GNBS.

In the course of the discussions, the Ministers exchanged opinions on the questions connected with the establishment and the operation of GNBS. Based on the decisions of Parliament and the Council of Ministers of the Hungarian People's Republic pertaining to the establishment of GNBS, the Hungarian party considers it necessary that measures be taken both by the Hungarian and the Czechoslovak parties in order to prevent the deterioration of the water quality of the Danube as a consequence of the operation of the waterworks. In the interests thereof, the conclusion of the inter- governmental agreement between HPR and CSFR is required. The principles and requirements of the protection of water quality connected with the establishment and operation of GNBS should be put down in the inter-governmental agreement.

The parties find it necessary, that at their next meeting, the chairmen of the Hungarian-Czechoslovak economic and technical scientific committee should approve the basic principles of the intergovernmental agreement and make a decision for its preparation.

The Ministers, furthermore, agreed to inform the public jointly and regularly on the issues of the arrangement of the ecological provisions connected to the establishment and the operation of GNBS.

In the course of the discussions, the Ministers surveyed the results of the extraordinary negotiation of the Water Quality Sub-Committee of the Hungarian-Czechoslovak Frontier-Water Committee held from 9 to 13 January 1989. They agreed on the proposal of the Sub-Committee concerning the immediate commencement of the joint investigations necessary for the establishment of the condition of water quality of the Danube in 1989.

An agreement should be made on the elimination of the determining sources of pollution in the basin, and the countries located along higher stretches of the Danube should also be requested to enforce the above requirement.

The parties consider the preparation of a joint proposal in connection with the open questions necessary, during the next (February 1989) negotiation of the Sub-Committee, for:

- the number of parameters tested,
- the settlement of the questions of dispute connected with the definition of the area affected by the operation of GNBS,
- making the sewage programmes more exact,
- the preparation of a proposal for the purpose of evaluating the basic conditions of water quality of the Danube, and
- the discussion of certain questions of methodology in connection with the analysis of water quality parameters.

2. Other issues

László Maróthy informed the Czechoslovak party that the Secretariat of GNBS operates as a separate organisational unit in the Ministry of Environment and Water Management of HPR, as of 1 January 1989.

In the course of the discussion, the members of the delegations of the two parties inspected the industrial sewage establishments of the Slovnaft plant.

The Ministers agreed – at the request of the Hungarian party – that the Czechoslovak party will provide an opportunity to present the ecological programme of the plant to Hungarian public opinion.

The Ministers agreed to meet regularly in order to check the tasks approved. The dates of the meetings will be agreed upon according to their schedule of work .

This Memorandum was prepared in two copies both in the Hungarian and the Slovak languages; both are authentic.

Dated in Bratislava, 21 January 1989.

László Maróthy Vladimir Margetin

Annex 55

STATEMENT OF THE HUNGARIAN ACADEMY OF SCIENCES CONCERNING THE STANDPOINT OF THE MINISTRY OF ENVIRONMENT PROTECTION AND WATER MANAGEMENT, 8 MARCH 1989

[Translation]

Hungarian Academy of Sciences
President

Budapest, 8 March 1989

to Comrade Zsolt Bajnok
The Editor of *Magyar Hírlap*

Herewith I enclose a statement by the Hungarian Academy of Sciences concerning the standpoint of the Ministry of Environment Protection and Water Management published in Magyar Hírlap today.

Would you please publish the statement in the newspaper.

Yours Sincerely,

Iván T. Berend

The reply of the Ministry of the Environment and Water Management given to a group of people demanding a referendum, that appeared in yesterday's edition of the Magyar Hírlap, referred several times to the statements of the HAS related to the GNBS. On this subject, the HAS makes the following statement:

It is not true that the Academy would have been able to publish its views on the subject. The HAS requested that those resolutions of the HAS classified as "top secret" or "for internal use" be allowed to be published. The Academy has not received an answer to its request up to now. Without the permission of the organ classifying the above documents it was not possible to publish the views.

With respect to the content of the views of the Academy, the two sentences quoted from the 6 page document expressing the views of the Academy handed in during August 1986 for interministerial use is misleading. That is, the reply of the Ministry of Environmental Protection and Water Management does not refer to the fact that the Academy had stated in its 1983 statement that "...the presidency finds that the significant postponement of the investment and the validation of the modifications to content are justified, and generally finds that halting the investment is most justified." Upon submission of the Academy's 1985 statement, the President of the HAS stated in his letter that "according to the judgement of our experts, the content of the Academy's 1983 statement is still valid". The same point is made – amongst others – in the 1988 standpoint of the Academy on the consequences of the possible abandonment of the Nagymaros barrage.

The HAS was not consulted about the decision relating to the construction of the GNBS. Nevertheless, the HAS satisfied all those requests that required it to give a scientific assessment of the investment and its environmental effects. It did so in the Autumn of 1988 when there was only unrealistically little time, 2 weeks, to carry out the task.

It developed its standpoint according to which "the halting or postponement of the construction provides a realistic alternative as opposed to continuation, even in the present circumstances" and "the postponement of the construction at Nagymaros is a solution which can reduce economic burdens and would definitely carry smaller environmental risks". It might have served as a basis for an alternative to the original governmental or parliamentary decision.

Annex 56

AIDE MEMOIRE
ON THE MEETING OF THE OFFICE OF COUNCIL OF MINISTERS ADVISORY BOARD, 3 MAY 1989

[Excerpts]

[Translation]

At the meeting, which was chaired by Iván Berend T., the members of the advisory body were present (with the exception of Ferenc Pataki and Béla Pokol), Miklós Németh, the President of the Council of Ministers, Rezső Nyers State Secretary, György Jenei Chief Government Adviser, György Marosán Government Spokesman, Csaba Gelényi and László Harsányi members of the Secretariat of the Advisory Body.

The agenda of the meeting: the Government attitude to the GNBS

Prior to the debate the following were presented to the members of the Advisory Body

1. The 1983, 1985, 1988 collective standpoints of the Hungarian Academy of Sciences related to the Gabčíkovo-Nagymaros Barrage System.
2. The report of the ad hoc inter-departmental committee created by the Minister of Justice
3. A compilation on the economic evaluation of the GNBS produced under the co-ordination of the National Planning Office— prepared on
4. The preliminary analyses prepared by members of the Advisory Body on request.

In the first part of the meeting, the Advisory Body heard the supplementary comments made by Péter Szerdahelyi, Deputy President of the National Planning Office and Miklós Kolosszár, an expert from the NPO. The members of the Body put questions to the experts, which served to give a more precise interpretation to the various elements used in the calculations.

The Advisory Body also heard the experts representing the Danube Circle: András Horváth, Gábor Lővey, Boldizsár Nagy, Csaba Páska and János Vargha. The representatives of the Danube Circle explained their view that they do not consider this discussion to be an official meeting between the Danube Circle and the representatives of the Government. (In reaction to that, Miklós Németh confirmed that he does not consider the meeting to be official either.) Later they emphasised that the official materials they familiarised themselves with are of reductionist character and do not extend to the ecological and socio-political character of the problem. They explained their views on GNB related questions of energetics, international law and ecology. Following that, the members of the Body put forward their questions.

Having listened to the expert opinions, during the ensuing debate the Advisory Body formed the following standpoint (with one opposing vote):

Weighing up the international legal, economic, ecological, internal, and foreign political arguments for and against the Nagymaros investment, the Advisory Body of the Council of Ministers recommends the investment of the Government be halted.

[...]

8 May 1989 László Harsányi

Annex 57

BRIEF
ON THE NEGOTIATIONS CONDUCTED BY THE PRESIDENT OF THE COUNCIL OF MINISTERS, PRAGUE AND VIENNA, 7 JUNE 1989

[Excerpts]

[Translation]

President of the Council of Ministers of
the Hungarian People's Republic

The Prague visit occurred as a result of an invitation by the Czechoslovak Head of Government, L. Adamec, on the 24th May 1989. Following the narrow circle discussion of the Prime Ministers, a plenary meeting was also held. Comrade Németh met Comrade Jakes, the Secretary General of the Czechoslovak Communist Party, and was received by the President of the Republic, Gustav Husak.

During the narrow circle negotiations continued with Comrade Adamec, Comrade Németh informed him in detail about the processes and efforts of internal politics, the economic situation and our economic policy goals. Following this he revealed those factors which were considered by the Hungarian Government when making the decision about the suspension of construction at Nagymaros. He emphasised our intention that a thorough investigation of the risks, situations of peril and concerns that have arisen be considered as a common task since we decided on the investment jointly, and our responsibilities are joint as well.

Comrade Adamec thanked him for the frank information, adding that between friend and neighbours openness must prevail, even if sometimes it is not comfortable.

He gave a thorough and very frank briefing on the Czechoslovak political and economic situation. They want reforms embracing the entire economy. The Party has taken the lead in this process, taking up its management and with that the responsibility. A large part of the population agrees with the reconstruction, but mainly because it hopes for easier life and better conditions already in the short run. Yet this is not the point. The aim is to improve work-discipline and quality in a way that does not go with proportionately higher wages. This is not going to be liked, but they cannot turn back. On the June parliamentary session, Comrade Adamec is going to forward a detailed economic analysis to the representatives in which he is prepared to give an open and critical evaluation.

The eighth 5-year plan has failed. Instead of the planned 3.5 %, GNP has grown a max. 2.5 %. There is no change in quality. The material and energy demands of production remains high and productivity low. It is not impossible that in total the GNP will be a 100 billion Kcs less, which can have an enormous effect on both investment and human spheres.

Steps have already been taken: with the exception of housing developments and ecological investments, investments will be drastically curtailed. The number of unfinished investments can be put at 28 thousand.

The disarmament process has created great problems in the arms industry. Defence expenses are considerably reduced, and a large-scale staff decrease is planned in the administration. (Approximately 1 million people are employed in the administrative sector.)

Regarding the Gabčíkovo-Nagymaros plant he explained:

We are talking about a matter that was initiated at a time when neither of us was present. But it is a fact that they have already invested a vast amount – about 20 billion Kcs – into it. Therefore, it is understandable that they are interested in the construction of the project. At the same time they are ready to investigate with us, or if necessary with the participation of a third party, either the newly emerged or earlier underestimated risks that have aroused our concerns. If it turns out that we have made mistakes, they will have to be exposed bravely and the consequences have to be faced. We have to act soberly, using common sense to avoid dramatising the situation, and to refuse to engage in demagogy.

Our relations are rich and manifold. Amongst these the power plant is only one issue that cannot be allowed to ruin the whole. There are, and especially there will be, a lot more complicated issues that will have to be solved jointly on the basis of friendly and good relations.

Finally, he declared that this was not a question that could be decided on by a referendum.

At the opening of the plenary meeting Comrade Adamec reported about the agreements made at the narrow-circle meeting of the two Prime Ministers.

7th June 1989

Compiled by:
György Jenei
László Mohai

Approved by:
Miklós Németh

Annex 58

REPORT FOR THE COUNCIL OF MINISTERS ON THE NEGOTIATIONS CONTINUED WITH LADISLAV ADAMEC, PRIME MINISTER OF THE CZECHOSLOVAK GOVERNMENT, 24 JULY 1989

[Excerpts]

[Translation]

The results of the negotiations can be summarised as follows:

We had a frank, objective and exhaustive exchange of views on the questions relating to the further fate of the Gabčíkovo Nagymaros Barrage System. Comrade Adamec explained that the Czechoslovak party's starting point is that the investment is a joint project, and its efficiency has to be guaranteed by joint efforts. They are also considering the ecological questions as a priority, being aware of the fact that any kind of degradation of the environment is unacceptable to both present and future generations. Since the Hungarian party considers the maximum possible reduction of the environmental risks a priority – knowing also that this is a sensitive political question in Hungary – the Czechoslovak party agreed that the experts should again examine the ecological and seismic aspects. He accepted that the examination was also required because the solutions of the investment were based on the technology of the late seventies. At the same time he emphatically pointed out that on the Czechoslovak side 20 billion Kcs had already been invested into the scheme, the Gabčíkovo water barrage was nearly completed, therefore they had no alternative but to build the joint project. This is in accordance with the interstate Treaty in force, and this is authorised by their Parliament. Pointing out that during the Hungarian-Czechoslovak scientific and expert examinations carried out to date no success was achieved in creating a joint standpoint on the important questions, he emphasised that when the Czechoslovak party accepts the continuation of these examinations, they presume that those examinations cannot continue forever.

For the Hungarian part, before explaining our suggestions I summarised the reasons and circumstances for our standpoint. I pointed out that our decision for suspension was related to the construction of the Nagymaros barrage and to the technical facilities of impoundment which relate to the peak operational mode and was extended to the entire section of the Danube in Hungary. I referred to the (fact) that the realisation of the GNBS in the planned order of magnitude and cost is justified by an already dated energy production concept. At the same time, the ecological and other dangers and risks are entailed in the solutions related to energy-production, in particular the solutions required for the peak-operational mode; the requirements of peak-operation defined in the original treaty were not fulfilled in proportion to time and the long-term conditions of their fulfilment are not guaranteed either. I made it clear, that the complete enforcement of ecological requirements was essential for us, since we are responsible for the present and future generations living on both sides of the Danube. Therefore we cannot make irreversible technological steps until the ecological problems have not been cleared up and the harmonic relationship and balance between nature, man and the water barrage is not found – no matter how late the recognition of this and how advanced the constructions are.

[section omitted]

We have also transmitted our suggestions to Comrade Adamec in writing. We jointly commissioned the competent organs of the two countries to continue the fact-finding and evaluative work, and agreed to meet before the end of October, to formulate our positions on a more objective basis and in a more precise way, taking into account the scientific results to be produced by that time as well as the standpoint of the Hungarian Parliament to be formulated in September. The Czechoslovak side took note of the statement of our Government that we extend the suspension of the works aimed at the completion of the Barrage system until 31st October 1989".[20]

II.

[Omitted]

24 July 1989

Compiled by: György Gilyán

Annex 59

PRAVDA, STATEMENT OF THE GOVERNMENT OF THE CZECHOSLOVAK SOCIALIST REPUBLIC ON THE JOINT CONSTRUCTION OF THE GABČÍKOVO-NAGYMAROS HYDROELECTRIC PLANT, 31 OCTOBER 1989

[Translation]

The proposal of the Government to the Republic of Hungary
is to meet its obligations in the construction
of the Nagymaros stage

Prague (ČSTK) – Evžen Vacek, Deputy Prime Minister of the Czechoslovak Socialist Republic yesterday handed over the following memorandum to Miklós Barity, Ambassador of the Hungarian Republic to Czechoslovakia:

The Ministry of Foreign Affairs of the Czechoslovak Socialist Republic wishes to express its respect toward the Embassy of the Hungarian Republic in Prague and on behalf of the Government of the Czechoslovak Socialist Republic respectfully presents the statement of the Government of the Czechoslovak Socialist Republic in relation to the construction of the Gabčíkovo-Nagymaros System of Barrages, delivered by the President of the Government of the Czechoslovak Socialist Republic at the government summit meeting with Miklós Németh, President of the Council of Ministers of the Hungarian Republic on 26 October 1989 in Bratislava.

To promote the conclusion of the treaty proposed by the Hungarian party between the Government of the Czechoslovak Socialist Republic and the Council of Ministers of the Hungarian Republic on the subject of the technical, ecological and operational guarantees of the Gabčíkovo-Nagymaros system of Barrages the Czechoslovakian party has expressed its willingness to conclude the said treaty within a short time on condition that the Hungarian party will commence preparatory work for the blocking of the Danube at Dunakiliti without delay. The proposal of the Czechoslovak party relies on the assumption that the water management experts and other concerned professionals of both countries will draft the technical principles for the said treaty within fourteen days, to be initialled at Deputy Foreign Ministerial level. Following the initialling of these principles will the Hungarian party be obliged to commence actual work on the blocking of the Danube. The treaty should be phrased in such a manner as to enable its ratification latest by the end of March 1990.

The Government of the Czechoslovak Socialist Republic has also proposed the conclusion of a separate treaty wherein both parties would oblige themselves to limit or exclude altogether the possibility of operating the Gabčíkovo-Nagymaros system of barrages at peak. In so doing, the Czechoslovak party has eliminated the doubt raised by the Hungarian party according to which peak operation could lead to unforeseeable consequences. At the same time the Czechoslovak Socialist Republic has proposed that the rulings pertaining to the Nagymaros stage be deleted from the minutes prepared in February 1989, and to revert to the deadline contained in the minutes of October 1983. In making this proposal aimed at compromise, the Czechoslovak party has taken into account the Hungarian party's desire to study the ecological aspects during this period and submit its according proposals within a fair time frame.

The proposals of the Government of the Czechoslovak Socialist Republic witnessing the above described intents are based on the Treaty concluded by the Czechoslovak Socialist Republic and the People's Republic of Hungary on the construction and operation of the Gabčíkovo-Nagymaros system of barrages, dated 16 September 1977, the said proposals being in full conformity with that treaty.

The Hungarian party has raised, as a pre-requisite to the acceptance of the Czechoslovak proposals that the Czechoslovak party give its consent to the amendment of the Treaty concluded between the Czechoslovak Socialist Republic and the People's Republic of Hungary in 1977 in such a manner that the Nagymaros stage of the system be abandoned. The Government of the Czechoslovak Socialist Republic sees no acceptable reason for such amendment of the said Treaty.

In the event the Hungarian Republic should take a unilateral decision to abandon the construction of the Nagymaros barrages – and thereby violate its international obligations – the Czechoslovak party will demand indemnity for its losses incurred thereby.

In consideration of all this, and notwithstanding the government summit meeting held in Bratislava on 26 October 1989, the Government of the Czechoslovak Socialist Republic maintains its opinion that the Nagymaros barrages be built, and proposes, moreover, that the Government of the Republic of Hungary fully meet its obligations in relation to the construction of the Gabčíkovo barrages as well in order to ensure their completion as per the conditions of the Treaty in effect, stipulating however that a separate Treaty shall provide for technical, ecological and operational subjects, as has been stated above.

In the event the Hungarian Republic fails to meet its obligations and continues to unilaterally violate the relevant treaty documents, the Czechoslovak party will be compelled – in order to avoid incurring further damages – to implement a provisory technical solution exclusively on the territory of the Czechoslovak Socialist Republic, which solution is based on diverting the amount of water from the river Danube to the Gabčíkovo barrages agreed upon in the original Treaty and the project provided thereby.

May the Ministry of Foreign Affairs of the Czechoslovak Socialist Republic take the opportunity to express its deepest respect toward the Embassy of the Hungarian Republic in Prague.

Annex 60

PRAVDA
INTERVIEW WITH ING JOZEF OBLOŽINSKÝ: CZECHOSLOVAKS TO CONTINUE DELIVERIES FOR GABČÍKOVO HYDROELECTRIC POWER PLANT,
2 NOVEMBER 1989

[Translation]

COSTS INCURRED BY CONSTRUCTION ALTERNATIVE EXPECTED TO HAVE A QUICK RATE OF RETURN

Yesterday's majority vote in the Hungarian Parliament was a decision on the abandonment of the construction by Hungary of the Gabčíkovo-Nagymaros Hydroelectric Power Plant.

In an interview with Ing. Jozef Obložinský, representative of the investment company working on the construction of the plant and deputy director of Vodohospodárska Výstavba, s. p. Bratislava, editor Ľubo Rabay was informed of the consequences of the above decision.

* Not only has the Hungarian partner abandoned the construction of the Nagymaros Barrage System, now it also regards the operation at off-peak levels of the Gabčíkovo Barrage System as a precondition of its approval concerning the realisation of that part of the original plan. Other requirements have also been mentioned.

At the same time, the Hungarian partner would like to change the 1977 International Agreement accordingly.

The position of the Czechoslovak side, at the same time, is the concept that the system is not to be conceived otherwise than as one indivisible whole, therefore the Czechoslovak side has not accepted the proposal by the Hungarian side for alterations to be made with respect to the 1977 Agreement. Under these circumstances the Hungarian suppliers have refused to carry on with work related to the filling up of the Hrušov-Dunakiliti reservoir, the completion deadline of which is imminent...

\- Although we had hoped that this alternative would be out of the question, we have had to be prepared for every eventuality.

Not only would the failure to finish the construction of water management units mean considerable loss from the point of view of the economy, it would equally have an unfavourable influence on the environment during spring floods as well as on hydrological parameters and navigation. There was no difference between us and our Hungarian colleagues as to the necessity of preventing dangers of this sort. The only difference is between our attitudes. They have suggested the pulling down of certain dams.

This, however, is unacceptable from our point of view. Therefore we will do our best to prevent the postponement of original deadlines for the commencement of operation of the system. We are determined to start working on the construction alternative on Czechoslovak territory...

* Not only is the original deadline for the filling up of the reservoir unrealistic, but it could not be realised within one year even if an option of a construction alternative is to be followed. At the same time we have to be prepared for floods in spring...

- We would like to utilise the internal dam leading to the head-race canal, the pulling down of which has been suggested by the Hungarian partner, as the foundation on the future dam on the right-hand side of the subsequently modified version of the reservoir.

  Therefore, we are determined to strengthen it. On the 17th December, in line with the original deadline, albeit from the opposite direction, we are starting to fill up the head-race canal with water, up to the intake of the reservoir which has been blocked so far. More than 21 million m^3 of water has been pumped over the Gabčíkovo Barrage system. Should there be floods, they will be "cushioned" by the above quantity of water.

  Within a few weeks we can finish the construction of other dams on Czechoslovak territory that the Hungarian side has failed to finish.

* What is the use of a provisional alternative? Doesn't it mean, as we have stressed many times before, the substantial increase in the costs incurred by the construction of the Barrage System?

- We can only speak about a provisional alternative in phase one. We will first build the leading dam mentioned above and construct it along an additional section on the left-hand side of the river, where the Danube functions as the joint frontier between the 2 countries. We will then link the river on our territory to the original dam on the right-hand side. The linking of the old Danube bed, to be performed via water that will be obtained from the reservoir in accordance with the provisions of the 1977 agreement in terms of quantity, will be done via a dam, therefore no costs will be incurred by the construction of a new dam.

  It has to be added, though, that this will decrease the level of water by approximately 2 metres as far as the Gabčíkovo barrage, which will undoubtedly have an effect on the hydroelectric power plant, too.

  If the Hungarian side decides not to finish the construction of units on its own territory we will, during the next phase, use clack-valves to make the regulation of water level possible in the reservoir up to the planned height. The provisional alternative could, in this way, no longer be considered provisional.

  As early as in phase one, we will be able to operate the plant by the steady flow method, producing an annual energy of kWh 2,4 billion worth approx. Kcs 1.7 billion. The costs incurred by the temporary solution can be estimated to Kcs 1 billion. The rate of return is, therefore, less than one year.

  The final option is in accordance with our international duties and agreements. In addition, the option itself is in accordance with all safety and ecological requirements.

* In what stage of readiness are the alternative units and how safe are they from the point of view of delivery?

- All geologic and hydrological research is virtually completed, we are .currently working on the preparation of plans.

  Construction work items will be performed by Hydrostav, Váhostav or Doprastav, all of which have free capacities to that effect.

  Should the government decide on this provisional construction alternative, work can then be immediately started on the dams in question as well as on transformation work items with respect to the new navigation route. All necessary work items would be performed gradually and in accordance with the corresponding preparedness of plans.

* In what way can the provisional construction alternative affect the original construction deadline?

- Unit One of the Power plant is to be finished by June 1990 in accordance with the deadline set by the government. Its trial operation can, at the same time, only be started a year later.

Annex 61

SVĚT SOCIALISMU, INTERVIEW WITH VIKTOR VOZTEK:
DUNASAURUS VERSUS BRONTOSAURUS, 21 JANUARY 1990

[Excerpts]

[Translation]

[...]

"I have encountered, for instance, a view, that accused the Hungarian Party of chauvinism, that is rooted back in history, and this idea remains in the background of the majority of the decisions of our neighbours. According to these opinions, we should rather have not started the construction jointly. All in all, originally, an independent Czechoslovak plan was already prepared as well."

[...]

"As a non-professional I cannot and I do not want to discuss technical details, that is why I am only addressing the substance. The structures constructed at a value of 13 billion KCS have to be submerged and their operation has to commence. Therefore the Czechoslovak side rapidly elaborated the supplementary plan for the realisation of the power plant on Czechoslovak territory. Every delay would mean an increase in the damage. The deadline for setting the Gabčíkovo barrage in operation cannot be postponed. Every day, every hour Hydroconsult remains idle is very expensive: the weather also causes damage, the already prepared structures lose their value, the maintenance and conservation of these is also costly...

According to the estimations of our experts, two of the eight turbines of the Gabčíkovo barrage will start operation by the end of 1990. The supplementary plan has been prepared, the preparatory works have commenced. The territory and volume of the originally planned Dunakiliti-Hrušov reservoir will diminish by about one third. Because the Hungarian Party has withdrawn from the construction, the entire reservoir has to be situated on Czechoslovak territory. New dykes of 14 km will have to be built, and the Danube will have to be dammed on our territory. At the same time, Czechoslovak constructors will have to finish the structures not yet completed by the Hungarians on the Czechoslovak side of the construction – it is not possible to count on the partner seriously and risk further delays..."

Annex 62

PRAVDA,
SUBSTITUTIVE SOLUTION FOR GABČÍKOVO, 21 AUGUST 1990

[Translation]

"After the consideration of every argument for and against, we are going to urge the completion of the Gabčíkovo barrage" – said Vladimir Mečiar, Prime Minister of the Slovak Republic to journalists yesterday, immediately following his survey of the energetic structure from the air and on foot. Every effort to continue the negotiations with the Hungarian Party has so far proved unsuccessful. It is possible that the meeting of the Foreign Ministers of the two countries to be held on the 27 August will provide a resolution of the problem. Should this not happen, the Czecho-Slovak side will probably set the plant in operation without Hungarian participation. This would mean the realisation of a substitutive solution which would make the filling up of the Hrušov reservoir without the utilisation of the Dunakiliti barrage possible.

According to the original schedule of the construction the first of the eight turbines of the power plant should have already started operation on the 2nd July. The fact that this would not take place was already obvious last October. However, prior to this date, a sufficient basis had generated for the Czecho-Slovak side to doubt the above deadline. That is, the entire joint Czechoslovak-Hungarian investment became a subject of high level political-scientific games around the autumn of 1988, admittedly, mainly on the initiative of the Hungarian Party. Last May the Hungarian Parliament halted all works on the Nagymaros section, and at the latest in the summer it started to subject the participation of Hungarian contractors in the construction of the structures on Czechoslovak territory to the condition that the interstate Treaty be modified. The official reason was the fear of ecological catastrophe. The Hungarian Party, however, still has not handed over the objective justification of the above fear. For this reason, the Czecho-Slovak party started to consider the substitutive solution. In the meantime, the Gabčíkovo barrage has become a high level internal political game in our country, a sort of symbol of the anti ecologist megalomania of a totalitarian state.

Under the pressure of the sad economic situation, however, the Slovak Republic is now obviously forced to reassess the 2 years postponement as well. (The loss resulting from the delay in the commencement of operation amounts to over 3 billion KCS annually). The situation was best described by Ondruš, Deputy Prime Minister by saying that: "the assessment of the Project from different political and pseudo political aspects shall be finished, and it should be assessed as a professional question again."

Annex 63

RESOLUTION NO. 44 OF THE ENVIRONMENTAL AND NATURAL PROTECTION COMMITTEE OF THE SLOVAK NATIONAL COUNCIL, 24 OCTOBER 1990

[Translation]

session 11
point 2

The Environmental and Natural Protection Committee of the Slovak National Council reviewed the construction site of the Gabčíkovo Hydroelectric Power Plant and the area next to a territory designed for the creation of a park to be called the Danube Region National Park, on October 9, 1990, together with members of the Popular Chamber of the National Assembly of the Czech and Slovak Federal Republic and the Committee of Environmental Protection of the Chamber of Nations.

On the basis of the above mentioned review, and via information obtained in connection with the issues in question and also on the basis of documents that deal with the National Park of the Trilateral Danube Region (which became known to the Committee following an initiative by Milan Zemku, the Deputy Chairman of the Slovak National Council to that effect), the Environmental and Natural Protection Committee of the Slovak National Council

A. declares

that the consequences on the natural environment of the construction of the Gabčíkovo Hydroelectric Power Plant are of a magnitude unparalleled in the history of the country.

Some less obvious consequences of the construction, which are related to the further decrease in quantity of the groundwaters, the endangering of the quality and quantity of agricultural production, the endangering of fish farming and forestry, the potential destruction of ecosystems and the level of self-purification of the Danube and its branches, were looked into by two independent specialist committees between January and March 1990.

The majority of experts substantiated the reality of potential risks factors, which was included in the official statements made by heads of both work teams.

This fact contradicts efforts made to play down the importance of the negative effects of the Gabčíkovo Hydroelectric Power Plant.

Currently, two further alternatives are being looked into to find a solution to the problem. At the same time, efforts are being made with the help of international natural and environmental protection organisations to declare the remaining part of the natural environment surrounding the Danube an International Natural Park of the Danube Region.

B. requests the governments of the Czech and Slovak Federal Republic to

1. Refrain from playing down the importance and extent of damages caused by the construction and planned operation of the Gabčíkovo Hydroelectric Power Plant and issues relating to potential risks factors.

2. Support an option that minimises the negative effects on the production and reproduction abilities of the Danube region.

3. Accept fully the findings during the 1st quarter of 1990 of the independent work team.

4. Take into consideration the opinion of the local population of the Danube region.

5. Support trilateral efforts being made to declare the territories in question a National Park of the Danube Region along with efforts being made to protect in a complex way the natural environment along the Danube and also to help the regeneration of the same area. Moral as well as financial support is necessary in efforts to be made to protect the invaluable natural resources of the Danube region. Measures should be taken immediately to protect what is left of the natural environment in the Danube region.

6. Prevent the triggering of new conflicts by abusing the international ramifications of the current controversy in Slovak-Hungarian relations today. Seek to find a common denominator with the Hungarian side. Demand the provision by the Hungarian side of scientifically verified arguments.

RNDr. Mikuláš Huba, CSc.
committee chairman

Annex 64

INTERNATIONAL LAW ANALYSIS OF THE POSSIBILITY OF IMPLEMENTING THE GABČÍKOVO HYDROPOWER PLANT AS A CZECHOSLOVAK NATIONAL INVESTMENT, 29 OCTOBER 1990

[Translation]

- The Republic of Hungary has decided on the prolonged suspension of the construction works at the GNBS on its territory, which is considered by the Czechoslovak partner a material breach of the Treaty on the GNBS (Treaty) and other agreements contained in related documents.

- According to general international law, the following should be understood by the expression: "material breach":

a) any refusal of the Treaty not permitted by general international law (all unilateral interventions on the part of the Republic of Hungary in the system of the Treaty, e.g., termination, suspension of implementation, etc.).

b) any violation of the provisions of the Treaty which is material from the standpoint of execution or the object of the Treaty (according to the Treaty, the GNBS forms a unified and indivisible operating system of components).

- According to general international law, the Czech and Slovak Federal Republic may invoke this material breach as a cause on the occasion of suspension of implementation of particular parts of the Treaty (Article 60 of the 1969 Vienna Convention on the Law of Treaties).

The obligations of the Treaty could be suspended primarily in the following areas:

- the operation of the elements of the GNBS (the method and organisation of operation)

- works which – according to the Treaty – were to be carried out for the Czechoslovak partner, on Czechoslovak territory, on the Nagymaros step

- the sharing by the partners to the Treaty of costs and income.

Suspension will be carried out in concrete time periods.

- precise determination of the final extent of the obligations to be suspended from the standpoint of performance will be carried out in accordance with the decisions of the Republic of Hungary concerning further construction,

- beyond the fact that the Czech and Slovak Federal Republic considers the conduct of the Republic of Hungary to be a material breach of the Treaty, and it shall refer to this as the cause of the suspension of implementation of the Treaty, it will be also necessary officially to inform (e.g., in a Note Verbale) the Republic of Hungary of the following:

- As a consequence of the decision of the Republic of Hungary to suspend works on the GNBS, the Czech and Slovak Federal Republic has accumulated damages for which the Republic of Hungary has obligations to compensate according to general international law. At the same time, the Czech and Slovak Federal Republic will have the right to implement measures on its own territory which serve to prevent or mitigate those damages and losses of the Czech and Slovak Federal Republic which arose as the result of the unlawful act of the Republic of Hungary,

- the Czech and Slovak Federal Republic – according to Article 30 of the [ILC Draft Articles on State Responsibility] – may, out of its own resources and with appropriate counter-measures, force the Republic of Hungary to carry out its obligations.

Variant "C" as Czechoslovak national investment fulfils the above-mentioned conditions, because

a) all installations of the Gabčíkovo Barrage shall stand on territory belonging to the Czech and Slovak Federal Republic,

b) the Czech and Slovak Federal Republic will refer to the cause of the material breach of the Treaty only in the context of suspension of implementation of particular parts of the Treaty; all other obligations of the Treaty will be implemented, or will appear as causes of counter-measures,

c) the character of Variant "C" from the standpoint of technology and the schedule of implementation makes it possible for the Slovak partner to carry out its obligations contained in the Treaty at any time, in the event that the causes for the suspension of implementation of the Treaty should cease to operate (namely, if there would be an indication of interest on the part of the Republic of Hungary in the construction of the GNBS according to the original plans). According to general international law, the Parties must refrain from all negotiations during the period of suspension which could prevent the renewed implementation of the Treaty (Article 72 of the Vienna Convention on the Law of Treaties). As a consequence, the Czech and Slovak Federal Republic must present Variant "C" to the Hungarian partner as a provisional solution.

d) Variant "C" does not contradict the 1948 Agreement between the Republic of Hungary and the Czechoslovak Republic on certain issues of water management and cession of territories pursuant to Article 1(c)(4) of the Paris Peace Treaty, as this measure will not have any influence on the water supply of the Mosoni branch of the Danube, toward which the Czech and Slovak Federal Republic assumed an obligation in the above mentioned Treaty. According to Article 3(1)(c) of the 1948 Agreement, the Czechoslovak State assumes an obligation not to implement any such river management measures at rkm 1850-1862 of the Great Danube which could influence the water supply of the Mosoni branch of the Danube. This ordinance is valid only in relation to the obligation toward rkm 1860-1862, as to the rest of the stretches of the Danube (1850-1860), an agreement came into being with the 1977 Treaty on the construction of the GNBS.

e) the utilisation of the hydropower capacity of the Danube has been resolved in the Treaty concluded with the Hungarian Party on the construction of the GNBS, in which the income of the two partners has also been determined – in proportion to their share in the investment.

- The realisation of Variant "C" makes the limited operation of the Gabčíkovo plant possible in only 2 years (with the development along the State boundary on the Czechoslovak side of the right bank of the Hrušov reservoir),

- the expenses related to the implementation of Variant "C" shall be put forward by the Czech and Slovak Federal Republic among the damages for which it seeks compensation from the Republic of Hungary,

- upon the realisation of Variant "C" and the subsequent operation of the Gabčíkovo Hydropower plant there should be no statements – not even during negotiations concerning this question – which refer to the recognition by the Czech and Slovak Federal Republic of the suspension of works on the GNBS by the Republic of Hungary, as this **could put in question the validity of the Czechoslovak claim** for compensation for damages,

- the realisation of Variant "C" will have no effect on the existing State boundary between the Czech and Slovak Federal Republic and the Republic of Hungary,

- in spite of the diversion of the old bed of the Danube by the Czechoslovak partner on Czechoslovak territory, the amount of water shall remain on the level determined for this bed in Article 14 of the Treaty,

- the realisation of Variant "C" shall observe the original provisions of the Treaty for maintaining normal navigational conditions on the Danube, while at the same time, the 3.5 m navigational depth suggested by the Danube Committee for the Gabčíkovo section of the Danube will also be attained,

- Variant "C" allows for the operation of the Gabčíkovo Hydropower Plant as a purely national investment, which means that all of its advantages shall be enjoyed by the Czech and Slovak Federal Republic, which in turn makes possible the satisfaction of its demands of compensation for damages from the Republic of Hungary (this solution does not touch upon questions relating to joint property),

- the realisation of Variant "C" does not belong within the scope of the 31 May 1976 Convention between the People's Republic of Hungary and the Czechoslovak Socialist Republic on the Regulation of Water Management Issues of Boundary Waters, as the realisation takes place on the Czechoslovak section of the Danube, which does not form the common Czechoslovak-Hungarian border. Furthermore, Article 15 of the 1977 Treaty refers to the agreement only in the context of water quality; in all other questions of water management Chapter V of the Treaty contains all the binding obligations concerning this section of the Danube.

Conclusion:

No principle of international law has been found which would prevent the implementation of Variant "C".

Annex 65

OPINION OF THE INTERNATIONAL LAW COMMISSION FOR THE STUDY OF ALTERNATIVE SOLUTIONS FOR THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, PRAGUE, 29 NOVEMBER 1990

[Translation]

Members of the commission: JUDr. Josefina Darásová
JUDr. Erich Fleischhaker
JUDr. Ludek Krajhanzl
Engineer Míroslav Sándor

"A" variant:

Assumes the fulfilment of the obligations contained in the Treaty. Compensation might become an issue, according to Article no. 26 of the Treaty, as the deadline for the commencement of the operation of the first aggregate has not been met. Compensation for the damage is a matter of political decision. The deadline for the realisation of the GNBS must be negotiated by the HR.

"C" variant:

The Commission reached a decision, according to which this variant may be realised from the standpoint of international law. The solution in question is an extreme measure, which has been forced via the breaching of the Treaty by the Hungarian partner, and it would have a negative effect not just on bilateral relations – the European public should also be informed in the event of its realisation.

Separate analysis has been annexed.

"B" variant:

This variant assumes the assent of the HR and the modification of the Treaty, an integral part of which is the question of compensation for created damages. These damages would occur for the Czechoslovak partner if it agrees with the abandonment of construction of the Nagymaros step. It is impossible for the Czechoslovak partner to agree with the point of view of the Hungarian partner about "having jointly taken a mistaken step", as it would henceforth deprive itself of the possibility of obtaining compensation for the damages, and what is more, it would also have to assume responsibility for damages caused for the HR (Article 25. of the Treaty).

"D" and "E" variants:

These variants assume the assent of the HR and the modification of the Treaty, an inseparable part of these variants is the question of compensation from those damages which would occur for the Czechoslovak partner from spending on unnecessary investment costs.

With respect to the question of ecological catastrophe, see above – "C" variant.

<u>"F" variant:</u>

This does not assume a modification of the Treaty, both partners would agree upon the dissolution of the Treaty (the consent of the Federal Council is indispensable). In case the Czechoslovak partner would unilaterally realise this variant (without the consent of the HR), it would commit a breach of the Treaty, and for this reason, the Hungarian partner would reach its goal of deviating from the Treaty.

<u>"G" variant:</u>

Entirely hypothetical variant, assumes the modification of the entire Treaty and compensation.

Prague, 29 November 1990

Annex 66

REPORT CONCERNING THE SOLUTION OF PROBLEMS RELATED TO THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, DECEMBER 1990

[Translation]

Deputy Prime Minister of the Slovak Republic

Government Plenipotentiary of the Czech and Slovak Federal Republic and the Slovak Republic *dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System*

A document for SR government negotiations

Bratislava, December 1990

REPORT

concerning the solution of problems
related to the Gabčíkovo-Nagymaros Barrage System

The document submitted by:

Vladimir **Ondruš**
SR Deputy Prime Minister

Dominik **Kocinger**
Government Plenipotentiary of the CSFR and SR *dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System*

Contents of the document:

1. Draft proposal of the SR Government
2. Information for the SR Government
3. Document for the CSFR

Attachment 1

DRAFT PROPOSAL OF THE GOVERNMENT OF THE SLOVAK REPUBLIC

dated.. No.............

concerning the solutions to the problems of the
Gabčíkovo-Nagymaros Barrage System

The Government of the Slovak Republic

A. s t a t e s t h a t

due to disagreements in competency issues, the CSFR Government failed to discuss the report discussed by the Presidium of the Government on 27 August, 1990 about the situation of the Gabčíkovo-Nagymaros Barrage System.

B. a g r e e s

with the Report concerning the solutions to the problems of the Gabčíkovo-Nagymaros Barrage System and the draft proposal of the CSFR Government in the form as contained in Attachment 3 of the Report.

C. e n t r u s t s t h e P r i m e M i n i s t e r

that, jointly with the Finance Minister of the CSFR, the Minister-Chairman of the Federal Environmental Protection Committee and the Government Plenipotentiary of the Czech and Slovak Federal Republic and the Slovak Republic *dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System*, he should submit a Report at the meeting of the CSFR Government concerning the solution to the problems of the Gabčíkovo-Nagymaros Barrage System

D. c a n c e l s

point C and paragraph 1 of point D of Resolution No. 32 of the SR Government Presidium, dated 27 August, 1990 and linked with the Report on the status of the Gabčíkovo-Nagymaros Barrage System.

To be executed by: the Government Plenipotentiary of the Czech and Slovak Federal Republic and the Slovak Republic *dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System*

Attachment 2

FOR THE INFORMATION OF THE GOVERNMENT OF THE SLOVAK REPUBLIC

On 27 August, 1990, the Presidium of the Government of the SR discussed the state of the construction of the Gabčíkovo-Nagymaros Barrage System and with its resolution No. 32 decided that those issues that the Government of the SR cannot solve in its own sphere of authority they would present the Government of the CSFR with. The main issues were those of appointing the leader of the negotiations with the Hungarian partner, the questions related to the potential modification of the Contract between the CSFR and the HPR, the request for a statement of official position by the Government of the Hungarian Republic concerning the completion and operation of the Gabčíkovo-Nagymaros Barrage System, and the organisation of international help mainly from the European Community for evaluating the ecological problems caused by the Gabčíkovo-Nagymaros Barrage System. One of the important issues passed on to the authority of the Government of the CSFR was the imbalance in the financing of the project that came about in 1990, the need for a 163.4 million Kcs higher subsidy from the Federal budget.

The Government of the SR also drafted a proposal for ensuring through government plenipotentiaries the further negotiations with the Hungarian partner about the current state of the construction of the Gabčíkovo-Nagymaros Barrage System and the related technical, financial, ecological and international legal questions, on the basis of Czecho-Slovak and Hungarian legal documents. In connection with this it was proposed that the position, tasks, authority and responsibility of the CSFR and SR government plenipotentiary should be determined in accordance with the position approved in resolution 133 of the CSSR Government, dated 31 May, 1979.

The Presidium of the Government entrusted the Prime Minister of the SR to submit, jointly with the Minister-Chairman of the Federal Environmental Protection Committee and the Government Plenipotentiary, the report on the status of the construction of the Gabčíkovo-Nagymaros Barrage System to the Government of the CSFR.

