INTERNATIONAL COURT OF JUSTICE

CASE

CONCERNING THE GABCIKOVO-NAGYMAROS

PROJECT

(HUNGARY/SLOVAKIA)

MEMORIAL

OF THE REPUBLIC OF HUNGARY

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PART I

CHAPTER 1

INTRODUCTION

SECTION A: OVERVIEW

1.01. On 7 April 1993, the Republic of Hungary and the Slovak Republic entered into a Special Agreement for Submission to the International Court of Justice of the Differences between them Concerning the Gabcikovo-Nagymaros Project.[1] The Special Agreement entered into force upon the date of the exchange of instruments of ratification in Brussels on 28 June 1993. It was jointly notified to the Court on 2 July 1993.

1.02. By its Order of 14 July 1993, the Court fixed 2 May 1994 as the date for submission by each of the Parties of its Memorial in the case (ICJ Reports 1993, p. 319). This Memorial with accompanying Annexes is submitted in accordance with that Order.

1.03. In essence, the dispute between the Parties relates to a major industrial project . . .

* conceived during the 1950s under the auspices of the Council for Mutual Economic Assistance (CMEA, otherwise known as COMECON) and under Soviet pressure;

* planned in erratic stages over the next 20 years;

* agreed upon in an interstate treaty in 1977,[2] without any system of environmental impact assessment;

* never implemented as originally planned;

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1 For the text of the Special Agreement see Annexes, vol 3, annex 32.

2 Hungary-Czechoslovakia, Treaty concerning the Construction and Operation of the Gabcikovo-Nagymaros System of Locks, Budapest, 16 September 1977, 1109 UNTS 236; 32 ILM 1247; Annexes, vol 3, annex 21 (hereafter "the 1977 Treaty").

* increasingly the subject of national and international criticism on environmental and economic grounds;

* the subject of lengthy delays on both sides, then of suspension of works and fruitless attempts at renegotiation . . .

and eventually -- following revolutionary changes in Eastern Europe -- terminated by Hungary in the face of threats of unilateral diversion by the other Party, and pressing needs to maintain the integrity of its environment and of its present and future drinking water supplies.

1.04. The threatened diversion of the Danube -- resisted throughout by Hungary -- was hastily and incompetently executed and culminated in the closure of the riverbed at river kilometre[3] 1851.7 in October 1992. The closure has already caused significant damage to the environment of the Szigetköz region, a unique wetlands area, and threatens potentially irreversible long-term harm to the environment and water resources of both Parties. Yet despite demonstrated harm and substantial risks of further harm, Czechoslovakia[4] refused to modify the 1977 Treaty, and the Slovak Republic -- never itself a party to that Treaty -- continues to insist on its integral implementation. Moreover, contrary to undertakings made within days of the unilateral diversion, Czechoslovakia failed to maintain "the whole traditional quantity of water into the old Danube riverbed".[5] And neither it nor the Slovak Republic ever -- except where flooding left it no choice -- maintained even the minimum flow recommended as necessary by an independent body, established through

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3 River kilometres (abbreviated as rkm) are measured along the main course of the river from the Black Sea.

4 Czechoslovakia changed its name several times during the period of discussion, planning, construction and disintegration of the Project: Czechoslovak Republic (1918-1939; 1945-1960); Czechoslovak Socialist Republic (1960-March 1990); Czech-Slovak Federal Republic (March-April 1990) and Czech and Slovak Federal Republic (May 1990-31 December 1992). For consistency, this Memorial will refer to it as Czechoslovakia in relation to the whole period until its disappearance as a State on 31 December 1992.

5 This commitment was made in the London Agreement, para 1. See Czech and Slovak Federal Republic-EC-Hungary, Agreed Minutes on the Gabcikovo-Nagymaros Project, London, 28 October 1992, for the text of which see Annexes, vol 3, annex 31. A note to para 1 defined "the whole traditional quantity of water" as "not less than 95%" of its traditional level. In fact, the actual amount of water delivered to the Danube since October 1992, except during floods, has been approximately 8-12% of the average flow.

the mediation of the European Commission to avoid serious ecological harm to the Hungarian side.[6]

1.05. Such, in the most summary terms, is the dispute before the Court. This first Part of the Memorial introduces the issues and describes the Special Agreement which confers jurisdiction on the Court. But to understand this dispute it is helpful to start with a brief description of the two elements which, in combination, are at the core of the dispute -- its physical setting, and the Barrage System which was planned to transform that setting.