The report was discussed and submitted to the Government of the CSFR. The Government of the CSFR scheduled a discussion of the report for 6 September, 1990. At the meeting of the CSFR Government, however, Mr Vavroušek submitted his own report concerning the solution of the problems of the Gabčíkovo-Nagymaros Barrage System, which was contradictory to the report of the Government of the SR. They differed in the envisioned method and schedule of the negotiations with the Hungarian partner as well as the institutional backup of these.

Since the Federal Government had two documents, they decided not to discuss the report, and the minutes of the meeting contain that it is the task of Ministers Vavroušek and Dlouhý, with consideration of comments from other members of the Cabinet and especially the Minister for Foreign Affairs, to discuss these issues at a separate meeting with the Forest and Water Management Minister of the SR, to consider the ways out and to propose further action. The joint document prepared in such a way should be submitted to the CSFR Government meeting as soon as possible.

The new draft for the report dealing with the status of construction at the Gabčíkovo-Nagymaros Barrage System was discussed in Bratislava on 9 October, 1990, partly in the presence of Mr

Vavroušek, then, after modifying it in accordance with formal-administrative requirements it was submitted to the authorities concerned and the Federal Environmental Protection Committee, asking for speedy transmission of the document in this jointly agreed form to the Government of the CSFR.

Due to the disagreements that arose in connection with the Czechoslovakian-Hungarian Inter-Governmental Committee dealing with the Gabčíkovo-Nagymaros Barrage System, commissioned with the task of finding an optimal solution to the problems of the Gabčíkovo-Nagymaros Barrage System, and whose foundation the SR Government considers a duplication, the report was not submitted to the CSFR Government.

Because of the continued postponement of a solution to the issue of the Gabčíkovo-Nagymaros Barrage System in the CSFR Government, the Prime Minister of the CSFR came to the deduction that it should be the Federal Minister of Finance who submits the report discussing the problems of the Gabčíkovo-Nagymaros Barrage System to the CSFR Government. Therefore, in a letter written 12 November, 1990, he asked Minister Dlouhý to submit to the CSFR Government within a short time his comprehensive problem-solving proposal concerning the Gabčíkovo-Nagymaros Barrage System, which would organically integrate into the policy of the CSFR Government the ecological and energy aspects of the issue, taking into consideration the interests of the SR Government as well.

The document was supplemented with new facts and results from negotiations of the government plenipotentiaries, lasting from September to November.

The document was discussed, evaluated and modified on 5 December, 1990 in accordance with statements of the CSFR Government Presidium Office, the SR Government Office, the Federal Ministry of Finance, the Federal Ministry of Transport, the Federal Environmental Protection Committee, the Slovak Environmental Protection Committee and the SR Ministry of Construction.

[Attachment 3]

Report for the Government of the CSFR concerning the solution of problems related to the Gabčíkovo-Nagymaros Barrage System

[Translation]

Government of the Slovak Republic
Federal Ministry of Finance
Federal Environmental Protection Committee

Government Plenipotentiary of the ČSFR and SR dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System

Document for the meeting of No.:

The Government of the ČSFR

The document submitted by:

Vladimir M e č i a r
Prime Minister of the SR

Vladimir D l o u h ý
Fin. Minister of the ČSFR

Josef V a v r o u š e k
Chairman of the Federal Environmental Protection Comm. – minister

Dominik K o c i n g e r
Government Plenipotentiary of the ČSFR and SR dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System

Bratislava, December 1990

Contents of the document:

1. Draft resolution of the Government of the ČSFR

2. Preamble

Attachment 1

DRAFT
RESOLUTION

of the Government of the Czech and Slovak Federal Republic

date:..No....................

for the Report concerning the solution of the problems related to the Gabčíkovo-Nagymaros Barrage System

The Government

1. agrees

a/ with the idea of negotiations on a government level with the Hungarian partner dealing with a complex solution to the problems related to the construction and operation of the Gabčíkovo-Nagymaros Barrage System, within the framework of the contract made by the ČSSR and the Hungarian People's Republic concerning the construction and operation of the Gabčíkovo-Nagymaros Barrage System.

b/ that foreign experts, especially EU experts should be involved in the solving of problems related to the construction and operation of the Gabčíkovo-Nagymaros Barrage System.

2. accepts

the principles, as shown in the attachment, of the negotiations of the Czech and Slovak government delegation.

3. decrees

a/ that the Prime Minister and the Minister for Foreign Affairs should by diplomatic means come to agreement as to the commencement of government-level discussions about the complex solution to the problems related to the construction and operation of the Gabčíkovo-Nagymaros Barrage System.

b/ that the Minister of the Federal Government should head the Czech and Slovak government delegation at the negotiations with the government delegation of the Hungarian Republic concerning the technical, financial, ecological and legal issues of the Gabčíkovo-Nagymaros Barrage System, to take place no later than 30 April, 1991.

c/ that the Minister of Finance should increase the federal budget subsidy to the Gabčíkovo-Nagymaros Barrage System with 163.4 million Kcs in 1990.

d/ that the Minister-Chairman of the Federal Environmental Protection Committee should organise international support, especially within the EU, for the evaluation of the ecological problems of the Gabčíkovo-Nagymaros Barrage System and should inform the Government of the progress by 31 January, 1991.

e/ that the Government Plenipotentiary of the ČSFR and SR dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System should suggest members for the Czech and Slovak government delegation at the negotiations with the Hungarian partner and draft a proposal for the guidelines at the negotiations.

4. a p p o i n t s

the Prime Minister of the Slovak Republic as Chargé d'Affaires at the negotiations with the Hungarian partner concerning the changing of the 1977 Contract and the related contract documents.

5. e m p o w e r s

the Prime Minister of the SR to appoint, on agreement with the central organs, the members of the delegation that is to discuss changes to the 1977 Contract with the Hungarian partner.

6. c a n c e l s

paragraph a/ of point 5 of government resolution No. 237 of the ČSFR, dated 5 April, 1990, along with points 6 and 7, that deal with the further Slovak steps in connection with the construction of the Gabčíkovo-Nagymaros Barrage System.

To be executed by: the Prime Minister of the ČSFR, the Prime Minister of the SR, the Deputy Prime Minister and the Minister of Foreign Affairs of the ČSFR, the Minister of Finance, the Minister-Chairman of the Federal Environmental Protection Committee, and the Government Plenipotentiary of the ČSFR and SR dealing with the construction and use of the Gabčíkovo-Nagymaros Barrage System

Attachment for Government Resolution
No......... of the ČSFR

PRINCIPLES

for the negotiations of the Czech and Slovak government delegation
with the Hungarian partner concerning

the complex solution to the problems of the Gabčíkovo-Nagymaros Barrage System

---

The Czech and Slovak government delegation will adhere to the following principles during the negotiations with the Hungarian partner:

1. Aim to find out the official position of the Government of the HR concerning the completion and operation of the Gabčíkovo-Nagymaros Barrage System in accordance with the 1977 inter-state Contract.

2. To ask the Hungarian partner to join the complex solving of the problems related to the mutual construction and operation of the Gabčíkovo-Nagymaros Barrage System.

3. To ensure that common teams be set up to solve the following issues:
   - to make international navigation possible on the shared section of the Danube
   - to provide flood protection for the surrounding areas
   - to use the shared section of the Danube for producing electric energy
   - ecological impact of the technical solution put forward in the inter-state agreement and proposal for the minimisation of unfavourable effects.

4. To agree on the involvement of foreign – especially EU – experts in the joint teams.

5. To claim damage for the harm done to the ČSFR by stoppage and delays of delivery and works on the Hungarian side.

Annex 67

SUMMARY OF EXPERT OPINIONS TAKING A ROLE IN JUSTIFYING THE GOVERNMENTAL DECISIONS (V. 13. 1989-X. 31. 1989) CONCERNING SUSPENSION OF WORKS AND PARTIAL ABANDONMENT OF THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, DECEMBER 1990

[Translation]

Preceding Events

According to the transcript of the October 17-18, 1990 meeting of the Hungarian and Czechoslovak Government Plenipotentiaries:

> "On the request of the Czechoslovak partner, the Hungarian partner pledged to hand over to the Czechoslovak partner the summary of those expert opinions, which serve as a basis to the Hungarian decision, according to which it will abandon the Nagymaros plant for good, and will suspend construction on all other sites of the Gabčíkovo-Nagymaros Barrage System."

The main reason behind the Hungarian decision was the prevention of the ecological catastrophe threatening the affected area of the barrage system. Hence, this summary contains short extracts of the technological-ecological expert opinions which played an important role in making the decisions.

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Summary

The conclusion suggested by the opinions for the decision makers for consideration (independently of the field of speciality): the construction of the barrage system involves such risks, the extents of which – in lieu of basic research and analysis – although cannot be exactly measured, nonetheless, the possible damage, even according to our present knowledge, far exceeds the expected profit.

***

1. Historical overview

The joint investment proposal for the Bös(Gabčíkovo)-Nagymaros Barrage System was prepared in the years 1972-73 [1], [2]. The main goal of its realisation: electric energy production, combined with increased flood protection security and improved international shipping waterway. After some two decades of preparatory work – which was found justified by repeated consultations with experts from the Soviet Union [3] – the plans for the barrage to be built on left bank bypass canal near Gabčíkovo, was accepted as the most favourable solution, together with the hydropower plant to be constructed in the area of Visegrád, which was fixed back in 1958.

The two countries entered into an international treaty on 10. September, 1977 on the realisation and operation of the GNBS [4]. The implementation schedule was also signed on the 16th September, 1977 by the Hungarian/Czechoslovak Technological/Scientific Joint Committees.

Consequently, the first turbine should be started in the Gabčíkovo power plant in 1986, and in the Nagymaros power plant, in 1989.

The interstate Treaty deals with the "joint investment" defined as the object of the Treaty (Article 1.), and with the "national investments" (Article 2.) in 13 Chapters, in 28 articles.

The realisation of the joint investment will take place on the basis of a jointly agreed plan (Article 4.). The partners to the Treaty guarantee, and bear a responsibility toward each other that the implementation, planning and realisation of the establishments and works will take place in accordance with the jointly agreed plan (Article 5.). The partners to the Treaty shall divide between themselves equally the profits and advantages of the barrage system (Article 9.).

By the measures envisaged in the Joint Contractual Plan, the Parties to the Treaty ensure that the implementation and operation of the barrage system will not cause any harm to the water quality. The Parties to the Treaty guarantee to fulfil the natural protection requirements arising in connection with the implementation and the operation of the barrage system, using the measures envisaged in the Joint Contractual Plan (Article 19.).

The Parties to the Treaty are jointly responsible for the content of the approved jointly agreed plan, for the implementation of the Treaty during the period of construction and the period of operation of the barrage system, and for the sanctions carried out in agreement with the Government Plenipotentiaries, as well as for the joint measures and resolutions of the joint organisations (Article 25.).

***

The preparation for the joint investment began in 1978. Following that, economic difficulties in both countries and the critical manifestations that became permissible with the beginning of democratisation made the delay of the construction necessary. For in this period – despite the ban – a courageous article appeared [5] which drew attention to the ecological dangers as well as the irresponsibility of the planning behaviour of those interested in the construction.

It has been determined in the bilateral government level negotiations of the beginning of June 1981 that neither one of the countries is in a position to be able to guarantee the implementation according to the original schedule [6], [7]. Together with the revision relating to the rescheduling of the construction, it emerged that the investor National Water Management Office (NWO) – should ask for an official expert opinion from organisations not interested in the planning and realisation of the barrage system on the environmental effects of the establishment and the effects on agricultural production, so as to create a more "reassuring" situation with respect to these questions.

Acting upon a request from the central committee of the Hungarian Socialist Workers Party, the Hungarian Academy of Sciences (HAS) has created an ad hoc committee for the examination of the questions under scientific dispute. In its resolution of December 1983, the Presidential Board of the HAS has approved the plan for the committee as a unanimously accepted statement [8]. According to the statement (based on technical, agricultural, water construction, transportation, economic, environmental and regional development studies): "The Joint Contractual Plan did not deal comprehensively with the ecological effects and consequences of the GNV. No study has been prepared so far that would have examined the technological, ecological, economical and the related risks of this important topic in a single system and in relation with each other."

The statement defines the main requirement of further research planning and implementation works for the protection of the water quality of the Danube, the agricultural and forestry potential of the area, and the retainment of the controlled living water character of the old Danube as befits its stature as a boundary river. It supports the planning of a complex environmental effect study with the necessary studies to be carried out jointly with the related Czechoslovak organisations. It further deems necessary the building of a monitoring system which is appropriate for the continuous examination of changes in environmental conditions.

The conclusion of the HAS statement "On the basis of the listed and unlisted factors, the Presidential Board considers the significant delaying of the investment, the implementation of reasonable changes in content, and in particular, the halting of the project to be appropriate." [8].

The Environmental Impact Study (EIS) was prepared in 1984-85 [9]. The goals: the impact statement must determine whether there is a reason from the point of view of ecology, which could question the establishment of GNBS, and must investigate the extent of measures that might be expected to be necessary from an ecological point of view [10]. Although the EIS answered many questions, nevertheless it dealt only with the effects expected following the implementation of the Joint Contractual Plan – and even with these only partially – the compilers of the study did not concern themselves with effects to be expected from alternative technological solutions. Thus, the deficiency in the ecological studies did not cease to exist with the preparation of the EIS. The EIS did not answer the qualms, observations and diverse opinions raised either in the statement of the HAS of 20 December, 1983, or the analytical study of the National Technological Development Committee (NTDC) of January 1984 [12]. (For instance in the case of the cardinal question of water quality, it states that in this respect the effect of the barrage system is advantageous, or at least neutral [9].)

The gradual acceleration of works beginning with 1985 strengthened the opposition to it as well. Expert and laymen alike protested in sharply voiced articles and at conferences against the damaging and irreversible processes [13]. The people rejected the Barrage in public demonstrations. Finally, at the end of 1989, the Hungarian Parliament raised its voice as well. It asked the government for a briefing, on the basis of which it could decide on the further fate of the establishment.

***

In this period, together with the impending change in the political system, a change of attitude took place within Hungarian society. Environmental consciousness and the realisation of the priority of ecology in a wide sense became more and more wide spread, and this led to the re-evaluation of the goals to be realised by the GNBS.

It is, of course, impossible to characterise the road leading to the acceptance of the priority of environmental goals by summarising expert opinions, as the issue is a shift in the attitude of the decision makers. Changes in points of view, in turn, may come about as a result of different factors in the case of different situations or different individuals, and sometimes lay opinions, and lay articles, lectures and documentaries play a greater role than expert works presenting the values or evaluating the ecological risks.

The development of the changing point of view is shown for example by quotations taken from studies on river control, dredging and ones concerning bank-filtered drinking water bases. "...river control and bank-filtering has and will have its own role and area of activity, with all its problems and difficulties. The only possible course to take in the future is to coordinate the interests and possibilities over time." (1987) [14]. A year later, the same water construction engineer writes in the spirit of ecological concern: "The method of interference necessary in the future – in the case of both active establishments and areas of planned water bases – must be correlated with the interests of bank infiltration with the unified consideration of priorities, economic efficiency, and other points of view" (1988) [15].

***

The Hungarian Parliament, in its session of 7 October, 1988, although having opted for the continuation of the Nagymaros construction, formulated strict nature protection conditions for the continuation of the construction [16]:

> "The ecological risks must be kept at a minimum, consequently, ecological interests must precede interests of economy during both investment and operation....It must be stated as the basic principle of operation, that the water quality of the Danube must not deteriorate. Peak operation may only begin after the construction of sewage water cleaning plants on both sides which are necessary for the operation of the system without environmental risks."

***

The general need appeared following this, that is, in connection with this, for the scientific investigation of the values and their evaluation, including the order of magnitude of the values and the amount of expected damage as well.

A quote from the February 1989 recommendation of the representatives asking for the revision of the decision [17]: "The hydropower plant at Nagymaros will not give us electric energy for at least twenty years, and requires the construction of such additional investments, sewage water cleaning plants, roads, protection plants, etc., for which we have insufficient funds. We have no guarantee, that Czechoslovakia, which is also struggling with crisis is at all in the position of beginning the implementation of the supplementary investments, which are many times more expensive than the ones we need. The lack of sewage water cleaning plants would lead to an ecological catastrophe and the depletion and ruin of our drinking water reserves and drinking water supply. The House of Representatives have not been sufficiently informed on the expected effects of the barrage system, and particularly, on the counter opinions. For instance, they received the 1983 and 1985 Statement of the Hungarian Academy of Sciences only on the eve of the parliamentary vote, and this made a responsible decision impossible [18]...In these circumstances, we deem a scientific examination of the Nagymaros construction, considering all scientific reasons and arguments without political prejudice, necessary, so that the Parliament can make a really responsible decision. Until that point however, the immediate suspension of the Nagymaros works is necessary. Common sense demands this from us..."

According to the suggestion of March 1989 of the 'Ecologia' Northampton, Massachusetts (USA) work group, whose opinion was requested by the government: "In the case of the establishment under examination, certain decisions of the Hungarian, Czechoslovak and Austrian governments have been made without the full consideration of the ecological and other well founded concerns....Hence, the procedure did not follow the order we suggested earlier, that is that the effects and alternatives must be examined more carefully before anything happens....The power plant and shipping establishment aroused international concerns proportional with its size. A response which is in accordance with that magnitude may be suggested, which requires great foresight, courage and an international approach.."

Later some more expert opinions contributed to the concerns over the GNBS, which suggested the suspension of the construction based on geological and geophysical research conducted in the affected areas of Gabčíkovo/Nagymaros, and on seismic problems. [20], [21] .

***

Finally, the government suspended the construction at Nagymaros in order to gain time for the clearing up of the problems that occurred in connection with the construction [22].

The government formulated a resolution on the creation of expert groups, whose task was to carry out the research and evaluations necessary for the decision. [23]. The HAS was requested to provide a summary of its opinion on the environmental-ecological-water quality-seismic questions under scientific dispute.

Thus, providing a basis for the governmental decision of 20 July on the prolongation of the *moratorium* at Nagymaros and the suspension of the works at Dunakiliti, evaluations and expert opinions were prepared on environmental-ecological-water quality, geological-geophysical, river regulation and technical planning, shipping, energy and legal issues, with the contribution of the expert groups of the Hungarian Academy of Sciences [43], the Central Ground Study Office [24], The Ministry of Environmental Protection and Water Management [25], [26], [27], [28], [31], The Ministry of Transport and Communication [29] and the Hungarian Electric Works Trust [30].

In parallel with the expert committees, independent experts and environmental protectionists made their statements and opinions known to the decision makers and the wider public. Quotation from the summary prepared for the Prime Minister [32]: "The realisation of the GNBS was made possible only by the principles of an age which has now been surpassed and proven to have been mistaken. All other goals (shipping, flood protection, etc.) can be achieved at a cost which is smaller by several magnitudes, and uses different technological solutions. The ecological and other (technical, social) dangers and risks are contained in the solutions necessary for peak operation. The conditions necessary for the operation of the GNBS, which have been fixed in the original Treaty and have been reinforced several times since, in the Resolution of the Hungarian Parliament of 7 October 1988 among others, (e.g., sewage water cleaning) have not been implemented according to schedule and the conditions for their implementation are not even guaranteed on the long run."

The resolution of the Ministerial Council ordering the prolongation and extension of the *moratorium* has prescribed the preparation of summary reports for the plan to be submitted to the Hungarian Parliament [33], [34], [35]. Finally, all the material was summarised by a committee consisting of independent experts created for the joint examination of the entire complex of questions [36].

***

Between 17-19 July, a Hungarian-Czechoslovak expert meeting was organised in Budapest in three areas of speciality of the questions under dispute (ecological-hydrological, geology-seismology, soil studies and agriculture).

There was agreement between the experts from the two countries in that the GNBS was a large scale interference in nature, which affects invaluable ecological values. For example in the jointly agreed statements of the ecological-hydrological work group [37] it states: "The undisturbed drinking water supply from the banks terrace of the affected stretch of the Danube is vital, Even today it is a question of the drinking water supply of 3 million people (5 million on the long run) in Hungary, while in Czechoslovakia it will be 5 million in the future."

The differences between the Hungarian and the Czechoslovak experts in all the work groups centred around the methods to be employed for the preservation of natural values. According to the Czechoslovak experts, technological measures after the implementation would suffice, whereas the Hungarian experts considered these to be insufficient. The Czechoslovak scientific experts assert that: "...the ecological problems are already partially solved, and the rest will be solved gradually, parallel with the schedule of the implementation". The Hungarian experts however claim the contrary. For instance: "The growth of the algae biomass reaching a hypertrophic level creates an <u>internal organic load</u> that is of the same order magnitude as the external load in the Danube stretch between Rajka and Budapest, and has an unfavourable effect lower reaches of the river too. The increase in internal organic load is directly related to the upper reservoir, and will be further increased by the Nagymaros reservoir, the COD and BOD5 concentrations, that is the organic matter content, will rise even if all sewage water directed into the river is biologically cleaned."

Between September 25-27, 1989 in Pozsony (Bratislava), there was another meeting of scientific experts on water quality and ecological questions relating to the Dunakiliti-Hrušov reservoir, on the basis of an agreement between the Deputy Prime Minister of the Hungarian People's Republic, Péter Medgyessy and the Deputy President of the Government of the Czech and Slovak Federal Republic, Pavel Hrivnák.

As at the meeting of July on the problem of the Nagymaros complex, there was an agreement on the importance of preserving drinking water. To quote from the jointly accepted statements [38]: "The quality of the groundwater must be preserved unconditionally for the water supply of the population....All necessary measures must be taken so as not to endanger the natural self purification capacity of the Danube."

However, with regard to the possibilities of preserving the drinking water, the differences did not change. The Czechoslovak delegation was in agreement with most of the ecological concerns raised by the Hungarian delegation, but stated that it will be possible to solve the problems during the construction of the plant, or following its completion. To quote from the statements of the Hungarian delegation [38]: "We do not agree with the opinion of the Czechoslovak delegation that most of the problems raised could be examined and solved after the construction of the barrage system, and in particular those arising from the Dunakiliti-Hrušov Reservoir. In a number of cases, even the extent of the alternative solutions cannot be determined, and hence we consider the 1:1 scale "experiment" to be carried out on the environment very risky. We consider it proved that in the case of the construction of the Dunakiliti-Hrušov reservoir, an unfavourable change in trophity levels will take place, which is characterised by the multiple increase in algae-biomass."

***

In the spring of 1989, at the request of the Hungarian government, the World Wildlife Fund (WWF) delegated a expert group to Hungary to examine the questions related to the GNBS to prepare for the decision.

The experts of the WWF prepared their statements on the basis of water construction, virology, fish biology and fishing, landscape and holiday-resort and international law studies [21], which was presented on 28 August 1989 to the Hungarian government commissioner by general Director Charles de Haes. The conclusions and suggestions of the work group [39]:

> "1. The establishment has a serious negative effect on the environment. Even now it is causing a significant devastation in ground and water habitats.
>
> 2. The ecological and technological data at hand are insufficient for reinforcing the continuation of the construction and the commencement of the operation of the establishment. The construction of the Nagymaros barrage would aggravate the negative environmental effects. Because of all this, the Nagymaros barrage must not be constructed.
>
> 3. Before any construction work or other operation on the establishment, further studies are necessary, in particular in the areas of water quality, seismo-tectonics, ecology and floodplain cultivation.
>
> 4. Because of all this, the moratorium must be extended for at least three years, so that the above mentioned studies can be carried out. The rehabilitation works of the habitats must be started immediately in the area of Nagymaros, on the Danube stretch between Gabčíkovo and Nagymaros, and in the Szigetköz.
>
> I request that this report be delivered to all concerned and to let us know if you require any further assistance."

***

2. On the ecological effect of the Bős-(Gabčíkovo)-Nagymaros barrage system (GNBS)

The Danube and the area it affects is not some sort of surrounding of the planned water step and barrage system, but an autonomous, uniform hydrogeological, biological (ecological and physiological), social-cultural system.

The environmental and ecological consequences of the GNBS shall arise primarily as a result of changes in hydrodynamics and water pollution.

1) Effects of the changes in flow relations

*) resulting in changes in the reservoirs:

a) at a least periodical slowdown of the flow,

b) increased sedimentation,

c) surplus infiltration into the groundwaters, and hence an increase in the groundwater level .

**) resulting in changes of water recharge in the abandoned bed of the Old Danube:

a) a decrease in moisture of the floodplains,

b) a decrease in the water levels in their area as a result of flood drainage.

2) Apart from the hydrodynamic changes, the now seriously deteriorating water pollution must also be taken into account. The effects of these superimpose and mutually reinforce, indeed, may cause new interactions.

Environmental and ecological conditions resulting from the above are primarily: a drop in the velocity of the flow, increased sedimentation, water pollution and effects on groundwaters. This is because the river and groundwaters provide and support the environment for very different kinds of biocoenoses. Material flow and its intensity are influenced also by the mechanics of the water body and the dynamics of the flow relations, especially with the present degree of pollution. In the area affected by the GNBS, the quality of the subsurface and surface waters already show a significant tendency to deteriorate even now. A change in parts of the present ecological system will result in less fertile soil and much worse water quality. Concerning the human and animal population, this is the most dangerous short-term effect. Further basic research is required to forecasting the actual effects, as well as to determine the time scale we are working with: the mutual inducement of the changes in conditions produce their impact relatively slowly (and partly in a latent way) with respect to some changes of the ecological system, and as a consequence, the short-term models of study may produce results which differ significantly from reality.

A) Some significant changes which can be expected in the inundated areas.

As result of decreased water movement sedimentation will increase. Estimates show that the volume of suspended material is 3-6 million m^3/year [40]. The sediment comes partly from the natural sediment of the Danube (organic materials and the complexes of these formed with minerals) and partly from agricultural and industrial pollution which could be accompanied by significant viral and bacterial infections.

The sedimentation indirectly pollutes the water of the bank-filtered well fields as well. In the past years the bed of the Danube has been deepened along the Szentendre island because of the planned power plant. This was partly the cause of the deterioration of the water quality of the wells supplying Budapest. Although the nitrate content increased more than thirty-fold over some thirty years in the water of the wells, it has only exceeded the limit value a few times up to now. This process could accelerate as a result of the effects of the planned barrage system [41], [42].

The sedimentation has other negative consequences. Dredging could cause the increased spreading of sedimented pollution, toxic material and infectious agents [40].

As a result of increased sedimentation, water transparency will increase, and hence the reproduction and volume of phytoplankton will increase. This will be further increased by the plentiful N and P compound contents of the incoming sewage waters. Because of these, biological organic material production will increase significantly, the trophity of the water of the Danube will increase considerably, that is, water quality will definitely deteriorate [43].

Because of the slowing of the flow velocity and the incoming sewage water, the density of bacterial populations will increase rapidly (especially over 15°C, 10^5 germs could form per millilitres in a few hours!) [40]. As a result the amount of oxygen dissolved in the water will decrease rapidly, and the anaerobic processes in the bed sediment will begin dominating on the surface as well [40], [43].

The intertwined results of the bacterial anaerobic processes are the following: 1) seriously harmful anaerobic, organic decay, rotting, 2) the organic and inorganic industrial pollutants could work their way into biological metabolism products, 3) as an effect of the enzymes released from disintegrating cells, synthesis of humus will increase. As a consequence, the materials in the sediment will rot, reactive fulvo and humin acids will be produced, and furthermore metabolic side products such as those harmful to genes, and also mutagenic, carcinogenic and teratogenic materials will mix into the water (sediments turn into dangerous pollution silt of a rotting industrial sewage character) [40].

The biological filtering layer forming on the surface of the bed sediment will be seriously damaged [40].

As a result of eutrophication, weed and reed vegetation will proliferate on shallower stretches of the banks [43].

The volume of live fish population is estimated to drop to 1/4th of its present value, and its yield could decrease to below 1/10th [39].

B) Effects on soil and agriculture [57], [58]

As an immediate consequence of the construction of the technical facilities many thousands of hectares of agricultural area will be withdrawn from cultivation. The size of the area to be lost this way is estimated around 5,000-6,000 hectares.

As a result of damming and the change in riverbed, groundwater level will increase in the area of the barrage, and will decrease in the area of the diversion of the bed (Old Danube and by-pass canal, tail-race canal) as a result of the decrease in natural seepage from the living bed (groundwater supply).

In those areas where the groundwater level will drop:

1. mineralisation of plant remains will accelerate, the organic matter content of the soil will drop, the danger of deterioration of soil structure and eluviation of nutrients will increase,
2. where the groundwater level is presently in the fine covering layer, but as a result of the GNBS, the level sinks to below the gravel boundary and the capillary water supply of the root zone will disappear. On the given area, this means a 50-100 mm annual drop in the supplementary water supply coming from below, which decreases production of cultivated plants significantly, especially with respect to security of production, increases the drought-sensitivity of the area, but also causes unfavourable changes in the natural ecosystem:

   a) the favourable water supply of the floodplain forests will change,

   b) the presently connected floodplain biocoenoses will be isolated into fragments,

   c) the organic matter production of floral biocoenoses decreases.

In those areas where the groundwater level rises:

1. the soil is deprived of oxygen, so anaerobic processes will begin to dominate [40],
2. inland water danger increases,

3. in areas possessing bad drainage conditions (especially on the left shore of the Danube, on the Slovak side, east of the Vág estuary) secondary salinisation could take place.

The change in water management of the soil changes the metabolism of the soil as well. If the frequent and significant groundwater level fluctuation (especially in the case of peak mode operation) takes place on the surface border of the fine covering layer and the gravel layer at the bottom, the carbonates precipitating from the high carbonate content groundwater could result in the formation of a strongly cemented "mite" layer, or a solid limestone bank, which could in turn result in the thinning of productive soil, and render it sensitive to drought, decrease its growing potential and could also limit its agricultural use.

The dynamics of reduction processes related to the bacteriological activity of the affected groundwaters will change. As a result, the transport of different elements and the kinetics of their reactions will change [40]. For example, iron and manganese will gradually precipitate from groundwaters, sulphates will reduce to hydrogen sulphate, and nitrates will reduce to ammonia.

These changes in metabolism induce modifications in the composition of the covering plants and as a result, in the fauna as well.

C) The deterioration and impoverishment of the biocoenoses

The biocoenoses are priceless (and to this date unassessed) natural resources and national treasures.

As a result of the changes in hydrodynamic relations and the shifting in the biogeochemical processes partly induced by the former, and as a result of deterioration in water quality:

- the composition of biocoenoses shifts as well, their patterns rearrange over a short period.
- During this process, diversity (number of species and the genetic pool of species) decreases, that is, a significant degradation occurs.

The rapid changes will result in the irrevocable disappearance of a multitude of gene variants (quite possibly millions) from the area. This will endanger the further adaptability of the remaining species, which they would need under the changed circumstances.

As a result of the small amount of water planned to remain in the Old Danube:

- the bed will stagnate,
- the water recharge of the side arms from the direction of the main arm will decrease or disappear, and as a result, the isolated old side arms could become clogged,
- the wetland habitats could become isolated, the uninterrupted floodplains could become fragmented, and as a result, there will be serious degradation in the grove ecosystems which are used to water rich in oxygen.

The planned water recharge system will increase the disturbance of the plant and animal population. This decreases their reproduction by way of degrading the quality of their habitats [43].

As a result of the fluctuation of water level because of peak mode operation, the fish eggs laid in bankside strips and the hatched specimens will not be able to tolerate the oscillation in the current and the silt disturbance. As a result, the quantity of fish population will decrease, and its composition will change significantly.

No stable fish coenoses develop in the power canal.

In particular locations of the reservoir and in the power canal, an unnatural bank zone develops without plants. In these places, the organic remains will rot, at best [40].

D) The problem of drinking waters

In Hungary, 40% of the supply of drinking water comes from the so called bank-filtered water stocks [40]. Their most significant part is connected precisely with those sections of the Danube which are affected by the GNBS. Among water supplies to be found here, two are especially significant.

One is the most important working water base of the country – providing for the water supply of Budapest [47], [48]. The other is the most important potential well fields of the country – this can be found in the Szigetköz area [42], [46].

These well fields have increased in value significantly over the past decade as a result of the narrowing in the extensive development possibilities of water acquisition, the consequences of the over production of the well fields in use (aquifer plants on the Alföld, karst water in the Dunántúl) and of the arsenic content of the aquifer in the south Alföld having been revealed, whose water treatment is very expensive [49]. Furthermore, as a result of the still increasing developmental gap in public works distribution, the effect of the desiccated sewage water coming from settlements still without drainage on the groundwaters and the aquifers near the surface is also increasing. The effect of illegal and legal waste disposals and the chemical compounds used in agriculture must be taken into account, as well as the increasing pollution of industrial and military territories – all of these diminish the water stocks.

The situation is well characterised by the fact, that there has been a deterioration in water quality registered at 34% of the water from working well fields compared with their state at the beginning of their utilisation. Actual defensive measures have been put into effect at only 6 of the 420 endangered well fields in the country in the last 5 years, and it was possible to attain an evaluation of the extent of the danger in only 50 cases. While 45% of the drinking water samples (excluding Budapest) examined by officials were found not to comply with chemical or bacteriological regulations, only 9% of water samples from the bank-filtered wells of the Budapest Water Works were found problematic [50].

It is obvious from the above that the 1 million m^3/day capacity bank-filtered systems in the Budapest area and Szigetköz are among the most significant in the country, together with other still existing natural treasures of Hungary.

As a result of the operation of the GNBS, basic changes will take place in the area of the Dunakiliti-Körtvélyes reservoir, besides the deterioration of the water quality of the water of the Danube. The most significant problem is caused by the sedimentation of polluted silt with its anaerobic dynamics, the mobilisation of manganese and iron, the infiltration of certain toxic and organic materials and genotoxic bacterium-metabolites. The silt means a constant viral infection source at the same time (until now, the highest viral density values were registered on the Rajka-Nagymaros segment) [40].The reduced flow speed in the reservoir will increase the period of infiltration into the groundwater of the harmful and occasionally toxic materials coming from water pollutants.

Because of the special hydrological situation in Szigetköz (constant water supply from the Danube, excellent water conductivity of gravel based water supply exceeding 350 m at places) the harmful material reaching the groundwater will eventually pollute the entire subterranean water supply (30-50 years) [38]. The planned occasional dredging of the accumulated silt will not only have a harmful effect on the surface water quality but, with the deconstruction of the filtering layer, it will also enable certain organic micropollutants and microbes to penetrate into the groundwater [37].

The so called water recharge system planned to counter balance the sinking of the groundwater level along the bed of the Old Danube under the Dunakiliti barrage will, depending on the quality of the supply of raw water and the condition of the clogged floodplain side branch system, could also result in the pollution and the degradation of the volume of the entire stock [38]. The effect of peak operation on the filtering capability of the bed can only be speculated upon, and none of the forecasts are favourable [51].

With respect to the bank-filtered well fields of the area affected by the Nagymaros barrage it also holds that: "...it has a harmful effect if the filtering layer is decreased by dredging or other mechanical means, or we create circumstances which lead to the clogging of the filtering layer or its siltation." [52]. The dredging carried out on the Nagymaros-Budapest section, partly for the sake of the GNBS "...resulted in a 60-160 (200) cm sinking of the bed and a significant decrease in the amount of filtering layer, and hence, a reduction in the amount of producable water quantity and hence the deterioration of water quality. The previously extractable volume of drinking water dropped by a daily 300 thousand m^3 (25% of the former capacity above Budapest)." [37]. And in the surface parts at the Dunakiliti reservoir, the above described siltation and processes of colmatation endanger both the quantity and the quality of the smaller, but locally more significant bank-filtered water supplies of the area.

Further problems concerning water quality

A) Viral infection

The water of the Danube is polluted by viruses as well, picornarota, adeno, Coxszackie-B and echo viruses have been found. The segment around Gabčíkovo and Nagymaros is especially polluted: $2x10^{11}$ infecting agents could flow in the Danube in this area daily [40].

The viruses retain their capacity for infection for a very long time in the water sediments, as a result the sediment silt of the reservoirs becomes particularly infectious.

Some viruses could infiltrate into the groundwaters from the water of the river.

B) Pollution of the water supplies lying in the gravel layer

The water supplies lying in the gravel layer under the Szigetköz will also be polluted, mainly by infiltration from water in the reservoirs.

C) Effects of the protecting asphalt cover

The several hundreds of thousands m^2 of asphalt covering the dyke of the by-pass canal and the covering of the bank-wall of the Dunakiliti reservoir will be coated by epibionta bacterial coenoses. The catalytic activity of these could significantly facilitate the infiltration into the water of the carcinogenic, polycyclic and aromatic carbon compounds [40].

D) The effect of the water level fluctuation caused by peak mode operation on the suspended materials

As a result of the periodic fluctuation in flow and water levels, the periodically increasing mixing of the suspended sediment and the fine sediment below the barrages is significant. The result of this is: 1) damage to the filtering layer of the bed covering [40], 2) increased turbidity, longer carrying range of floating pollutants.

It should be remarked that dredging the bed exacerbates these processes even further.

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4. Geological and seismic problems

No valid technical standards and regulations are in force in Hungary for regulating geological and seismic research to be carried out in connection with the barrage construction. The investor undertook responsibility for the organisation of this research, and commissioned the contributors to conduct selected subtasks. Hence there was no closing report to summarise the data resulting from geological, geophysical and seismic research on the Hungarian segment of the GNBS (that is an evaluation synthesising the special reports of the research accepted by a expert board of supervisors), although this is prescribed in Hungary in the case of any sort of geological and seismic research.

No geological and geophysical documentation evaluating the entire GNBS is available [24], [43]. Nor was any regional engineering ecological report prepared on the area affected by the barrage system. A further problem is presented by the fact, that no summary has been prepared until now of the results of research conducted on the Hungarian and Czechoslovak side (for instance the position of the great fault lines discovered on the Hungarian side is known only up to the line of the Danube) [53], [54]. And similarly, the Gabčíkovo fault line detected on the Slovak side is unexamined on the Hungarian side [45]. This was the reason for changing the location of the Gabčíkovo dam in 1978 (some 600 metres with respect to the original position). The complex geological, tectonic, geological engineering, hydrogeological, environmental-geological, regional pollutant sensitivity examination of the entire affected area of the barrage system is indispensable, which could serve as a further basis for decision making [24], [33].

The geological model of the Nagymaros barrage system and its environment is based on the 1980 report of the Hungarian National Geological Institute (MÁFI). Geological considerations did not play a decisive role in locating the site of the barrage system, and hence the establishments were planned in a tectonically highly disturbed area [55]. After the opening of the working pit, it became possible to realise this immediately – the geological structure proved to be more complicated than expected [56]. As a result, it became emphatically necessary to conduct tectonic, geodesic, geomorphological studies for understanding the young movement processes of the area, which was already suggested for examination in the report of MÁFI.

According to the summary of the MÁFI report [55]: "We do not possess immediate data and observations concerning the recent movements along the indicated main fault lines. This possibility cannot be ruled out on the basis of environmental observations. All main fault lines are to be qualified as potential water conductor zones....according to our opinion, the solution of the tasks sketched in the above belong entirely to the research phase preceding the implementation. Ignoring these or providing insufficient solutions may lead to difficulties in the implementation of the barrage system." The question as to the origin of the waters conducted by the discovered crevices also has to be clarified, because the quality of the water indicates that some of the faults are open at the bottom.

The increasingly organic integration of the role of geological sciences into the monitoring system is indispensable in the areas of geological environment protection, hydrogeological-sedimentological evaluation systems, regular aero-ecological tracking, etc.. The observation systems capable of registering weak seismic movements are of special importance, which we suggest placing in a network to be operated jointly with the Czechoslovak partner [37].

The seismic problems of the area of the GNBS constitute a separate circle of problems. According to our present knowledge, the seismic values registered in the Joint Contractual Plan are no longer acceptable, and in absence of necessary studies, no well founded answer can be provided to the question of seismicity [27]. The consequences of this fact should be weighed carefully concerning the security and economic efficiency of the finished and the planned establishments. (In the original plans for instance, the method of dynamic analysis has been ignored, besides other shortcomings.)

Two studies addressing the question of the sizing of the earthworks of the establishment system [59], [60], became known in the summer of 1989. It is stated on the basis of engineering seismic evaluations that there are sections of the earth works (Dunakiliti, Esztergom, etc.,) the stability of which is insufficient even with respect to earthquakes of strengths presently prognosticated. Hence, these plans must be revised concerning the entire barrage system together with the respective economic efficiency perspectives, using data from modern forecasts.

15 December 1990

Bibliography

1. Gabčíkovo-Nagymarosi Vízlépcsőrendszer Közös beruházási program. Összefoglaló (Gabčíkovo- Nagymaros Barrage System Joint Investment Plan. Summary)
OVIBER, VIZITERV-VVIP, HYDROCONSULT
Budapest-Bratislava, 1973. June

2. Gabčíkovo-Nagymarosi Vízlépcsőrendszer Közös beruházási program. Rövid összefoglaló (Gabčíkovo- Nagymaros Barrage System Joint Investment Plan. Short summary)
Országos Vízügyi Hivatal (National Water Management Office)
Budapest, 1974.

3. Zielgler Károly-Fehér Lajos: A GNV beruházási programját előkészítő tanulmányok, tanulmányúti jelentés (Preparatory studies for the GNBS investment program, study travel-report)
Kiev-Moszkva, 1965. (0666) MFN 00367

4. Szerződés a Magyar Népköztársaság és a Csehszlovák Szocialista Köztársaság között a Gabčíkovo-Nagymaros Vízlépcsőrendszer megvalósításáról és üzemeltetéséről. (Treaty between the People's Republic of Hungary and the Czechoslovak Socialist Republic on the realisation and operation of the Gabčíkovo- Nagymaros Barrage System)
Magyar Közlöny, 1978. 61. szám

5. Vargha János: Egyre távolabb a jótól (Further and further from the good)
Valóság, 1982.

6. Előterjesztés az MSZMP KB Gazdaságpolitikai Bizottságához a Gabčíkovo Nagymarosi Vízlépcsőrendszer megvalósítása ütemének felülvizsgálatáról (Proposal submitted to the Central Committee of the Hungarian Socialist Worker's Party on the revision of the schedule of implementation of the Gabčíkovo Nagymaros Barrage System)
Országos Tervhivatal
Budapest, 1981. June

7. Tájékoztató a Magyar Népköztársaság és a Csehszlovák Szocialista Köztársaság kormánymeghatalmazottainak a Gabčíkovo-Nagymaros Vízlépcsőrendszer megvalósítása ütemtervének felülvizsgálatára vonatkozó tárgyalásairól (Bulletin on the negotiations of the revision of the schedule of implementation of the Gabčíkovo Nagymaros Barrage System between the plenipotentiaries of the People's Republic of Hungary and the Czechoslovak Socialist Republic)
Budapest, 1981. June 17.

8. A Magyar Tudományos Akadémia Elnökségének állásfoglalása a Gabčíkovo- Nagymaros Vízlépcsőrendszerrel kapcsolatos tudományosan vitatott kérdésekről (The statement of the Hungarian Academy of Sciences concerning scientifically disputed questions relating to the Gabčíkovo-Nagymaros Barrage System)
Budapest, 1983. december 20.