SECTION B: THE LOCATION OF THE DISPUTE

1.06. After the Volga, the Danube is the second largest river in Europe, both in length and in the extent of its catchment area. On its 2860 km route to the Black Sea, the Danube flows along or across the borders of 10 countries: its 817000 squ km catchment area embraces 15 countries, about 8% of Europe. The area through which it flows is divided into three reaches: the Upper, the Middle (within which falls the area affected by the present dispute) and the Lower Danube. The Middle Danube, consists of the Little Hungarian Plain in north-western Hungary and south Slovakia, the Great Hungarian Plain, and the Transylvanian basin in Romania.

1.07. The Kisalföld or Little Hungarian Plain, 10,000 squ km in extent, is the most environmentally and economically varied flatland region in the Carpathian Basin. In this sector the Danube runs from the Hungarian-Slovak border (just below Cunovo) at rkm 1843.3 to the Danube Bend, where the towns of Nagymaros (rkm 1696.25) and historic Visegrád are located. Below is the large river island of Szentendre, with Budapest immediately to the south. This area is shown in maps 1-3 in Volume 2 of the Annexes and its key features are depicted in the photographs also found in Volume 2 of the Annexes.

1.08. Just below Bratislava, the river gradient decreases from 35-40 cm/km to 8-10 cm/km, depositing the largest stream alluvial cone in Europe. On the Hungarian side this is known as the Szigetköz (375 squ

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6 See EC-Hungary-Slovak Republic, Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks, *Report on Temporary Water Management Regime*, Bratislava, 1 December 1993; Annexes, vol 5, annex 19. See further below, para 2.11 for the Slovak rejection of the EC recommendation.

km): it is the area between the main Danube and the Moson Danube, which separate near Cunovo and merge again at Győr. The term Szigetköz means "islands region", so-called because on the gravel and sand sediment a large number of "islands" of diverse character have been formed by the shifting river and its branches. Similarly, in Slovak territory, outside the floodplain and along the main riverbed, a long meandering branch, the Maly Dunaj, encloses an island region known as Zitny Ostrov (Csallóköz, in Hungarian).

1.09. Here the braided Danube flows on the crest of an alluvial fan in a hanging channel. In the past frequent floods inundated large areas of Szigetköz, but these have been diminished in the past 150 years by the construction of flood protection levees and river regulation.

1.10. The Szigetköz is a flood plain criss-crossed with rivers. In the Middle Ages, it must have been a vast alluvial trackless forest. Since then the ancient scenery has been gradually transformed, mostly into an agricultural area interspersed with patches of woods, meadows, fen and swamps, former river bends and water courses. This accounts for its diversity or mosaic-like character, and is why it provides a habitat for a wide variety of plant and animal communities.

1.11. The Szigetköz Nature Conservation Region was established in 1987 to protect the specific water system, and the characteristic flora and fauna of the Szigetköz. The territory of the Conservation Region is 9,157 ha, of which 1,325 ha is highly protected. Its scenery is remarkably diverse: flood plains, sand floods, marshlands with water surfaces, flowery fields, forests, and waters with banks, branches flowing at different speeds, enclosed villages, and towns.

1.12. One important natural resource of the Szigetköz is the timberland: 64% of the over 16,400 ha of forest is economic timberland. The most important tree species is the poplar which covers 2,763 ha.

1.13. Downstream from the Szigetköz in the direction of Visegrád and Nagymaros, the topography is hilly. The Danube Bend, where the Nagymaros Barrage was to be situated, is a narrow valley surrounded by the 700-900m high ridges of the Visegrád and Börzsöny hills. Visegrád itself, overlooking the bend, was the seat of the Magyar kings and the Hungarian Renaissance (15th century). The Danube Bend is one of the most important sites in Hungary, combining fine scenery with sites of historical and archaeological significance.