9. A Gabčíkovo-Nagymaros Vízlépcsőrendszer Környezeti Hatástanulmánya (The Environmental Impact Study of the Gabčíkovo-Nagymaros Barrage System)

Vízügyi Tervező Vállalat (Water Affairs Planning Company)
Budapest, 1985. June

10. 3/1983 OKKT határozat (Resolution No. 3/1983 of OKKT)

11. A Duna távlati komplex hasznosítása (The long-term complex utilisation of the Danube)
Országos Műszaki Fejlesztési Bizottság Elemző tanulmány (Analytic study of the National Technical Development Committee)
Budapest, 1984. January

12. Magyar Tudományos Akadémia: Vélemény a Gabčíkovo-Nagymaros Vízlépcsőrendszer környezeti hatástanulmányáról a zártkörű kerekasztal- konferencián elhangzott vita alapján (Hungarian Academy of Sciences: Opinion of the Environmental impacts study of the Gabčíkovo-Nagymaros Barrage System on the basis of the arguments that took place at the round-table conference closed to the public)
Budapest, 1985. June 24.

13. Utánunk az özönvíz ("Aprés nous, le déluge")
Duna kör-ELTE ÁJTK Politikatudományi tanszékcsoport (Danube circle)
Budapest, 1989.

14. Laczay I. (1987) Folyószabályozás, ipari kotrás és a parti szűrésű vízbázis (River regulation, industrial dredging and the bank-filtered well fields
Vízügyi Közlemények, LXX évf. 3. füzet p. 378-392

15. Laczay I. (1987) Folyószabályozás és az ipari kotrás hatása a Nagymaros- Budapest közötti Duna szakasz mederviszonyaira (The effect of river regulation and industrial dragging on the bed relations of the Danube segment between Nagymaros and Budapest)
Vízügyi Közlemények, LXX évf. 4. füzet p. 547-567

16. Az Országgyűlés 1988. október 7-i határozata (Resolution of the Hunagrian Parliament of 7 October, 1988)

17. Bubla Gyula képviselő indítványa az Országgyűlés 1989. márciusi ülésszakára (The proposal of Gyula Bubla for the March 1989 session of the Hungarian Parliament)
Budapest, 1989. February 7.

18. Magyar Tudományos Akadémia: Állásfoglalás a Nagymarosi Vízlépcső esetleges elhagyásának lehetőségeiről, következményeiről (Hungarian Academy of Sciences: Statement concerning the possibilities and consequences of the possible cancellation of the Nagymaros Barrage)
Budapest, 1988. October 5.

19. Armando J. Carbonell-Robert D. Yaro: Gabčíkovo-Nagymaros Barrage Study, Program Options and Impacts
Ecologia, Northampton, Massachusetts, USA
I. March 1989
II. May 1989

20. Barta György-Cserepes László-Hajósy Adrienne: A nagymarosi vízlépcső-építkezés területének tektonikai problémái (The tectonical problems of the construction area of the

Nagymaros barrage system)
Hitel, 1989. May 5.

21. Tóth György: Új geológiai és hidrológiai szempontok a Gabčíkovo-nagymarosi vízlépcsőrendszer megítéléséhez (New geological and hydrological considerations for the evaluation of the Gabčíkovo-Nagymaros Barrage System)
Budapest, 1989. március 5.

22. 9/1989. (VI.13.) Ogy határozat (Parliamentary resolution No. 9)
a Minisztertanács tájékoztatójáról a Gabčíkovo-Nagymarosi vízlépcsőrendszer Nagymarosnál folyó munkálatainak felfüggesztéséről (On the bulletin of the Ministerial Council on the suspension of works at Nagymaros of the Gabčíkovo-Nagymaros Barrage System)

23. 1071/1989. (VI.15.) MT határozat (resolution of the Ministerial Council)
a nagymarosi beruházás felfüggesztésével kapcsolatos ügyek kormánybiztosának kinevezéséről és szakértői bizottságok létrehozásáról (on the appointment of a government commissioner for affairs connected to the suspension of works of the Nagymaros investment and the creation of expert committees)

24. A Gabčíkovo-Nagymarosi vízlépcsőrendszer építésével kapcsolatos földtani geofizikai kérdések témájában összehívott szakértői bizottság tagjainak állásfoglalása (The statement of the expert committee created for the examination of geological and geophysical questions connected with the construction of the Gabčíkovo-Nagymaros barrage system)
Központi Földtani Hivatal (Central Geological Office)
Budapest, 1989. July 3-7.

25. A Duna vízminőség-romlásának megelőzésével kapcsolatos tennivalók és garanciák meghatározása (Determination of the sanctions and guarantees in connection with the prevention of the deterioration of the water quality of the Danube)
Környezetvédelmi és Vízgazdálkodási Minisztérium (Ministry of Environmental Protection and Water Management)
Budapest, 1989. July 5-10.

26. Javaslat a Gabčíkovo-nagymarosi vízlépcsőrendszer környezeti kockázatoktól mentes, az ökológiai követelményeknek megfelelő lehetséges működési módjainak meghatározására (Proposal for the determination of the possible modes of operation appropriate for the ecological requirements and devoid of environmental risks of the Gabčíkovo-Nagymaros Barrage System)
Környezetvédelmi és Vízgazdálkodási Minisztérium (Ministry of Environmental Protection and Water Management)
Budapest, 1989. July 5-7.

27. A Szigetközi vízpótló rendszer kiegészítése és az Öreg (szigetközi) Duna vízhozamának szabályozása (The supplementation of the water replacement system of the Szigetköz and the regulation of the flow-rate of the Old (Szigetköz) Danube
Környezetvédelmi és Vízgazdálkodási Minisztérium (Ministry of Environmental Protection and Water Management)
Budapest, 1989. July 5-6.

28. A nagymarosi vízlépcső és vízerőmű elhagyásának műszaki tervezési feladatai, a teljes vízerőmű rendszer alapjáratú üzemmódjának műszaki feltételei, a működtetési mód környezeti ökológiai hatásvizsgálata (The technical planning tasks of the cancellation of the nagymaros barrage and hydropower plant, the technical conditions for the base level operation of the entire hydropower plant system, the ecological environmental impacts study of the mode of operation)
Környezetvédelmi és Vízgazdálkodási Minisztérium (Ministry of Environmental Protection and Water Management)
Budapest, 1989. July 21.

29. A dunai hajózás folyamatos biztosításának feltételei (The conditions for securing the continuous possibility for navigation on the Danube)
Közlekedési, Hírközlési és Építésügyi Minisztérium (Ministry of Transport, Communication and Construction)
Budapest, 1989. July 26-28.

30. A Gabčíkovo-Nagymarosi Vízlépcsőrendszer csúcsrajáratása, illetve a Nagymarosi Vízlépcső megvalósítása esetleges elmaradásának hatása a magyar villamosenergia-rendszerre (The peak mode operation of the Gabčíkovo-Nagymaros Barrage System and the effect on the Hungarian electric-energy system of the possible cancellation of the Nagymaros Barrage)
Ipari Minisztérium-Magyar Villamos Művek Tröszt (Ministry of Industry-Hungarian Electric Works)
Budapest, 1989. July 6.

31. A magyar és osztrák vállalatok közötti magánjogi szerződések esetleges megszüntetésére, illetve módosítására vonatkozó javaslatok kidolgozása, vállalati tárgyalások előkészítése (Development of Hungarian proposals and preparations for negotiations concerning the possible expiration or the modification of (civil law) contracts between Hungarian and Austrian companies)
Környezetvédelmi és Vízgazdálkodási Minisztérium (Ministry of Environmental Protection and Water Management)
Budapest, July 26

32. Hardi Péter: Feljegyzés Németh Miklós részére (A Note for Miklós Német 9)
Budapest, 1989. July 16.

33. A Nagymarosi vízlépcső és vízerömü felépítése esetleges elhagyása müszaki- ökológiai feltételeinek összefoglalása II/a szakértői bizottság (The summary of the ecological conditions of the possible cancellation of the Nagymaros Barrage and the construction of the hydropower plant, Report of Expert committee II/a)
Budapest, 1989. August 21.

34. Jelentés a Nagymarosi Vízlépcső felépítése esetleges elhagyásának az államközi szerződés módosítására vonatkozó jogi feltételek összefoglalásáról II/b szakértői bizottság (the summary of the legal conditions concerning the modification of the international treaty of the possible cancellation of the construction of the Nagymaros Barrage, Report of Expert committee II/b)
Budapest, 1989. August

35. Gazdaságossági számítás a Gabčíkovo-nagymarosi vízlépcsőrendszerre (Economic efficiency calculation for the Gabčíkovo-Nagymaros Barrage System).
II/c szakértői bizottság (Expert committee II/c)
Budapest, 1989. August

36. Független szakértői bizottság: Összefoglaló a Minisztertanács részére a nagymarosi munkálatok felfüggesztése alatt a Gabčíkovo-Nagymarosi Vízlépcsőrendszer ökológiai-környezetvédelmi, müszaki, gazdasági, nemzetközi és jogi kérdéseiről folytatott vizsgálatok eredményeiről (Committee of Independent Experts: Summary for the Ministerial Council of the results of the studies conducted on ecology- environmental protection, technical, economic, international and legal questions during the suspension of works at the Gabčíkovo-Nagymaros Construction)
Budapest, 1989. September 18.

37. Emlékeztető a Nagymarosi Vízlépcső munkáinak ideiglenes felfüggesztésével kapcsolatos magyar-csehszlovák tudományos szakértői tárgyalásról (Memorial on the Hungarian-Czechoslovak scientific expert negotiations connected with the provisional suspension of the works at the Nagymaros Barrage)
Budapest, 1989. July 17-19.

38. Emlékeztető a magyar és a csehszlovák tudományos szakértők tárgyalásáról a Dunakiliti-Hrušovói tározó vízminőségi és ökológiai kérdéseivel kapcsolatban (Memorial on the Hungarian-Czechoslovak scientific expert negotiations connected with the questions of water quality and ecology of the Dunakiliti-Hrušov reservoir)
Pozsony, 1989. September 26-27.

39. World Wide Fund for Nature: Stellungnahme des WWF zum Staustufen-Projekt Gabčíkovo-Nagymaros
WWF-Auen-Institut, Rastatt 1989

40. Az általános Mikrobiológiai Bizottság állásfoglalása a Gabčíkovo-nagymarosi vízlépcsőrendszer várható ökológiai hatásáról (The statement of the General Committee for Microbiology on the expected effects of the Gabčíkovo-Nagymaros Barrage System)
Magyar Tudomány 1989. 6. szám p. 515-517

41. Fáy Cs. (1987) A budapesti ivóvíz minőségét befolyásoló tényezők (Factors influencing the water quality of the Budapest drinking water)
Hidrológiai Közlöny, 67. évf. 5-6. szám p. 310-315

42. Erdélyi M. Budapest víztartalékai (The water reserves of Budapest)
Budapest, XXII 8. (1984. aug.) 6-8

43. Magyar Tudományos Akadémia ad hoc bizottság: Vélemény a Nagymarosi Vízlépcső elhagyásának, illetve megvalósításának környezeti-ökológiai-vízminőségi és szeizmológiai hatásairól (Hungarian Academy of Sciences ad hoc committee: Opinion on the environmental-ecological- water quality and seismic effects of the cancellation and the implementation of the Nagymaros Barrage)
Budapest, 1989. June 23.

44. Vida Gábor: A Szigetköz genetikai értékei (The genetic values of the Szigetköz) Duna-kör-ELTE ÁJTK Politikatudományi tanszékcsoport (Danube-circle) Budapest, 1989.

45. Janácek J. K tektonice pliocenu ve strědni casti Podunajské niziny. Geologické práce, Správy 55, 65-85 Bratislava 1971.

46. Erdélyi M. A Győri-medence természeti-gazdasági értékei és a tervezett vízlépcső (The natural-economic values of the Győr basin and the planned water barrage) Földrajzi Értesítő XXXII 3-4 475-490

47. Juhász E. (1989) Az ivóvízellátás mennyiségi és minőségi kérdései Magyarországon (The qualitative and quantitative questions of drinking water supply in Hungary) Hidrológiai Közlöny, 69. évf. 4. szám p. 193-202

48. Altnöder A. (1989) Magyarország ivóvízbázis atlasza, Vízbázisok katasztere (The Drinking Water Base Atlas of Hungary, The Survey of Water Bases) KVM kiadvány (KVM publication)

49. Dank V.: Észrevétel az 1070/1989 (VI.15.) MT határozatában megadott feladatok végrehajtásához (A remark for the implementation of tasks given in the Resolution No....of the Ministerial Council) Budapest, 1989. July 7.

50. Bulla M (szerk.) (ed.): Tanulmányok hazánk környezeti állapotáról (Studies on the condition of the environment in our homeland) Budapest, 1989.

51. Heródek S. Szakvélemény az Országgyűlés Gabčíkovo-Nagymarosi ad hoc bizottsága 1989. március 1-i ülésésre (Expert opinion for the meeting of 1. March, 1989 of the Gabčíkovo-Nagymaros ad hoc committee of the Parliament)

52. Kontur a. (1989) A folyó és talajvíz kapcsolata partiszűrésű vízbeszerzésnél (The connection of the river and groundwaters in the case of bank-filtered water acquisition) IAWPRC Conference on Water Pollution Control in the River Danube Basin Beograd, 1989.

53. Marsi I.: A szigetközi térség ártéri (fedőréteg) üledékei. Környezet-földtani tanulmányok a Kisalföldön (The flood-plain (covering layer) sediments of the Szigeköz area. Environmental-geological studies on the Kisalföld) Budapest, 1989.

54. Hajósy A., Tóth L., Zsíros T.: A vízlépcső-építkezések szeizmológiai- tektonikai problémái (The seismic-tectonical problems of the barrage constructions) Budapest, 1989. June 17.

55. A tervezett Nagymarosi Vízlépcső területének és környezetének földtani felépítése (The geological structure of the area and environment of the planned Nagymaros barrage) A MÁFI földtani szakvéleménye (The expert geological opinion of the Hungarian National Geological Institute) Budapest, 1980.

56. Csontos L., Maros G.: Szerkezetföldtani megfigyelések a Nagymarosi vízlépcső tervezett helyén (Structural geological observations on the planned location of the Nagymaros barrage)
Budapest, 1989. March 2.

57. Várallyai Gy.: Összefoglaló vélemény a Gabčíkovo-Nagymaros Vízlépcsörendszerrel várható talajtani hatásairól (Summary opinion of the expected pedological effects of the Gabčíkovo-Nagymaros Barrage System)
Kézirat (Manuscript), MTA TAKI, Budapest, 1989. June 12.

58. Várallyai Gy.: Zárójelentés a "Gabčíkovo-Nagymaros Vízlépcsőrendszerrel összefüggő ökológiai kutatások" című főtéma keretében "A talaj vízháztartásának, anyagforgalmának és termékenységének változása különböző antropogén beavatkozások hatására" című témában 1987-1989-ben végzett munkálatokról (Closing report on the work done in 1987-1989 under the title of "The changes in the water regime and metabolism of the soil as the effect of different anthropogenic interferences" within the larger frame of the main topic entitled "The ecological research in connection with the Gabčíkovo-Nagymaros Barrage System".
Kézirat (Manuscript), MTA TAKI, Budapest, 1989. November 21.

59. Dulácska E., Hunyadi F.: A Gabčíkovo-Nagymaros Környezetében épülő vízlépcsőrendszer földrengés-állósági kérdéseiről (On the earthquake withstanding capability questions of the barrage system to be built in the Gabčíkovo-Nagymaros area)
Szakvélemény (Expert opinion) Budapest, 1989.

60. Goschy B.: a Gabčíkovo-Nagymaros vízlépcsőrendszer földműveinek földrengésállékonyságáról (On the earthquake withstanding capacity of the earth works of the Gabčíkovo-Nagymaros Barrage system)
Szakvélemény (expert opinion) Budapest, 1989. August 15.

Annex 68

INFORMATION DOCUMENT FOR THE CABINET MEETING OF THE GOVERNMENT OF THE SLOVAK REPUBLIC, BRATISLAVA, 29 DECEMBER 1990

[Translation]

Submitted by the Ministry of Forestry and Water Management of the Slovak Republic

Document to be submitted:

in accordance with Resolution No. 32/1990 of the Government of the Slovak Republic.

Document submitted by:

Viliam Oberhauser, Minister of Forestry and Water Management of the Slovak Republic

Contents of the document:

1. Proposal submitted during the cabinet meeting of the Slovak Government
2. Information
3. Attachments

RECOMMENDATION

for the preparation of a protocol of the cabinet meeting on.............of the Government of the Slovak Republic concerning an information document entitled "Alternatives of utilisation of the Czechoslovak share in the Gabčíkovo Hydroelectric Power Plant".

The Government of the Slovak Republic

A. accepts

the potential alternatives of utilisation of the Gabčíkovo Hydroelectric Power Plant.

B. sets the task

1. for the Minister of Forestry and Water Management, the Government Commissioner of the Czech and Slovak Federal Republic and the Government Commissioner of the Slovak Republic, currently in charge of ongoing construction work and of the operation of the Gabčíkovo-Nagymaros Barrage System, of

   organising talks on and the assessment of studies relating to the technological alternatives of the Gabčíkovo Hydroelectric Power Plant, in the context of option "C", to be realised exclusively on Czech and Slovak territory through the inclusion in the process of all organisations affected by the execution of the above plans, in order to minimise economic risks with respect to the operation of the power plant;

   preparing project documentation for the whole process, including recommendations, in such a way that summary proceedings leading to an earlier start of construction work might become possible.

2. for the Finance Minister, of

   raising funds to the tune of Kcs 86 million for the preparation of a project documentation to make possible the starting of work on and the subsequent realisation of option "C".

3. for the Minister of Forestry and Water Management, of

   assessing damages caused to the Czech and Slovak side to date as a result of work suspended by the Hungarian side with respect to the construction of the Gabčíkovo-Nagymaros Hydroelectric Power Plant, and the submission of the above assessment by 31 January, 1991 to the Prime Minister of the Slovak Republic as the basis of documents upon which inter-state negotiations are to be based and also to be used as a starting point of the position taken by the Czech and Slovak Republic.

INFORMATION DOCUMENT

The Cabinet of the Government of the Slovak Republic discussed, during a meeting on 27 August, 1990, the reports submitted in connection with the current state of affairs concerning the construction of the Gabčíkovo-Nagymaros Hydroelectric Power Plant, setting the task of preparing alternatives for the utilisation of construction units that are located on Czech and Slovak territory, with special regard to further steps having to be taken in connection with the Gabčíkovo Hydroelectric Power Plant.

In his speech delivered in the Hungarian Parliament on 11 December 1990, the Minister of Transport and Communications of the Republic of Hungary stressed that the Government of the Republic of Hungary had no intention of changing its position on the Gabčíkovo-Nagymaros Barrage System, i. e., the restoration to the original conditions of ongoing work on the Nagymaros Hydroelectric Power Plant is an absolute necessity, and the putting into operation of the Gabčíkovo Hydroelectric Power Plant is out of the question. This is the position taken by the Government of the Republic of Hungary prior to negotiations to be entered into with the Government of the Czech and Slovak Federal Republic.

It became obvious during the assessment (Enclosure One) of the existing alternatives of the utilisation of the Gabčíkovo Hydroelectric Power plant that option "A" might provide the most advantages, that is, completion of the Gabčíkovo Hydroelectric Power Plant in accordance with the International Agreement currently in force and concluded on 16 September 1977.

Option "C" is the second best alternative, including plans for the construction of the Gabčíkovo Hydroelectric Power Plant exclusively on Czech and Slovak territory (Enclosure Three).

Option "Dc" is the third best alternative, including plans for the utilisation of the Gabčíkovo Hydroelectric Power Plant without the Hrušov reservoir and the utilisation of the Dunakiliti weir.

Plans for the alternative utilisation of the Gabčíkovo Hydroelectric Power Plant are included in Enclosure Two.

Given the negative attitude of the Hungarian side with respect to the construction of the Gabčíkovo-Nagymaros Hydroelectric Power Plant, we suggest the completion of the Gabčíkovo Hydroelectric Power Plant in accordance with option "C" to be performed exclusively on Czech and Slovak territory.

In order to organise the construction of the power plant in accordance with option "C", during 1991 it will be necessary to prepare the project documentation costing Kcs 6 million. Work items to be realised in 1991 will incur costs to the tune of Kcs 80 million.

It is essential for the Ministry of Finance of the Slovak Republic, in reaching the aforementioned objectives, to raise the funds mentioned above in excess of the state subsidy planned for 1991.

The completion of option "C" will be done in such a way that ecological risk factors due to the operation of the Gabčíkovo Hydroelectric Power Plant might be reduced to the lowest possible level.

Given the fact that the Hungarian side suspended ongoing work on the Gabčíkovo and Nagymaros Hydroelectric Power Plant, an assessment of damages caused to the Czech and Slovak side shall be made, compensation for which the Czech and Slovak side will demand from the Hungarian side.

Plans for the assessment of the extent of damage caused to date will be submitted to the Prime Minister of the Slovak Republic as values to be referred to in claims for damages during forthcoming negotiations with the Hungarian side.

[Attachment 1]

USAGE ALTERNATIVES FOR THE GABČÍKOVO BARRAGE SYSTEM

Attachment 1

ALTERNATIVES

Summary Data	unit	A	B	C	Da	Dc	E	F	G
Total electric energy production,	GWh/yr	3558	2433	2421	2220	1881	1869	0	0
of this for CSR		1779	1639	2070	1494	1584	1249	0	0
Completing the investment									
- direct	th.mill. Kcs	3.5	2.9	6.6	3.7	10.1	3.1	10.2	15.0
- additional		4.0	2.1	2.1	2.1	1.1	2.3	1.4	4.3
Yield per yr. for CSR (-loss)	mill. Kcs	2325	1417	2194	454	641	-16	-3104	-2613
Total economic effect for CSR	th.mill. Kcs	8.0	-2.2	1.1	-22.7	-32.1	-29.5	-71.7	-72.9

Order of feasibility of the alternatives based on the following criteria	Weight of the order	Order of feasibility							
international legal relations	7	1	2	1	7	3	5	4	8
health and epidemics	3	4	4	3	2	1	4	1	1
environmental-ecol. and eco-sociological	6	5	5	4	3	2	6	8	8
water management	7	7	7	7	4	2	7	7	7
social-psychological	3	1	1	3	5	5	4	6	6
completion	3	1	2	3	6	7	4	5	8
economic efficiency	6	1	3	2	4	7	5	8	8
The order is thus		1	4	2	5	3	6	7	8

Bratislava, December 1990

Attachment 2

Usage Alternatives for the Czech and Slovak Part of the Gabčíkovo Hydroelectric Power Plant

Alternative **A** – Completing the Gabčíkovo-Nagymaros Barrage System in accordance with the 1977 international contract.

Alternative **B** – Completing the Gabčíkovo hydroelectric power plant in accordance with the 1977 international contract, without completing the Nagymaros hydroelectric power plant, through-flow operation.

Alternative **C** – Building the Gabčíkovo hydroelectric power plant on exclusively Czecho-Slovak territory, without the Nagymaros hydroelectric power plant (Attachment 3). All the projects of the Gabčíkovo hydroelectric power plant would be built on Czecho-Slovak territory, including the damming up of the Danube. This is a solution that ensures continuous operation for the Gabčíkovo hydroelectric power plant and its use for navigational and flood protection purposes.

This alternative would be realised in two stages. In Stage I the water flowing into the old river-bed of the Danube would not be used. In Stage II the hydroelectric power plant with the reservoir would be built, facilitating the use of the water output of 350m^3/s that flows into the old river-bed.

Alternative **D** – Completing the Gabčíkovo hydroelectric power plant without the reservoir at Hrušov and the Nagymaros hydroelectric power plant.

Alternative **Da** – Building dikes on the banks along the Danube river-bed as far as Rusovce.

The river-bed of the Danube would thus be surrounded from the Dunakiliti dike to Rusovce. The level of the dammed up water in this surrounded section of the Danube river-bed is 129.0 ms; this solution would make use of the dam at Dunakiliti. The water output of 350m^3/s that flows into the old river-bed will be used by the newly built hydroelectric power plant.

Alternative **Dc** – Extending the head-race canal to Rusovce. The right-hand side dike will be extended as far as Rusovce along the Hrušov left-hand side dike. A hydroelectric power plant with a dam would be built near Rusovce in order to make use of the water output of 350m^3/s that flows into the old river-bed.

The dam at Dunakiliti cannot be used for this solution. The aforementioned technical solution would decrease the capacity of the head-race canal to 200m^3/s from flood protection considerations, which results in a 50% use of the Gabčíkovo hydroelectric power plant.

In the case of all the above alternatives, the lateral branch system as well as the old river-bed of the Danube will have to be regulated. In the old river-bed of the Danube locks would be built with special chutes for fish and boating. Water output of $350 m^3/s$ would be ensured for the old river-bed of the Danube. With this solution, the resulting dammed up water level would be the equivalent of $1350\ m^3/s$ output in the old river-bed of the Danube (Attachment 4).

Alternative **E** – Using the Gabčíkovo hydroelectric power plant for navigation purposes, draining of high water and partially for energy purposes.

The Gabčíkovo hydroelectric power plant was completed in accordance with the international Contract, including the Dunakiliti weir as well. These ensure a water output of $1500\ m^3/s$ into the old river-bed of the Danube, which is used for energy purposes in the hydroelectric power plant newly built by the Dunakiliti weir.

The volume over and above $1500\ m^3/s$ will be used in the Gabčíkovo hydroelectric power plant. Of all the alternatives, this one would utilise the Gabčíkovo hydroelectric power plant to the least extent.

Alternative **F** – Stopping all work on the Gabčíkovo-Nagymaros Hydroelectric Power Plant and freezing this state.

All work would be stopped, except for work related to flood protection and ensuring the draining of internal waters.

Activities needed for the conservation of the objects would also be done.

Alternative **G** – Demolishing the Gabčíkovo hydroelectric power plant and reinstating the original state of the terrain.

Technical equipment would be dismantled and projects unnecessary for flood protection would be eliminated. The terrain would be put back into its original state.

[Attachment]

The International Law Analysis of the Possibility of Implementing the Gabčíkovo Hydropower Plant as a Czechoslovak National Investment, 29 October 1990

[For Text of the International Law Analysis, see Annex 64]

[Attachment]

The detailed description of the 1990 controversy due to problems pertaining to the financing of the construction

Enclosure including explanation of reasons

The construction of the Gabčíkovo-Nagymaros Barrage System is divided into areas of water management and energetics. By 31 December 1990, costs incurred by the construction amounted to Kcs 10.7 billion (using 1990 price rates in accordance with "SZK", chapters II-VIII), out of a total of Kcs 13.5 billion planned for the water management part of the project.

The 1990 construction budget envisages Kcs 769.2 million for water management related constructions and deliveries.

In June 1990, state planning confirmed a subsidy of Kcs 723. 8 million, including Kcs 679.7 million for work items and deliveries ("SZK", chapters II-VIII), which is Kcs 88.5 million less than actually required by the construction budget.

Due to the enforcement of changes in 1991, the price of construction work items will increase by an average of 12% (based on figures of new price lists) compared to calculation coefficients used in the definition of prices for the construction budget.

The difference in the value of construction work items, resulting from the above facts, is as high as Kcs 75 million for 1990 (625 (construction work items) x 0.12).

The difference between the 1990 state plans and plans related to the construction budget in terms of financing is Kcs 163.4 million.

In a letter written by the Minister of Forestry and Water Management of the Slovak Republic on 25 April 1990, the investor of the water management part of the project stopped all work aimed at deforestation on areas around the reservoir of Hrušov-Dunakiliti, which proved cost-efficient to the tune of Kcs 17 million.

Due to the fact that the Hrušov-Dunakiliti reservoir was not put into operation in December 1989, the danger of flood threatened the area.

In early 1990, the state spent an additional sum of Kcs 7 million on flood-prevention measures to be taken on Czech and Slovak territories and on the protection of the Gabčíkovo Hydroelectric Power Plant, which was exclusive of previous calculation figures in the 1990 construction budget.

The failure of the Hungarian side to perform the deepening of the Danube riverbed at Palkovičovo caused the areas around the canal, during periods of flood, to become seriously exposed to the dangers of floods. To rectify the situation, Kcs 56 million might be needed to take the necessary steps, out of which Kcs 10 million worth of work items are to be performed during 1990.

It is obvious that the financing of work and deliveries during 1990 will necessitate a sum of Kcs 843.2 million, including Kcs 763 worth of construction-related work items and Kcs 80 million worth of technology to be supplied.

During the period between January and October, the value of work items and deliveries paid for reached Kcs 650 million, while sums pertaining to items unpaid for amounted to Kcs 71.5 million.

The Ministry of Forestry and Water Management of the Slovak Republic has decided on an increase by Kcš 163.4 million of state subsidies in order to keep control of the financial situation of the construction.

Construction work relating to the flood-protection of the structures of the barrage and the surrounding areas has to be completed by the end of 1990. The agricultural areas that have been temporarily taken over should be returned and recultivated, and any maintenance work to keep the project operational should be carried out.

The above work items have to be performed irrespective of a decision on any of the existing construction alternatives.

As far as the energy-related aspect of the construction is concerned, funds relating hereto are to be raised exclusively by the investor (Kcs 2.35 million, "SZK", chapters II-VII), including a 45% credit amount.

The value of invoices made out by October 1990 was Kcs 1.132 billion, and in comparison the value of the work which was still unfinished was Kcs 450 million.

Annex 69

NARODNA OBRODA, ANNUAL DAMAGES AMOUNT TO KCS 3.5 BILLION, 18 JANUARY 1991

[Translation]

OPTION "C" FOR THE GABČÍKOVO PROJECT

Bratislava (CSTK): After the cabinet meeting yesterday of the Government of the Slovak Republic, press attention focused on a proposal by William Oberhauser, Minister of Forestry and Water Management, aimed at optional solutions concerning the issues pertaining to the Czechoslovak share in work items with respect to the Danube Hydroelectric Power Plant.

Based on analyses performed by specialists, certain groups of experts doing scientific research in conjunction with Bratislava Hydroconsult, submitted a proposal for the further construction of the Gabčíkovo Hydroelectric Power Plant. The alternative in question is known as option "C", the aim of which is the creation of the reservoir by a dam on our territory. In this case we would lodge no claim against our Hungarian partners. "Naturally" the Minister added, "what we have here is a provisional situation and the Czech and Slovak side will continue to hold negotiations with the Republic of Hungary in accordance with the original agreement.

The assumption upon which option "C" was prepared is the capacity for water flow next year in the operation of the Gabčíkovo Hydroelectric Power Plant, and the completion of the plant is expected in 1993. Projected expenses concerning the realisation of this alternative are in excess of Kcs 6 billion. The costs incurred by the current postponement of the putting into operation of the Barrage System are in excess of Kcs 3.5 billion annually.

The Government has accepted this proposal and made the decision that it would be presented to the Hungarian side by V. Mečiar during his forthcoming visit to Hungary.

Annex 70

POSITION OF THE SLOVAK ECOLOGICAL AND ENVIRONMENTAL COMMITTEE WITH RESPECT TO THE METHOD OF SELECTING AN OPTION FOR THE EXPLOITATION OF THE GABČÍKOVO BARRAGE SYSTEM, 5 FEBRUARY 1991

[Translation]

During a meeting held in the Ministry of Forestry and Water Management of the Slovak Republic, the specialist committees taking part in the assessment of the seven options for the further construction of the Gabčíkovo-Nagymaros barrage system, (i. e. those pertaining to international law, ecology and production, ecology and environment, water management [subsurface and groundwaters,] hydrotechnology and energetics, economy and production) were named.

Their duty was to judge without bias the options submitted for consideration, attempting at the same time to eliminate the negative effects on the environment of the barrage system and minimising ecological risk factors.

The options judged are as follows:

Option A	Completion of the Gabčíkovo-Nagymaros Barrage System in accordance with the international agreement of 1977.
Option B	Completion of the Gabčíkovo Barrage System in accordance with the international agreement of 1977 without the concurrent completion of the Nagymaros barrage system and its operation by a steady flow mode.
Option C	Construction of the Gabčíkovo Barrage System on the territory of Czechoslovakia without the completion of the Nagymaros barrage system.
Option D	Completion of the Gabčíkovo barrage system without the Hrušov and Nagymaros barrage system.
Option E	Exploitation of the Gabčíkovo barrage system for navigation purposes, to be used partially for energy-related purposes.
Option F	Abandonment of all construction work items with respect to the Gabčíkovo-Nagymaros Barrage system and measures to be taken to preserve the barrage system in its present condition.
Option G	The gradual demolition of the Gabčíkovo barrage system and recultivation of the surrounding areas to reach an environmentally acceptable level (i. e. the whole of the Danube inundation area will, on both Czechoslovak and Hungarian territory, be able to function, among others, as a vast region of environmental protection in the same way as it did prior to the beginning of construction work.

Each committee had its special task; the calculation of economy- and ecology-related profits and losses was to have been done by a committee to be appointed by the Economic Council.

All this follows from a meeting on 14 September 1990, where individual committees were appointed, as well as from propositions made by individual committees (September-November 1990); moreover, this proposition is part of a protocol of written comments dealing with the options of exploitation with respect to the Gabčíkovo Barrage system's technical, economic and ecological aspects during a meeting held in the Forestry and Water Management of the Slovak Republic on 12 December 1990.

Excerpts from the protocol:

A proposal was made, in the final conclusions of the ecological and environmental committee, for the creation of a committee, whose task would be to submit the final version of a proposal pertaining to the completion and exploitation of the Gabčíkovo barrage system to the Economic Council and the Government of the Slovak Republic.

Members of the Committee would be representatives of the Committee of Environmental Protection in Slovakia (SKZP), the Ministry of Economic Strategy of the Republic of Slovakia (MHS SR), the Ministry of Economy of the Republic of Slovakia (MH SR), the Finance Ministry of the Republic of Slovakia, the Ministry of Forestry and Water Management in the Republic of Slovakia MLVH SR), the Academy of Sciences in Slovakia and the chairmen of specialist committees that have assessed the existing options for the exploitation of the Gabčíkovo hydroelectric power plant.

In contrast with the process that had been agreed upon, the findings of the six specialist committees in question were submitted by the Minister of Forestry and Water Management to the government for consideration without processing via a procedure of synthesis, the resulting document being one which relies on the findings of the Economic Committee and the Committee of International Law making a proposition for the acceptance of Option "C" as the best solution. The whole of the material submitted to the Government reflects an attitude of technocracy in its assessment methodology, disregarding the attitude of other specialist committees.

In the documents submitted to the Government, a suggestion is made for the proposed option (option C) to be elaborated to minimise ecology-related risks. It is to be noted, though that there is no suggestion whatsoever in the document as to how the above mentioned idea is to be put into practice and how the term itself is to be interpreted. At the same time, measures are being taken to make funds available for the elaboration of the plan documentation and for the realisation of work items related to this option.

As head of the Ecological and Environmental Committee, I would like to voice my disapproval with respect to this so called "synthesis" of findings resulting from the work of specialist committees.

I consider this attitude a blunt disregard for all expert's opinions that include a variety of opinions and comments of experts, organisations and specialist committees on issues of ecology, water management, ecology and production, hygiene and epidemiology etc.

The proposal lacks the full assessment of economic efficiency of the Gabčíkovo barrage system, i.e., the objective inspection of advantages and losses, taking into consideration all necessary measures of compensation. Attention was called to this deficiency as early as the beginning of work pertaining to the assessment of the Gabčíkovo barrage system (from February of 1990).

In the light of profits from electric energy production, it might also be essential to translate losses into figures; losses are the consequences of:

- options substituting water sources, expenditure on drinking water treatment

As is clear from the position of specialist committees dealing with the problem of surface and groundwaters, the "reservoir options" put the quality of waters at risk. The main problem is caused by risk elements pertaining to the quality and quantity of groundwaters. Also, the water sources of Kalinkovo and Šamorín would geographically be much closer to the reservoir. Within the reservoir, processes of sedimentation of suspended and dissolved matter would have to be reckoned with.

Due to the sedimentation of suspended and dissolved matter, there is a danger that groundwater levels might decrease, which will have to be eliminated via the deepening and clearing of the bottom.

As a result, the organic complexes of heavy metals accumulated in the bottom sediments may be set into motion.

- the negative effects on production related to agriculture, forestry and fish farming

In this phase it was impossible to determine the consequences correctly in the absence of reliable prognosis of groundwater levels for certain variants. There was no information about the size of the previously completed underground walls that were built to eliminate the negative impoundment effect of the Nagymaros plant, and essential data to help estimate the effect on fishery was also missing.

- the aim here was the elimination of negative effects resulting from water retainment due to the barrage system at Nagymaros, there was a shortage of data for the assessment of effects on the fish farm etc.

- negative effects resulting from the change in functional links within the natural ecosystem, the change in operational dynamics of ecosystems as a result of a change in hydrological regimes.

Special attention should be drawn to problems of hygienic and epidemiological nature, described in detail in the position of the Committee of Ecology and Environment (pp. 4-5 and enclosure 1.)

In order to eliminate the ecological risks listed above, the Committee of Ecology and Environment suggests the modified "D" option (lengthening of the canal at the dam on the left-hand side).

The Water Management Research Institute has elaborated option "D", which is a proposal for a smaller-size reservoir (river version). The aim of both proposals was to find a solution in order to minimise ecological risks in the first place.

Finally:

Given the fact that the decision in selecting an option for alternative exploitation with respect to the Gabčíkovo-Nagymaros Barrage System is not done objectively, we request the creation of a "synthesising" working group made up of independent experts that would be able to make decisions objectively i.e. without prioritising technocratic approaches in selecting the most acceptable option available.

Bratislava, 5 February 1991.

RNDr. Maria Kozová, Csc.
Head of the Committee of Ecology
and Environment

Annex 71

PETITION BY THE MEMBERS OF THE ASSOCIATION OF THE ŽITNÝ OSTROV TOWNS AND VILLAGES, 20 FEBRUARY 1991

[Translation]

PETITION

We, the members of the Association of the Žitný Ostrov Towns and Villages, convening on February 2, 1991 at the meeting of Grand Mayors and Mayors in Dunaszerdahely, demand the following:

1. To stop all work related to the construction of the Gabčíkovo-Nagymaros hydroelectric plant.

2. To stop the financing of planning and preparatory work for the so called C variant of the project.

3. To set up a committee that will start negotiations with the Hungarian Republic as regards the annulment of the 1977 Treaty in respect of the construction of the Gabčíkovo-Nagymaros system of barrages, and initiate negotiations on how to distribute the losses incurred during the construction.

4. Ing. Ivan Čarnogurský to submit his resignation either from his function of deputy chairman of the Slovak Parliament, or from the directorship of the company Hydrostav, as we deem such concentration of power inadmissible, and more characteristic of the former communist government of Czechoslovakia.

5. To set up a committee of experts that will develop the scheme for the rehabilitation of the areas severely damaged by the construction to an ecologically acceptable status. We do not agree with Hydroconsult Bratislava's assessment of Variant C stating that the solution would cost 20 M Crowns and take some 15 years. We shall submit to this committee our own proposals as to the recultivation of the areas damaged by the construction.

Date: Dunaszerdahely, 20 February 1991

Annex 72

INFORMATION DOCUMENT OF THE SLOVAK REPUBLIC ENCLOSING LETTER FROM MIKULÁŠ HUBA, CHAIRMAN OF THE ENVIRONMENTAL AND NATURAL PROTECTION COMMITTEE, TO THE CHAIRMAN OF THE SLOVAK NATIONAL COUNCIL, 27 MARCH 1991

[Translation]

Environmental and Natural Protection Committee
of the Slovak National Council

Information document

with respect to the negotiations held in connection with the issues of the construction of the Gabčíkovo Hydroelectric Power Plant.

Contents:

1. A letter addressed to the Chairman of the SNC
2. Resolutions 44 and 116 of the Committee **[Omitted]**
3. Draft resolution for the SNC **[Omitted]**

Bratislava, March, 1991

Environmental and Natural Protection Committee
of the Slovak National Council

Bratislava, 27 March, 1991.

Dear Mr. Chairman,

During our meeting in January this year, M. Zemko, Deputy Chairman of the Slovak National Council and myself suggested that the Presidium of the Slovak National Council should deal with the urgent problem of the further construction of the Gabčíkovo Hydroelectric Power Plant and also with a recommendation pertaining to the creation of a National Park in the Danube region. Our suggestion included the idea of the invitation of certain officials representing the Slovak Government, specialists on behalf of the Slovak and Federal governments and in charge of the construction and operation of the Gabčíkovo-Nagymaros Hydroelectric Power Plant, and other experts involved in the issue.

During the negotiation we came to the conclusion that it might be worthwhile to hold negotiations within the framework provided by the activity of the Environmental and Natural Protection Committee of the Slovak National Council (all the more so, as plans for the 2nd half of 1990 of the Committee include the organisation of a meeting of this sort), and it might equally be worthwhile to inform the Presidium of the Slovak National Council on the outcome of the meeting.

At the next meeting of the Slovak National Council, both Deputy Chairman M. Zemko and myself informed members of the Presidium in accordance with what has been outlined above. The presidium agreed to the recommendation in question although gave no indication of the date concerning the submittal of the report. Meanwhile, the Committee mentioned above has, on three occasions (the most recent of which was 22nd March, 1991) dealt with the issue, and the resolution that emerged from the meeting is to be submitted today, along with the resolution of 24 October 1990.

In our view it is essential that the issue be taken up as early as the session of 28 March of the Presidium of the Slovak National Council, considering the information that the realisation of variant "C" shall commence on 2 April 1991, and it will do so without the approved planning documentation and contrary to the opinions of the majority of the members of the specialist committees and their leaders.

We consider such a procedure to be unacceptable.

RNDr. Mikulás Huba CSc.
Chairman of the Committee

No. of enclosures: 2 **[Omitted]**

Dear RNDr. František Mikloško
President of the Slovak National Council

Bratislava

Annex 73

RESOLUTION NO. 116 OF THE ENVIRONMENTAL AND NATURAL PROTECTION COMMITTEE OF THE SLOVAK NATIONAL COUNCIL IN CONNECTION WITH THE GABČÍKOVO HYDROELECTRIC POWER PLANT, 22 MARCH 1991

[Translation]

The Environmental and Natural Protection Committee of the Slovak National Council

A/ a c c e p t s

1. the information provided by V. Ondruš, Vice President of the Slovak Republic and D. Kocinger, Government Commissioner supervising the Gabčíkovo Barrage System, during the committee meeting of 28 January 1991, in which the position of the Ministry of Forestry and Water Management in Slovakia and the Government of the Slovak Republic on the issues related to the construction of the Gabčíkovo Hydroelectric Power Plant were outlined.
2. the information provided by members and leaders of the specialist committees, which, acting on the initiative/suggestion of the Government of the Slovak Republic and the Ministry of Forestry and Water Management in Slovakia, focused on investigation into the consequences of the construction of the barrage system, (this problem was dealt with by two committees in the first quarter of 1990) and an assessment of seven other alternatives of solutions to the problem.
3. the information provided during a committee meeting on 28 January 1991, by J. Sibel, leader of the work team called "Danube Region" (Podunajsko), currently in operation near SZOPK, on the current situation concerning the preparation of the Danube Region National Park.
4. written comments by certain scientific and research institutes.

B/ d e c l a r e s

1. the existence of major contradictions between viewpoints outlined in A/1 and A/2-A/4.
2. the slowness of the preparation work performed with respect to the announcement of the intention to create the Danube Region National Park, which is in contrast with Resolution No. 44 of 24 October 1990 of the Environmental and Natural Protection Committee of the Slovak National Council.
3. non-compliance with requirements during the final assessment of working committees No. 1 -5 and the selection of the optimal alternative.
4. the fact that option "C", recommended by the Ministry of Forestry and Water Management in Slovakia and subsequently accepted by the Government of the Slovak Republic, did not coincide with the conclusion made by any of the committees involved during the 1st quarter of 1990, neither did it coincide in the 4th quarter of 1990 with the recommendations and final conclusions of committees 2, 3, and 4.

5. The final conclusions of the committee mentioned above, with special regard to hygienic-epidemiological, environmental-ecological, ecosociological- and water-management-related aspect, regards option "C" as unsuitable and unacceptable.

C/ suggests

1. the setting up of a committee including independent experts, for the assessment of comments provided by committees having worked during the 1st quarter of 1990, and for that of committees 1-5 during the 2nd half of 1990.
2. consultation with respect to unresolved issues including disputes with foreign experts about controversial issues related to international law.
3. the acceleration of work related to the preparation of the creation and the announcement of the existence of the Danube Region National Park for the protection of the natural environment, which is part of the Trilateral National Park along the frontiers between Austria, Czechoslovakia and Hungary, in accordance with suggestions made by SZOPK and the international organs.
4. the most up-to-date specialised knowledge and information (the results of the monitoring system etc.) has to be taken into consideration.

RNDr. Mikulás Huba, CSc.

Annex 74

PRAVDA,
THE HYDROELECTRIC POWER PLANT AT GABČÍKOVO IS SLOWLY BUT SURELY CONSUMING MILLIONS,
2 APRIL 1991

[Translation]

THE OPTIMUM VARIANT – OPTIMAL FOR WHOM?

It is a well-known secret that as of today, i.e., 2nd April, the state-owned Hydrostav Bratislava company is intending to start the construction activities related to the so-called variant "C", the substitute solution to the Gabčíkovo hydroelectric power plant.

This is the variant that excludes the project in Hungary.

The diversion of the river would take place at a different site and in a different volume compared to the original plan.

Since it is inconsistent with the 1977 international contract, the whole plan became confrontational in an international legal sense.

For this and other reasons, the Environmental and Natural Protection Association of Slovakia expressed their rejection of the current course of action of the Slovak Government, which is also criticised by the members of the Environmental and Natural Protection Committee of the Slovak National Council.

Mr. Mikulás Huba, president of the Environmental and Natural Protection Association of Slovakia and president of the Environmental and Natural Protection Committee of the Slovak National Council, further clarified the motivation for their views during an interview.

• The so-called "defiance" variant, i.e., completing the power plant without the Hungarian partner, had been mentioned under the previous regime as well; they had even prepared it in part, when in 1989 Hungary retreated from the original agreements. Words of those then in charge, however, bear witness to the fact that this was never considered as a final variant, for it would have only partially satisfied the economic goals. Rather, it was a method of exerting pressure on the Hungarian partner.

– This is partly what we see happening again today. This could be an explanation of the logic of the steps of the Government of Slovakia, who, previously not very successfully establishing contact with the Hungarian partner, accepted this resolution – concerning the primary consideration of variant "C" – this January. For your information: the variant in question is one of those seven options studied by independent expert committees during the last year. It is noteworthy that three of the expert committees consider this very variant problematic, even unacceptable. A similar opinion was voiced by the presidents of two independent expert groups as well, although variant "C" had not then been mentioned yet.

• *???*

– In December, 1989, one of the first steps of the government of national consensus was to exclude the "defiance variant" as a solution absurd from the points of view of financing, ecology and international law. The Government of the Slovak Republic then decided that they would fully suspend work going on at the Gabčíkovo hydroelectric plant, commission independent expert appraisals and attempt to find the variant that is optimal in an ecological as well as economical sense. Not so long ago, Vladimir Ondruš, Vice President of the Government of the Slovak Republic was still boasting of this at the Slovak National Council meeting, trying to mitigate the criticism of MP's directed at the government in connection with the Tatragate scandal...

The Government of the Slovak Republic based its decision to give priority to the consideration of variant "C" on suggestion from the Forest and Water Management Ministry of Slovakia. This was backed up by the reasoning of the sixth, so-called financial-production committee. This, however, should not be considered independent and objective, since it was produced by employees directly concerned in the design, construction and use of the hydroelectric power plant. We do not wish to degrade the professional level of their work, we simply wish to point out the presence of a one-sided vision.

• *What does this one-sidedness mean?*

– This committee assigns secondary importance to health and epidemiological, environmental-ecological, ecosociological and water management considerations. Originally, the final decision was to be accepted by a so-called synthesis committee, comprising of members representing each committee, which would then present the arguments of all the parties. This is the only way for the optimal solution to be decided upon. Such a committee, however, has not been formed to this day, in spite of the binding procedures set forward in the original agreement. Representatives of the committee of the Slovak National Council have voiced their criticism of this and the fact that there is an attempt to substitute a financial-production committee for the aforementioned synthesis committee.

• *If the government was inclined towards the unacceptable variant "C", it is possible that they presented it not as the optimal solution, rather, as the optimal way out of the dead-end street which the discussions with the Hungarian partner to this day constitute.*

– Negotiations on the highest level will take place in Budapest in the near future, on 22nd April. We can assume that if such a meeting is organised then both parties want an agreement. However, if we on our side go ahead with the variant that excludes the other party, how are we to come to an agreement with them?

• *The substitute solution was first mentioned by our constitutional representatives during last summer. At the press conference organised at the construction site, this view was upheld by the Vice President of the Slovak National Council, Ivan Čarnogurský, who is also director of the state-owned Hydrostav Company. He probably had an unwilling slip of the tongue, saying that he would exert pressure on the representatives of the Slovak National Council to accept this alternative...*

We drew the attention of the Presidium of the Slovak National Council to the risks resulting from the current plan for the further construction of the hydroelectric power plant and the work of the expert committees. Unfortunately neither the presidium nor the plenary meeting of the Slovak National Council have the time or the inclination to discuss these objective problems.

• *So far the government has only stated that the analysis of variant "C" has to be given primacy. No decision has been made as to its realisation. The Hydrostav company, concentrating large forces for the construction, are acting today as if they knew the result in advance...*

– And we are still within the deadline set by the government for submitting the design documentation. Several water law permits are still missing, along with some other permits for the lasting use of agricultural lands, etc. The decision is under regional and district jurisdiction. Their leaders, according to my information, are not in favour of the issue.

The mayors of Žitný Ostrov villages and towns act in a similar fashion, they have recently sent a sharply critical protest to the President of the Czech and Slovak Federal Republic.

• *Does this imply that Hydrostav is shunning the legally binding regulations?*

– I can document that by way of the ministries concerned (e.g., the Slovak Environmental Protection Committee) and the Agricultural Ministry of the Slovak Republic, pressure is being exerted on the subordinate organisations to obtain the permits necessary.

• *This rings a few bells...*

– The large industrial-financial lobbies, let it be in the field of energetics or something else, are always trying to obtain the protection of the leading political forces in a society. In this case it means a continuous transition from the protection of the Slovak Communist Party (KSS) to the Christian Democratic Movement (KDH) and the Publicity to Prevent Violence Movement (VPN).

It is sadly ironic that this project is everything but a democratic or Christian creation (is it, after all, consistent with Christianity to destroy all that life, nature?). This project has always been saturated with violence against nature and people, while the opinions of those concerned was never asked.

Interviewer Lubo Rabay

Annex 75

LETTER FROM DR. GYÖRGY KOMLÓSSY, PRESIDENT OF THE CENTRAL OFFICE OF GEOLOGY, TO DR. ISTVÁN LÁNG OF THE HUNGARIAN ACADEMY OF SCIENCES, 16 APRIL 1991

[Translation]

Central Office of Geology
President

Dr. István Láng
Academician
Hungarian Academy of Sciences

Budapest

Dear General Secretary,

A high-level Slovak delegation is expected to arrive in Hungary to start negotiations on the issues concerning the Gabčíkovo-Nagymaros barrage system. I would, therefore, like to inform you that the Central Office of Geology and its Institutes (the Geological Institute of Hungary and the Eötvös Lóránd Geophysical Institute) have, along with the Slovak Office of Geology and other Slovak geological and geophysical institutions, been collecting geological, hydrogeological and geophysical materials necessary for the acquisition of knowledge with respect to problems related to the environmental and seismic risks, and have also been jointly analysing and assessing these materials.

It became clear during the first half of the year that we are short of certain necessary information (for example data concerning the size and thickness of the gravel complex containing the largest fresh water aquifer in Central Europe and the position of tectonic lines, considered by the UNESCO recommendation as one of the most important components in examining risk factors associated with the possibility of an earthquake, are not entirely known.)

Being aware of this, the Central Office of Geology (KFH) will use HUF 21 million out of its budget to rectify the shortages.

During my stay in Slovakia last month I was informed that funds made available for the Slovak geological institutions were not in excess of 2 million Kcs, which makes the already existing disproportions even worse. In order to understand the situation, it is necessary to be aware of the fact that we have spent about HUF 1 billion over the past decade on geophysical research and drilling (including drillings for the oil industry) on the Small Plain (Kisalföld), while currently there is no information available relating to drilling or quantitative geophysics with respect to depths exceeding 3000 m on the Slovak (Danube) Plain.

Therefore I request that during these negotiations emphasis be put on the fact that research findings in Hungary pertaining to geophysics can only be put into practice if problems arising from the current lack of information are rectified. This is because of the fact that any map, cross-section or any other form of information processing concerning the areas affected by the Gabčíkovo-Nagymaros barrage system on Hungarian as well as Slovak territory can only be prepared if the same density of information is available on both territories. If the information from the Slovak side continues to be deficient, we will be forced to disregard the majority of data from our own infrequent measurements.

Should details of a particular problem emerge during negotiations, we will be ready to help and provide the required data. I also ask you to inform the Central office of Geology of the outcome of negotiations.

Thank you for your cooperation in advance and I hope it will gradually become clear to the Slovak and Hungarian experts that there is no efficient environmental protection in the absence of fundamental geological information.

Budapest, 16 April 1991

Yours sincerely:

Dr. György Komlóssy

Annex 76

STATEMENT ON THE NEGOTIATIONS BETWEEN THE CZECHOSLOVAK GOVERNMENT DELEGATION AND THE HUNGARIAN GOVERNMENT DELEGATION CONCERNING THE CONSTRUCTION AND OPERATION OF THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM, 22 APRIL 1991

[Translation]

The government commissioners of the Czech and Slovak Federal Republic, the Prime Minister of the Slovak Republic, Vladimir Mečiar, and Ferenc Mádl, Minister without Portfolio of the Hungarian Republic met in Budapest for the first time on April 22, 1991 to discuss the points of dispute related to the Gabčíkovo-Nagymaros hydroelectric system. Both parties have assigned great significance to these negotiations. They have mutually informed each other about the standpoint and views of their respective governments, which are significantly divergent. The expert members of the delegations have analysed the reasons for this divergence of opinions.

The heads of the delegations have agreed to inform the governments and parliaments of their countries about the contents of the negotiations conducted., Furthermore, agreement has been reached that the Academies of Sciences of the two countries will carry on their researches within the framework of the cooperation already established between them and drawing on the resources of experts from other technical institutions as well. It has been emphasised, that both delegations believe these negotiations will have to be continued. The parties will agree on the date and venue of the further round of negotiations later on.

Annex 77

TECHNICAL DESCRIPTION AND ECONOMIC ASSESSMENT OF THE TEMPORARY COMMENCEMENT OF OPERATIONS AT THE GABČÍKOVO HYDROELECTRIC POWER PLANT, JUNE 1991

[Translation]

Data of identification for the construction works:

Name of the operation:	Gabčíkovo-Nagymaros Barrage System
The assessed part of the operation:	Commencement of operation at the Gabčíkovo plant as a temporary solution
Investor of water management operations:	Vodohospodárska Výstavba š.p. Bratislava
Central body of the water management operations investor:	The Ministry of Forestry and Water Management of the Slovak Republic
Investor of energetic operations:	Slovenský energetický podnik š.p. Bratislava-Vodné elektrárne Trenčín o.z.
Central body of the energetic operations investor:	The Ministry of Economy of the Slovak Republic
Operation management of water management operations:	Povodie Dunaja š.p. Bratislava
Operation management of energy management operations:	Slovenský energetický podnik š.p. Bratislava-Vodné elektrárne Trenčín o.z.
Municipalities affected by the temporary Gabčíkovo plant:	Bratislava-capital, Bratislava-county, Dunajská Streda
General designer:	Hydroconsult š.p. Bratislava
Main contractor of the construction works:	Hydrostav š.p. Bratislava
Main contractor of the water management works:	ČKD a.s. Blansko
Main contractor of the energetic technology works:	ČKD a.s. Blansko

BUDGET EXPENSES ON 1991 PRICE LEVELS (THOUSAND KCS)

Water management parts of the construction:

The costs of the temporary hydroelectric plant at Gabčíkovo:

(costs of items a-f of Table 1.)

- completion of operations on the territory of the Czech and Slovak Federal Republic, a work that should have been performed by the Republic of Hungary	415 580
- supplementary flood control measures	202 600
- regulation of inundation in the area of the by-pass canal	405 614
- temporary solution of reservoir on the territory of the Czech and Slovak Federal Republic	6 483 436
Total	**7 507 230**

Energetic part of the construction

Costs of the temporary hydroelectric power plant at Gabčíkovo: 906 050

(costs of items d and e of Table 2.)

Total of water management and energetic construction costs:

Costs of the temporary hydroelectric power plant at Gabčíkovo: 8 413 280

Annual electric power generation at the temporary hydroelectric power plant at Gabčíkovo in a year with average precipitation:

1 758 GWh

of this:

- the power plant at Gabčíkovo:	1 317 GWh
- other hydroelectric power plants:	441 GWh
Commencement of construction:	September, 1991
Removing navigation into the by-pass canal:	October, 1992
Commencement of energetic operations on level 129.0 Bm	October, 1992
Completion of construction works:	December, 1995

Description of the technical solution

Water management part of the constructions:

A temporary operation of the Gabčíkovo plant is possible only in the event that all the works have been completed, which are prescribed by the Joint Contractual Plan on the territory of the Czech and Slovak Federal Republic, and also those operations, which are included in the evaluated part of the project.

Realisation of the temporary Gabčíkovo plant includes the following main steps:

a. Completion of the operations on the territory of the Czech and Slovak Federal Republic, a work that should have been performed by the Republic of Hungary

   Following the suspension of works by the Hungarian partner at the Gabčíkovo hydroelectric plant, some parts of the construction remained unfinished. These are the following:

- completion of a part of the service levee, which ensures a transition between the right hand side embankments of the head-race canal and the Dunakiliti weir. It will be formed in a way that it joins the right hand side embankments of the head-race canal with the right hand side embankments of the temporary reservoir on the territory of the Czech and Slovak Federal Republic.

  In order to inundate the flood area, the attachment of the embankment body to the water extraction structure will be accomplished on both sides of the service levee. Slope formation on the service levee embankments will be completed in the region of the Báć-Dobrohošť state route corridor. The service levee project also involves the completion of a diversion dam on the bottom of the reservoir, and the attachment of this to the service levee structure in order to be able to fill up the reservoir and the by-pass canal for the first time.

- removal of the earth bank of the Gabčíkovo hydroelectric plant located between the outlets of the power plant and the tail-race canal.

- completion of the construction works at the tail-race canal

- removal of the sealing structure (earth bank) at the mouth of the tail race canal towards the Danube, at Palkovičovo.

For these works the water laws permit has been issued.

b. Supplementary flood control measures

   The original concept of the creation of the barrage system involved the dredging of the Danube bed downstream of the junction of the tail-race canal with the Danube.

   This dredging is only possible by impoundment levels ensured by the Nagymaros dam, but this will not be built by the Hungarian party. As a consequence of this, during flood water flows the water level of the Danube will be increased as compared to the levels identified in the Joint Contractual Plan.

These levels will have an effect in the tail-race canal as well, and from here, through the filtration canals and along the right hand side embankments of the head-race canal they will have an impact on the surrounding areas.

In order to provide flood control for the surrounding territories against the increased water levels, there is a need for further measures to be taken. The most significant measures include formation of filtration drains along both embankments of the tail-race canal, and those measures, which make the application of pumps possible at the mouth of the Čiliszky canal into the right hand side filtration canal.

The water laws permit referring to the first part – filtration drain of the left hand side of the tail-race canal – will be issued by the 10th of July, 1991.

c. Regulation of inundation in the region of the by-pass canal

In recent years a depression in the river bed could be observed in the Danube on the reach between Bratislava and Gabčíkovo, and as a consequence of the diminished rolling sediment transport capacity, furthermore due to the different measures taken in the interest of navigation, the water level of the Danube decreased, even at times of flood level water flows.

This state unfavourably influences the life of forests and fish and the groundwater tables in the flood area of the reaches mentioned.

For these reasons, measures were originally planned on the flood area, e.g. the project independent from the barrage system that included the closures of the various branches of the Danube and the build-up of forest roads to form bays.

In order to eliminate the negative effects of the Gabčíkovo barrage system, a decision was taken, with the concept that the region must be allowed a constant water flow of 50 m^3/s from the water releasing structure and a 250 m^3/s water flow must be provided in the form of periodic floods so that natural floods could be simulated. In the service levee, the water releasing structure was built just for this reason, as a part of the barrage system.

On the inundation area ongoing works include the construction of five cross sectional structures, which are provided with built in locks at the places of former branch crossings. This also includes the formation of the embankments and banks, their elevation and the construction of the necessary structures at the junction of the river branches with the Danube.

With this solution, a permanent water supply can be ensured to the flood area and the branch system, and furthermore it is possible to simulate flood conditions.

For these works the water laws permit has been issued.

d. Temporary solution of reservoir on the territory of the Czech and Slovak Federal Republic

The declaration of the temporary Gabčíkovo barrage system conceptualises the realisation in two distinct phases.

In the first phase, works in the by-pass canal and the reservoir must be performed, enabling the operation of the power plant at 129.0 mB level.

The second phase includes works enabling operation on 131.10 mB level (which level is also represented in the Joint Contractual Plan).

The first phase includes a set of structures which enable the relocation of the Danube course at the community of Čunovo (i.e. at a place where the state border is not running along the Danube bed any more), and the redirection of navigation into the water releasing structure. The set of structures consists of the following: embankments on the left hand side of the Danube, which adjoins to the service levee at the site of the former Hrušovo settlement, and the relocation of the riverbed by the settlement of Čunovo.. The reservoir will then be bordered by the right hand side embankments, which runs from the closure of the riverbed through the inundation area and at a right angle to the existing right hand side embankment of the Hrušov-Dunakiliti reservoir.

These works also include the water releasing structure, which enables the water supply of the Mosoni Danube from the reservoir.

Release of high mark water levels (above 4000 m^3/s) are ensured by an overflow structure between the closure of the Danube riverbed and the right hand side dike of the Danube, and by a clack-valve dam on the left hand side of the Danube. This phase contains the deepening of the navigation route between the existing left hand side embankment of the reservoir and the new embankment located on the left hand side of the Danube.

In the second phase – taking advantage of the protection ensured by the structures built during the first phase – the weir, provided with an auxiliary shiplock and the hydroelectric power plant shall be built, the small hydro project will be completed on the water release structure on the Mosoni Danube branch, and the overflow structure of the dam shall be erected.

Taking into consideration the conditions set by international legal experts, water erosion mitigation dams in the old riverbed of the Danube were omitted from the set of structures proposed for the temporary solution at Gabčíkovo.

As a consequence, it is recommended that the old river bed should be supplied with at least 600 m^3/s water flow (during the growing season, this value leaps to 1300 m^3/s.).

The exact amount of water flow directed into the old riverbed will be determined in the management guidelines. As a consequence of these, the potential capacity of the Gabčíkovo power plant to generate electricity will decrease.

In order to use the 600 m^3/s water flow, the original plant at the weir which was designed for $Q=350$ m^3/s had been enlarged, and thus the production loss at Gabčíkovo might be partly compensated for.

In order to facilitate the transition from the 129.0 mB level operation to the 131.10 mB level operation the overflow structure of the dam was also supplemented with a clack-system.

Public traffic following the commencement of operation of the Gabčíkovo power plant between the old river bed and the by-pass canal will be solved by the traffic route across the Gabčíkovo weir, while on the head-race canal a ferry will be operated.

The Ministry of Forestry and Water Management of the Slovak Republic will investigate the possibilities of a bridge across the head-race canal. This suggestion has not been included in the declaration of the constructions as yet.

Energetic part of the operations

The energetic part of the operations includes the completion of the construction of the technological equipment listed in the Joint Contractual Plan, itemising:

- the hydroelectric power plant at Gabčíkovo
- small hydro plant on the water releasing structure into channel S VII
- small hydro plant on the water releasing structure into the inundation area near the community of Dobrohošť

In the framework of the temporary Gabčíkovo power plant the following structures will be built:

- hydroelectric power plant on the weir, annual capacity of 422 GWh
- small hydro plant on the water releasing structure into the Mosoni Danube, annual capacity of 4.0 GWh.

The energy sector will ensure the gradual commencement of operation of the machines at the Gabčíkovo power plant in 1.5 month cycles, having reached the 129.0 mB level in the reservoir and the by-pass canal.

Output management from all the hydroelectric plants and the small hydros is the task of energetics, which will satisfy these tasks according to its possibilities and requirements. According to assumptions, the hydroelectric power plant on the weir and all the small hydros will gradually be transformed into plants with automated mode of operation, without staff, while all the necessary information will be transported into the control room of the Gabčíkovo power plant.

Measures to be taken to minimise the environmental impact of the operation of the Gabčikovo hydroelectric power plant

As all construction works and large scale projects, the construction of the Gabčíkovo barrage system also means an interference with the natural environment. Therefore, measures are needed to mitigate or eliminate the negative effects exerted on the natural environment, or moderate them to an acceptable level, respectively. Already at the beginning of the conceptualisation of the barrage system such measures were taken into consideration.

When assessing the environmental impact of the Gabčíkovo barrage system, the most controversial issue proved to be the problematic effect of the dam system on the undergroundwater quality and the groundwater tables. In this context, our task is primarily to clear up/explore the condition of the groundwater tables on the Žitný Ostrov.

The hydrological state of the Danube is determined by the following factors in the long run: straightening of the river course, closures of river branches, raising branch sills, dredging, gravel extraction, deepening of the riverbed for navigation purposes, and the diminishing capacity of the river on the upper reaches to transport rolling sediments, due to the impact of hydroelectric projects constructed on the Austrian reach of the river.

The accumulation of all these effects has caused a bed erosion downstream of Bratislava, and together with other interventions – like the hydraulic protection of the Slovnaft industrial plant – resulted in an extreme drop in water levels of the Danube, which subsequently caused the decrease of groundwater tables in the upper part of the Žitný Ostrov.

Agricultural production plays a major role in the pollution of the groundwaters, mainly due to livestock concentration, and by applying agricultural technology and irrigation methods that are not optimal in this respect. The quality of groundwaters is negatively influenced by the erratically created waste deposit sites, the missing sewage network system of the settlements, etc.

Drawing conclusions from what was said above, it can without doubt be stated that the large drinking water reserves of the Žitný Ostrov are already threatened in their present state, even without the Gabčíkovo barrage system, a fact which emphasises the necessity of taking measures which would promote the protection of the water reserves mentioned.

On the affected areas of the Gabčíkovo system there are the following large water resources: Rusovce-Ostrovné lúcky-Mokrad, Kalinkovo, Šamorín, Gabčíkovo A and a prospective Dobrohošť.

During the evaluation of the possible impact of the operations at the Gabčíkovo barrage system on the water quality of the groundwater tables, the different committees and institutions expressed their concern and opinion that the barrage system would evoke a threat to the quality of groundwaters.

In order to justify these assumptions, there are supplementary investigations underway. The results of the research will be considered when elaborating the measures aimed at the conservation and protection of the quantity and quality of groundwater bodies which provide the public water supply.

At the Rusovce-Ostrovné lúčky-Mokrad' water resource oxygen enrichment equipment was installed which passed the tests successfully.

With regard to the construction of the Gabčíkovo barrage system, special attention was paid to the flood area of the Danube, which runs parallel to the by-pass canal. The previous part of this material deals with the technical solution for providing water resources in the branch system and the regulation of the inundation.

By implementing the measures suggested above, plus by providing the water supply of the old riverbed – 600 m^3/s water flow outside the growing season, and 1300 m^3/s water flow during the growing season a substantial part of the plant cover (flora) and the wildlife (fauna) can be maintained at the present level of existence.

In certain parts of the gallery forests in the forest ecosystems, a tendency can be observed, where soft character riparian forests transform into transitional character riparian forests.

Bearing all this in mind, the monitoring of observations will be very important in the neighbouring areas of the Gabčíkovo barrage system. With the help of the monitoring system, the present state – prior to the operation – of the barrage system can be characterised.

Similarly, it will be possible to observe the eventual changes in connection with the operation of the system. In this way one can obtain objective information as to how the barrage system will influence the adjoining environment, and one can obtain data for performing any necessary measures in the future. The monitoring system will also be instrumental in the optimalisation of the qualitative data of the water supply of the old Danube bed.

An overview sketch of the ground plan of the temporary barrage system at Gabčíkovo is shown inset.

Participants of the project – investors and contractors

The construction tender for the main structures (which are also part of the temporary solution of the Gabčíkovo barrage system) has been elaborated and the state expert's opinion has also been issued – Supplement I of the Justification.

According to the agreement between the Ministry of Forestry and Water Management of the Slovak Republic and the Slovak Environment Protection Committee, the Slovak Environment Protection Committee – based on the Law on Waters, No 138/73 Zb, paragraph 14. – has issued the expert opinion regarding the declaration of the temporary solution of the Gabčíkovo barrage system on the 25th of June, 1991.

The design documentation of the temporary reservoir solution implemented on the territory of the Czech and Slovak Federal Republic is possibly divided into independent units.

Based on the procedure in line with the agreement, the Bratislava county Municipal Environmental Protection Bureau has to issue a water law resolution on the "Preparation phase" with regard to the design documentation, not later than the 10th of July 1991. The resolution comes into force following the 15 day deadline of appeal.

By issuing the expert's opinion based on the Law on Waters, No 138/73 Zb, paragraph 14., and the coming into force of the resolution of the Water Management Authority, the conditions are set for the commencement of construction works of the "Preparation phase of the temporary solution of the putting into operation of the Gabčíkovo barrage system".

The question of who will deliver the technology of the water management part of the construction, will be decided upon the results of the presently running tender.

The technology of the energetic part of the constructions will be supplied by the investor with the help of the ČKD a.s. Blansko, setting the following deadlines:

- hydroelectric power plant on the weir	1993/94
- small hydro plant on the water release structure into the Mosoni Danube,	1992/94
- small hydro plant on the water release structure into the inundation area near the community of Dobrohošť	1992/93
- small hydro plant on the water release structure into channel S VII	1992

Financing of the project

Water management part of the operations will be financed from the funds provided by the state budget. The energetic part of the operations will be implemented from own resources and loans.

Investment costs

The investment in question involves the following costs:

Water management part of the operations	7 507 230
of this	
- completion of operations on the territory of the Czech and Slovak Federal Republic, a work that should have been performed by the Republic of Hungary	415 580
- supplementary flood control measures	202 600
- regulation of inundation in the area of the by-pass canal	405 614
- temporary solution of reservoir on the territory of the Czech and Slovak Federal Republic	6 483 436
of this to attain the 129.0 mB level	2 563 000
Energetic part of the operations	906 050
Total	**8 413 280**

Summing up these expenses with the costs of the Gabčíkovo-Nagymaros Barrage System as stated in the Joint Contractual Plan, the total value of the project, taking into account the 1991 price level, is:

Gabčíkovo-Nagymaros Barrage System	thousand Kcs
- water management part	17 239 981
- energetic part	3 203 770
Total	20 443 751
Gabčíkovo-Nagymaros Barrage System and the total costs of the temporary solution of the Gabčíkovo barrage system	thousand Kcs
- water management part	24 747 211

- energetic part	4 109 820
Total	28 857 031

	thousand Kcs
Total built in costs of the Gabčíkovo-Nagymaros Barrage System at 31.12.1990	13 853 157
- water management part	12 393 992
- energetic part	1 459 165

Deadlines of the construction works on the temporary solution of the Gabčíkovo barrage system:

1. Commencement of the construction	91/09
2. Relocation of the Danube riverbed and retention to level 129.0 mB	91/10
3. Redirection of the international navigation into the by-pass canal (suspension of navigation between 01.-20.03. 1992.)	92/10
4. Commencement of the energetic operation at level 129.0 mB	92/10
5. Completion of the project	95/12

With regard to the deadlines indicated above, it must be kept in mind, that the operations are carried out on the unprotected side of the Danube flood area, and extremely high water flows might endanger or thoroughly influence the progress of the works.

If such unfavourable conditions occur in the year 1991, the relocation of the Danube riverbed would shift from the date indicated, i.e. March 1992 to the next hydrologically favourable period, October 1992.

Economic evaluation (cost-benefit analysis) of the temporary solution of the Gabčíkovo barrage system

Economic analysis was carried out on:

- investments of the temporary solution of the Gabčíkovo barrage system (based on the expenses since 1991 and the benefits from generating electricity)
- total investments of the Gabčíkovo-Nagymaros barrage system, including the costs incurred so far.

The economic assessment involves the non-energetic benefits of the structure (navigation, irrigation, gravel extraction, regional development, recreation, sports) and losses (forestry, agriculture and water management).

Economic evaluation was carried out at the following water flow values supplied to the old Danube riverbed:

- 50 m^3/s all year round
- 350 m^3/s all year round
- 350 m^3/s with water erosion mitigation dams in the old riverbed of the Danube
- 600 m^3/s all year round
- 600 m^3/s outside the growing season and 1300 m^3/s in the growing season
- 1300 m^3/s all year round

In addition to the Gabčíkovo power plant and the plant on the weir – which is powered by the amended water flows mentioned above – calculations include the use of small hydros in the Mosoni Danube, the S VII canal, and the water release structure at Dobrohošť.

Of the economic efficiency parameters, the following can be calculated:

- At a replenishment water flow of 50 m^3/s the investment of the completion of the constructions is especially cost efficient; internal profitability could even reach 46%, the return on the costs of completion of the project is 3 years, and the total profitability is more than 42 billion Kcs: the internal profitability of the entire project is more than 12%, return is approximately 6 years, total profitability is almost 28 billion Kcs.
- At a replenishment water flow of 350 m^3/s (increasing up to 600 m^3/s) the investment of the completion of the constructions is still cost efficient; internal profitability is between 33 and 28%, return on the costs of completion of the project is 4-5 years, and the entire profitability is more than 33-28 billion Kcs: the internal profitability of the whole project is more than 10%, return is approximately 7-8 years, total profitability is almost 14-19 billion Kcs.
- Based on a replenishment water flow of 350 m^3/s, combined with the water erosion dam system in the old Danube bed, the efficiency parameters moderately drop, but a further 2 billion Kcs decrease in the total benefits would already ensure the improvement of the present state of the surrounding territories, since using this solution, a higher water level can be reached than at the 1300 m^3/s natural water flow of the Danube, which occurs only periodically under natural conditions.
- Given the water replenishment supply of 600 m^3/s outside growing seasons and 1300 m^3/s during growing seasons, the profitability of the investments would fall back to a moderate average level:

  internal profitability could even reach 13%, return is approximately 6 years, and the entire profitability is 17 billion Kcs. Taking into account the expenses incurred so far, the internal profitability of the whole project is approximately 8%, return is approximately 10-8 years, total profitability is approximately 2 billion Kcs.

This version must be dealt with as a limit to profitability.

By a water replenishment supply of the old riverbed with 1300 m^3/s all year round, the efficiency ratio further declines, internal profitability would further diminish to 6.6% (below bank interests), and the total profitability ratio of the whole project would reach the negative sum of -7 billion Kcs.

Certainly, this version is still better, than the loss of all the items already spent (which exceeds the 20 billion Kcs limit when including interest as well), let alone the enormous additional expenses necessary for the dismantling of the existing structures and the replacement solution for the lost effects.

The Joint Contractual Plan determined the replenishment amount of water flow directed into the old riverbed as 50 m^3/s. We are eager to increase this supply, and thus contribute to the stabilisation of the present situation in the surrounding areas.

A further improvement of the present state would only be possible in cooperation with the Hungarian party – and this in the form of a referendum, or even by the joint construction of water erosion mitigation dams in the old Danube bed, by which the water flow equivalent to the natural flow of more than 1300 m^3/s can be ensured with a smaller loss in water flows.

Annex 78

LETTER FROM THE LEAGUE OF TOWNS AND VILLAGES IN ŽITNÝ OSTROV AND OTHER LOCAL ORGANISATIONS TO THE COMMITTEE CHAIRMEN OF ASSORTED NATIONAL BODIES, 18 JULY 1991

[Translation]

Dunajska Streda
18 July 1991

To Alexander DUBČEK,
President of the Federal Assembly of the Czech and Slovak Federal Republic

To the chairman of the Federal Environment Committee –
Dr. RYNDA and Mr. STANK

To František MIKLOŠKO
Chairman of the Slovak National Assembly

To Dr. HUBA
Environmental Protection Committee in Slovakia

Members of our community protest about the continuation of the Gabčíkovo-Nagymaros hydroelectric power plant. No response has been given to our petition sent to the President of the Czech and Slovak Federal Republic, the Chairman of the Federal Environment Committee and the Chairman of the Slovak National Assembly. Despite the fact that the Slovak Government had previously stopped all ongoing construction work in connection with the barrage system, the only exception being flood prevention work in the region, we have information about the continuation of full scale construction work. The position of the Slovak Environmental Committee on the provisional option for the putting into operation of the Gabčíkovo power plant is known to us. We also know that according to a document compiled by experts and known as "STANDPOINT", the majority of prerequisite conditions for the continuation of construction work cannot be fulfilled. The Slovak Government, however, has provided funds for preparatory work in connection with option C, i.e., the completion of the power plant.

According to information coming from workers on the construction site, one cannot turn a blind eye to certain deficiencies with respect to the building of the dam and also in connection with the Gabčíkovo part of the system. Given the fact that we can in no way rely on the quality of construction work and have no information whatsoever pertaining to the issue, we demand the immediate setting up of a parliamentary committee to look into these matters.

As a result of this situation, we declare our citizens' rights, included in paragraphs 19, 23 and 35 of Act Zb. 23/1991 violated and endangered.

We warn the Water Management and Development Company (Vodohospodárska Výstavba) of Bratislava that the company's activity is in breach of paragraphs 19, 23 and 35 of Act Zb. 23/1991.

Árpád Öllös
President of the Žitný Ostrov region

Ing. BABEJ Ján
EUROCHAIN citizens' movement,

Conditions under which we are ready to stop obstructing the construction site at the inlet canal at the Gabčíkovo hydroelectric power plant are as follows:

We are ready to stop our protest movement started on 3 July, 1991 if:

- All preparatory work for the provisional realisation of the Gabčíkovo-Nagymaros hydroelectric power plant is abandoned immediately.

We equally demand that

- the local population have priority rights in decision-making with respect to the issues concerned
- the international agreement concluded in 1977 be given a new definition, emphasis being laid on the preservation of the natural resources in the Žitný Ostrov region
- the immediate start of area rehabilitation in the region, restoring the natural (living) environment to an acceptable condition, an option that we think is the most economical one
- the immediate start under the supervision of a parliamentary committee of quality revision concerning all work items performed to date on every construction unit of the Gabčíkovo hydroelectric power plant.

14 July 1991

Annex 79

PETITION BY THE INHABITANTS OF THE ŽITNÝ OSTROV, 28 JULY 1991

[Translation]

We hereby request the Government of the Slovak Republic to

1. Stop the direction of the Danube from the Hrušov branch into the affluent canal,
2. Stop all work pertaining to the transitional option with respect to the construction of the Gabčíkovo hydroelectric power plant.

The petition was handed over to the Prime Minister JUDr. Jan Čarnogurský of the Slovak Republic by members of the appointed delegation, which included deputies of the legislative bodies in the region, representatives of the Association of the towns and Villages of the Žitný Ostrov, and other citizens participating in the demonstration.

The petition was, as part of movements of protest, accepted during the demonstration in accordance with paragraph 6 of Act 85/1990 Zb regulating legal procedures pertaining to petitions; such movements have been taking place since July 3 1991, against the completion of the Gabčíkovo Hydroelectric Power Plant.

The petition was read out before those present at the demonstration and was subsequently accepted unanimously. The list of attendance has been deposited with the organisers of the demonstration.

Organisers of the demonstration are:

Citizens' Organisation called Eurochain;

Individuals in charge of the organisation are:
- Ing. Ondrej Sárkány
- "EUROCHAIN – Žitný Ostrov-Šamorín"
- Association of the towns and Villages of the Žitný Ostrov
-"Association of the towns and Villages of the Žitný Ostrov, Dunaszerdahely"

[Annex Omitted]

Annex 81

CONSTRUCTION PERMIT FOR THE OPERATION
OF THE GABČÍKOVO HYDROELECTRIC POWER STATION, 30 OCTOBER 1991

[Translation]

County Environmental Office, Bratislava Region
State Water Conservancy and Water Protection Department

Bratislava, 30 October 1991

Commencement of operation of the Gabčíkovo Hydroelectric Power Station

Water Law order

RESOLUTION

The Bratislava Region County Environmental Office as the responsible water conservation organisation according to paragraph 4 of Law No. 595/1990 and the special construction office according to paragraph 120 of Law No. 50/1976 on the basis of the Water Law Order

licenses

the Bratislava Hydraulic Construction Company for the construction of the Hydroelectric Power Station according to the 1st section of paragraph 9 of Law No. 138/1973 and to paragraph 66 of Law No. 50/1976 on the basis of the projects compiled by Hydroconsult in Bratislava "Gabčíkovo-Nagymaros Hydroelectric Power Station System, Water Conservancy part – preparation phase, Commencement of Operation of the Gabčíkovo Barrage System with Temporary Solution, The Temporary Solution of the Reservoir in the Territory of the Czechoslovak Socialist Republic, archive No. 26280, June 1991 and Gabčíkovo-Nagymaros Hydroelectric Power Station System, Commencement of Operation of the Gabčíkovo-Nagymaros Hydroelectric Power Station in the Territory of the Czechoslovak Socialist Republic with Temporary Solution, Part 1", archive No. 26343, Aug. 1991.

A. Conditions of Permission

1. The applicant is obliged to guarantee the execution of all the obligations that were laid down in the statement of the Slovak Environment Protection Committee according to paragraph 14 of Law No. 138/1973 (25 June 1991) until the filing of the application on permission connected with the construction of the remaining part of the water conservation project, the "Commencement of Operation of the Gabčíkovo Hydroelectric Power Station with Temporary Solution in the Territory of the Czechoslovak Socialist Republic."

2. Filling up the reservoir is not allowed without guaranteeing proper sewage purification for the Patržalka district and Istrochem Company.

3. To exercise rights and to perform obligations deriving from the permission is only allowed in accordance with the decision of the Slovak Republic's Bratislava National Committee, according to resolution No. 489/405-1988, dated 25 February 1988, on the hygienic sector connected with the protection of the Ostrovné Lucky-Mokrad spring.

4. The exploitation of the inner spring of Ostrovné lucky-Mokrad is not permitted.

B. Obligations of the applicant

1. During construction the applicant is required to submit a report every half a year to the Bratislava Region County Environmental Office on the situation of the quality of the groundwater in the surroundings of the spring of Ostrovné lucky-Mokrad, between the area of the actual construction and the area of the spring.

2. Any changes in the project -which appear to be necessary during construction and which would change the technical solution or the relationships pertaining to the rights of property- must be discussed with the proper water conservation authority.

3. The height of the project must be in accordance with the state levelling network.

4. Any damage done during construction and operation of the licensed water conservation project, must be compensated.

C. Matters pertaining to the ownership rights

1. The licensed projects will be executed on the sites with parcel No. Čunovo 747, Hamuliakovo 1338, Šamorín 1464, Mliecno 647. The applicant exercises ownership rights in connection with these.

2. This construction licence does not authorise the applicant to illegally interfere in the rights of other individuals, therefore, the rights guaranteed by the licence can only be exercised if it does not involve illegal interference.

D. General regulations

1. There is no restriction of time on the licence, but it is only valid until the construction of the water conservation project is completed .

2. The local department can change the licence or repeal it on their own initiative or on a proposal after the enforced order on the basis of paragraph 11 of Water Law No. 138/1973 if the society's guaranteed water conservation or other important interests make it necessary or if there is a change in the status (ténylegesség) of the licence's decision makers.

3. This decision does not acquit possible claims concerning a third person.

4. The projects compiled by Hydroconsult constitute an important part of the decision, "Gabčíkovo-Nagymaros Hydroelectric Power Station, Water Conservation unit, Preparation phase, The Commencement of Operation of the Gabčíkovo Hydroelectric Power Station with Temporary Solution, The Temporary Solution of the Reservoir in the Territory of the Czechoslovak Socialist Republic," archive No. 26280 June 1991 and the Gabčíkovo-Nagymaros Hydroelectric Power Station, "The Commencement of Operation of the

Gabčíkovo Hydroelectric Power Station in the Territory of the Czechoslovak Socialist Republic, Part 1", with temporary solution, archive No. 16343 August 1991.

Justification

The Bratislava Water Engineering Company requested the construction of the water conservation project in their letter No. 233-720/1991, dated 9 April 1991, at the following units: 1-11.540 right dam on the left bank of the Danube between the 4.02-7.02 river reach part 1, according to the temporary solution alternative (the "C"), the commencement of operation of the Gabčíkovo Hydroelectric Power Station in the territory of the Czechoslovak Socialist Republic. The application did not contain the prescribed requirements, therefore, the water conservation body requested the applicant to modify the application, and the order was suspended by decision No. 137/A2/1991-K, dated 26 April 1991.