SECTION C: THE ORIGINAL BARRAGE SYSTEM AND VARIANT C

1.14. It may be helpful to begin this outline of the Gabcikovo-Nagymaros Barrage System by defining some terms used throughout this Memorial.[7] The Barrage System was designed as "a single and indivisible operational system of works", to use the language of Article 1(1) of the 1977 Treaty. References to "the Project" or "the Barrage System" will indicate the scheme as a whole. The Barrage System contained two major elements:

(1) the upstream sector, including works at Dunakiliti on Hungarian territory and Gabcikovo on Czechoslovak territory: this will be referred to as *the Gabcikovo sector*;[8]

(2) the downstream sector, comprising works at and in the vicinity of Nagymaros, on Hungarian territory: this will be referred to as *the Nagymaros sector*.[9]

By contrast, the term "Variant C" will be used to refer to the so-called "provisional solution", i.e., the unilateral diversion of the Danube at rkm 1851.7 on what was then Czechoslovak territory.

(1) THE ORIGINAL BARRAGE SYSTEM

1.15. The Barrage System as envisaged by the 1977 Treaty was intended to serve four purposes: electricity production, navigation, flood protection and regional development.[10] The role of major installations in performing those tasks would have been the following:

(1) *The Hrusov-Dunakiliti reservoir* covering 60 squ km, extending from the south-east end of Bratislava to the Dunakiliti dam (rkm 1858-1842) and having a 300-700 metre wide *head race canal*, would have had a total capacity of 200 million cubic metres, out of

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7 To assist the Court, a select glossary of frequently used terms may be found directly before the Appendices of this Memorial.

8 For a map of the Gabcikovo sector, see Annexes, vol 2, map 1.

9 For a map of the Nagymaros sector, see Annexes, vol 2, map 3.

10 For a more detailed description of the plans, see Joint Contractual Plan, Summary, 1977; Annexes, vol 3, annex 24, and Environmental Impact Assessment, Summary, Budapest, June 1985; Annexes, vol 5, annex 4.

which 49 million cubic metres would have been used to generate electricity at the Gabcikovo power plant situated at canal km 17. The power plant was designed to operate in peak mode, utilising that amount for several hours, depending on the discharge of the Danube. Except for the morning and evening peak hours of electricity consumption, the Danube would have been "stopped", with practically no water coming through the power plant into the 8.2 km long *tail race canal*, joining the Danube at Palkovicovo. Apart from large floods measuring over 4500 cubic metres per second (m3/s) which would last for only a few days each year the average discharge of 2,000 m3/s in the 31 km long by-passed main riverbed would have fallen to a mere 50 m3/s after construction of the Hrusov-Dunakiliti reservoir.

(2) The built-in capacity of the eight turbines of the Gabcikovo *Barrage* was planned to be 720 Megawatts, and of the six turbines at the Nagymaros Barrage 158 Megawatts. In total, the Barrage System was designed to produce 3675 Gigawatthours electric power per year, which the Parties were to share equally.

(3) In order to maintain the required navigational depth in the 113 km long stretch between Palkovicovo and Nagymaros, it would have been necessary to dam back the Danube water. This long *impoundment*, with raising the water level almost 1 metre above the recorded highest flood at Nagymaros and occupying the floodplain between the existing but reinforced levees, would have been achieved by a *second barrage*, situated in the riverbed at rkm 1696 (at Nagymaros) and with a hydro-power plant running in continuous mode. There would have been no need for this Nagymaros Barrage, had the Gabcikovo power plant operated in continuous mode, not peak mode.

(4) Also, for navigational purposes, two 275 metre long *shiplocks* were designed for the barrages at Gabcikovo and Nagymaros. In the case of an accident in the by-pass canal or malfunctioning of the Gabcikovo shiplocks, one of the seven tainter gates of the Dunakiliti weir was augmented with a fifth shiplock, enabling emergency navigation in the main riverbed. Under normal conditions navigation was to be re-routed to the by-pass canal, but small boat traffic and emergency navigation would have remained in the main riverbed.

(5) *Flood protection* was to be provided by dividing the Danube's water discharge between the by-pass canal and the main riverbed and by reinforcing the banks downstream of Palkovicovo. In addition, dredging below Palkovicovo and downstream of Nagymaros was intended to increase safety from flooding, even if the Project would cause the Danube to flow 6-16 meters above terrain level between man-made dykes in the head race canal, and with the water level constantly above high water level in a large part of the Nagymaros reservoir.