The applicant expanded the request in letter No. 02722-730-91, dated 18 June 1991, with the construction of the following water conservation projects: 1-11.501 right dam on the left bank of the Danube,

1-11.545 navigation,

1-11.571 incoming road at the Čunovo reach – the right dam of the reservoir,

1-11.572 bridging of the right drainage channel at km 1.0,

1-11. 596-599.

Preparatory works – prep. connections to the construction area of the right dam on the left bank of the Danube. After the modification of the request in the letter dated 18 June 1991 the applicant annexed to the order the following: territory decision No. 11170/70-13, dated 30 Dec. 1970 and the extension of its validity No. 10018/ 1975-12, dated 16 Jan 1976, the position of the Slovak Environment Protection Committee, dated 31 May 1991 on the validity of the territory decision, the statement of the Slovak Central Committee according to paragraph 14 of Law No. 138/1973, the verification of paying the fine, the minutes No. 3334-700/91, dated 3 July 1991 on the confirmation of the project documentation, the record of the meeting on the guarantee of the issuing of the Water Law licence, dated 10 June 1991, the justification "Preparatory Phase" of the reservoir's temporary solution, to be executed in the territory of the Czechoslovak Socialist Republic, compiled by HYCO Bratislava...

Minutes were compiled on the result of the personal discussion, held on 3 July 1991 on the initiative of the Bratislava Region County Environment Protection Office. Written positions were delivered before the personal discussions took place:

Area Environment Protection Office, Šamorín, 27 June 1991, negative position concerning the continuation of the construction as temporary solution of the Gabčíkovo-Nagymaros Barrage System, Bratislava-Čunovo Local Office, negative position, 2 July 1991, Hamuliakovo Area Council 1 July 1991, requested in connection with the construction as temporary solution the building of the water system for the whole village, the formation of disposal sites, considering the springs, and re-instating the road and traffic system after construction, Šamorín Mayor's Office: the town self-government does not agree with the execution and commencement of operation of the Barrage System, 27 June 1991.

Before the execution of the Water Law order, the applicant extended its request in letter No. 02722-730/1991, dated 29 July 1991, for the licence of the following main projects:

1-11.501 training dam on the right bank of the Danube between km 0.0-0.9

1-11.540 training dam on the left bank of the Danube between km 0.0-2.0 and km 7.5-11.5: 1-11.509-515, 1-11.517-519 and 1-11.585 water intake project in the Mosoni Danube branch, 1-11.581-584, 586-589 dam in the flood area: 1-11.535 river bed diversion: 1-11.565 dam and supplementary lock and 1-11.530 dam at the outlet), 1-11.599 bridging over the Mosoni Danube branch.

The investor added to the application of the modification of the commencement of operation with temporary solution of the Gabčíkovo Hydroelectric Power Station the following: Area Office Dunajská Streda negative decision No. 72/91, dated 12 July, the minutes of the negotiation with Hydroconsult, held on 25 June 1991.

The Bratislava Region County Environmental Committee requests the applicant in their letter of 14 Aug. 1991 to complete their application and to complete the missing sections . The application was modified by a supplementary report and with a modification to the application for construction report, with the project documentation 1- 11.599 Bridging over the Mosoni Danube branch, with the outlines of the nature protection zone of the springs, and with the position of the Bratislava-Hrušov Local Office concerning the reconstruction of the roads.

The personal meeting took place on 8 August 1991 after the written invitation. Minutes were compiled on the discussion. The following positions were attached to the Minutes: positions of the Hamuliakovo Area Office, dated 1 July and 18 August 1991, in which they express their disagreement with the construction of the projects and with the justification of the preservation of healthy drinking water. They requested that their opposing position should be taken into consideration. Šamorín Mayor's Office requests in their letter of 19 Aug. 1991 that the Water Law order should not be passed without the consent of the villages of the Žitný Ostrov. Later they remark that the temporary solution construction violates Law No. 23/1991. The Šamorín Area Environment Protection Committee in their letter of 20 Aug. 1991 does not give their consent to the issuance of the Water Law licence on the basis of paragraph 120 of Law No. 50/1976 from the point of view of the area decision of the solution proposal.

The Bratislava-Čunovo Local Office maintained their opposing position. The Dunajská Streda Area Environment Protection Committee demands guarantee that the construction of the projects does not worsen the quality of the groundwater.

After the personal conversation the bodies of the hygienic service issued their compulsory decision, in which they approve of the proposed project documentation on condition that after construction the investor is obliged to ask for permission for the commencement of operation of the Hydroelectric Power Station, and it is also requested that the date of the commencement of operation of the ecological projects, as well as each individual project of the Barrage System should be punctually kept.

The position of the Bratislava Water and Sewage Company was issued on 20 Sept. 1991, in which they request a positive experts' hydrogeological decision for the construction work in the protected zone of hygienic protection.

After issuing the Water Law order, the position of the "Groundwater" consultation group entitled "The Optimalisation Possibility of the 'C' Variant from the Point of View of the Groundwaters," 27 August 1991, was discussed. The discussion of the proposal took place at the Hydraulic Construction Company on 4 September 1991 in the presence of the designer and the concerned water conservation bodies . The proposal was not considered optimal considering the result of the meeting and the further conditions and further negotiation was cancelled.

Stating the proposals, positions and criticisms

Šamorín Mayor's Office and Čunovo and Hamuliakovo Area Office

The self-government of the village according to paragraph 61 of the Construction Law can take up a position on the Water Law order, regarding paragraph 4 of Law No. 369/1990, which says that the village settles their own internal matters and within the framework of the management of the financial action, they take up a compulsory position in the investment proceedings.

The licence of the water conservation project is not an internal affair. From this point of view the positions of the enlisted villages against the construction of the "Commencement of Operation with Temporary Solution of the Gabčíkovo Hydroelectric Power Station in Czechoslovak Territory" cannot be considered as an obligation in the decision making of the water conservation body.

The functional arrangement and the process of utilisation of the area was solved in the approved territorial plan, which is according to paragraph 29 of the Construction Law compulsory to all. The same applies to the territorial decision, within the framework of which the guarantee of the interests of the territory concerned, was solved. The negative position of the village representatives, which is contrary to the approved territorial plan and territorial decision is not compulsory for these reasons for the Water Law order. The applications of the area offices of the villages cannot constitute the topic of the solutions within the framework of the Water Law order, but they belong to the field of possible compensation.

Šamorín Area Environment Protection Committee

According to section 3 of paragraph 9 of the Water Law, the construction office can only give permission within the framework of the Water Law licence order, from the point of view of guaranteeing the accordance with the territorial plan of the proposed investment and the territorial decision.

The provisions of paragraph 9 on the Water Law, which is a special regulation about the validity of the resolutions on the merit takes as its starting point the wide range of possibilities to guarantee the conditions at the decision of the water conservation project.

Therefore, according to paragraph 120 of the Construction Law, the consent of the concerned local body with general construction official authority does not apply to this order. From the point of view of changing the above mentioned law, the decision of the legal action of the Šamorín Area Environment Protection Committee's negative position is needed. The Slovak Environment Protection Committee passed a judgement on the request of changing the territorial decision in the context of the prepared investment . In letter No. 2265/625/91, dated 31 May 1991, as the central body of the state Construction Law, they issued a detailed position on the question of validity of the territorial decision.

The position of the Slovak Environment Protection Committee is a written document from the point of view of the accordance with the territorial plan and territorial decision of the proposed water conservation project, according to section 3 of paragraph 9 of the Water Law. In this context it must be mentioned that the territorial plan on the Gabčíkovo-Nagymaros Barrage System was approved by the Government and the territorial decision was issued by the central body of the State Construction Law.

Consequently the position of the Šamorín Area Environment Protection Office cannot qualify as proof.

Dunajská Streda Area Environment Office,

State Environment Protection Centre, Bratislava,

Environment Protection Centre, Bratislava,

Environment Protection Development Centre, Bratislava

The claims are laid down in the statement of the Slovak Environment Protection Committee according to paragraph 14 of Water Law No. 356/91, in which as the central body they criticise the technical solution of the given construction from the point of view of defending the interests guaranteed by the Water Law and the wider interests protected by special regulations.

The obligations laid down in the statement must be considered by the investor and the designer in the projects and during construction, which is the condition of the execution of the construction.

Beside the above listed facts, the water conservation body considered many of the criticisms of the Water Conservation Research Institute.

The applicant justified the commencement of operation of the Gabčíkovo-Nagymaros Hydroelectric Power Station by temporary solution in Czechoslovak territory as a solution enforced on the basis of the position of the Hungarian Government. It makes the execution and commencement of operation and especially the repairs of the Dunakiliti dam and the control of the sedimentation possible. A very difficult step, the damming of the bed of the river Danube and connecting the dam to the linking dam will be possible under dry circumstances, which would accelerate and make the work a lot cheaper. The right dam on the left bank of the Danube can serve as an island for birds. Its strategic function is significant in the event that there is no compensation between the parties of the treaty in the near future. The operation of the Gabčíkovo Hydroelectric Power Station is possible without the functioning of the Dunakiliti dam

1.

The decision cited in the resolution section was made on the basis of the listed reasons.

Direction: The decision can be appealed according to paragraph 53 of Law No. 71/1967 within 15 days of delivery at the Bratislava Region County Environment Protection Office of the Slovak Environment Protection Committee.

Robert Wendl

Leader of Department

Annex 82

LETTER FROM MR. JAN ČARNOGURSKÝ, PRIME MINISTER OF THE SLOVAK REPUBLIC, TO MR. FERENC MÁDL, HUNGARIAN MINISTER WITHOUT PORTFOLIO, 14 NOVEMBER 1991

[Translation]

The President of the Government
of the Slovak Republic

Bratislava, 14 November 1991

Dear Mr. Minister!

I thank you for you letter of 7 November 1991.

I greatly value the efforts made by you and the Parliamentary Committees of our countries in the attempt to find a resolution for the situation which has occurred in relation to the Gabčíkovo-Nagymaros Barrage System, which is disadvantageous for the Hungarian and also for the Czech and Slovak Party.

I welcome your proposal that we discuss, once again, the technical/scientific questions during the meeting of the Hungarian and Czech and Slovak Governmental delegations, with special attention to the ecological effects of the hydroelectric plant on the surrounding region, to navigation, to energy production to the security of the operation and to other questions.

The proposal made by your Government – which you mentioned in your letter – that you are prepared to debate all proposals and technical/scientific problems raised by the Czech and Slovak Party will surely help our negotiations achieve success. I, like you, find it necessary for us to debate the incidental participation of foreign professional institutions in the resolution of individual problems.

Dear Mr. Minister, I thank you for the invitation of our delegation to the third round of negotiations. I propose that the Hungarian and Czech and Slovak delegations' meeting be held on 2 December 1991. The make-up of our delegation will be appropriate to the nature of the meeting, during which it is our intention to resolve primarily professional questions.

Dear Mr. Minister, I assure you of my deepest regards!

Jan Čarnogurský

Annex 83

RESOLUTION NO. 794 OF THE CZECH AND SLOVAK
FEDERAL REPUBLIC, 12 DECEMBER 1991

[Translation]

Re: the Report on the Commencement of the Operation of the Gabčíkovo Hydroelectric Plant.

The Government

I. Recognises the fact that the negotiations between the government delegations of the Czech and Slovak Federal Republic and the Hungarian Republic have not succeeded in producing a solution for the joint construction of the Gabčíkovo-Nagymaros hydroelectric system, and furthermore, that the Czech-Slovak party has in this phase exhausted all possible avenues toward the settlement of the dispute by negotiations;

II. confirms its resolution to commence the operation of the Gabčíkovo hydroelectric plant in the interest of the flood protection of the neighbouring areas, the facilitation of navigation at low water levels and in order to achieve the optimum utilisation of the Danube's hydroelectric potential, while minimising the total ecological damage brought about by the construction and operation of the said plant, and unless the Hungarian party agrees to participate in the joint completion of the Gabčíkovo plant, the Government gives its consent to the completion of the plant on the territory of the Czech and Slovak Federal Republic;

III. instructs

1. the Head of the government delegation of the Czech and Slovak Republic to

   a/ appoint the experts to participate in the joint Professional Committee;

   b/ inform the Federal Assembly about the course of the negotiations between the government delegations of the Czech and Slovak Republic and the Republic of Hungary, to express the standpoint of the government and call on the Federal Assembly to pass a resolution in the matter;

2. the Deputy Prime Minister and the Minister of Finance of the Czech and Slovak Federal Republic to cooperate with the Minister of Finance of the Slovak Republic in exploring possible avenues to procure the funds necessary for the construction of the water management part of the Gabčíkovo-Nagymaros hydroelectric plant system for the whole construction phase of the project, including the commencement of the operation of the Gabčíkovo plant under a temporary solution.

Executed by: The prime minister of the Slovak Republic, head of the government delegation of the Czech and Slovak Republic, J. Čarnogurský, and the deputy prime minister of the Czech and Slovak Federal Republic, V. Klaus.

Annex 84

INFORMATION DOCUMENT NO 239 FOR SUBMISSION AT THE MEETING OF THE SLOVAK REPUBLIC NATIONAL ASSEMBLY, BRATISLAVA, JANUARY 1992

[Translation]

Government of the Slovak Republic

Information Document

on issues related to the Gabčíkovo-Nagymaros hydroelectric power plant system and on the current state of affairs concerning efforts made to overcome problems related to that issue; this document also contains updated information on further steps taken by the government of the Slovak Republic with respect to alternatives for the solution of ecology-related problems

Document submitted by:

Jan Čarnogursky
Prime Minister of the Slovak Republic and leader of the government delegation of the Czech and Slovak Federal Republic

Suggested resolution:

The Slovak National Assembly accepts the updated information provided in relation to problems pertaining to the construction of the Gabčíkovo-Nagymaros hydroelectric plant; the Assembly has no objection to further steps to be taken by the government of the Slovak Republic aimed at the solution of the ecology-related problems.

Bratislava, January 1992

[Section outlining history of bilateral negotiations omitted]

Further steps taken by the Czechoslovak side

For the Czechoslovak side, the validity of the International Agreement is of crucial importance. The validity of the agreement cannot in any way be questioned as the International Agreement:

- has made it clear that after the completion of the Gabčíkovo-Nagymaros hydroelectric power plant the frontier between the two countries will continue to go along the old riverbed of the Danube and the line along which the frontier goes will be determined by the mid-line of the current navigation riverbed.

- provides for exclusive responsibility and compensation duties for one of the contracting sides, i.e. the Czechoslovak side is entitled to demand damages for the stopping by the Hungarian side of the construction,
- provides for the division of water in the Duna according to water approved by the joint contract project. This division determines water quantities to create fresh supply of water into the Danube bed and the Mosoni river branch,
- determines the territory upon which the provisional test operation of the Gabčíkovo-Nagymaros hydroelectric power plant is realised (e.g. the region of the Hrušov-Dunakiliti reservoirs, which is one among the main construction units of the Gabčíkovo-Nagymaros hydroelectric power plant,
- provides instructions for the contracting sides to obtain permission for the construction of the water management power plants and to organise, on their own territories, water management supervision, in accordance with the regulations of the contracting sides themselves.

If the Czechoslovak side wishes to minimise damages arising from losses incurred by the non-operation of construction units and also wishes to provide a limited amount of ecologically clean energy for Slovakia and to create a high quality navigation route on the Danube, the Gabčíkovo hydroelectric power plant has to be put into operation on the territory of the Czech and Slovak Federal Republic without the cooperation of the Hungarian side, if need be. However, this is a provisional alternative for the Czech and Slovak Federal Republic as a result of the illegal behaviour of the Hungarian side. The Czechoslovak side is ready at any time to finish the construction of the Gabčíkovo-Nagymaros hydroelectric power plant in accordance with the International Agreement if the Hungarian side starts acting in compliance with the spirit of the agreement and undertakes to pay damages to the Czechoslovak side.

This is the only alternative for providing a realistic solution from the point of view of the Czechoslovak side, in which the Czechoslovak side's compensation would be made possible through electric energy produced in the Gabčíkovo-Nagymaros hydroelectric power plant being transferred from the Hungarian side to the Czechoslovak side.

Provisional solutions concerning the Gabčíkovo hydroelectric power plant have been looked into by Czechoslovak experts and the following preconditions have been outlined:

- the Czech and Slovak Federal Republic shall insist on the validity of the International Agreement;
- all construction units constituting a provisional alternative for the realisation of the Gabčíkovo hydroelectric power plant will have to be built on the territory of the Czech and Slovak Federal Republic,
- Fresh supply of water and water supply in general for the Duna branch at Moson has to be secured in accordance with Paragraph C./ of (4) of Chapter One of the Peace Treaty of Paris signed 9 October 1948.,
- the provisionally built and test-operated Gabčíkovo hydroelectric power plant shall not affect in any way the frontier between the Czech and Slovak Federal Republic and the Republic of Hungary,

- water flow into the Danube bed has to be secured in accordance with the amount determined in the water division rulings approved by the project included in the joint agreement,

- during the construction of the provisional Gabčíkovo hydroelectric power plant, rulings included in the International Agreement, providing for duties to be performed with respect to the construction itself, shall be observed in order to secure acceptable conditions for navigation on the Danube during the period of construction,

- during the operation of the provisional Gabčíkovo hydroelectric power plant cross-sections have to be secured in accordance with the recommendations of the Danube Committee.

In its ruling No. 237 of May 1991, the government of the Slovak Republic instructed the Minister of Forestry and Water Management and the Finance Minister of the Slovak Republic to arrange for essential investment- and supply-related measures to be taken in preparation for the start of work on the construction units for the provisional test operation of the Gabčíkovo hydroelectric power plant without, if necessary, the participation of the Hungarian side.

The Ministry of Forestry and Water Management of the Slovak Republic provided the document pertaining to the provisional Gabčíkovo hydroelectric power plant (technological description of the plant and the economic assessment of the construction of the provisional Gabčíkovo hydroelectric power plant is included in Enclosure 3), which had been studied by the Environmental Committee of Slovakia. The Committee also provided an evaluation complete with comments made by other competent institutes and institutions, with special regard to the protection of the water resources at Žitný Ostrov and laying emphasis on requirements related to environment protection, bearing in mind the consequences of endangering the ecosystem and the genofond. Below is an extract from the letter of June 25 1991, addressed to the investor of the provisional Gabčíkovo hydroelectric power plant (No. 354/91-OSS II), which is in line with paragraph 14 of 138/1973 "Zb" of the Water Management Act:

1/ To provide documentation of the process and mechanism of self-purification and capacities thereof with respect to the infiltration of surface waters along the riverbank and on territories off the riverbank.

2/ To provide documentation of the horizontal pollution of ground layers and that of subsurface horizontal water in the branch system on the upper regions of Žitný Ostrov horizontally as well as vertically, to specify polluting material ingredients and characteristics and the transport thereof into subsurface waters in prevailing as well as changing hydrological conditions when the changing of such conditions occurs as a result of their rising hydraulic gradients.

3/ To examine and provide documentation of the effects of the provisional Gabčíkovo hydroelectric power plant on subsurface waters from the point of view of the exploitation of hydroelectric power plant capacity and the supply with drinking water in large quantities of the population, and also bearing in mind the transfer of the navigation route and the creation of units of kinetics at locations which are closer to exploitable river sources.

4/ To work out a prognosis for the improvement of subsurface water quality as subsurface waters are a major source of supply of large quantities of drinking water for the population. Recommendations of water treatment technology should fall in line with treatment results. The schedule for the construction of water treatment equipment units has to be in accordance with the date upon which the Gabčíkovo hydroelectric power plant is to be put into operation. To achieve this objective, results of an international project included by professor Mucha in the framework of PHARE I., also have to be taken into consideration.

5/ As a result of a change in the configuration of the reservoir and the ensuing change in the quantity of infiltrated water at neighbouring locations, conditions of the supply of water sources equally change in areas surrounding the reservoir. Presumably, the provisional hydroelectric plant is an obstacle to the full-scale exploitation of water supply capacities at the water source of Dobrohošť in particular, which has been made ready for such purposes. The effects of this provisional alternative have to be examined and proved via an adequate modelling research on subsurface water quantities.

6/ As a result of the provisional option, the settling effect of the reservoir on the surface agents will be reduced along with the increase of flow velocity. Due to the process of sedimentation of suspended and dissolved matter at the bottom of the reservoir as well as to infiltration in subsurface waters in areas adjacent to the reservoir, it is essential to determine, via a mathematically devised model, the efficiency of settling in the modified reservoir.

To assess the possibility concerning the reduction of the accumulation space within the reservoir near the riverheads at Šamorín.

7/ As a result of heightened hydraulic gradients, the acceleration of the process of sedimentation of suspended and dissolved matter is to be expected at the right hand side of the reservoir. The intensity of this process will depend on the water level in the Danube as well as in the reservoir. Therefore recommendations should be made in the project to create parallelism with respect to the above process near the reservoir rather than near the inlet canal.

8/ To judge the effects of the old river bed on subsurface waters on both sides of the Danube resulting from the obstruction of the flow of the river 11 km further up north (at Dunacsuny) compared to the original location (Dunakiliti). To examine whether the drainage effect of the old Danube riverbed still exists.

9/ The provisional solution deforms the riverbed at Palkovičovo, where the drainage canal joins the old Danube bed. The floating debris of the Danube will settle at the end of the retainment process, while the settling of suspended sediments will occur in the reservoir of the power plant, which means that "hungry waters" will become saturated by suspended sediment below Palkovičovo (i.e. the deepening of the bed will take place). This is why it is necessary to regulate the Danube bed and to help create suspended sediment along the reach between Palkovičovo and the location where the Ipoly meets the Danube, and also to pay special attention in neutralising processes of erosion along the reach between Palkovičovo and the estuary of the Mosoni Danube river branch. To achieve this aim, the application of a suggestion made by Ing. Bartolicek and included in the letter of 28, 3, 1991 (No. 246/91-OOBV), written by the Committee of Environment Protection in Slovakia to the Ministry of Forestry and Water Management in Slovakia.

10/ The deposition from the reservoir of sediment produced on dump sites equipped with a control system and are designed in accordance with ministerial ruling No. 23/1977 Zb. pertaining to what is known as the protection of surface and subsurface water quality, on areas that are situated outside the protected water management plains of Žitný Ostrov.

11/ To secure on both sides of the Danube the joining of tributaries along with the regulation of affluent beds at places where water inflow occurs, i.e. to remove the dams along reaches between Dobrohošť and Palkovičovo where water inflow originally occurred.

Tributary flow is hindered and the unnatural discrepancy of layers in surface waters occurs as a result of the construction of disproportionately large transversal dams between reaches and of pathways on top of dams, and also as a result of the creation of what is known as "cassettes" and, in addition, via the creation of isolated areas in subsurface waters which in turn produce stagnant waters, the oxygen and nutrient content of which will prove inappropriate for the needs of floodplain forest ecosystems. In this way, the undesirable and long-duration flooding of floodplains would have to be reckoned with, the consequences of which would be a complete change in their condition. The difference between actual and required quantities will increase via the construction of transversal dams, therefore the difference in tributary water quantities will secure the actual flow of water in the tributaries.

To submit a proposal to the Committee of Environment Protection in Slovakia for regulation of the reach where the derivation canal is situated, in view of the fact that the tributaries along with a simulated flood will have access to supplies from the old Danube bed. A periodical flooding of the area by extracting water from the river requires 5-7, but a maximum of 14 days in each case, and it is done according the seasonal level fluctuations of the Danube, that is primarily in May and June and also in August and September.

12/ To provide for the building of permanent construction units for preventive measures, which, along with mobile equipment prevent the accidental decrease in the quality of water in the Danube, caused primarily presumably by oil by-products.

13/ To secure the water supply of the Mosoni branch of the Danube based on the guidelines of water division in accordance with the Agreement between the Czech and Slovak Federal Republic and the Republic of Hungary signed in 1948 in compliance with the Paris Peace Treaty.

14/ Given the fact that the realisation of the construction takes place in the unprotected Danube bed, the investor recommends the realisation of work items during a period in which conditions are hydrologically favourable. However, it is important that measures for the prevention or reduction of damage be taken, should the quantity of inflowing water from the Danube increase during the construction period. The proposal should be submitted for legal proceedings.

15/ To assess the passing of floods and of ice, along with all flood prevention measures during the period of construction and also during the operation of the Gabčíkovo hydroelectric power plant during the provisional operational period, all this in connection with the shrinking of the reservoir and also with the regulation of dams on the territories affected.

16/ In order to monitor affluence, it is necessary to organise continuous sessions of measurement of the regions in question and also the registration of levels, plus the flowing through of water in every major construction unit of the Gabčíkovo hydroelectric power plant and in the old Danube bed.

17/ During the assessment of project documentation entitled "A summary of flood-prevention measures", small protected areas have to be taken into consideration i.e. a proposed state-owned nature reserve (Istragon), another state-owned nature reserve (Ostrov orliaka morského), summer oaks at the forester's lodge and protected natural formations (Královská lúka). To achieve this objective, it is necessary to contact the state-controlled Nature Protection Supervisory Authority's local office in Komárom.

18/ Given the current degree of plant profusion at the flood belt in the old Danube bed, it is necessary to take steps for the flowing through of 1300-1500 m3 water during what is regarded as a period of vital importance in order for natural physiological processes to be protected from any disruption (especially during the period lasting from the third month to the ninth month). Furthermore, it is necessary to ensure the flowing through of water in the old Danube bed, which makes contact between subsurface waters and the ground level feasible, and it is equally necessary to prevent the subsurface waters from being separated from the ground level. Apart from this, the drainage effect of the old river bed has to be preserved whenever water levels in the old river bed are low. Assessment has to be made whether the flowing through of a minimal of 600 m3 /s-1 is enough as has been proposed, to fulfil the requirements outlined above. Required quantities of water flowing through have to be controlled in order for the above mentioned requirements to be fulfilled and also during the period of construction in winter as well as during the vegetation period (3rd to 9th month of the year). Due to the absence of data concerning the thickness of covering layers of biotic pebble to determine the flowing through of water in the growing season and to protect the dynamics of subsurface waters, it is vital to work out a prognosis for the flowing of water from the levels of the old riverbed, joining the appropriate water level of subsurface waters at a flowing through of 1300-1500 m3/s.

19/ To prove safety by flood prevention measures in case of flowing through from the area next to the right-hand canal (transit canal)–(Bodiky region) for the flowing through at Q 0.1 % of the Danube.

When the assessment of prevailing conditions was made in a statement based on paragraph 14 of the Water Management Act, the Committee of Environment Protection in Slovakia used data submitted during a water legislation procedure with respect to what is known as preparations for the official approval of a water management power plant, entitled "Provisional operation of the Gabčíkovo hydroelectric power plant on the territory of the Czech and Slovak Federal Republic; the committee also used the findings of research work and its document of academic opposition completed in the Institute of Water Management, entitled "The effects of the operation of the Gabčíkovo hydroelectric power plant on the natural environment", plus a report submitted to the Committee of Environment Protection by the investing company "Vodohospodárska Výstavba" (Water Management Construction Company) working in cooperation with the Natural Sciences Department of Comenius University. The name of the working group is "Consultation group of subsurface issues–professor RNDr. Igor Mucha, DrSc.).

The aim of conditions under (1)-(7) is to determine the effects of the construction of the Gabčíkovo hydroelectric power plant on the quality and quantity of subsurface waters in Žitný Ostrov.

Research work started within the framework of measures accepted by the Ministry of Forestry and Water Management of Slovakia and in conjunction with the work of the Committee in 1990, related to the effects, viewed from diverse aspects, including ecological issues, of the construction of the Gabčíkovo hydroelectric power plant on the environment, was completed in July 1991.

Tasks related to the original alternative (known as the B alternative) of the construction of the Gabčíkovo hydroelectric power plant were performed for the flowing through of water, which necessitates the transformation of findings for what is known as "Provisional alternative for the operation of the Gabčíkovo hydroelectric power plant on the territory of the Czech and Slovak Federal Republic". Among problems to be solved, the task of optimising the utilisation of reservoir space [1.) among conditions] in order to restrict sedimentation of suspended and dissolved matter in the reservoir. This task is to be completed by the end of 1991.

The effects of the Gabčíkovo hydroelectric power plant on the quality and quantity of subsurface waters in Žltný Ostrov and research findings will be looked into and re-evaluated and will be outlined in a more accurate way complete with tasks pertaining to the conditions and their fulfilment as described in 3,4,5,6,7, completing the regulatory measures with respect to the shape and space parameters of the reservoir. Approved measures will be part of the project documentation of phase two of the construction, which will be part of the investor's application for the granting of a water management permit with respect to the remaining construction units.

Among requirements emphasising research focusing on environmental protection (8,13,11,17,18) and aiming at the creation of the best possible system of the Danube tributaries and water levels, this one, determined in 13., has been fulfilled. There are partial results with respect to task-related research used as part of the measures taken by the "Ministry of Forestry and Water Management in Slovakia" and completed by June 1991.

Tasks pertaining to the drainage effect and the assessment of this effect of the old riverbed (8.) and also to the elaboration of a prognosis in connection with the creation of layers at the flowing through of water to the tune of 600m3, 1300 m3, 1500 m3/s-1 (see 18. among the specification of conditions).

The investor will be responsible for the testing via modelling of the mutual regulation of the flowing through of water in the inlet canal and in the Danube bed. Within the framework of the initial project belonging to the 2nd phase of construction work, the proposal will be an integral part of the project documentation of the flood area.

To meet conditions (included in 14.,15.,19.), to overcome obstacles to the navigability of a reach of the Danube below Palkovičovo and to protect construction units from average caused by oil pollution by eliminating it; these requirements will be an integral part of the 2nd phase in the project documentation of the 2nd phase of construction.

Before a water management permit is granted, conditions in accordance with 13. and 14., pertaining to phase one of the construction have to be fulfilled as described in paragraph 14 of the statement of the Committee of Environmental Protection in Slovakia. Theses conditions have already been met.

Only those parts of or permanent construction units belonging to the Gabčíkovo hydroelectric power plant may be the subject of the legal procedure of water management, which do not prejudge the putting into operation of the power plant as a permanent solution.

The legal procedure of water management was initiated upon request by the investor, (Water Management Construction Company, Bratislava Company in State Ownership) at the Office of Environmental Issues in Bratislava County. During the procedure, the assessment of documents pertaining to the construction units built in phase one and the granting of permission with respect to those construction units in the course of what is known as the "Provisional commencement of operation of the Gabčíkovo hydroelectric power plant on the territory of the Czech and Slovak Federal Republic", was performed. The Office of Environmental Issues in

Bratislava County issued a document of resolution on 30 October 1991, based on research findings (resolution No. Vod. 137/251/A2/1991) allowing the use of construction units of the power plant; the resolution took effect on 18 November 1991. Among others, the following institutions appealed against the resolution: the Town Office of Šamorín, the Community Office of Vajka and Dunajom, the Community Office of Dobrohošť, the Central Committee of the Association for Environmental Protection in Slovakia. Deliberation with respect to the application documents will follow consideration by the Committee of Environmental Protection in Slovakia, taking into consideration the possible application of exceptional modification measures. Based on information published by the press, the above mentioned organisation of environmental protection submitted via its legal adviser an appeal against the resolution to the Supreme Prosecutor's Office. A competent department of the Supreme Prosecutor's Office is also expected to tackle legal problems related to the issue of the resolution.

The government of the Republic of Slovakia approved in resolution No. 384 of July 1991 the compulsory data provided in connection with the provisional alternative for the construction of the Gabčíkovo hydroelectric power plant approving at the same time the commencement of construction work in September 1991. The government instructed the finance minister of the Republic of Slovakia to enter into negotiations with the finance minister of the Czech and Slovak Federal Republic on issues related to the share of the financial burdens of construction-related costs. Resolution No. 384 by the Republic of Slovakia is included in Enclosure Four.

<u>Investment in the provisional construction of the Gabčíkovo hydroelectric power plant</u>

The state of affairs (end of October 1991) relating to the legal procedure of water management and the start of work with respect to the principal construction units is as follows:

- Completion of work on behalf of Hungary, on the territory of the Czech and Slovak *Federal Republic.*

  The issue of resolution relating to water management was based on documentation prepared by the Hungarian side. The documentation was later transformed to fit in with conditions in Czechoslovakia and construction work was started in September.

- Complementary flood-prevention measures.

  a project documentation with respect to the leaking drain of the left dam in the affluent canal was prepared. Construction work was started in July 1991.

  In October 1991, a project documentation was compiled, pertaining to flood-protection measures in connection with the right dam in the affluent canal and in the inlet canal. The issue of resolution relating to water management will be followed by the start of construction work in 1992.

- Transformation of the flood along the reach of the derivation canal.

  The project documentation has been prepared and the resolution relating to water management has been issued.

  Given the stopping of work by the Hungarian side and the conditions under which the Committee of Environmental Protection in Slovakia is ready to approve the continuation of construction work, project documentation has to be redrafted. Construction will start in 1992.

- Provisional alternative with respect to the operation of the reservoir on the territory of the Czech and Slovak Federal Republic.

  Subsequently completed parts of the project documentation with respect to the above principal construction unit have equally made applicable to make the continuity of construction work possible.

  The first part of the project documentation, compiled in 1991, is made up of the following sections:

- right dam on the right side of the Danube 0.0-0.9 km,
- left dam on the left side of the Danube 0.0-2.0 km and

  7.5-11.5 km,

- water transfer construction unit in the Mosoni branch of the Danube,
- brushwood dam in the flood
- brushwood dam at the affluent – water outlet,
- obstruction of the Danube bed,
- brushwood dam and complementary navigation chamber-protection of the jointly used construction ditch.

  The exact line along which the right dam on the left side of the Danube (2.5 km-7.5 km) is situated has yet to be defined in more detail, given the need for the creation of the best possible shape of the reservoir.

  If the Hungarian side will act in breach of the International Agreement by its refusal to participate in the construction work, the removal on the territory of the Czech and Slovak Federal Republic of the provisional alternative with respect to the structure of the reservoir will become redundant. The construction unit in question will control the direction of water flow in the Hrušov-Dunakiliti reservoir and will, in case of unit malfunction, make possible the operation as usual of the Gabčíkovo hydroelectric power plant at the brushwood dam at Dunakiliti.

<u>Financing the construction work</u>

Data approved by the government of the Republic of Slovakia show that costs incurred by the provisional construction alternative of the Gabčíkovo hydroelectric power plant are the equivalent of Kcs 8,413 million out of which water management-related costs will be Kcs 7,507 million and energetics- related costs will be as high as Kcs 906 million (calculation based on prices in 1991).

The Federal Ministry of Finance set aside a sum of Kcs 250 million for the financing of the Gabčíkovo hydroelectric power plant and for the provisional constructional and operational alternative of the power plant to be realised on the territory of the Czech and Slovak Federal Republic. Cash thus made available can only be used if other financial resources approved in the state budget of the Republic of Slovakia have already been exhausted. Cash made available via the federal budget can only be used until December 1991, i.e. no subsequent spending after 31 December until as late as January 15 of the following year will be possible.

Given the urgency with respect to the commencement of the operation of the Gabčíkovo hydroelectric power plant, and the need for complementary supply facilities, the financing of construction work in the forthcoming years will equally be necessary. Prices listed below are based on calculation at the price level in 1991:

The financing of construction work
Kcs million

Year	Water Management	Energetics	Total
1991	372	-	372
1992	3305	-	3305
1993	1400	100	1500
1994	1044	506	1550
1995	1386	300	1686
Total	7507	906	8413

<u>Supply-related measures with respect to the construction of the Gabčíkovo hydroelectric power plant</u>

Supply-related measures with respect to the construction of the Gabčíkovo hydroelectric power plant have been taken via retaining the main contracting supplier, a state-owned company (Hydrostav Bratislava), which in turn will have several sub-contracting suppliers. CKD, Rt. Blansko is responsible for water management.

Energetics-related will be performed by CKD, Rt. Blansko through delivery between 1992-1994.

A few citizen's movements and natural protection groups have responded favourably to the refusal by the Hungarian side with respect to the construction of the Gabčíkovo-Nagymaros hydroelectric power plant and the putting into operation of the Gabčíkovo hydroelectric power plant in particular. The start of a more intense phase in these movements became apparent in the preparatory phase of the second round of government delegations, reaching a peak on 3 July, 1991, when the filling-up construction unit was taken and ongoing work was disrupted at the Hrušov-Dunakiliti reservoir. Work on the unit was only restarted after interference by the police on July 22, 1991, following a ruling by the District Prosecutor's Office denouncing the activists' move as illegal.

Prime minister of the Republic of Slovakia J. Čarnogursky met on August 1, 1991 with representatives on behalf of "Rallying Round", an organisation of the towns and villages of Žitný Ostrov. The organisation was behind protests against the putting into operation of the Gabčíkovo hydroelectric power plant organised by part of the population in Žitný Ostrov. During the meeting it was agreed upon that a public debate in the form of a seminar class would, via media coverage, be held on the completion and putting into operation of the Gabčíkovo hydroelectric power plant. Water management aspects of the whole issue will have to be looked into (including the protection of subsurface waters) along with delivery-related, environmental, production (forestry, agricultural, fishing etc.), psychological as well as social consequences and economic issues of the construction of the Gabčíkovo hydroelectric power plant. The secretariat of the prime minister of the Republic of Slovakia selected several pairs of experts, during cooperation with representatives of ecological initiatives, under whose leadership the compiled edition of documents will be published and the public seminar will be organised. The realisation of the seminar is expected to take place in December 1991.

In accordance with task II.2.d. of No.384/1991 of a resolution by the government of the Czech and Slovak Federal Republic, an announcement was made by the leader of the government delegation of the Czech and Slovak Federal Republic in his letter of July 31, 1991, that the Czechoslovak side requests the examination by a joint committee of the original solution with respect to the realisation of the Gabčíkovo-Nagymaros Hydroelectric power plant.

On 6 August, 1991, the ambassador in Hungary of the Czech and Slovak Federal Republic handed over a memorandum to the president of the Danube Committee, addressed to every Danube state participating in the committee, in which the leader of the Czechoslovak government delegation outlined the position of Czechoslovakia with respect to the construction of the Gabčíkovo-Nagymaros hydroelectric power plant and the importance of the construction from the point of view of navigation cross sections along the reach between Bratislava-Budapest.

On July 30, 1991, the Foreign Ministry of the Republic of Hungary submitted a "note Verbale" to the Embassy of the Czech and Slovak Federal Republic, in which the Hungarian side protested against the pumping through of water to the inlet canal, which is looked upon by the Hungarian side as a unilateral move incompatible with international law. The Czechoslovak side responded that the pumping through of the water into the inlet canal is a step of technological importance to protect the condition of the construction unit and could be finished by the deadline indicated in the original schedule of the construction plans given the Hungarian side's failure to fulfil its obligations with respect to the joint construction efforts.

On September 11 1991, Mr. Vavroušek, minister and president of the Federal Environmental Protection Committee submitted his suggestions to the Committee of Economy and the Committee of Foreign Affairs of the Hungarian National Assembly and the Committee of Environmental Protection, for solutions available with respect to the unresolved issues concerning the Gabčíkovo-Nagymaros hydroelectric power plant.

The outcome of the negotiations was an agreement between the government delegations of the Czech and Slovak Federal Republic and the Republic of Hungary on 14 and 15 July, 1991, followed by a letter sent by the leader of the government delegation of Czechoslovakia to the Hungarian side on 19 September, 1991, in which the Hungarian side was informed about the insistence of the Czechoslovak side on the solution by the Czechoslovak-Hungarian joint committee and with the participation of experts on behalf of the European Community, of the problems in their complexity, which were related to the construction and operation of the Gabčíkovo-Nagymaros hydroelectric power plant. Emphasis was, at the same time, put on the fact that the Czechoslovak side would only be ready to accept a suggestion which made the putting into operation of the Gabčíkovo hydroelectric power plant possible.

Negotiations were held between October 9 and 11 1991 in Budapest between the Committee for Environmental Protection of the Czech and Slovak Federal Republic and the Committee for Environment Protection of the National Assembly of Hungary. The agenda of the negotiations was mostly taken up by problems related to the joint construction of the Gabčíkovo-Nagymaros hydroelectric power plant.

The position of the government of the Republic of Hungary, confirmed by resolution No. 26/1991 of April 16, made by the parliament of the Republic of Hungary, had not changed. A letter written by minister Mádl, leader of the government delegation of the Republic of Hungary, on October 8, 1991, is yet another piece of evidence thereof. The letter was addressed to the leader of the government delegation of the Czech and Slovak Federal Republic, and although the letter itself contained a suggestion for new negotiations concerning the problems related to the Gabčíkovo-Nagymaros hydroelectric power plant, but in the clause of the letter the minister made clear that his principal objective is to negotiate the drafting of a new agreement that would eliminate the consequences of the termination of the contract concluded in 1977 and currently in force, with respect to the construction of the Gabčíkovo-Nagymaros hydroelectric power plant. The lack of constructive behaviour on the part of the Hungarian side and its negative approach concerning the issues arising from the construction and operation of the Gabčíkovo-Nagymaros hydroelectric power plant is illustrated below.

During the Pan-European conference on transportation, held in Prague between 29 and 31 October 1991, with the participation of the European states, the Hungarian delegation, led by minister Siklós, left the conference room immediately when Mr. Pavle, Minister of Transport and Telecommunications of the Republic of Slovakia, uttered the words Gabčíkovo-Nagymaros in his speech. There is no denying that the aim of the Gabčíkovo-Nagymaros hydroelectric power plant is to overcome problems related to navigation bearing in mind the existing ecological and economic parameters.

Mr. Sámsodi-Kiss, government commissioner of the Republic of Hungary, asked the government commissioner of the Czech and Slovak Federal Republic, Mr. Kocinger, in a letter of 22 September 1991, for approval by the Czechoslovak side of research to be carried out by a Dutch specialist company, with respect to the availability of navigation routes in category four with the exclusion of a barrage system i.e. without the Gabčíkovo-Nagymaros hydroelectric power plant. In the letter the government commissioner of the Republic of Hungary made the statement that the Hungarian side had no plans or studies prepared to rely on, which made it necessary for the Hungarian side to see for itself under what conditions its own alternatives were viable without the use of a barrage system.

The Presidium of the Slovak National Assembly was informed on 20 August, 1991 about the current state of affairs concerning the construction of the Gabčíkovo-Nagymaros hydroelectric power plant. As a result of the meeting, resolution No. 492 was accepted by the Assembly.

The Federal Assembly of the Czech and Slovak Federal Republic was informed on 3 October, 1991, about the current state of affairs concerning the construction of the Gabčíkovo-Nagymaros hydroelectric power plant and was equally informed about the negotiations of the committees for environmental protection. Resolution No. 200, based on the above mentioned information, was then accepted.

The Republic of Hungary, our contracting partner has failed, since the abandonment in May 1989 of work pertaining to the Nagymaros hydroelectric plant, to submit any proposal for the modification of the joint project included in the contract. Recently, the Hungarian partner has done nothing more than make claims verbally for the rehabilitation of the construction site of the Gabčíkovo hydroelectric power plant. The Hungarian side has admitted to having nothing more up their sleeve than technological plans in an embryonic stage. The government commissioner of the Republic of Hungary is under the strain of having to acquire an expert's opinion and having to provide professional and technological arguments in order to support steps taken by the Parliament and the Government of the Republic of Hungary and also of having to submit professionally and technologically substantiated proposals for the modification of the joint project included in the contract. The Hungarian side takes every step to create a situation where the Czechoslovak side is virtually forced to submit alternative plans, thus convincing the Czechoslovak side of the erroneous nature of the joint project included in the contract.

If we assess the approach taken by our contracting partner in the problems related to the Gabčíkovo-Nagymaros hydroelectric power plant, there is no reason to believe that the authorisation given by the parliament of the Republic of Hungary to the government of the Republic of Hungary will change in any way in the near future. No further negotiations, including those of the government delegations, can change this situation. It is to be expected that following pressure from the Czechoslovak government delegation, the government of the Republic of Hungary will be authorised to approve the setting up of a committee under conditions exclusive of prerequisites for the abandoning of work on our part and possibly with the participation of experts on behalf of the European Community. This may prove a suitable reason for the Hungarian partner to play for time. Every research of this kind is a lengthy process and may last for several years, and research findings do not necessarily mean any future cooperation with respect to the completion of the Gabčíkovo-Nagymaros hydroelectric power plant.

Bratislava, December 1991

[Attachment]

REVIEW OF BUDGETARY EXPENDITURES FOR THE CONSTRUCTION AND OPERATION OF THE GABČÍKOVO PLANT UNDER THE TEMPORARY SOLUTION

TABLE 1

B. WATER MANAGEMENT SECTION:

1. THE SOLUTION OF THE JOINT CONTRACTUAL PLAN
2. COMMENCEMENT OF OPERATION OF THE GABČÍKOVO PLANT UNDER THE TEMPORARY SOLUTION

a) completion by Czechoslovakia of works which were to be realised by Hungary

b) supplementary flood control measures

c) filling up the headwater canal

d) temporary solution for the dam on CSFR territory (without the stone dike of the old riverbed), ideas on the utilisation of the temporary solution dam

e) substituting the VEQ=350 hydroelectric plant with a Q=600 m^3/s

f) acceleration of the operational level by switching over from 129.0 to 131.0 watergates (extra costs).

in thousand CSK

Items	1. The Solution of the Joint Contractual Plan		2. Commencement of Operation Of The Gabčíkovo Plant Under The Temporary Solution								
	1990	1991	a)	b)	c)	d)	Σ 2a)...2d)	e)	f)	1+Σ2a)...2d)	1+ Σ2a)...2f)
I. PROJECT, STUDIES, RESEARCH	541,017	629,335	17,456	8,512	17,039	239,923	282,930	14,410	17,778	912,265	944,453
II. OPERATIVE TEAMS	505,806	514,918	-	4,920	-	217,274	222,194	-	173,466	737,112	910,578
III. CONSTRUCTION STRUCTURES	11,335,174	11,980,048	313,677	148,367	306,175	4,110,198	4,878,417	258,508	158,520	16,858,465	17,275,539
IV. MACHINES, EQUIPMENT	21,535	28,471	-	-	-	5,000	5,000	-	-	33,471	33,471
V. STRUCTURES	1,100	1,540	-	-	-	-	-	-	-	1,540	1,540
VI. SUPPLEMENTARY COSTS	1,357,667	1,495,951	35,445	16,916	34,598	470,970	557,929	27,727	23,445	2,053,080	2,107,652
VII. OTHER COSTS	187,630	187,630	1,745	850	1,703	23,992	28,290	1,440	1,777	215,920	219,137
VIII. PROVISION	36,471	51,059	24,439	11,915	23,854	335,892	396,100	20,177	24,887	447,159	452,223
IX. OTHER INVESTMENTS	1,006,000	1,202,718	3,510	1,710	3,425	48,275	56,920	2,897	3,573	1,259,638	1,266,108
X. INVESTMENT COSTS	351,500	432,194	1,755	855	1,710	24,140	28,460	1,448	1,787	460,654	463,889
XI. OPERATING ENVIRONMENT COSTS	629,502	716,117	17,553	8,555	17,110	241,382	284,600	14,585	17,865	1,000,717	1,033,167
II.-VIII. TOTAL	**13,445,383**	**14,259,617**	**375,306**	**182,968**	**366,330**	**5,163,326**	**6,087,930**	**309,852**	**382,195**	**20,347,547**	**21,039,594**
I.-XI. TOTAL	**15,973,402**	**17,239,981**	**415,580**	**202,600**	**405,614**	**5,717,046**	**6,740,840**	**343,192**	**423,198**	**23,980,821**	**24,747,211**

2e)+2f)	**II-VIII.**	**392,047**
	I-XI.	**766,390**
Σ 2a)...2f) Σ	**II-VIII.**	**6,779,977**
	I-XI.	**7,307,230**

TABLE 2

REVIEW OF BUDGETARY EXPENDITURES FOR THE CONSTRUCTION AND OPERATION OF THE GABČÍKOVO PLANT UNDER THE TEMPORARY SOLUTION

ENERGETICAL SECTION:

1. THE SOLUTION OF THE JOINT CONTRACTUAL PLAN
2. COMMENCEMENT OF OPERATION OF THE GABČÍKOVO PLANT UNDER THE TEMPORARY SOLUTION

a) completion by Czechoslovakia of works which were to be realised by Hungary

b) supplementary flood control measures

c) filling up the headwater canal

d) temporary solution for the dam on CSFR territory (without the stone dike of the old riverbed), ideas on the utilisation of the temporary solution dam

e) substituting the VEQ=350 hydroelectric plant with a Q=600 m^3/s

f) acceleration of the operational level by switching over from 129.0 to 131.0 watergates (extra costs).

ENERGETICAL AND
WATER MANAGEMENT
SECTIONS TOTAL:

in thousand CSK

Items	1. The Solution of the Joint Contractual Plan		2. Commencement of Operation of the Gabčíkovo Plant under the Temporary Solution					
	1990	1991	d)	e)	1+2d)	1+2d)+2e)	1+Σ2a)...2d)	1+Σ2a)...2f)
I. PROJECT, STUDIES, RESEARCH	51,949	51,949	15,190	4,250	67,139	71,389	979,404	1,015,842
II. OPERATIVE TEAMS	2,028,645	2,396,037	607,910	169,630	3,003,947	3,173,577	3,741,050	4,084,155
III. CONSTRUCTION STRUCTURES	-	-	-	-	-	-	16,658,465	17,275,593
IV. MACHINES, EQUIPMENT	1,851	1,851	-	-	1,851	1,851	35,322	35,322
V. STRUCTURES	-	-	-	-	-	-	1,540	1,540
VI. SUPPLEMENTARY COSTS	21,010	45,042	9,120	-	54,168	56,712	2,168,042	2,163,764
VII. OTHER COSTS	9	9	-	-	9	9	215,929	219,146
VIII. PROVISION	143,821	143,821	43,180	12,050	187,001	199,051	634,160	691,274
IX. OTHER INVESTMENTS	120	120	-	-	120	120	1,259,758	1,266,228
X. INVESTMENT COSTS	5,200	5,200	-	-	5,200	5,200	465,854	469,087
XI. OPERATING ENVIRONMENT COSTS	559,741	559,741	32,960	9,210	592,701	601,911	1,593,418	1,635,078
II.-VIII. TOTAL	**2,195,336**	**2,586,760**	**660,210**	**184,230**	**3,246,970**	**3,431,200**	**23,594,517**	**24,470,794**
I.-XI. TOTAL	**2,812,346**	**3,203,770**	**708,360**	**197,690**	**3,912,130**	**4,109,820**	**37,892,951**	**28,857,031**
	2d)+2e)	**II-VIII.**	**844,440**					
		I-XI.	**906,050**					

Annex 85

DECLARATION BY THE ASSOCIATION OF THE TOWNS AND VILLAGES OF THE ŽITNÝ OSTROV CONCERNING THE CONSTRUCTION OF THE GABČÍKOVO HYDROELECTRIC POWER PLANT, 18 FEBRUARY 1992

[Translation]

On 18 February, the issues pertaining to the construction of the Gabčíkovo Hydroelectric Power Plant was, among others, discussed during a meeting of the Association of the Towns and Villages of Žitný Ostrov, by the leading officials of the surrounding towns and villages, while voicing their discontent on grounds of arguments listed below:

- The Government of the Czech and Slovak Federal Republic and of the Slovak Republic has failed to take into consideration the position of the mayors of Žitný Ostrov, declared in the form of a petition on February 3, 1991, voicing their disagreement of the further construction of the Gabčíkovo Hydroelectric Power Plant. They consistently confirmed their position in another declaration after July 2, 1991, during a meeting of the above mentioned Association, which was also supported by members of a demonstration of protest between July 3, 1991 and October 6, 1991.

- The provisional option of plans pertaining to the construction of the power plant reduces the efficiency of work to be performed by specialist groups working along with experts representing the European Community, investigating in a complex way into the effect on the environment of the Gabčíkovo Hydroelectric Power Plant.

- In spite of the fact that the towns and villages concerned have submitted a valid appeal, expressing disagreement over the resolution issued by the District Office of Environmental Protection of the Bratislava Region, an official permit of construction for the execution of the provisional option pertaining to the construction of the Gabčíkovo Hydroelectric Power Plant along a permit for the operation of the same plant, was granted, resulting in the subsequent start of construction work, whereas no in-depth analysis of the economic or ecological consequences of this option had previously been performed.

- No fulfilment of the requirements of individual resolutions has been performed, despite Resolution No. 200/91 by the Federal Assembly on October 3, 1991; the resolution in question provided for the quality control of work items performed to date and also the examination of the effects on the environment of the hydroelectric power plant, providing for the fulfilment of requirements pertaining to ownership rights and claims of restitution in connection with the owners of expropriated lands and forests.

- Despite the fact that the outcome of meetings between October 9 and 11, 1991 was broadly to be thought of as positive, work on jointly set tasks with a prospect of leading to bilaterally acceptable solutions could not be started as the Czech and Slovak side had in the meantime started to perform work items with respect to the execution of the construction and the future operation of the Gabčíkovo hydroelectric power plant, which is to be regarded as a unilateral solution.

Given the fact that the Association of the Towns and Villages of Žitný Ostrov has no reason to believe that effort are being made by competent organisations and officials, with special regard to the Government and specialist ministries of the Slovak Republic, to take into consideration the position and general view of the communities in the region concerned, the mayors and other leading officials thereof are forced to appeal to the Constitutional Court of the Czech and Slovak Federal Republic in accordance with Act 23/1991 Zb. on grounds of the prospects of a healthy way of life and the existence of a healthy living environment being reduced and consequently being in need of legal rectification.

Dunajská-Streda, February 18, 1992

Ing. Peter Pázmány,
Secretary of the Association.

Annex 86

NATIONAL ACCOUNTING OFFICE,
REPORT ON THE DECISION -MAKING PROCESS FOR THE GABČÍKOVO-NAGYMAROS BARRAGE SYSTEM,
MARCH 1992

(an excerpt)

[Translation]

Part I:

The state and political decisions made on the construction of the barrage system as reflected in documents (1958-1989)

March 1992

2.2.2 The Hungarian standpoint was presented officially to the Czechoslovak party by József Marjai at the 21st September 1981 Prague meeting of the co-presidents of the Hungarian-Czechoslovak Committee for Economic and Technical Scientific Cooperation. The proposal for the postponement until 1990 was justified on the grounds of there being an economic case of emergency, and the need for further examination of the environmental effects was also mentioned. The Czechoslovak party rejected the Hungarian proposal, referring to the advanced state of the works, and the damages they would incur by the suspension. They would only agree to slowing down the pace of construction for three years. As there was no agreement, it was decided to continue negotiations.

Annex 87

INFORMATION DOCUMENT FOR THE SLOVAK GOVERNMENT:
ESSENTIAL INTERSTATE NEGOTIATIONS AND THE TALKS OF THE GOVERNMENTS OF THE SLOVAK REPUBLIC AND THE CZECH AND SLOVAK FEDERAL REPUBLIC DURING 1991, 9 APRIL 1992

[Translation]

September 6, 1990 Bratislava: The first negotiation in Bratislava of newly appointed Government Commissioners György Sámsondi Kiss and Dominik Kocinger, on the construction and operation of the Gabčíkovo-Nagymaros Barrage System.

The CSFR Government Commissioner officially confirmed the validity of the International Agreement of September 16, 1977; and of other documents of relevance and the willingness of the CSFR for the joint harmonisation of viewpoints with respect to issues of environmental protection and in the realisation of measures to be taken to minimise negative effects in accordance with article 19 of the interstate agreement. Information was also provided on current research and co-ordination including assistance from the EC and the formation of a work team at Comenius University in Bratislava. The commissioner proposed to the Hungarian partner the participation of individuals and official experts in joint research under supervision by the government commissioners, which is made possible by the position of the latter.

No protocol was signed during the negotiations. In a statement made in October with respect to the draft protocol, the Hungarian side enforced its demand concerning preconditions that construction work was to be suspended during research. Moreover, approval by the committees was referred to government delegations for agreement.

October 17-18, 1990 Budapest: talks held between government commissioners. On the agenda of negotiations were:

- Renewal of the activity of the Joint Operative Group (JOG)
- Renewed proposal made to the Hungarian side by the government commissioner of the Government of the CSFR for participation in scientific research within the framework of PHARE through assistance from the EC
- Promise made by the Hungarian side following request by the Czechoslovak partner to summarise expert's opinions having led to the abandonment of work by the Hungarian side on the Danube Barrage System. Despite requests made by the Czechoslovak side, the Hungarian side only sent a list (titles) of documents related to scientific research that were unknown in the CSFR.

November 7, 1990 Budapest: Prof. Mucha, leader of the consultation group of the Government of the SR and also acting as government commissioner, was introduced to the Hungarian government commissioner; a draft proposal prepared for PHARE, concerning modelling of subsurface waters and ground waters on the area of the Danube Plain, along with a draft agreement for a jointly elaborated option concerning unresolved issues had been handed over. In his answer of November 15, 1990, the Hungarian government commissioner indicated that the program in question was not a trilaterally balanced one, and that the Hungarian side planned to restart negotiating it in the spirit of talks with Minister Vavroušek and government commissioner Kocinger. This has not been done so far. The PHARE program was launched in the CSFR for the first time in March 1992.

January 9, 1991 Budapest: Negotiations held between government commissioners. On the agenda was the preparation of negotiations between government delegations including problems that cannot be resolved during talks between government commissioners or by the "Joint Operative Group" and would, therefore, be submitted to the government delegations. Commissioners provided information on resolutions made by their respective governments.

April 22, 1991 Budapest: Negotiations between government delegations. As far as the Hungarian side is concerned, the spirit of talks was a reflection of a resolution made on April 16, 1991 by the Hungarian Parliament instructing the Hungarian Government to stop ongoing work on all the units of the Danube Barrage System, also instructing the Hungarian Government to insist, during negotiations with the Czech and Slovak government delegation, on the abandonment of construction work on the Danube Barrage System. The leader of the government delegation of the CSFR announced that 6 teams of experts were preparing without any delay for an immediate solution to be found in connection with unresolved issues.

July 10, 1991: Negotiations between government commissioners. Talks on unresolved issues referred to negotiations by government delegations. A statement was made with respect to the start of the activity of the government commissioners' Joint Operative Group. The limits concerning authorisation given to the Hungarian delegation during negotiations was an obstacle to the viability of a constructive agreement, the above mentioned authorisation comprising nothing else than the termination of the agreement.

July 14-16, 1991 Bratislava: Negotiation of government delegations. The mandate of the Hungarian delegation, according to which the latter may negotiate only on the suspension of the Treaty, blocked the way to all constructive agreements,

December 2, 1991 Budapest: Negotiations between government delegations. Top of the agenda was the setting up of an experts' team with the participation of EC experts. The draft version of guiding principles was elaborated; the Hungarian side disagreed with the idea of naming EC experts and stressed that the stopping of work aimed at finding a provisional solution agreement was the precondition of a prospective agreement.

October 9-11, 1991 Budapest: Negotiations between the Federal Parliament of the CSFR and the Environmental Committee of the Hungarian Parliament. There was no convergence during these negotiations in the position taken by the two sides on issues related to the construction of the Danube Barrage System.

September 11, 1991 Budapest: Negotiations between Federal Minister of Environmental Protection, Mr. Vavroušek and the committees of Environmental Protection, Economy and Foreign Affairs of the Hungarian Parliament. Mr. Vavroušek's attitude made the headlines and was given intense media coverage but led to no change in the position of the Hungarian parliament.

The position taken by the Czech and Slovak side never changed during negotiations, i.e., any proposed change in the Danube Barrage System or acceptance by the Czech and Slovak side of suggestions based on technologically and legally appropriate documentation of the Hungarian side, making possible the accelerated operation of the Gabčíkovo Hydroelectric Power Plant, would only be possible on the basis of the International Agreement currently in force.

Problems related to technology and co-ordination were discussed during 7 negotiations of the Joint Operative Group in Bratislava and Budapest. Talks focused on issues such as flood-prevention measures, the preparation of an inventory, the handing over of units the construction of which had been abandoned by the Hungarian side on our territory, and the assessment of the consequences of the passing of flood in August 1991, along with further proposals for joint action.

Negotiations of the government of the Slovak Republic and the Czech and Slovak Federal Republic:

Government of the SR:

January 17, 1991	- acceptance of the possible option for utilisation of the GHPP and instructions for the elaboration of option "C" in the form of a memorandum
April 16, 1991	- Resolution No. 174 of the Government of the SR: approval of the proposal for the composition of the Czechoslovak government delegation and the financing of activity performed by the Czechoslovak side in the work teams.
May 21, 1991	- Resolution No. 237 of the Government of the SR: the outcome of negotiations of the government delegation on April 22 in Budapest were discussed and the preparation of a report to the Government of the CSFR was ordered.
July 23, 1991	- Resolution No. 237 of the Government of the SR: approval of construction-related data and acceptance of plans for the start of construction work for the putting into operation in September 1991 via a provisional option.
December 7, 1991	- Resolution No. 688 of the Government of the SR: memorandum of the negotiations on December 2 between the government delegations was accepted and agreement was reached on the submission to the Government of the CSFR of the report on the provisional option for the realisation of plans.

Government of the CSFR:

February, 7 1991	- Resolution No. 82 of the Government of the CSFR: approval of guiding principles to be followed by the Czech and Slovak government delegation during negotiations with the Hungarian side.
June 6, 1991	- Resolution No. 34 of the Government of the CSFR: discussion of the results of the negotiations on April 22, 1991 in Budapest of the government delegation, setting the task of elaborating new guiding principles and approval of the appointment of Mr. Čarnogursky, the new leader of the government delegation and the completion of the delegation with new members.

June 20, 1991	-	Resolution No. 383 of the Government of the CSFR: approval of guiding principles to be followed by the Czech and Slovak government delegation during negotiations with the Hungarian side.
July 25, 1991	-	Resolution No. 484 of the CSFR: agreement to the steps made by the government delegation of the CSFR with respect to negotiations held between 14 and 15 July, 1991 on preparations to be made for the provisional putting into operation on Czechoslovak territory of the Gabčíkovo Hydroelectric Power Plant.
	-	tasks set for the Finance Ministers of the governments of the CSFR and the SR to raise funds for the construction of the GHPP.
	-	The government of the HR is to be informed by July 31 that the CSFR insists on the original technical solution based on the joint agreement.
December 12, 1991	-	Resolution No. 794 of the Government of the CSFR:
	-	reasserts its determination for the provisional putting into operation of the GHPP, should the Hungarian side reject the idea of the joint completion of the GHPP.
	-	setting the task for the Deputy Prime Minister and Finance Minister of the CSFR to make efforts to raise funds for the completion of the G-N HPP, including costs incurred by the provisional option.

Bratislava, April 9, 1992

Annex 88

STANDPOINT OF THE CZECH AND SLOVAK FEDERAL REPUBLIC ON THE FINISHING OF THE COMMON GABČÍKOVO-NAGYMAROS PROJECT, 13 APRIL 1992

[Translation]

Chronology of the dispute:

16 September 1977	Signing of the Treaty about the construction of the common Gabčíkovo-Nagymaros Project by the Presidents of both Republics – from the standpoint of the international law, the Treaty represents a document of the highest legal rank, it does not contain any clause about the possibility of one-sided cancellation.
1981	The Hungarian side suspends the first time works of its share, with a proposal, to slow down or to interrupt the construction for ten years. Given reason: financial problems.
10 October 1983	Signing of a Protocol postponing the operation and termination of construction by four years.
cca 1986	Signing of a treaty between Hungary and Austria, according to which the Austrian side would provide the necessary finances and would take care of the construction of the Dunakiliti weir and of the Nagymaros dam. The investment should be repaid by electric energy. – 1,2 TWh/yr. for 20 years, starting in 1994.
6 February 1989	Based on a request of the Hungarian side a Protocol about shortening of the construction time of the Nagymaros part of the project and of the termination of the whole Project, by 15 months.
13 May 1989	The Hungarian Government decided, without consultation with the Czecho-Slovak side, to suspend the construction of Nagymaros for two months.
20 July 1989	The Hungarian Government took a further decision, to suspend also works of Hungarian share on the Gabčíkovo part of the Project.
25 August 1989	The plenipotentiary of the Czecho-Slovak Government formulates the first time the damage-claim of ČSFR, if Nagymaros will not be finished.
18 September 1989	On a meeting of experts on international law in Prague. It was stated, that the proceeding of Hungarian side represents a violation of the Treaty, which results in a liability for reimbursement of damages caused to the Treaty partner, as well as to third parties.

31 October 1989	The Hungarian Parliament decided to stop the construction of Nagymaros and empowered the Government to negotiate a change of the Treaty of 1977.
30 November 1989	The Hungarian side submitted an offer, to finish commonly Gabčíkovo as a run-of-the-river plant, at a condition, to accept the abandoning of Nagymaros.
December 1989	The Minister of Forestry and Water Management of the Slovak Republic stopped the studies of a temporary solution of Gabčíkovo on Czechoslovak territory, to facilitate the negotiations of a common solution.
January 1990	The Hungarian side withdraws the offer of November 1989.
October 1990	On the first meeting of newly appointed plenipotentiaries of both Governments, the Czecho-Slovak plenipotentiary proposed to address a common request to the EC, to study the possibility of ground-water-source protection in the frame of PHARE Program. This proposal was refused by the Hungarian partner.
14 November 1990	The Governments of Hungary and Austria agreed on a compensation of the Austrian firms suffering damages caused by suspension of works in Nagymaros (later a damage-claim of the Austrian side of 2,65 billion Sch, was acknowledged by a court).
December 1990	A report on evaluation of options of the Project (including the returning of territory into the "original" state) submitted to the Slovak Government.
17 January 1991	The Government of the Slovak Republic discussed the options and consented to the preparation of the temporary solution of Gabčíkovo on the Czecho-Slovak territory, not requiring cooperation of Hungarian side.
7 February 1991	The Government of ČSFR approved the guideline of negotiations. based on the valid Treaty of 1977.
10 April 1991	The Hungarian Parliament empowered the Governmental Delegation to negotiate only the abolishing of the Treaty and restoring the original state of territory.
22 April 1991	On negotiations of governmental delegations in Budapest, the Hungarian side asked for abolishing of the Treaty, without giving any plausible reasons. The Hungarian delegation did not submit any concrete solution and was not willing to discuss any other possibility. It rejected also the proposal of bilateral discussions on the level of experts – the group of Czecho-Slovak experts was prepared to join the negotiations on a telephone notice;

15 July 1991	On the second meeting of governmental delegations in Bratislava, the Czecho-Slovak side proposed to form tripartite commissions, including experts of EC, to make a scientific expertise of impacts of finishing of the Project – the Hungarian side, having the power to negotiate only the abolishing of the Treaty, rejected this proposal, but was willing to start bilateral talks at a condition of stopping works also on the Czecho-Slovak side (evidently considering such "talks" as a first step to the abolishing of the Treaty).
23 July 1991	The Government of the SR approved the realisation of the temporary solution of putting Gabčíkovo into operation by structures on the territory of ČSFR.
25 July 1991	The Government of the ČSFR approved the realisation of the temporary solution of putting Gabčíkovo into operation by structures on the territory of ČSFR.
30 October 1991	The Slovak Commission of Environment approved the construction of new weirs dams of the temporary solution, giving 19 conditions, to be fulfilled before putting into operation.
18 November 1991	Starting of construction works on the temporary solution on the Czecho-Slovak territory.
2 December 1991	On the negotiation of governmental delegations in Budapest, the Hungarian side refused to sign the minutes and submitted to ČSFR a 10-days ultimatum requesting the stopping of works on the temporary solution, as a condition of any talks on professional level.
23 December 1991	The ultimatum of stopping construction-works on the temporary solution (this time only "works not included in the Treaty") was repeated in a letter of the Prime Minister Mr. J. Antall to the Prime Minister Mr. M. Čalfa and in the letter of chairman of the Hungarian Parliament Mr. Gy. Szabad to its partner Mr. A. Dubček.
23 January 1992	The Prime minister of ČSFR in his response has given a guarantee that ČSFR will respect the decision of the commission of experts, even if it will be different to the solution realised.
26 February 1992	The Prime Minister Mr. J. Antall repeated his request addressed to Mr. M. Čalfa, to stop the construction works on the temporary solution during the work of the tripartite professional commission, without taking notice of the guarantee given by Mr. M. Čalfa and without giving a guarantee from his side, to respect the recommendations of the commission.

March 1992 The Hungarian side started a diplomatic and propagandistic campaign in the whole of Europe and overseas, asking for support of its actions, without mentioning or distorting the standpoint of the Czechoslovak side (address of Minister Mádl the Hungarian Parliament, the protest note to the Ministry of Foreign Affairs of ČSFR, the international organisations, mission of Minister Mádl to EC in Brussels).

Analysis of the situation

The Hungarian side made a political decision: to stop the construction of Nagymaros; only afterwards it ordered the Hungarian Academy of Sciences, to formulate verbal arguments for this decision. From the standpoint of international law, the only acceptable reason for not keeping a treaty of highest rank (when technical objections were out of questions) was "environmental self-defence". Therefore, the main argument had to be "a threat of an environmental catastrophe", but this could be based on popular "catastrophic" information, spread among the people in the course of resistance against the regime.

The Hungarian people, poorly informed about facts around the Gabčíkovo-Nagymaros Project, but convinced about the wrong policy of the communist government, did nor need more details or scientifically based arguments. Fighting against "internationalism", it was also desirable to "play a national tune", which was the preservation of the "historic scenery of the Danube-bend", upstream of Visegrád.

The Hungarian politicians were well informed about the situation among the political dissidents in Czecho-Slovakia (because of the same source of finances) and counted on cooperation with groups of environmentalists (who uncritically took-over the poorly-based arguments), as well as with ethnic Hungarians living in the Danube region, influenced by the Hungarian media. Therefore they did not bother with scientific back-up of arguments, or with looking for other technical, more economic solutions.

They calculated, that the "ripping-up" of the situation in ČSFR will need only some time and then, the Treaty will be abrogated with a consent from both sides, without any dispute.

The offer to commonly finish Gabčíkovo, was only a manoeuvre, how to stop the studying of the solution not requiring the cooperation with the Hungarian side. It was withdrawn immediately after suspending this line of Czecho-Slovak defence. The Hungarian side evidently considered also, that the common finishing of Gabčíkovo would weaken the main argument – the hypothesis of a threat of an environmental catastrophe; therefore this proposal was never repeated again.

Since May 1989, the Hungarian side was not interested in any positive action. The normal way of solving any problems connected with the realisation of the Project were blocked by recalling the Hungarian plenipotentiary, which hindered also the work of the Common Operative Group. Then, it was necessary only to invent reasons for delays in negotiations on all levels. The reaction on the Czecho-Slovak side (re-evaluating of environmental impacts, studying of possible technical measures, studying of possible solutions – without strong protests on the diplomatic level) was evidently considered as weakness.

The "play for time" had to be modified, after the Czecho-Slovak side resumed the work on the temporary solution on its own territory. When the "catastrophic line" did not succeed in stopping the construction works on the Czecho-Slovak side (as it was strongly requested by local "unbiased environmentalists", the political green lobby and their external supporters as Eurochain, Globe 2000, WWF etc.), protests and demonstrations were organised, to prove at least lack of democracy and surplus of nationalism in ČSFR – and specially in the Slovak Republic. The stopping of construction works was a steady condition of the Hungarian side, hindering any progress in seeking a positive solution. The decision of the Hungarian Parliament of April 1991 does not leave any doubts, that a solution by a compromise is not the aim of Hungarian policy.

If there would be no technical possibility to put Gabčíkovo into operation by means of structures situated only on the territory of ČSFR, the Hungarian "play for time" would undoubtedly be successful and the Slovak economy would receive another heavy shock, multiplied by the synergetic effect of the conversion of the military industry, privatisation and transformation into a free-market economy. But the starting of realisation of the Czecho-Slovak temporary solution in November 1991, upset this scheme. Ultimatums given since December do not request stopping of all works any more, but only the "works not included into the Treaty", because without these, all others would be useless!

From the beginning of 1992, an international campaign has been started by Hungary, accusing falsely ČSFR of not wanting to fulfil conditions for the work of an impartial commission (given by Hungary), of not willing to accept neither the creation of a tripartite commission including EC experts nor its recommendations, while evidently, the contrary is true.

It is clear, that this campaign is only another variation of the "play for time". The construction works do not interfere with the work of the commission, neither do they create an "irreversible situation". On the contrary – the Government of ČSFR gave guarantees to accept the recommendation of an impartial commission and, if necessary, to remove any structures, if they would be in contradiction with the recommendation. Accepting the condition of stopping the construction for the time of work of the tripartite commission, after three years of delays, it would unreasonably raise the sure losses, without a probable-enough perspective of possible environmental benefits. It would give the Hungarian side the possibility to prolong the work of this commission and finally, if the recommendation would be contradictory to the decision of the Hungarian Parliament, there is no guarantee of its acceptance!

During the resistance against the regime, a strongly nationally oriented group gained power in Hungary, arousing national feelings directed against the Trianon Treaty, for the reinstallment of the "Great Hungary" (including the territory of Slovakia, and parts of Romania, and Yugoslavia). In spite of the fact, that Hungarian minorities in other countries have much more rights than other minorities in Hungary, media all over the world are informed tendentiously about suppressing Hungarian minorities. The Prime Minister declares himself to be the Prime Minister of 15 million Hungarians (in Hungary, only about 10 million live) and the Minister of Defence declares to be ready to defend the rights of Hungarians outside Hungary. The radical nationalistic groups in Hungary are interested not only in severing the relations between Slovaks and Hungarian minority, but also between Slovaks and Czechs, to weaken the position of Slovakia.

To be just, the relation of the majority of Hungarian politicians to the "causa Gabčíkovo-Nagymaros", is not motivated by the nationalistic goals, but by the problem of how to change their standpoint, without "loosing face" and without losing their voters and their political position. The one-sided information spread for years through all forms of media resulted in the creation of a false "public opinion" in the minds of the uninformed and fear in the minds of those well-informed. This will be very hard to overcome, but the only remedy is, to spread the truth!

Evidence of correctness of the analysis

* The Hungarian side did not propose any positive solution and during the last three years it did not submit (neither elaborate) any technical and economical documentation – not even of its own, proposed solution of the demolition of all structures and putting the territory into the original state.

* The Hungarian side did propose an alternative source of energy (much more expensive and less environmentally-friendly), but did not propose alternative solutions for the flood protection and improvement of the navigation conditions on the Danube.

* The Hungarian side did not use the possibility of solving problems by means included into the Treaty (Common Operative Group and plenipotentiaries), refused common actions on the EC level (program PHARE) and refused to cooperate in professional commissions of any kind, without preliminary ultimate conditions and thus blocked the possibility to analyse the consequences of the stopping of works from various aspects (legal, environmental, economic, navigational, energetic, hydraulic, social).

* The Hungarian side expresses doubts about willingness of the Czecho-Slovak side, to keep all obligations resulting from the Treaty, but does not publish arguments contradicting this supposition.

* The Hungarian side in its present argumentation against the Project, does not mention that after suspending of works in Nagymaros, it proposed to finish commonly Gabčíkovo as a run-of-the-river plant, without Nagymaros.

* The Hungarian side does not allow the publishing of opinions of Hungarian professionals supporting the Project, neither does it inform the public, that the putting Gabčíkovo into operation is bound on fulfilling of 19 conditions of the Slovak Environmental Commission, reducing the possible adverse impacts to an acceptable level.

* The Hungarian media like to use strong expressions (Stalinist megalomania, Dunasaurus, concrete lobby etc.), very popular in the previous regime, when expressions of this kind had to hide lack of arguments. The catastrophic prophecies are based more on faith, then on arguments; many times, contradictory arguments are used in favour and nobody dares to notice it (see the column "Refuzniki" in the journal Hidrológiai Közlöny).

* The Hungarian media spread deliberate disinformation about the situation of Hungarian minority in ČSFR, even about an attempt of genocide! Rumours about poor quality of structural works are invented and presented as facts. Even members of the delegation give false information about insufficient geologic survey, while the contrary is true. This all serves to create an atmosphere of fear among the inhabitants. The very mild removing of demonstrators from the construction site (what is not tolerated even in countries with old democratic traditions) is described as "bloody". ČSFR is many times accused of intentions to change the border, to threaten the safety of Hungary, to steel the Danube, while a look into the text of the Treaty would be sufficient to prove the falseness of such accusations.

* As a manifestation of national superiority (and arrogance), many journalists use local names from the Austro-Hungarian Empire, when Slovakia was "Felvidék" (upper land) and the village Gabčíkovo was called Bős. But the Treaty and all official documents do not recognise any "Bős-Nagymaros Project"!

* The Hungarian side keeps the dispute on the political level, in spite of its declaration, that it has to be solved on a professional level (blocking of professional channels of solving problems on the level of the Common Operational Groups and the plenipotentiaries, correspondence of premier-ministers, spreading doubts about the border line, "defending" the interests of ethnic Hungarians in Slovakia, ultimate conditions, threats of one-sided cancelling of the contract, false accusing of reluctance in the creation of an impartial commission and of unwillingness to accept its recommendations, internationalisation of the dispute).

* The Hungarian side did not react on the Czechoslovak guarantee of the willingness to accept the recommendations of the tripartite commission, the constitution of which has been blocked for nearly a year. Even now – in April 1992, the Hungarian side is reluctant to give a similar guarantee.

Conclusions

The legal basis of misunderstandings between the Czecho-Slovak and the Hungarian side, is in different classifications, which one-sided steps are legal and which illegal.

Starting from the undisputed fact of validity of the Treaty signed in 1977, the party wishing changes, should respect the usual practice and to discuss any proposed change on all levels, before taking any one-sided action. This would be necessary also in the case, where one of the partners arrived at a conclusion that the project has been bad from the beginning, and that it's operation could create a threat of an environmental catastrophe. But this theory would have to be documented and proved. Besides, the feasibility or the optimality of the proposed solution, at given conditions, should be documented by a complex technical, economical and environmental analysis which should have been proposed.

If this normal sequence of actions was violated and the one-sided action was taken without previous proof of its necessity, this action has to be considered as illegal, quite apart from the "nobleness" of its motives. Such a procedure is incompatible with a democratic regime and it would mean passing a sentence before the process of investigation was finished and a legal suit even started.

The unwillingness of the Hungarian side, to seek a mutually acceptable solution was quite unambiguously confirmed by both, the Hungarian Government and Parliament, in April 1991. Therefore, all counteractions of the Czecho-Slovak side are defensive in character and have to be considered as an effort to diminish the damages accruing from the delay of operation, which the Hungarian side is unwilling fully to acquit. The Czecho-Slovak side expressed repeatedly its willingness to return any time to the conditions of the Treaty, when the partner will give necessary guarantees of keeping its obligations and when an agreement about compensation of caused damages will be reached.

Moreover, the Czechoslovak side is ready to take part in creation of an impartial tripartite commission on any professional problem necessitating clearance and is willing to respect the recommendations of these commissions. Moreover it is willing, for about six months, to restrain from closing the river-bed on Czecho-Slovak territory.

Annex 89

Non-official translation!

His Excellency
Frans Andriessen
Vice President of the Commission
of the European Community

<u>Brussels</u>

Budapest, 17 April, 1992

Dear Mr. Vice President,

Thank you for your letter of April 13, 1992 in which you offer us the cooperation of the European Community in clarifying the professional-scientific aspects of the Gabcikovo/Bős-Nagymaros barrage scheme.

I would like to take this opportunity to inform you that the Government of the Republic of Hungary is pleased to learn that the European Community is prepared to cooperate in this matter and that we accept the three conditions indicated in your letter.

I sincerely hope that the Government of the Czech and Slovak Federal Republic will likewise accept the European Community's offer.

Yours sincerely,

Géza Jeszenszky

Annex 90

EUROCHAIN ECOLOGICAL CIVIL INITIATIVE, AN OVERVIEW OF THE DEMONSTRATIONS AND OTHER MOVEMENTS AGAINST THE CONTINUATION OF CONSTRUCTION WORK WITH RESPECT TO THE GABČÍKOVO HYDROELECTRIC POWER PLANT,
MAY 1992

[Translation]

(Chronology of organised and other events)

When the issue concerning the solution of problems related to the Gabčíkovo Hydroelectric Power Plant is raised, apart from aspects such as ecology, economy, international law, one tends to disregard yet another factor, which is closely linked to the social ramifications of this conflict. What it boils down to is nothing else than what local residents might regard as being of primary importance, such residents living on a territory directly or indirectly affected by the negative effects of the hydroelectric power plant.

The population at Žitný Ostrov has, since the very beginning (1978), been concerned over the effects of construction work of this magnitude in the region.

As early as the 1978 session of the Dunajská Streda District Council, the scenario of which had been written well in advance by party officials, in the same way as was everything else of public interest in the days of totalitarianism, words of sharp criticism were to be heard in connection with the start of construction work. Local residents at Žitný Ostrov made a huge effort to prevent the destruction of their environment and the creation of a brave new world made out of concrete, a future without much hope that seemed to attend on them. They turned to their local Members of Parliament, the District and Regional Councils, the President of the Republic. The response they got was similar to the ones given to petitions in general, the ones that we have to put up with even today, saying "Have confidence in the government, they have their competent specialists to rely on". Those who master-minded the petitions were, very often, under police surveillance and were often accused of causing political disturbance. Meanwhile, the ubiquitous instruction coming from the upper echelons of party hierarchy, was for all functionaries at district, town and village levels to promote the cause of the hydroelectric power plant before local residents. Information concerning the effects of the plant was replaced by cheap promises for the construction of infrastructure, post offices, the creation of an ambulance service and of a laundry. Ostentatious promises were made of investments of this kind, in spite of the fact that villages were entitled in their own right to services and facilities of this sort, even without prior consent to the loss of their forests and agricultural lands along with the vanishing of their feeling of economic stability.

After 1989, the opposition of the local population with respect to the construction of the Gabčíkovo Hydroelectric Power Plant, a new political mood that could only be felt in a subdued form up to then, did eventually surface with more determination. People seemed to converse casually with specialists and meetings were organised; also, petitions and public letters were compiled in the hope that eventually, the confession that the whole concept of the construction of such a power plant was a mistake, and that after the assessment of the volume of future damage and of Kcs several billion worth of investments made so far, there might be no comparison between the former and the latter, would lead to the abandonment of the realisation of plans.

In the brief overview that follows, we will have a cursory look at the movements against the continuation of the Gabčíkovo Hydroelectric Power Plant in the Žitný Ostrov region in particular. Initially, events of this sort were organised spontaneously, as it were, which was followed by a period when measures were taken more consciously by Euretaz (Eurochain), a citizen's movement, which worked closely together with ecological organisations and movements in Czechoslovakia, and, above all, with the Association of Slovak Environmentalists and Conservationists along with the League of Settlements at Žitný Ostrov, the latter comprising more than 60 villages.

It is to be mentioned that information on the environmentalists in Bratislava, who had previously taken steps for measures to be taken to save the Danube, is to be found in a publication entitled DUNASTORY.

December 16, 1989. – demonstration at Gabčíkovo (1,500 participants)

- participants send a petition to officials

January 12, 1990. – Public debate held between the local residents of Šamorin and specialists on behalf of the Research Institute of Water Management, the Slovak Academy of Science and the Association of Environmentalists in Slovakia, about the negative effects of the power plant. It was then that the idea surfaced of a major demonstration of protest, i.e. the human chain. The participants (700 people) addressed their petition to the Government of National Understanding.

February 3, 1990. – A human chain along the dam is formed from Hainburg to Komárom (60,000 participants), a petition is sent to officials on behalf of the participants of the demonstration.

March, 1990 – Petition by the renewed plenary session of the Dunajská Streda District Council.

Mach, 1990 – Discussion between local residents and specialists in the village of Vojka and Dunajom on the effects of the hydroelectric power plant.

April 8, 1990. – With the participation of Austrian, Czechoslovak and Hungarian environmentalists along with participants of citizens' movements, a proclamation called Danube Charta Proclamation is issued with respect to the long-term development of the Central Region of the Danube, advocating the idea of the creation of a trilateral park, where units of the size of the Gabčíkovo Hydroelectric Power Plant must not be built. (WWF, Association of Environmentalists in Slovakia /"EIS"/ VERONICA, Eurochain, Danube Circle)

August, 1990 – A charity concert organised at Šamorin under the auspices of a movement called "Let us save the Danube Region" – petition sent to officials.

October, 1990 – Domestic and foreign environmentalist organisations (WWF, EIS, VERONICA, Eurochain, Danube Circle)

August, 1990 – A demonstration taking place in Prague's Wenceslas Square with the participation of environmentalists and the population of the Žitný Ostrov region, on the occasion of a conference being held of the Helsinki Citizens' Association. A petition addressed to the HCA.

November, 1990 – A scientific conference organised by EIS, WWF and Eurochain on the negative effects of the Gabčíkovo Hydroelectric Power Plant, a meeting held in Bodiky between participants of the conference and the population of the Žitný Ostrov region.

February 3, 1991 – During the first meeting of the chief burgomasters and mayors of Žitný Ostrov, 62 newly elected chief burgomasters and mayors signing a petition requesting the suspension of all work items currently being performed on the Gabčíkovo Hydroelectric Power Plant until a large-scale investigation into the effects on the environment of the power plant is to be launched, pointing out the erroneous nature of linking political power with an economic one, requesting, at the same time, Ivan Čarnogursky, to resign from one of his currently held positions.

June 15, 1991 – An international conference called "Let the rivers live" tackles the problems of the negative effects world-wide of large hydroelectric power plants; formation of a coalition called "ICALD", against the creation and operation of huge hydroelectric power plants, a public letter sent in the spirit of the IRN Declaration to the participants of "ICOLD", a conference of the builders of large dams (San Francisco, 1988).

June 16, 1991 – A protest rally held in Vojka and Dunajom, by the local population of the Szigetköz region with the participation of an international conference called "Let the rivers live". Specialists and experts from India, Thailand, the Soviet Union, Quebec, San Francisco all expressing solidarity for the population of the Žitný Ostrov region in their fight against the Gabčíkovo Hydroelectric Power Plant, all of them planting a tree in the power canal as an act of solidarity.

July 2, 1991 – The assembly of the Towns and Villages of Žitný Ostrov expressing dissatisfaction over the rejection by officials of the petition of February 3, making a declaration of what is called "Negative Standpoint" with respect to the filling up of the power canal.

July 3-17, 1991 – The blocking of the unit at Hrušov with the aim of preventing its use for filling up purposes, with the participation of the local residents of the Žitný Ostrov region and the environmentalists of the CSFR and Austria (Eurochain, EIS, Global 2000, WWF).

July 17, 1991 – The cordoning off by the police of access roads leading to the construction site

- Police guarding the site of the dam and of surrounding areas until the end of August 1991, then duty taken over by a private-owned security service.
- Further work in connection with the unit used for filling up purposes continuing under police control

July 18, 1991 – Demonstration in Čilistov, 400 participants, abortive attempts to communicate with the police, being on a 24-hour duty related to the guarding of the dam and providing safety for those working on the site.

July 20-21, 1991 – Members of different environmentalist groups of the CSFR (Ecocentre Brno, COE Prague, VLK Presov, Green Party Prague) arriving in the region to express their view in support of the cause of the Žitný Ostrov people.

Letters of support by environmentalist movements and citizens keep coming from all over the CSFR, while supportive views also reach the region of ecological organisations all over the world (WWF International, International Rivers Network, FOE).

July 22, 1991 – Demonstration in Čilistov (400 participants) – representatives of the town of Komárom arriving to express their solidarity and to hand over their resolution in which they express their disapproval over the continuation of the construction of the Gabčíkovo Hydroelectric

Power Plant (village and town local governments making similar resolutions to express their solidarity with the participants of the demonstration)

July 25, 1991 – Demonstration in Hrušov (500 participants) –

Participants send another petition to Jan Čarnogursky, Prime Minister of Slovakia, in which they request the suspension of work with respect to the unit to be used for filling up purposes.

July 29-30, 1991 – Blocking the way of cars driving out of the construction site where Hydrostav, a building company is currently performing work.

- An "emergency squad" is on the alert in front of the Šamorin police station to take action against demonstrators but the word gets out soon that the construction site in question no longer belongs to Hydrostav as the tenant's agreement is no longer in force; therefore there is no intervention by the police.

August 1, 1991 – Jan Čarnogursky receives the delegation of demonstrators, making a promise that he will help form a bilateral group of specialists and the public presentation of their research findings.

August 3, 1991 – "Black Day" in the history book of protest rallies.

- Participants of the demonstration moving from Čilistov to Hrušov, where a few people are brave enough to occupy the pump-boat, which is not used because of the high water-level of the Danube. This act of symbolic occupation was meant to point out the fact that the pump-boat was illegally performing work as the legally binding appeal with respect to issue of contention, made by the communities of neighbouring villages, was disregarded when the water-laws permit was eventually issued.
- After a few hours' suspense due to time spent waiting for the arrival of the attorney in charge of the case, whose failure to turn up on the grounds that he doesn't consider himself competent enough in decision-making on this controversial issue, eventually leads to the riot squad displaying some considerable violence in using force against the demonstrators.

August 4, 1991 – Demonstration at Gabčíkovo (1500 participants), petition accepted, in which need is asserted for a guarantee to be offered for the security of the unit in question

- Human chain in the bypass canal

August 17, 1991 – Demonstration at Vojka and Dunajom (500 participants). An act of protest against a campaign of misinformation and discrediting against Eurochain, a citizens' movement.

- Human chain in the bypass canal between Vojka and Kyselica.

September 7, 1991 – Demonstration at Dunajská Streda (1500 demonstrators)

- Acceptance of another petition, in which the suspension of work items is requested anew, while investigation is made into the effects thereof with respect to economic, ecological and social problems and also into the quality of work performed to date under the supervision of members of parliament.

September 10, 1991 – Day of international demonstrations against the Gabčíkovo Hydroelectric Power Plant, proclaimed by the World Trade Fund for Nature. Symbolic demonstrations and the handing over of a petition to officials in the CSFR and in front of the Embassy buildings of the CSFR in 15 countries world-wide (France, Austria, Venezuela, Switzerland, Germany, Thailand, the USA, Finland, Belgium, Holland, Spain, Hungary, Great Britain, Poland, Austria).

September 13, 1991 – The Ministry of Forestry and Water Management of the SR and the District Office of Dunajská Streda jointly organising a seminar called "The completion and putting into operation of the Gabčíkovo Hydroelectric Power Plant and the study trip along the Rhine, the Danube and the Rhine-Maine-Danube canal"

- Eurochain inviting its "own" experts as no ecologist is officially invited to attend the conference.
- RNDr. Juraj Holčík points out the negative effects of the Power Plant, after a decade of having tried to draw officials attention to the problem in vain. Dipl. Ing. Georg Rast of Aueninstitut Raststatt pointing out the negative effects of the hydroelectric power plants built along the Upper Rhine.
- Sharp criticism by Eurochain concerning the Office of Forestry and Water Management in Hungary for unfounded accusations voiced during the flood in August and the bias of the organised study trip.
- Mr. Oberhause's answer with respect to doubt expressed by local residents attending the seminar: "Have confidence in the government, they have their competent specialists to rely on"

September 17, 1991 – Meeting held by the Committee of Environmental Protection of the Federal Parliament, where representatives of the Association of the Towns and Villages of Žitný Ostrov, Eurochain, and the Association of Slovak Environmentalists.

- In accordance with the resolutions (No. 104) accepted during the above meeting of the Committee of Environmental Protection, resolution No. 200 is to be accepted on October 3, 1991, in which requirements other than those referring to the abandonment of construction work, are also included.

September 20, 1991 – The Association of Environmental Protection in Slovakia handing out an information brochure to representatives of the Slovak National Assembly entitled "Issues of concern with respect to the current position of the Government of the Slovak Republic on problems pertaining to the Gabčíkovo Hydroelectric Power Plant."

September 28, 1991 – The Slovak National Party and Hydrostav organising a "counter demonstration" at Gabčíkovo for the completion of the power plant. The demonstration, in which a total of 300 demonstrators take part, all of them being people transported from different parts of Slovakia, is described by the press as a rally organised by local residents. Eurochain keeps out of the rally, but no information is given by the Czech and Slovak Information Agency on their position concerning the event.

October 1, 1991 – Information brochures and photographs are made available for the Federal Parliament and then handed out to each member of parliament following approval by the Vice-President of the SR.

October 6, 1991 – Demonstration at Velky Meder (700 participants) acceptance of the petition of September 1991, the mayor of Velky Meder having requested the suspension of construction work in accordance with the petition, referring to "the need for thinking free of bias".

October 23, 1991 – From the negotiations of WWF and Eurochain at the Embassy of Germany in Vienna, representatives of the Bundestag conclude that "former East Block countries should invest in energy saving projects rather than spending money on megaplans without prospect".

November 4, 1991 – The issue of permits with respect to water rules for the starting of work in connection with the provisional alternative for the construction of the power plant, irrespective of the negative attitude by the villages affected by the construction itself. The villages of Vojka, Bodiky, Dobrohošť and Šamorin making a legally binding appeal against the issue of the above permit.

November 18, 1991 – The starting of work with respect to the provisional construction alternative

November 21, 1991 – The Association of the Villages and Towns of the Žitný Ostrov issues a declaration of protest jointly with Eurochain against the provisional alternative, sending the document in question to the prime ministers of the CSFR and the RS, the Federal and Slovak Parliaments, the Committee of Environmental Protection of the Federal and Slovak Parliaments and the Chairman of the Federal Committee of Environmental Protection.

December 6, 1991 – In accordance with the decision of an independent board Eurochain is awarded the "Prize of the Day" for its ecological activity during 1991.

December 9, 1991 – Dr. Mikulás Huba and S. Bartakovic, the former being the chairman, the latter being a member of the Committee of Environmental Protection in Slovakia, meeting representatives of the town of Šamorin and of Eurochain and the Association of the Slovak Environmentalist as part of an investigation under parliamentary supervision. The meeting is attended by representatives of the Committee of Environmental Protection in Slovakia and those of the Office of Environmental Protection of the Bratislava Region, the organ responsible for having issued the permit with respect to water rules. Sharp criticism over the issue of permit, highlighting the negative attitude of, and subsequent appeal made by, the four villages involved, in agreement with the Association of Environmental Protection in Slovakia and the Regional Office of Environmental Protection of Šamorin.

December 12, 1991 – Letter sent to the Prime Minister of the CSFR and members of the Federal Government, Žitný Ostrov and the Eurochain drawing the attention of the Federal Government to take into account the attitude of the population of Žitný Ostrov (a total of 20 rallies of demonstration and 10 petitions) to the idea of continuing construction work by way of a provisional alternative, before decision aimed at giving the go-ahead to the further construction of the power plant is to be made.

December 19, 1991 – Interpellation in parliament by local MPs:

1/ Over the issue of a permit relating to water rules (E. Bauerova)
2/ Over the disregard of the attitude of the local population (S. Bartakovic)

January 15, 1992 – Meeting in Prague of the Committees of Environmental Protection of the Federal Parliament, invitation also extended to representatives of the Žitný Ostrov Region, Eurochain and the Association of Environmental Protection in Slovakia.

January 15, 1992 – The Finance Minister and Václav Klaus, Prime Minister of the Federal Government meet the delegation of Eurochain and the Association of Environmental Protection in Slovakia.

- Submittal of option "H", which does not consider the commencement of operation of the GHPP as a viable option, proposing at the same time the restoration of the region to a condition acceptable from an ecological point of view.

February 18, 1992 – The Association of Towns and Villages expressing dissatisfaction over the activity thus far of the Government of the CSFR and the SR as it adamantly disregards the opinion of the local population. The provisional construction alternative would prevent the joint specialist committee from being set up, failing, at the same time, to comply with resolution No. 200/91 of the Federal Parliament.

- 57 chief burgomasters and mayors attending the meeting, sign a declaration expressing their determination to appeal, in accordance with Act No. TK23/1991, to the Constitutional Court for the violation of rights of entitlement to living in a healthy natural environment.

March 27-30, 1992 – A conference in Bratislava held by the Helsinki Citizens' Association (HCA).

- A work group called "Gabčíkovo-Nagymaros" approves a declaration signed by representatives of 8 organisations of the HCA and 60 other participants. The document emphasises the importance of the suspension of work with respect to the provisional construction alternative as a precondition for the success of attempts to be made by independent specialists to find a solution to the existing conflict between the attitude of technocrats and that of the principle of steady development.

April 25, 1992 – Conference in the Danube region under the auspices of a movement called "Let the Danube live", with the participation of experts from Slovakia, Austria, Hungary, Germany and the US.

- In a Memorandum compiled jointly by 80 mayors in the Žitný Ostrov and Szigetköz (Hungary) region, and 60 other representatives of the local organisations and of citizens' movements of the region in question, a request is put forward for the suspension of the provisional construction alternative and the start of joint research for the rehabilitation of the Danube.
- The above Memorandum is sent to the chairmen of the parliaments concerned and to the governments of the 2 countries and also to the competent committees of the European Parliament.

May 20, 1992 – The programme editor of the information headquarters of the Slovak Television bans the interview with a representative of Eurochain from being broadcast on the grounds that "views showing divergence from the position taken by the Government are expressed" in it.

- Eurochain and the Green Party pointing out, in an official act of protest during a press conference, that measures of this sort prevent ordinary citizens and environmentalists from having their rights enforced and arguments accepted, all this against a background of millions of Kcs being raised through state budget and being spent on adverts promoting the construction of the power plant.

Annex 91

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

May 18, 1992

Mr. John Hontelez
Chairman
Friends of the Earth International
Minister Elandstraat 27
NL-6523 CS Nijmegen
Netherlands

Dear Mr. Hontelez:

As Mr. El-Ashry indicated in his letter of May 6, 1992, he has forwarded your letter of May 2 to me for a detailed reply.

I would like to inform you that the position of the World Bank has not changed from that stated by Mr. Lari in 1989. We have not been officially requested to finance the Gabcikovo Project; nor would we do so without the most thorough environmental assessment, in accordance with World Bank policy. As to the restoration of the Danube Flood Plain, we share your concern. You may be interested to note that we are about to appraise a Global Environmental Facility (GEF) project for conservation of biodiversity which includes assistance to five areas. One of these is the Dyje-Morava Flood Plan. This component may include planning for the Danube Flood Plain downstream in Bratislava, to be implemented as and when the Gabcikovo contraversy is resolved.

Sincerely

Anand K. Seth
Chief
Environment Division
Technical Department
Europe & Central Asia, Middle East & North Africa Regions

Annex 92

European Bank
for Reconstruction and Development

Thierry Baudon
Director
Infrastructure, Energy &
Environment Department

Messrs C Balint & P A Farkas
Reflex
Environment Protection Society
1, Bartok B. u.
9024 Gyor
Hungary

(Ref.)

19 May 1992

Dear Sirs,

Your letter about the possible involvement of the European Bank in the Gabcikovo-Nagymaros dam project on the Danube really astonished me. Obviously EBRD has never considered financing the project. Even more, there have not been any requests for our participation. We will definitely not be involved in a contentious project of dubious economic value and negative environmental impact which is argued between two of our member countries.

We intend to concentrate our efforts on projects supporting rational and environmentally sound development.

Yours sincerely,

Thierry Baudon

122 Leadenhall Street, London EC3V 4EB Telephone: 071 338 6000 Fax: 071 338 6100

Annex 93

Aktstycken utgivna av Utrikesdepartementet
Ny serie I:E: 11

Register över Sveriges internationella överenskommelser Den 31 december 1992

Stockholm 1993

1959 (SÖ 1959:37), den 13 aug. 1964 (SÖ 1964:50) och den 17 dec. 1971 (SÖ 1971:68).

1953, febr. 20. Luftfartsöverenskommelse (SÖ 1953:19). Se även den 5 febr. 1971 (SÖ 1971:51).

1956, aug. 8. Ministeriella noter rör. upphävande av passviseringstvånget (SÖ 1956:59).

1957, sept. 20. Överenskommelse ang. reglering av vissa svenska fordringsanspråk (SÖ 1958:14).

1959, maj 16. Protokoll rör. varuutbytet (SÖ 1959:37).

1964, aug. 13. Ministeriella noter rör. varuutbytet (SÖ 1964:50).

1970, okt. 23. Ministeriella noter rör. vissa viseringsfrågor.

1971, febr. 5. Ministeriella noter med ändring av routeförteckningen i luftfartsöverenskommelsen den 20 febr. 1953 (SÖ 1971:51).

1971, dec. 17. Memorandum rör. utvecklingen av handeln och de ekonomiska förbindelserna (SÖ 1971:68).

1973, mars 27. Ministeriella noter ang. samarbete för atomenergins fredliga utnyttjande (SÖ 1974:65).

1983, jan. 21. Avtal för undvikande av dubbelbeskattning och förhindrande av skatteflykt beträffande inkomstskatter (SÖ 1983:40).

1992, april 3. Skriftväxling om anslutning till kontrollregimen för kärnteknisk "dual-use"-utrustning.

Jordanien

1961, jan. 9. Luftfartsöverenskommelse (SÖ 1965:23).

1978, maj 2. Vägtransportavtal (SÖ 1978:43).

1983, okt. 30. Avtal om samarbete beträffande vägar och motorvägar (SÖ 1984:31).

1992, mars 30. Avtal om skuldkonsolidering.

1992, nov. 3. Överenskommelse om senareläggning av vissa betalningar.

f. d. Jugoslavien

Genom upplösningen av Socialistiska federativa republiken Jugoslavien har federationens traktaträttsliga förpliktelser övertagits av successorstaterna enligt traktaträttens regler. Något bestämt besked i vilken utsträckning de nya staterna övertagit federationens förpliktelser kan emellertid inte ges förrän frågan utretts bilateralt mellan Sverige och var och en av successorstaterna. Intill dess sådan utredning föreligger redovisas i detta register de avtal som gällde mellan Sverige och Socialistiska federativa republiken Jugoslavien. Se även under Bosnien-Hercegovina, Kroatien och Slovenien. Den 8 april 1993 invaldes utan omröstning den tidigare jugoslaviska republiken Makedonien i FN. Sverige har därmed erkänt landet.

1907, april 11 (mars 29). Deklaration ang. handelsförbindelserna (SFS 141). Upphävd 8 okt. 1992.

1937, maj 14. Handels- och sjöfartsavtal (SÖ 1938:27). Upphävd 8 okt. 1992.

1947, april 12. Handelsöverenskommelse (SÖ 1947:12). Uppsagd av Sverige. Upphörde att gälla den 15 april 1992. Se även den 15 nov. 1962 (SÖ 1962:42) och den 22 juni 1967 (SÖ 1967:23).

1958, april 18. Överenskommelse rör. luftfartsförbindelserna (SÖ 1962:41).

1958, maj 28 och 31. Ministeriella noter rör. ömsesidigt erkännande av fartygs mätbrev (SÖ 1958:55).

1962, nov. 15. Ministeriella noter rör. varuutbytet (SÖ 1962:42). Upphävd den 8 okt. 1992.

1963, jan. 17. Överenskommelse ang. reglering av vissa finansiella fordringar (SÖ 1963:6).

1964, maj 6. Överenskommelse rör. avskaffande av passviseringstvånget (SÖ 1964:45). Uppsagd med verkan från den 9 okt. 1992.

1966, sept. 16. Avtal om anställning av jugoslavisk arbetskraft i Sverige (SÖ 1967:68).

1967, juni 22. Ministeriella noter rör. varuutbytet (SÖ 1967:23). Upphävd den 8 okt. 1992.

1969, dec. 23. Överenskommelse om internationella vägtransporter (SÖ 1972:58).

1970, juni 9. Överenskommelse om ekonomiskt, industriellt och tekniskt samarbete (SÖ 1970:38). Uppsagd av Sverige, upphörde att gälla den 11 maj 1992.

1978, mars 30. Konvention om social trygghet jämte protokoll och tilllämpningsöverenskommelse (SÖ 1978:41).

1978, nov. 10. Överenskommelse om ömsesidigt skydd av investeringar (SÖ 1979:29).

1980, juni 18. Konvention för undvikande av dubbelbeskattning avseende skatter på inkomst och förmögenhet (SÖ 1981:54).

1987, aug. 28. Avtal om exporten av vissa textilvaror (SÖ 1987:59). Uppsagt, upphörde att gälla den 1 augusti 1991.

1990, nov. 22. Överenskommelse om inbördes rättshjälp i brottmål. Skall ratificeras.

1990, nov. 22. Överenskommelse om förenkling av tillämpningen av Haagkonventionen den 1 mars 1954 angående vissa till civilprocessen hörande ämnen. Skall ratificeras.

1990, nov. 22. Överenskommelse om avskaffande av kravet på legalisering av handlingar. Skall ratificeras.

Kamerun

1991, maj 6. Avtal om skuldkonsolidering.

1992, nov. 15. Överenskommelse om senareläggning av vissa betalningar.

Kap Verde

1988, febr. 8. Konvention om social trygghet (SÖ 1991:48). Se även den 22 aug. och 21 sept. 1989.

1988, dec. 20. Proceduravtal (SÖ 1989:16).

1989, aug. 22 och sept. 21. Skriftväxling om rättelse i den portugisiska versionen av konventionen om social trygghet av den 8 febr. 1988 SÖ 1991:48).

1991, dec. 9. Avtal om utvecklingssamarbete 1 jan. 1992 till 31 dec. 1994 (SÖ 1991:61).

Seychellerna

1978, juni 13. Ministeriella noter om avskaffande av passviseringstvånget (SÖ 1978:28).

Sierra Leone

1930, aug. 28. Konvention med Storbritannien rör. vissa till civilprocessen hörande ämnen av internationell natur (SÖ 1931:1 och 1933:29).

Singapore

1930, aug. 28. Konvention med Storbritannien rör. vissa till civilprocessen hörande ämnen av internationell natur (SÖ 1931:1 och 17).

1966, dec. 20. Luftfartsöverenskommelse (SÖ 1966:103). Se även den 23 dec. 1971 och 28 jan. 1972 (SÖ 1972:14), 12 juni och 10 aug. 1973 (SÖ 1973:137) och 5 nov. och 3 dec. 1976 (SÖ 1976:149).

1968, juni 17. Avtal för undvikande av dubbelbeskattning och förhindrande av skatteflykt beträffande skatter å inkomst och förmögenhet (SÖ 1969:22). Se även den 28 sept. 1983 (SÖ 1983:42).

1968, juli 8 och 31. Ministeriella noter rör. avskaffande av passviseringstvånget (SÖ 1968:51).

1971, dec. 23 och 1972, jan. 28. Ministeriella noter rör. ändrad bilaga till luftfartsöverenskommelsen den 20 dec. 1966 (SÖ 1972:14).

1973, juni 12 och aug. 10. Ministeriella noter rör. ändring av artikel 11 i luftfartsöverenskommelsen den 20 dec. 1966 (SÖ 1973:137).

1976, nov. 5 och dec. 3. Ministeriella noter rör. ändring i luftfartsöverenskommelsen den 20 dec. 1966 (SÖ 1976:149).

1983, sept. 28. Protokoll om ändring av avtalet den 17 juni 1968 för undvikande av dubbelbeskattning och förhindrande av skatteflykt beträffande skatter på inkomst och förmögenhet (SÖ 1983:42).

1986, juni 14. Överenskommelse om skydd av sekretessbelagd information som hänför sig till projekt inom försvaret (SÖ 1986:49).

Slovenien

Den 16 jan. 1992 beslutade regeringen erkänna Slovenien. Efter överläggningar mellan Sverige och Slovenien har konstaterats att följande avtal mellan Sverige och f. d. Jugoslavien gäller mellan Sverige och Slovenien, jfr regeringens beslut den 29 april 1993 (SÖ 1993:49).

1978, mars 30. Överenskommelse om social trygghet jämte protokoll och tillämpningsöverenskommelse (SÖ 1978:41).

1978, nov. 10. Överenskommelse om ömsesidigt skydd av investeringar (SÖ 1979:29)

1980, juni 18. Konvention för undvikande av dubbelbeskattning avseende skatter på inkomst och förmögenhet (SÖ 1981:54).

1992, jan. 29. Avtal om upprättande av diplomatiska förbindelser (SÖ 1992:52).

1992, jan. 29. Avtal om passviseringsfrihet (SÖ 1992:21).

Annex 94

[Hungarian draft prepared for Inter-governmental negotiations]

SPECIAL AGREEMENT
FOR SUBMISSION TO THE INTERNATIONAL COURT OF JUSTICE OF THE DIFFERENCES BETWEEN THE SLOVAK REPUBLIC AND THE REPUBLIC OF HUNGARY CONCERNING THE GABCIKOVO-NAGYMAROS PROJECT

The Government of the Slovak Republic, as the successor to the Government of the CSFR,* and the Government of the Republic of Hungary,

Considering that differences have arisen between the Slovak Republic and the Republic of Hungary regarding the Treaty on the Construction and Operation of the Gabcikovo-Nagymaros Barrage System, signed in Budapest on September 16, 1977 and related instruments (hereinafter referred to as "the Treaty"), and on the construction and operation of the so-called "Variant C";

Recognizing that the Parties concerned have been unable to settle these differences by negotiations;

Desiring that these differences, in accordance with their commitments under the Charter of the United Nations, as well as the relevant documents of the Conference on Security and Cooperation in Europe concerning the peaceful settlement of disputes, be brought to a rapid solution;

Having in mind [paragraph 4 of the Agreed Minutes of the Meeting between the Commission of the European Communities, the Czech and Slovak Federal Republic and the Republic of Hungary, held in London on October 28, 1992,] that both the Czechoslovak and the Hungarian delegations expressed their commitment to submit the dispute connected with the Gabcikovo-Nagymaros Project in all its aspects to binding international arbitration or to the International Court of Justice;

Desiring that these differences should be settled by a decision of the International Court of Justice;

* Underlined texts are proposals by the Commission on the basis of the last observations of the Slovak Government being under consideration by the Parties.

Recalling their intention to apply, pending the judgment by the International Court of Justice, such a temporary water management régime for the Danube water as shall be agreed between the Parties;

Desiring further to define the issues to be submitted to the International Court of Justice,

Have agreed as follows:

Article 1

The Parties submit the questions contained in Article 2 to the International Court of Justice pursuant to Article 40, paragraph 1, of the Statute of the Court.

Article 2

(1) The Court is requested to decide, on the basis of the Treaty and other relevant agreements as well as the rules and principles of general international law

(a) whether the Republic of Hungary was entitled to suspend and subsequently abandon, in 1989, the works on the Nagymaros Project and on the appropriate part of the Gabcikovo Project;

(b) whether the Czech and Slovak Federal Republic was entitled to proceed, in November 1991, to the so-called "Variant C" and to put into operation this system since October 1992, as referred to in the Report of the Working Group of Independent Experts of the Commission of the European Communitites, the Republic of Hungary and the Czech and Slovak Federal Republic dated 23 November 1992 (damming up of the Danube at river kilometer 1851,7 on Czechoslovak territory for the purpose of water supply into the derivation canal towards the hydroelectric power station and resulting consequences on water course and navigation);

(c) what are the legal effects of the notification, on May 19, 1992, of the termination of the Treaty by the Republic of Hungary.

(2) The Court is also requested to determine the legal consequences, for the Parties, including their respective rights and obligations, arising from its decision on the questions mentioned in paragraph (1) of this Article.

Article 3

(1) Without prejudice to any question as to the burden of the proof, the Parties, having regard to Article 44 and 46 of the Rules of Court, request the Court to authorize that the written proceedings should consist of:

(a) a Memorial presented by each of the Parties not later than ten months after the date notification of this Special Agreement to the Registrar of the International Court of Justice;

(b) a Counter-Memorial presented by each of the Parties not later than five months after the date on which each has received the certified copy of the Memorial of the other Party;

(c) a Reply presented by each of the Parties within such time-limits as the Court may order. The Court will be able to request the presentation of supplementary documents and information by the Parties.

(2) The above-mentioned parts of the written proceedings and their annexes presented to the Registrar will not be transmitted to the other Party until the Registrar has received the part of the proceedings corresponding to the said Party.

(3) The oral procedure, the notification of the appointment of the respective Agents of the Parties, and any other procedural questions will be regulated in accordance with the provisions of the Statute and the Rules of the Court.

Article 4

(1) The Parties shall accept the judgment of the Court as final and binding upon them and shall execute it in its entirety and in good faith.

(2) Immediately after the transmission of the judgment the Parties shall enter into negotiations on the modalities of its execution.

(3) If, for some reason, they are unable to reach agreement within six months, either Party may request the Court to render an additional judgment determining such modalities.

Article 5

(1) The present Agreement shall be subject to ratification.

(2) The instruments of ratification shall be exchanged as soon as possible in ....

(3) The present Agreement shall enter into force on the date of exchange of instruments of ratification. Thereafter it will be notified jointly to the Registrar of the Court.

In witness whereof the undersigned, being duly authorized thereto, have signed the present Agreement and have affixed thereto their seals.

Done in ...., this ..... day of ...., 1993, in three originals in English.

For the Slovak Republic | For the Republic of Hungary

Annex 95

MINISTRY FOR
FOREIGN AFFAIRS

The Ministry for Foreign Affairs of the Kingdom of Sweden presents its compliments to the Ministry for Foreign Affairs of the Republic of Slovenia and has the honour to refer to the Ministry's note of 7 April 1993 with the following wording:

"The Ministry for Foreign Affairs of the Republic of Slovenia presents its compliments to the Ministry for Foreign Affairs of the Kingdom of Sweden and has the honour to convey the following:

The Republic of Slovenia has become an Independent State, which has already acknowledged (Article 3 of the Constitutional Law of June 25, 1991) that Treaty Rights and Obligations of the former SFR of Yugoslavia would be inherited by Slovenia on its territory by virtue of the Customary International Law. Since it is likely that certain treaties may have lapsed at the date of Independence of Slovenia or there is interest to renew, change or substitute them with new ones, it seems essential that each treaty should be subjected to legal examination.

The Ministry for Foreign Affairs of the Republic of Slovenia has studied the bilateral agreements concluded between the former SFR of Yugoslavia and the Kingdom of Sweden. The Ministry should like to notify the Ministry for Foreign Affairs of the Kingdom of Sweden that the Government of the Republic of Slovenia has come to the conclusion that the agreements which are listed below remain in force between the Republic of Slovenia and the Kingdom of Sweden.

Ministry for Foreign Affairs
of the Republic of Slovenia

LJUBLJANA

Postal Address	Address	Telephone	Fax	Telex
Box 16121	Gustav Adolfs torg 1	(46) 8 786 6000	(46) 8 723 11 76 (G3)	(54) 10590 MINFOR S

1. Convention between the SFR of Yugoslavia and the Kingdom of Sweden on social security, with Protocol to the Convention and the Agreement on implementation of the Convention, signed at Stockholm on March 30, 1978,

2. Agreement between the Government of the SFR of Yugoslavia and the Government of the Kingdom of Sweden on the mutual protection of investments, signed at Belgrade on November 10, 1978,

3. Convention between the SFR of Yugoslavia and the Kingdom of Sweden for the avoidance of double taxation with respect to taxes on income and capital, with Protocol, signed at Stockholm on June 15, 1980.

If the Government of the Kingdom of Sweden has arrived at the same conclusion, the Ministry suggests that the present note and the affirmative reply by the Ministry for Foreign Affairs of the Kingdom of Sweden, constitute a joint confirmation that the afore-mentioned agreements remain in force between the Republic of Slovenia and the Kingdom of Sweden.

The Ministry for Foreign Affairs of the Republic of Slovenia avails itself of this opportunity to renew to the Ministry for Foreign Affairs of the Kingdom of Sweden the assurances of its highest consideration."

The Ministry for Foreign Affairs of the Kingdom of Sweden has studied the bilateral agreements concluded between the Kingdom of Sweden and the former SFR of Yugoslavia. The Ministry should like to notify the Ministry for Foreign Affairs of the Republic of Slovenia that the Government of the Kingdom of Sweden has arrived at the same conclusion as regards those agreements which remain in force between the Kingdom of Sweden and the Republic of Slovenia. Your Ministry's note and this affirmative reply therefore constitute a joint confirmation that the following agreements remain in force between the Kingdom of Sweden and the Republic of Slovenia:

1. Convention between the SFR of Yugoslavia and the Kingdom of Sweden on social security, with Protocol to the Convention and the Agreement on implementation of the Convention, signed at Stockholm on March 30, 1978,

2. Agreement between the Government of the SFR of Yugoslavia and the Government of the Kingdom of Sweden on the mutual protection of investments, signed at Belgrade on November 10, 1978,

3. Convention between the SFR of Yugoslavia and the Kingdom of Sweden for the avoidance of double taxation with respect to taxes on income and capital, with Protocol, signed at Stockholm on June 18, 1980.

The Ministry for Foreign Affairs of the Kingdom of Sweden avails itself of this opportunity to renew to the Ministry for Foreign Affairs of the Republic of Slovenia the assurances of its highest consideration.

Stockholm 3 May 1993

Annex 96

NOTE VERBALE AND ATTACHED EVALUATION OF THE POSITIONS ADOPTED BY THE RESPECTIVE SLOVAK MINISTRIES ON LEGAL SUCCESSION IN RESPECT OF AGREEMENTS CONCLUDED WITH HUNGARY, 15 NOVEMBER 1993, AND COVER LETTER OF 15 DECEMBER 1993 [THIS DOCUMENT REPLACES THE HM, ANNEXES, VOL 4, ANNEX 128.]

[Translation]

Embassy of the Hungarian Republic
Bratislava, 15th December 1993

Re: Note Verbale of the Slovak
Ministry for Foreign Affairs on
questions concerning succession

Annexes: 2

Please find enclosed the Note Verbale of the Slovak Ministry for Foreign Affairs – and its annex together with the Hungarian translation – in which the Slovak party declares that it is ready to negotiate the question of international succession to the bilateral conventions and treaties concluded by Czechoslovakia, at a date that is convenient for the Hungarian party.

The recommendations of the respective ministries are also communicated in the annex listing the treaties, and indicating the ones that they propose to delete or renegotiate.

When the Note Verbale was received, it was verbally communicated that the conventions listed also include the Government Agreement on the Gabčíkovo-Nagymaros Barrage System concluded in 1977. They do not wish to negotiate that or the validity of that Treaty, since we jointly requested the Hague International Court of Justice to resolve this question.

268/93 - NO

The Ministry for Foreign Affairs of the Slovak Republic expressing its regards to the Embassy of the Hungarian Republic, has the honour to communicate that the Ministry for Foreign Affairs of the Slovak Republic is ready to negotiate the questions of succession of the Slovak Republic and the bilateral conventions and treaties that were concluded between the former Czechoslovak Federal Republic and the Hungarian Republic at any time that it is convenient for the Hungarian party.

[a courtesy paragraph – **omitted**]

Bratislava, 15 November 1993

Bratislava

Schedule to K/X/126/93

Evaluation of the Position Taken Up by the Several Ministries on Legal Succession in Respect of Agreements Concluded with Hungary

1. Agreement on Exchange of Population between Hungary and Czechoslovakia.
Budapest, 27 February 1946.

2. Closing Protocol on the Activity of the Border Drafting Commission Established Pursuant to Article 1, Paragraph 4, Subparagraph "d" of the Paris Peace Treaty.
Bratislava, 22 December 1947
The Ministry of the Interior proposes to maintain them in force.

3. Agreement on Direct Service Contacts of Offices and Organs of the Republic of Czechoslovakia with the Offices and Organs of the Republic of Hungary in the Field of Criminal Prosecution.
Prague, 14 May 1948.
The Slovak Ministry of the Interior proposes to rescind it.

4. Agreement on Certain Issues of Water Management in Connection with the Surrender Effected Pursuant to Article 1, Paragraph 4, Subparagraph "c" of the Paris Peace Treaty.
Bratislava, 9 October 1948.
The Slovak Ministry of Agriculture does not propose any alteration.

5. Supplementary Protocol to the Closing Protocol of 22 December 1947, Regulating the Activities of the Hungarian-Czechoslovak Border Commission (11-12 October 1948.)
Bratislava, 11 October 1948.
The Ministry of the Interior proposes to maintain it in force.

6. Protocol between the Republic of Hungary and the Republic of Czechoslovakia Concerning the Definitive Regulation of Certain Pending Financial and Economic Issues.
Lake Štrbské Pleso, 25 July 1949.
The Ministry of Finance proposes to rescind the agreement.

7. Agreement between the Republic of Czechoslovakia and the Republic of Hungary on the Mutual Delivery of Court and Administrative Documents (Including Court, Public Guardianship, Administrative and Financial Deposits).
High Tatra, 22 February 1959.

8. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on Transit Railway Traffic (Passage) through the Hungarian Railway Line Selce-Nógrádszakál-Ipolytarnóc-Kalonda from Czechoslovakia to Czechoslovakia.
Budapest, 23 March 1951.

9. Closing Protocol of Negotiations between the Government of the Republic of Czechoslovakia and the Council of Ministers of the Hungarian People's Republic on the Regulation of Minor Disorders of the Hungarian-Czechoslovak State Borders.
Bratislava, 6 June 1952.
The Ministry of the Interior proposes to maintain it in force.

10. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Regulation of the Order of the State Border.
Prague, 13 October 1956. c.8/1958. Sb.
The Ministry of the Interior proposes to maintain it in force.
The Ministry of Finance proposes to maintain it invariably in force.

11. Agreement Concluded by Exchange of Notes between the Hungarian People's Republic and the Czechoslovak Socialist Republic Amending and Complementing the Rules of Transit by Railway on the Line of Slec-Nógrádszakál- Ipolytarnóc-Kalonda by Hungarian Railway Line from Czechoslovakia to Czechoslovakia.
Budapest, 25 November 1957. (8.10./25.11.1957.)

12. Agreement Concluded by Exchange of Notes between the Hungarian People's Republic and the Czechoslovak Socialist Republic on Consular Wedding Services (Marriage Services)
Prague, 31 January 1957. (26.4.1957/31.1958)

13. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Cooperation in the Field of Veterinary Hygiene.
Prague, 12 March 1958.
The Ministry of Agriculture proposes to maintain it temporarily in force, until an agreement is concluded on the amendment thereof.

14. Closing Protocol Concerning the Results of Negotiations of the Government Delegations of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Utilisation of Hydraulic Power of the Danube on the Reach of Bratislava and Nagymaros. (Prague, 6-7 October 1958.)
Prague, 7 October 1958.

15. Agreement on Cooperation between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic in the Field of Social Politics
Budapest, 30 January 1959. c.21/1960
The Ministry of Labour, Social and Family Affairs proposes to maintain it invariably in force

16. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Execution of the Agreement signed on 30 January 1959 on Cooperation in the Field of Social Politics.
Prague, 16 December 1959.
The Ministry of Labour, Social and Family Affairs proposes to maintain it invariably in force.

17. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Amendment of Certain Issues of Citizenship
Budapest, 4 November 1960. (Act No. 1961/37.)
The Ministry of the Interior proposes to leave it unchanged

18. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Economic and Technical- Scientific Cooperation
Budapest, 21 January 1961.

19. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Regulation of Traffic in the Border Zone

Prague, 16 October 1962. (Act No. 60/1963.)
The Ministry of the Interior proposes to amend it.
In the opinion of the Ministry of Labour and Social Affairs the agreement is already invalid

20. Agreement Concluded between the Customs Organs of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Compliance with Customs Regulations, as Supplement to the Agreement on Contacts along the Border (Prague, 16 October 1962.)
Prague, 11 January 1963.

21. Closing Protocol of Negotiations between the Government Delegations of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Joint Utilisation of the Reach of the Danube between Bratislava and Nagymaros
Budapest, 18-20 April 1963.

22. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Passenger Traffic between the Two Countries
Prague, 11 December 1963.
The Ministry of the Interior proposes to amend it.

23. Agreement on Trade and Navigation between the Hungarian People's Republic and the Czechoslovak Socialist Republic
Prague, 20 December 1963. (Act No. 2/1965.)

24. Protocol between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Regulation of Certain Issues Pertaining to the Law of Property Concerning Real Estates.
Budapest, 03 February 1964.
The Ministry of Finance proposes to maintain it temporarily in force, until an agreement is concluded on the amendment.

25. Agreement on the Amendment of Mutual Railway Transports between the Czechoslovak and Hungarian State Railways
Budapest, 4 April 1964.

26. Agreement between the National Central Archives of the Hungarian People's Republic and the Archives Directorate of the Ministry of the Czechoslovak Socialist Republic on the Cooperation of Archives.
Prague, 1 December 1964.

27. Agreement between the Ministries of Transport of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Mutual Technical and Other Assistance Concerning International Transports.
Prague, 4 February 1965.

28. Agreement between the Representatives of the Ministries of the Interior of the Czechoslovak Socialist Federal Republic and the Hungarian People's Republic on the Way of Crossing the Border by Persons Working on the Regularisation of the Boundary Rivers Ipoly-Hernád-Ronva-Izra and Bista
Prague, 26 February 1966.
The Ministry of Agriculture proposes to rescind the agreement.

29. Agreement on Customs Reductions for the Citizens of the Hungarian People's Republic and the Czechoslovak Socialist Republic Working or Studying in the Country of the Other Party
Budapest, 19 March 1966.
The Ministry of Finance proposes to maintain it in force, until a new agreement is concluded.

30. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Airlines
Budapest, 27 April 1966. (Act No. 32/1967.)

31. Closing Protocol of Negotiations of the Hungarian-Czechoslovak Commission Concerning the Execution of the Provisions in Chapter 1 of the Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the System of State Borders (Prague, 18-27 October 1966.)
Prague, 27 October 1966.

32. Agreement on the Amendment of Cooperation between the Customs Organs of the Hungarian People's Republic and the Czechoslovak Socialist Republic
Prague, 12 January 1968.

33. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Establishment of a River Directorate on the Rajka-Gönyü Reach of the Danube
Prague, 27 February 1968.

34. Protocol of Negotiations of the Hungarian-Czechoslovak Mixed Commission (The Commission was established on the basis of Article 3, paragraph 5 of the Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Adjustment of the Regulations of State Borders.) The Agreement was signed in Prague, on 13 October 1956 on the execution of the modification of the border line on the Bysta-Ronva border section.
Aggtelek, 17 May 1968.
The Ministry of the Interior proposes to maintain it in force.

35. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on Friendship, Cooperation and Mutual Assistance.
Budapest, 14 June 1968. (Act No. 48/1969.)

36. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on International Haulage
Budapest, 12 April 1969. (Act No. 125/1969.)

37. Agreement between the Ministry of Foreign Trade of the Hungarian People's Republic and the Ministry of Foreign Trade of the Czechoslovak Socialist Republic on Merchandise Traffic and Economic Cooperation along the Border.
Budapest, 17 May 1969. (Act No. 36/1969.)

38. Agreement between the State Board of Technical and Investment Development of the Hungarian People's Republic and the Federal Board of Technical and Investment Development of the Czechoslovak Socialist Republic on Scientific- Technical Cooperation
Tihany, 23 August 1969.

39. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cooperation in the Field of Plant Protection
Budapest, 25 October 1969.
The Ministry of Agriculture classified it in two categories: "to be maintained in force", and "not valid any more"

40. Agreement on Special Customs Reductions Granted to Persons Working along the Hungarian and Czechoslovak border
Tihany, 26 August 1970.
The Ministry of Finance maintains it temporarily in force, until amended by a new agreement

41. Agreement between the Ministry of Heavy Industry of the Hungarian People's Republic and the Federal Ministry of Energetics of the Czechoslovak Socialist Republic on Construction of a 400 kV Power Transmission Line.
Prague, 17 April 1971.

42. Protocol between the Hungarian People's Republic and the Czechoslovak Socialist Republic Concerning Scientific-Technical Cooperation in the Field of Geodesy and Cartography
Budapest, 6 October 1971.

43. Agreement between the Federal Ministry of Technical Development and Investments (Bureau of Standards and Measurement of the Czechoslovak Socialist Federal Republic) and the Hungarian Bureau of Standards
Prague, 17 November 1971.
The Bureau of Standards and Measurement proposes to maintain it in force until a new agreement is signed

44. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cooperation in the Field of Tourism
Bratislava, 26 June 1972. (Act No. 122/1973.)
The Ministry of the Interior proposes to amend it.

45. Consular Treaty between the Hungarian People's Republic and the Czechoslovak Socialist Republic
Budapest, 17 May 1973. (Act No. 50/1974.)
The Ministry of the Interior proposes to maintain it in force

46. Protocol among the Organs of the Member States of Comecon Concerning the General Conditions of Electric and Economic Assistance (VDBP RVHP 1968)
Prague, 6 September 1973.

47. Agreement between the Ministry of Agriculture and Food of the Czechoslovak Socialist Federal Republic and the Ministry of Agriculture and Food Industry of the Hungarian People's Republic on the Execution of the Agreement signed on 12 March 1958 on Veterinary Hygiene in the Field of Exportation, Importation and Transportation of Livestock, Animal Products or those Basic Materials of Animal Origin that can be Carriers of Infections
Bratislava, 18 January 1974.

The Ministry of Agriculture proposes for the time being to maintain it in force, until a new agreement is concluded

48. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Installation and Operation of the Csurgó-Tupa Oil Pipeline Joining the Oil Pipeline to be Constructed from Omisalja up to the Jugoslav- Hungarian border
Budapest, 20 June 1974.

49. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cooperation in the Construction of a 400 kV Power Transmission Line between Albertirsa and Göd.
Bratislava, 6 May 1976.

50. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on the Elaboration of a Joint Agreement Concerning the Project of the Bős-Nagymaros Hydroelectric Plant
Bratislava, 6 May 1976.

51. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Regulation of Issues of Water Management in the Border Region
Budapest, 31 May 1976 (Act No. 132/1978)
The Ministry of Agriculture proposes for the time being to maintain it, until an amended agreement is concluded.

52. Agreement on the Joint Control of Border Traffic on the State Border between the Hungarian People's Republic and the Czechoslovak Socialist Republic
Prague, 18 June 1976. (Act No. 57/1977)
The Ministry of the Interior proposes to maintain it in force

53. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on Cooperation and Mutual Assistance on the Hungarian-Czechoslovak State Border
Prague, 19 November 1976 (Act No. 39/1978.)
The Ministry of the Interior proposes to amend it.

54. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on the Activities of the Czechoslovak Cultural and Information Centre in Budapest and the Hungarian Cultural Centre in Prague, Protocol on the Agreement
Budapest, 16 September 1977. (Act No. 110/1977.)

55. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Mutual Assistance in Connection with the Construction of the Gabčíkovo-Nagymaros Hydroelectric Plant
Budapest, 16 September 1977.

56. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Construction and Operation of the Gabčíkovo- Nagymaros Hydroelectric Plant
Budapest, 16 September 1977. (Act No. 109/1978.)
The Ministry of Agriculture proposes to leave it unchanged

57. Agreement on the Cooperation of the Attorney Organisation of the Hungarian People's Republic and the Attorney Organisation of the Czechoslovak Socialist Republic
Prague, 24 May 1978.

58. Agreement on Customs Issues Related to the Construction and Operation of the Gabčíkovo Nagymaros Hydroelectric Plant
Budapest, 19 January 1979. (Act No. 8/1979.)
The Ministry of Finance proposes to leave it unchanged

59. Protocol on Session XL of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters on 18-23 June 1979 in Tatranské Štrba.
Tatranske Štrba 23 June 1979.

60. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on the Common Statutes of the Government Commissioners, Amending their Activities in Connection with the Construction and Operation of the Gabčíkovo-Nagymaros Hydroelectric Plant
Bratislava, 11 October 1979. (Act No. 11/1980.)

61. Agreement on the Amendment of Cooperation in Customs Matters (Hungarian People's Republic-Czechoslovak Socialist Republic)
Bratislava, 28 November 1979. (Act No. 1/1980.
The Ministry of Finance proposes to maintain it

62. Protocol of Session XLI of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Budapest, 1-6 December 1980.

63. Protocol of Session XLII of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Polarikovo, 6-10 July 1981.

64. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on the Foundation of the Joint Enterprise "Haldex- Ostrava"
Budapest, 16 November 1981. (Act No. 4/1988)

65. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cooperation in the Manufacture and Mutual Delivery of Main Machine Units for and Finished Products of Road Vehicle, Construction Machine and Agricultural Machine Industries
Győr, 30 November 1981. (Act No. 4/1988)

66. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Cooperation in the Field of Health Care and Medicine
Budapest, 22 December 1981. (Act No. 20/1983)
The Ministry of Health proposes to maintain it

67. Protocol of Session XLIII of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Siófok, 27 September to 1 October 1982.

68. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cooperation in the Field of Post and Telecommunications
Budapest, 18 May 1983. (Act No. 1/1984)

69. Protocol of Execution Concerning Cooperation between the Federal Ministry of Telecommunications of the Czechoslovak Socialist Republic and the Ministry of Telecommunications of the Hungarian People's Republic in the Field of Telecommunications
Budapest, 18 May 1983. (Act No. 1/1984)

70. Protocol of the Alteration of the Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Construction and Operation of the Gabčíkovo-Nagymaros Hydroelectric Plant signed in Budapest on 16 September 1977
Prague, 10 October 1983.

71. Protocol of Session XL of the Czechoslovak-Hungarian Boundary Waters Commission on the Management of Boundary Waters, held in Pöstyén between 10 and 15 October 1983
Pöstyén, 15 October 1983.

72. Agreement on Economic and Scientific-Technical Cooperation between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic in the Manufacture and Mutual Delivery of Electronic Parts, Special Technological Equipment and Materials
Budapest, 28 October 1983. (Act No. 20/1984.)

73. Agreement between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic on Reciprocal Transit of Electric Power Originating from the Soviet Union
Budapest, 27 April 1984.

74. Protocol of Session XLV of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters, held in Sopron between 24 and 29 September 1984
Sopron, 29 September 1984.

75. Agreement between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic on the Amendment of the Coefficient of the Conversion of Non-Commercial Payments into Commercial Rouble
Budapest, 16 May 1985.
The Ministry of Finance proposes to rescind it.

76. Agreement on the Amendment of the Application of the Stamp Duty Related to the Rates of Exchange of the National Currencies of Non-Commercial Payments, Signed between the Ministry of Finance of the Czechoslovak Socialist Federal Republic and the Ministry of Finance of the Hungarian People's Republic on 28 December 1974
Budapest, 16 May 1985

77. Protocol of Session XLVI of the Czechoslovak-Hungarian Boundary Waters Mixed Commission Concerning Issues of Water Management as to Boundary Waters, held at the Lake Csorba between 23 and 28 September 1985.
Lake Csorba, 28 September 1989.

78. Agreement on Cooperation until 2000 between the State Technical, Scientific and Investment Development Board of the Czechoslovak Socialist Republic and the Technical-Scientific and Investment Development Board of the Hungarian People's Republic.
Prague, 21 May 1986

79. Agreement on the Rules of Joint Passport and Customs Control on the State Border between the Hungarian People's Republic and the Czechoslovak Socialist Republic
Komárno, 10 October 1986.
The Ministry of the Interior proposes to rescind it, the Ministry of Finance proposes to maintain it.

80. Protocol of Session XLVII of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Győr, 6-10 October 1986.

81. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic on Cultural and Scientific Cooperation.
Budapest, 22 October 1986. (Act No. 41/1987.)
The Ministry of Educational Affairs proposes to maintain it until a new agreement is concluded.

82. Programme of Long-Term Scientific- Technical Cooperation until 2000 between the Czechoslovak Socialist Republic and the Hungarian People's Republic.
Budapest, 30 October 1986.

83. Agreement between the State Technical- Scientific and Investment Development Board of the Czechoslovak Socialist Federal Republic and the Bureau of Measurement of the Hungarian People's Republic on Reciprocal Recognition of Standards and Calibration of Measuring Instruments
Bratislava, 17 November 1986.
The Bureau of Standards and Measurement proposes to maintain it temporarily in force

84. Agreement between the Government of the Hungarian People's Republic and the Czechoslovak Socialist Republic on the Regulation of Railway Traffic
Budapest, 24 November 1986.

85. Agreement between the Ministry of Transport of the Hungarian People's Republic and the Ministry of Transport of the Czechoslovak Socialist Republic on the Repairs and Maintenance of Common Road Bridges on the Hungarian- Czechoslovak Border.
Budapest, 24 November 1986.

86. Agreement on Putting into Force the Appendices of the Agreement signed between the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Federal Republic on Cooperation in the Manufacture and Mutual Delivery of Main Machine Units for Vehicle, Construction Machine and Agricultural Machine Industries
Prague, 29 December 1986.

87. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Federal Republic on the Cooperation of Central Organs Participating in the Direction of the Councils and the National Committees
Židlochovice, 28 January 1987.

88. Agreement between the Ministries of Transport of the Hungarian People's Republic and the Czechoslovak Socialist Federal Republic on the Routing and Junction of the Motorways M 15 (Hungarian People's Republic) and D 2 (Czechoslovak Socialist Federal Republic) Planned in the Region between Rajka and Rusovce, as well as on the Area Required to the Border Stations to be Erected on Said Motorways
Budapest, 14 May 1987.

89. Agreement between the Federal Ministry of the Czechoslovak Socialist Federal Republic and the Ministry of Transport of the Hungarian People's Republic on Direct Technical-Scientific Cooperation
Budapest, 14 May 1987.

90. Protocol of Session XLVIII of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Kistapolcsány, 29 June to 3 July 1987.

91. Agreement between the Government of the Hungarian People's Republic and the Government of the Czechoslovak Socialist Federal Republic on Cooperation in the Field of Plant Protection
Moscow, 12 December 1988.

92. Agreement between the Ministry of Agriculture of the Czechoslovak Socialist Federal Republic and the Ministry of Agriculture and Food of the Hungarian People's Republic on Joint Examinations in Plant Protection and Health Care
Moscow, 12 December 1988.

93. Protocol of the Amendment of the Agreement signed between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic in Budapest on 16 September 1977, on Mutual Assistance Concerning the Construction of the Gabčíkovo-Nagymaros Barrage System
Budapest, 6 February 1989.

94. Agreement between the Hungarian People's Republic and the Czechoslovak Socialist Republic on Legal Assistance, as well as on the Regulation of Legal Contacts Related to Civil Law and Family Law Matters and Criminal Cases
Bratislava, 28 March 1989.

95. Protocol of Session L of the Czechoslovak-Hungarian Boundary Waters Commission Concerning Issues of Water Management as to Boundary Waters
Polarikovo, 8 September 1989.

96. Agreement between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic on the Mutual Recognition of Diplomas

Issued and Scientific Degrees and Ranks Granted by the Czechoslovak Socialist Federal Republic and the Hungarian People's Republic
Prague, 11 November 1989.

97. Agreement between the Government of the Republic of Hungary and the Czechoslovak Socialist Republic on the Transfer for Permanent Use of the Plot Provided for the Erection of the Bratislava Branch Institute of the Hungarian Cultural Centre
Bratislava 8 December 1989.

98. Agreement between the Government of the Republic of Hungary and the Czechoslovak Socialist Federal Republic on Mutual Information and Cooperation in the Field of Nuclear Safety and Radiation Protection
Vienna, 20 September 1990.

99. Protocol between the Government of the Czechoslovak Socialist Federal Republic and the Hungarian People's Republic on the Settlement of Mutual Claims and Obligations in Connection with the Switch-Over to Settlements in Free Currencies by 1 January 1991
Budapest, 1 December 1990.

100. Agreement between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic on Mutual Trade and Payments
Budapest, 1 December 1990.

101. Agreement between the Government of the Republic of Hungary and the Government of the Czechoslovak Socialist Federal Republic on Mutual Employment of Czechoslovak and Hungarian Citizens in the Counties along the Border
Prague, 18 January 1991.

102. Protocol between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic on the Termination of the Agreement concluded between the Government of the Czechoslovak Socialist Federal Republic and the Government of the Hungarian People's Republic on Cooperation Concerning the Construction and Operation of the Csurgó-Tupa Oil Pipeline, in Connection with the Pipeline Constructed between Omisalja and the Southern Border of Hungary, as well as on the Settlement of Mutual Debts and Claims Related thereto.

Bratislava, 31 July 1991.

Annex 97

COMMISSION OF
THE EUROPEAN
COMMUNITIES

Brussels,

43048 22 DEC '93

Directorate-General I
External Economic Relations
I.E - The Director

Dear Secretary of State,

With reference to previous informal contacts on the subject, I hereby would like to inform you that the European Commission requests to receive in writing the position of your government on the recommendations by the Commission appointed experts in the Working Group on the Temporary Water Management Regime as described in paragraph 9.3 of the final report published on December 1, 1993 (see annex).

The European Commission expects to receive the above document by January 15, 1994.

Sincerely yours

P. Benavides

Mr Janos Martonyi
Secretary of State
Ministry of Foreign Affairs
Budapest
Republic of Hungary

Discharge regime

* Minimum discharge in Old Danube of 400 m^3/s.

* Average discharge in Old Danube of 800 m^3/s.

* 1-3 floods of more than 3500 m^3/s per year into the Old Danube (to the extent hydrologically possible).

* 30 - 140 m^3/s into the side branches on the Slovakian side.

* 30 - 70 m^3/s into the side branches on the Hungarian side.

Remedial measures

* Improvement of the daily discharge capacity of Variant C structures from the present 600 m^3/s to 940 m^3/s by May 1994.

* Construction of an underwater weir at RKM 1835 enabling direct contact between the main river and the Slovakian side branches at one upstream point of the Slovakian floodplain and to improve the water supply to the Hungarian floodplain at rkm 1845.5. This underwater weir mainly serves an enviromnental purpose.

* Construction of an underwater weir at RKM 1845.5 for improving the operational reliability of water supply from the inundation weir (less maintenance of the spillway). This underwater weir is sufficient without other measures to ensure the water supply to the Hungarian floodplain.

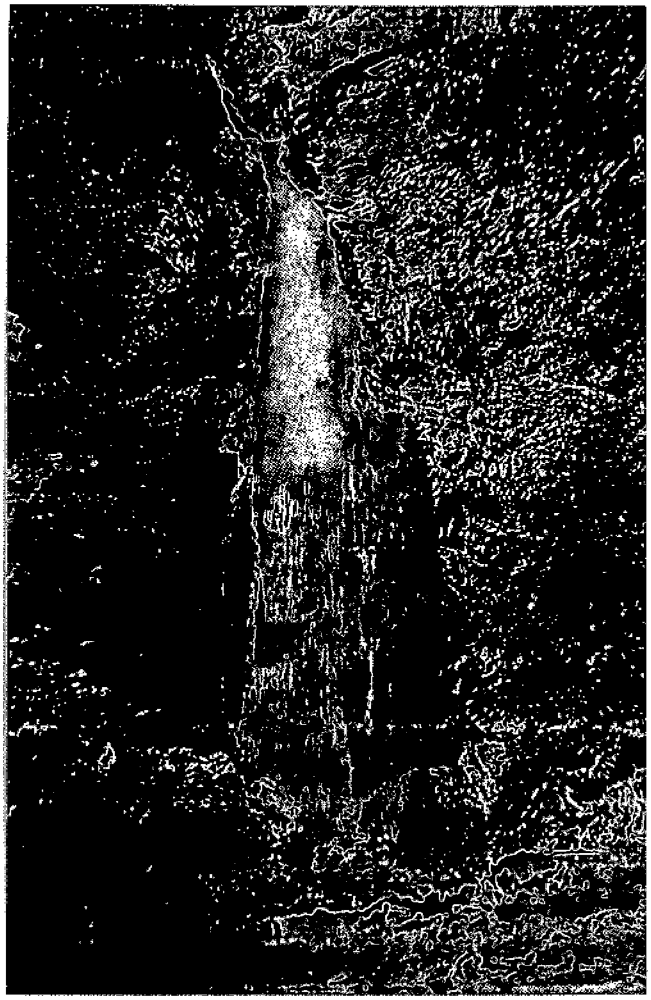
* Deposition of gravel between the inundation weir and the underwater weirs in the main channel.

* Construction of fish passes at Cunovo.

Annex 98

MINISTRY OF THE ENVIRONMENT OF THE SLOVAK REPUBLIC

ENVIRO GUIDE SLOVAKIA



Edited by
MINISTRY OF THE ENVIRONMENT
OF THE SLOVAK REPUBLIC
Hlboká 2
812 35 Bratislava
Slovakia

In cooperation with
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co-operation, or the future creation of bilateral and multilateral programmes of co-operation, it assumes the active participation of the Slovak Republic in global and European institutions on a global level. The Slovak Republic co-operates with the UN through UNEP. The Slovak Republic is a member of the Governing Council, UNDP. The Slovak Republic cooperates with UNIDO, the regional Economic Commission for Europe - UN ECE and Phare programme, as well as with international economic and financial institutions such as the World Bank, EBRD, and EIB. At the same time there is an interest in making bilateral agreements and treaties and regional transboundary agreements as another form of cooperation.

ORIENTATION AND PRIORITIES OF THE NATIONAL ENVIRONMENTAL POLICY

The national environmental policy, based on the environmental overview, in the previous section focuses on the following strategies:

1. Mitigating the negative impact of components of the polluted and damaged environment on life expectancy and public health;

2. Preventing the rise of further undesirable and irreversible changes in ecosystems and other damaging phenomena which will destabilize the environment and cause a decline in the ecological values, lower productivity, or decrease the habitability of the land;

3. Reducing or preventing the growth of environmental liability; in the privatization process, determination of responsibility for the environment liability of the privatized units;

4. Increasing polluter participation in improving the state of the environment and increasing enterpreneurial interest in providing environmental products and services; reduction of the disparity between environmental needs and the resources available for the environment and for effective, low/cost measures;

5. Creating conditions for effective transition of the economic structure from one with high energy and raw material demands to one characterized by conservative and rational raw material and energy use, a higher product to input ratio, utilization of decontamination procedures, and modern, environmentally safe technologies, modes of transport meeting environmental standards, proper storage of material extending their life and re-usability, and more accurate evaluation of people's work and abilities;

6. Greater reliance on non-traditional energy sources (solar, wind, geothermal) and conservation of natural resources; utilization of biological processes in agriculture; revitalizing damaged forests, river basins, and devastated areas; greening of the towns and countryside; optimizing land use;

7. Increasing public environmental awareness with emphasis on young people, the business community, and raising the level of awareness concerning the state of the environment in the Slovak Republic and possible measures which can be taken to improve it;

8. Closer international cooperation in the field of development and environmental protection and enhancement in the process of reaching sustainable development, especially fulfillment of commitments deriving from international environmental agreements.

Preference will be given to activities effecting the greatest and quickest improvement in the state of the environment and reduction of its negative impact on wildlife, development, global environmental security, and public health including an increase in life expectancy.

In accordance with these criteria and the preceeding overview of the

PARLIAMENTARY COMMISSION

The Commission of the National Council of the Slovak Republic for Environment and Natur Protection was established by the Constitution (Article 92). Its activity was determined by the government's election platform and by the Conception of the Activity of the Commission for the elected period.

NON GOVERNMENTAL ORGANISATIONS

The Slovak Union of Nature and Landscape Protectors (SZOPK) was founded in 1969 as a voluntary special-interest organization. It is an association of individuals, organizations and institutions of the Slovak Republic involved in nature landscape protection.

From the very begining SZOPK initiated and organized various activities aimed toward protection of nature and Slovak historical and cultural heritage, and improvement of the quality of life. As the only officially accepted non political environmental NGO in the Slovak Republic (besides the Tree of Life movement - a youth organization dealing with environmental education), SZOPK concentrated on a wide spectrum of activities from human rights. Many other NGOs have also formally included in their programmes and statutes care for the environment. Nevertheless, their members sometimes participate in SZOPK activities while SZOPK experts are often asked to give lectures, write articles, revise and evaluate projects, etc. Recent political and social changes and the coming market economy are opening the door to the western development model, consumerism and the commercialization of human and natural values. In the near future conditions for the transfer of foreign technology and the import of new commodities will be met and no control is as yet secured at the governmental level. SZOPK has to find new, far more effective ways to face these problems and eliminate these dangers.

SZOPK goals are to further increase public awareness of the environment in both the short-term and long-term development of solutions to environmental problems and in influencing decision making. SZOPK wants not only to reach the whole of society, but particulary young people.

Its activities and projects are divided into several areas:

- natural resources protection
- protection of historical structures of the landscape
- cultural heritage protection
- environmental education and work with young people
- creating expertise, publicity activities
- disseminating leaflets and journals, arranging lectures, seminars, conferences, etc.
- special environmental issues - health, energy conservation, waste, nuclear energy, traffic.
- social activities.

SZOPK activities are organized by 39 committees and the Central Committee and are carried out by local groups and volunteer groups. Expert and consulting services are provided by sections and commissions. There are 2 local committees - one in Košice and one in Bratislava.

SZOPK provides:

- publishing of an illustated journal antitled "Ecopanorama" 12x a year which is distributed all over Slovakia
- monthly printing and distribution of internal information for local groups
- publishing of handbooks, materials from

Annex 99

NOTE VERBALE FROM THE MINISTRY FOR FOREIGN AFFAIRS OF THE REPUBLIC OF SLOVENIA TO THE MINISTRY OF FOREIGN AFFAIRS OF THE REPUBLIC OF HUNGARY, 6 JANUARY 1994

Republic of Slovenia
Ministry for Foreign Affairs

Ljubljana, 6 January 1994

Dear Dr Szenasi,

Following our discussions in Budapest last September I would like to thank you for your assistance in arranging the delivery of texts of some bilateral treaties we couldn't find in our archives thus enabling us to have further interdepartmental consultations on the remaining open issues, i.e. the classification of some of the bilateral treaties.

Please find enclosed the note explaining our positions relating to the classification of the treaties.

We would be glad to have an early reaction from you on our proposals. If they are acceptable we can start the internal procedure for the approval of our agreement.

I am looking forward to meet you in Ljubljana to finalise this matter (initial the agreement).

Best regards,

Borut Mahnič
Head of the International
Law Department

Republic of Slovenia
Ministry for Foreign Affairs

No. 644/94

The Ministry for Foreign Affairs of the Republic of Slovenia presents its compliments to the Ministry of Foreign Affairs of the Republic of Hungary and has the honour to convey the following:

Discussions on the delegations of the two Ministries of Foreign Affairs on the succession of bilateral treaties held at Budapest on 23 and 24 September 1993 have left open the issue of the classification of some of the treaties. The Slovene side has conducted the necessary interdepartmental co-ordination with reference to the said treaties and has the honour to convey the following proposals and positions:

The Agreement on the Settlement of Issues relating to Water Management of 1955, the Agreement on Fishing in Frontier Waters of 1957 and the Consular Convention of 1963 with the Additional Agreement of 1980 can remain in force. It is therefore suggested that they be entered on List 1.

The Slovene side would further like to suggest that the following agreements be entered on List 2: The Agreement on Post Service and Telecommunications and the Protocol on Measures for the Extension of Telephone and Telegraph Terminal and Transit Links of 1958, the Agreement on the Protection of Plants of 1983 and the Framework Agreement on Cooperation in the Field of Power Supply and Mining of 1985. The above-mentioned agreements could, for the time being remain in force but they need appropriate adjustments or substitution.

The Agreement on the Connection of Electric Power Systems of 1957 is not applicable between the Republic of Slovenia and the Republic of Hungary, since there is no direct connection of the Slovene system with the Hungarian one for the time being.

To the Ministry of Foreign
Affairs of the Republic of Hungary

Budapest

According to the information of the Ministry of Finance of the Republic of Slovenia, there are no unsolved financial matters or obligations arising from the Agreement on the Settlement of Unsolved Financial and Economic Issues of 1956 with Amendments of 1957 and, from this point of view, there is no need to assume them in succession.

The Ministry for Foreign Affairs of the Republic of Slovenia would appreciate a prompt answer of the Hungarian side to our proposals and positions.

The Ministry for Foreign Affairs of the Republic of Slovenia would like to avail itself of this opportunity to renew to the Ministry of Foreign Affairs of the Republic of Hungary the assurances of its highest consideration.

Ljubljana, 6 January 1994

Annex 100

MINISTER FOR
FOREIGN AFFAIRS

ARKIVEXEMPLAR

Dnr	Avd	Grupp	Mål

Kam.rättsass L Peterson, R 4, KN

Stockholm 1 June 1994

Excellency,

I have the honour to acknowledge receipt of your note of April 29, 1994 which reads as follows:

"Excellency,

I have the honour to inform you of the following.

The Government of the Czech Republic recalls the declaration of the Czech National Council in which the Czech Republic as an independent and sovereign state declared that it considers itself bound as of 1 January 1993 by the bilateral treaties to which the Czech and Slovak Federal Republic was a party.

The Government of the Czech Republic has studied the bilateral agreements concluded between the Czech and Slovak Federal Republic and the Kingdom of Sweden and has arrived at the conclusion that the agreements listed below remain in force between the Czech Republic and the Kingdom of Sweden.

1. 1925, Apr. 18. Treaty on trade and navigation.

2. 1926, Jan. 2. Treaty on conciliation and arbitration.

His Excellency
Mr. Josef Zieleniec
Minister of Foreign Affairs
of the Czech Republic

PRAGUE

Postal Address Box 16121 | Address Gustav Adolfs torg 1 | Telephone (46) 8 786 6000 | Fax (46) 8 723 11 76 (G3) | Sign MINFOR S
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3. 1947, Oct. 15. Air services agreement.

4. 1956, Dec. 22. Agreement concerning settlement of certain claims (agreement, additional protocol and seven exchanges of notes).

5. 1957, Jan. 25. Amendment to the Air services agreement.

6. 1957, Feb. 28. Exchange of notes concerning the Air services agreement.

7. 1958, Dec. 18 and 1959, Feb. 20. Exchange of notes concerning amendment to the Air services agreement.

8. 1965, July, 14. Agreed Minutes concerning amendment to the Air services agreement.

9. 1969, June 27. Agreement on international road transport.

10. 1971, Oct. 13 Agreement on scientific and technical co-operation.

11. 1979, Feb. 16. Convention for the avoidance of double taxation with respect to taxes on income and on capital.

12. 1984, July 5. Agreement on co-operation in the field of health.

13. 1990, July 13. Exchange of notes concerning the abolition of visas.

14. 1990, Nov. 13. Agreement on the promotion and reciprocal protection of investments.

15. 1992, June 9. Exchange of letters concerning arrangements for trade in agricultural products.

I further have the honour to propose that if the Government of the Kingdom of Sweden has arrived at the same conclusion, this note and Your Excellency's affirmative reply constitute a joint confirmation that the afore-mentioned agreements remain in force between the Czech Republic and the Kingdom of Sweden.

I avail myself of this opportunity to renew to you, Your Excellency, the assurances of my highest consideration."

I have the honour to inform you that the Government of the Kingdom of Sweden has arrived at the same conclusion as the Government of the Czech Republic with respect to the agreements which remain in force between the Kingdom of Sweden and the Czech Republic. Your note and this affirmative reply therefore constitute a joint confirmation that the agreements mentioned above remain in force between the Kingdom of Sweden and the Czech Republic.

I avail myself of this opportunity to renew to you, Your Excellency, the assurances of my highest consideration.

Margaretha af Ugglas

Annex 101

ROLŇICKE NOVINY,

INTERVIEW WITH ING. DOMINIK KOCINGER, SLOVAK GOVERNMENT COMMISSIONER FOR THE CONSTRUCTION AND OPERATION OF THE GABČÍKOVO HYDROELECTRIC PLANT, 29 DECEMBER 1994

[Translation]

The temporary variant was presented as the correct solution

• *A little while ago the news agency of the Slovak Republic reported that the next round of talks on the Gabčíkovo-Nagymaros system of barrages will commence on June 20 next year, in The Hague. Could you explain to our readers what this is all about?*

– According to the rules of The Hague International Court of Justice, the Court trial is preceded by a long period of preparation. As the public has already been informed, the memorandum on the differences of opinion regarding the hydroelectric system has been submitted to the International Court in agreement with the Hungarian party. The Court will have to decide on the basis of the contract and other pertinent documents, and in keeping with the general principles of international law:

* whether the Hungarian Republic had the right to suspend, and later stop works in 1989 on the Gabčíkovo-Nagymaros hydroelectric system;

* whether the Slovak Republic had the right to go ahead with construction and operation under the so called temporary solution;

* what legal consequences the announcement of the termination of the contract with the Hungarian Republic has;

* the Court will have to decide about the legal consequences as regards both parties, including the licences and liabilities that may be derived from that decision.

At first sight it seems the questions the International Court will have to decide about are very simple and clear cut, and I myself agree with that. However, the lines of arguments the parties use to justify their decisions will develop gradually during the court process. We have submitted the Joint Appeal to the International Court on June 2, 1993. The first views and arguments of the parties, the so called memorial had to be submitted within 12 months, i.e. by May 2, 1992.

The memorials have been exchanged, and the Court has set December 2, 1994 as the deadline for the so called Counter-Memorials. These too have been exchanged by the parties who are now working on their replies. The deadline for these is June 20, 1995. It is not impossible, that one of the parties will demand further time to examine the counter-arguments of the other.

Today already, the arguments and counter arguments amount to several thousand pages of text and supplements. This requires the work of teams of experts on both sides: preparation for the trial is no two penny matter.

• *We are near the end of the year now. Could you briefly assess the second year of the operation of the Gabčíkovo plant?*

– We have acquired some positive, and some not so positive experiences. The most important is the feeling that our decision to commence the operation of the Gabčíkovo plant under the temporary solution was correct. This was the only possible means of proving the actual effect of the hydroelectric plant on the environment and to refute all prophecies of the catastrophe that was supposed to occur once Gabčíkovo began to operate. The forecasts of experts have been proved, according to whom the operation of the hydroelectric plant will cause no fast change in the natural environment, and that it is possible to optimise this in order to have the positive effects prevail over the negative ones for a long time. This has already been proved by biological monitoring, the examination of subsoil waters and the effects on agriculture and forestry. It became clear that by means of a constructive dialogue between the operators of the plant, the environmentalists and the scientific institutions, the absolutely unfounded anti-plant propaganda could be put to an end. Though this is evident to us, it is not so to the world at large. Next year we shall try to gather the scientific arguments yielded by these two years of operation and present them to the international scientific community.

No one, perhaps, would call to doubt the obvious economic benefit of electric energy, produced in the cleanest possible manner, of which the plant has provided some 4.5 million kWh from the time of the commencement of operation until the end of 1994. A smaller hydroelectric plant has been tested on the Čunovo dike, which makes it possible to increase the water discharge to the Moson Danube, and therefore to the Hungarian branch system as well. The revenue generated by the sale of this electric energy will have to finance the further construction and operation of the hydroelectric plant. Financing is the Achilles' heel of further construction and operation at present. Some half of the consumers refuse to pay the Slovak Energy company – the purchaser of electricity from the plant – for the electric energy used. Each kWh produced should provide one Crown for construction and operation. If this influx of cash were guaranteed, one could determine with good precision the funding requirements until completion, and meet them with loans. We cannot count on assets from the 1994 and 1995 budgets of the Slovak Republic.

One of the unpleasant events at the hydroelectric plant was the accident of the ship Zemograd in the right chamber, which caused the breakage of the gate of the left chamber. We had to exert maximum efforts to ensure navigation in the left chamber while carrying on repair work at the same time. We could not finish repair by the pre-set deadline. We were all expecting to have at least the left gate operate by Christmas, like a present, so to say. We don't want to exert any pressure on the suppliers, but the gates must be safe and operable, and normal operation must start in January, after all necessary safety tests have been conducted.

My comments on the events of the year would be incomplete if I failed to mention positively the renewal of expert discussions on the Hungarian side about the water supply to the branch system. We know that the Hungarian party had the possible alternatives of optimising water supply examined.

• *Mr. Commissioner, tell us about the rumours of discharge?*

– These are not rumours, but the truth. The former Minister of Soil Management, Pavel Koncoš submitted to the last government his proposal about my discharge as of July 1, 1994. All this while he never seemed to find the time during his ministership to put forth the reasons for having me discharged. I came to know about the proposal the same way you did: on the corridor. And all the time we had been working in the very same building.

Annex 102

ENVIRONMENTAL PROGRAMME FOR THE DANUBE RIVER BASIN

STRATEGIC ACTION PLAN FOR THE DANUBE RIVER BASIN

1995–2005

BY THE TASK FORCE FOR THE PROGRAMME

1.6 Fundamental principles and approaches for environmental protection

31. Despite the diversity of problems, interests and priorities across the Danube River basin, these countries share certain values and principles relating to the environment and to the conservation of natural resources. These values and principles underly the goals and actions for the restoration and protection of the Danube River basin set out in this Action Plan.

The precautionary principle

32. The precautionary principle states that planning and actions should take into account the possibility that adverse effects might occur, even when firm evidence is lacking. In other words, it is better to be safe than sorry. It may justify limits on the discharge of a hazardous substance even though adverse effects on human health or the environment have not been conclusively proven. The lack of information about the state of the environment in the Danube River basin and the general lack of understanding of the complex dynamics and relationships in the riverine and aquatic environment make this principle especially relevant to the Action Plan.

33. The CEE countries, in particular, will be taking many strategic decisions regarding industrial development and agricultural policy which could have far reaching effects on water and environmental quality. Use of the precautionary principle in making policy and investment choices which might affect the environment of the Danube River basin can help bring greater concern for the environment into decisions in other sectors.

Best Available Techniques/Best Environmental Practice (BAT/BEP)

34. Best Available Techniques (BAT) means the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. It is applied to industrial and other point sources of pollution. Best Environmental Practice (BEP) means the application of the most appropriate combination of sectoral environmental control strategies and measures. It is applied to nonpoint sources of pollution such as agriculture. These approaches do not imply fixed, predetermined solutions to problems. The choice of BAT or BEP depends on practical and economic factors as well as technologies. The result should be the adoption of the most cost-effective solutions, taking into account the full value of environmental functions and processes, and biological diversity.

Control of pollution at the source

35. The Action Plan gives higher priority to preventive actions, such as the reduction of waste through cleaner technologies and processes, than to curative actions. It is generally less expensive to prevent the creation of harmful wastes or pollution than to repair the damage to the environment afterwards. Reduction of pollution at source can also be encouraged by changes in patterns of consumption, for example if consumers select environmentally benign products such as phosphate-free detergents or recyclable packaging materials. Reducing harmful materials in products lessens reliance on costly end-of-pipe control technologies and helps to reduce the generation of hazardous wastes.

Annex 103

MINUTES OF THE NEGOTIATIONS BETWEEN SLOVAK AND HUNGARIAN TECHNICAL EXPERTS IN RELATION TO THE WATER SUPPLY TO THE SIDE BRANCH SYSTEM ON THE RIGHT SIDE OF THE DANUBE, BRATISLAVA, 18 JANUARY 1995

[Translation]

1. The heads of delegations summarised the results of the consultations between technical experts conducted from August 24, 1994. On the basis of the comments of the Slovak party, the Hungarian party has handed over the technical study on the water supply of the Szigetköz area from the right hand seepage channel via the supply structure located on the right hand dike. The Slovak party has promised to set forth its standpoint by 20 February 1995.

2. In the following part of the negotiations the parties have discussed the possibilities of water supply to the Mosoni Danube as part of the temporary water management regime and according to Chapter 4. of the Individual agreement completed between the Slovak Republic and the Hungarian Republic.

The Slovak party has given the information that as of October, 1994, the Mosoni Danube has been supplied with an average 30 m^3/s water discharge through the supply structure, during the test operation of the Moson MVE (hydroelectric plant). For a short period, the water discharge reached 47 m^3/s. However, such quantities can only be ensured for short periods and under certain special hydrological conditions. The Slovak party has furthermore advised that the test operation provided adequate proof that it is possible to supply the Mosoni Danube with a permanent 30 m^3/s water discharge.

The head of the Slovak delegation will submit a written reply by 25 January 1995 to the head of the Hungarian delegation regarding the general conditions necessary to ensure a permanent 30 - 40 m^3/s water discharge to the Mosoni Danube.

3. The parties have mutually advised each other about their future plans on the water supply to the right hand side branch system of the Danube. The Slovak party gave preference to the idea of providing the Danube's side branch system with water by means of underwater weirs in the old Danube bed.

These Minutes have been prepared in the Slovak language.

Bratislava, January 18, 1995

Head of the Slovak delegation

Head of the Hungarian delegation

Annex 104

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

J-2/B/8/1995

Note Verbal

The Ministry of Foreign Affairs of the Republic of Hungary presents its compliments to the Embassy of the Slovak Republic and with reference of the signature of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning certain temporary technical measures and discharges in the Danube and Mosoni branch of the Danube, has the honour to enclose herewith a declaration by the Government of the Republic of Hungary issued in connection with the signing of the aforesaid Agreement.

The Ministry of Foreign Affairs of the Republic of Hungary avails itself of this opportunity to renew to the Embassy of the Slovak Republic the assurances of its highest consideration.

Budapest, April 19, 1995

Embassy of the Slovak Republic

__Budapest__

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

MINISTRY OF FOREIGN AFFAIRS
OF THE REPUBLIC OF HUNGARY

Declaration

by the Government of the Republic of Hungary in connection with the signing of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube

The Government of the Republic of Hungary declares, in connection with the signing of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube, that the conclusion of this Agreement *shall not be considered as a fulfillment of the obligation of the Parties*, pursuant to Article 4 of the Special Agreement for the Submission to the International Court of Justice of the Differences between the Republic of Hungary and the Slovak Republic concerning the Gabčíkovo-Nagymaros Project, to establish a temporary water management regime.

The Government of the Republic of Hungary hereby reaffirms its position it has represented during the negotiations that the Agreement signed today is intended to introduce a temporary mitigation measure in order to alleviate damage in the Szigetköz region. The Agreement is without prejudice to the position of Hungary in the dispute before the International Court of Justice and is applicable pending the judgment of the Court or until an agreement on a temporary water management regime under Article 4 of the Special Agreement is concluded between the two Parties.

Budapest, April 19, 1995

1394 Budapest 62, Pf. 423
Tel: 117.63.02 Fax: 117.77.38

Annex 105

GOVERNMENT RESOLUTION 2109/1995. (IV.21.) OF THE REPUBLIC OF HUNGARY

CONCERNING THE IMPLEMENTATION OF PARLIAMENTARY RESOLUTION 31/1995 (III. 24) AND THE MODIFICATION OF GOVERNMENT RESOLUTION 2030/1995 (II.8) ON THE SUBJECT OF THE TEMPORARY WATER RECHARGE OF THE SZIGETKÖZ, 21 APRIL 1995

The Government

1. orders that a temporary underwater weir be built at 1843.0 rkm of the Danube;

Responsible: The Ministers for Transport, Communication and Water-Management

Deadline: an immediate start of the necessary preparatory work

2. orders that 450 million HUF be provided from the general reserve of the budget to cover the cost of implementation, in a manner that in the first half of the year 300 million HUF, and in the second half of the year 150 million HUF, is guaranteed;

Responsible: Minister of Finance

Deadline: Immediately, or continuously

3. orders, in the event of a crisis situation caused by unfavourable hydrological and meteorological conditions, the application of a 10 m^3/s capacity recharge using diesel water pumps to avert danger;

Responsible: Minister for Transport, Communication and Water-Management

Minister for Environment and Regional Development

Minister for Agriculture

Deadline: When necessary

4. the 2030/1995 (II.8) Government Resolution on the temporary water recharge of the Szigetköz

a) the deadline of point 1. is modified to the 30th April 1995

b) the deadline of point C) of the implementation schedule indicated in the Annex, for finishing the implementation work, is modified to 5th July 1995, and for the commencement of full operation to 15th July 1995;

5. orders the preparation of a brief for Parliament on the implementation of the measures;

Responsible: Foreign Minister

Deadline: immediately following the Slovak-Hungarian Intergovernmental Agreement

Gyula Horn
Prime Minister

Annex 106

No.: 1108/95-OMSD

The Ministry of Foreign Affairs of the Slovak Republic presents its compliments to the Embassy of the Republic of Hungary and, with reference to the "Declaration by the Government of the Republic of Hungary in connection with the signing of the Agreement between the Government of the Republic of Hungary and the Government of the Slovak Republic concerning Certain Temporary Technical Measures and Discharges in the Danube and Mosoni Branch of the Danube" of April 19, 1995, has the honour to state the following:

The Ministry of Foreign Affairs of the Slovak Republic is unable to share the view according to which:

> "the conclusion of [the] Agreement [mentioned above] shall not be considered as a fulfillment of the obligation of the Parties, pursuant to Article 4 of the Special Agreement for the submission to the International Court of Justice of the Differences between the Republic of Hungary and the Slovak Republic concerning the Gabčíkovo-Nagymarós Project, to establish a temporary water management regime"

for, inter alia, the following reasons.

Since the signature of the Special Agreement Slovakia and Hungary have been involved in negotiations aimed at establishing a mutually acceptable water management regime of a temporary character, applicable pending the Judgement of the International Court of Justice in the case concerning the Gabčíkovo-Nagymaros Project. The main elements under discussion were the discharge into the old river bed of the Danube, technical measures to enable the supply of the right side arms system with water and the discharge into the Mosoni Branch of the Danube. These elements were common to a number of proposals submitted during these negotiations.

The Agreement of 19 April 1995 deals with the same subject-matter. A detailed water management regime is specified in Annexes No 1 and 2. Thus it is crystal clear that the conclusion of this Agreement in the fulfillment, by the parties, of their commitment, expressed in Article 4 of the Special Agreement, to establish, pending the final Judgment of the Court, a temporary water management regime for the Danube.

Embassy of the

Republic of Hungary
<u>B r a t i s l a v a</u>

The Ministry would like to note, that the subject-matter and purpose of the Agreement of 19 April 1995 and the subject-matter and purpose of an agreement envisaged by Article 4 of the Special Agreement were implicitly recognized as identical by Hungary itself in paragraph 2 of its Declaration where the possibility of termination of the Agreement of 19 April 1995 as a consequence of the conclusion of a successive agreement pursuant to Article 4 of the Special Agreement is implied - a possibility which does not exist for treaties relating to the same subject-matter (Article 59 of the Vienna Convention on the Law of Treaties of 23 May 1969).

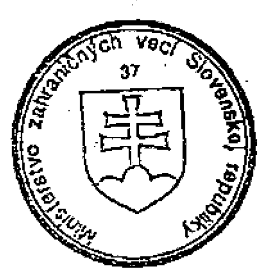
Moreover, Article 5 of the Agreement of 19 April 1995 is fully consonant with Article 4, paragraph 2, of the Special Agreement which provides for consultations and, if need be, reference to experts of the Commission of the European Communities.

Accordingly, the Ministry of Foreign Affairs of the Slovak Republic reafirms its view that the Agreement of 19 April 1995 is an agreement pursuant to Article 4 of the Special Agreement.

At the same time this Ministry reafirms that the Agreement of 19 April 1995 is without prejudice to existing rights and obligations of the Parties as well as to their respective positions in the dispute before the International Court of Justice.

The Ministry of Foreign Affairs of the Slovak Republic avails itself of this opportunity to renew to the Embassy of the Republic of Hungary the assurances of its highest consideration.

Bratislava, May 3, 1995



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