(6) *Regional development* was to include infrastructure investments (roads, waste-water treatment plants, provision of water supply and canalisation for villages), irrigation facilities, recreational amenities around the reservoirs, and local job opportunities. These would have been considered "national investments", whose costs would not have formed part of the Project as such.

(2) VARIANT C

1.16. The original Barrage System was never completed. Acting unilaterally, Czechoslovakia constructed Variant C. Variant C, as it exists in March 1994, incorporates a new connecting dam cutting across the floodplain approximately 1.5 km from the Slovak-Hungarian border and connecting the right bank of the reservoir with a new 11 km long dyke on the left bank of the river, joining the upper end of the original power canal. Thus, the Cunovo reservoir is created, which is 30% smaller than the Hrusov-Dunakiliti reservoir would have been.[11] The dam at Cunovo presently includes a by-pass weir, with four tainter gates with a nominal capacity of 1,460 m3/s, which is reduced -- due to a in fault design -- to a theoretical capacity of 600 m3/s. Continuously, however, in order not to produce erosion in the riverbed downstream of the barrage, the capacity at present is said to be only 250-350 m3/s. The Cunovo dam incorporates a 20 gate inundation weir built on the surface of the floodplain (128 m above the Adriatic sea level (asl)), capable of letting down 4,600 m3/s if necessary. The Danube-bed is closed with a permanent dam of stones and concrete blocks covered by a clay-cement protection layer. No shiplock exists. The Slovak Republic claims that it plans to augment these structures with a hydropower station, a spillway weir, and a shiplock. However, due to the 5 metre difference between the level of the Danube-bed and the deepest point of the by-pass weir the

11 For a map comparing the Gabcikovo sector of the Original project and Variant C, see Annexes, vol 2, map 5.

reservoir cannot be "flushed" nor can ice accumulating in the reservoir be passed downstream. There is no technical mechanism for releasing water in the extended head-race canal and the lower part of the reservoir if a dyke burst occurs.

1.17. Under Variant C, the water flows past the Cunovo dam through the six installed turbines at Gabcikovo. Those turbines are utilised in a continuous operation mode, since interruption of the water flow would hinder or prevent navigation in the tail race canal and downstream of Palkovicovo. The estimated electricity production of Variant C, all used by Slovakia, is said to be 2,000 Gigawatthours per year.

SECTION D: STRUCTURE OF THE MEMORIAL

1.18. This Memorial is in four parts. Part I (Chapter 2) outlines the essential issues presented for the Court under Article 2 of the Special Agreement. It also deals with the important question of the interim protection of the rights of the Parties, and in particular the obligation to establish a temporary water management regime, as required by Article 4 of the Special Agreement.

1.19. Part II gives an account of the essential elements of the dispute, including its long history (Chapter 3), the key features of the 1977 Treaty which is at the centre of the dispute, and of other relevant treaties between the Parties (Chapter 4), and the risks imposed on and the damage suffered by Hungary as a result of the unilateral diversion of the Danube in October 1992 (Chapter 5).

1.20. Part III deals with the breaches of international law attributable to Czechoslovakia and subsequently to the Slovak Republic. Chapter 6 details the breaches of relevant treaties, and of general international law, committed by Czechoslovakia prior to the construction and implementation of Variant C. Chapter 7 deals with the illegality of Variant C itself. Chapter 8 discusses the issue of the attribution of these unlawful acts to the Slovak Republic, and the consequential obligations of reparation.

1.21. Part IV demonstrates the lawfulness of Hungary's conduct in suspending and subsequently abandoning work on the Project (Chapter 9) and in terminating the 1977 Treaty (Chapter 10), as well as spelling out the legal consequences for the Parties of the termination of the Treaty (Chapter 11).

PART I

CHAPTER 2

THE TASK OF THE COURT UNDER THE SPECIAL AGREEMENT

SECTION A: ARTICLE 2 OF THE SPECIAL AGREEMENT

2.01. Article 2 of the Special Agreement provides as follows:

"*Article 2*

(1) The Court is requested to decide on the basis of the [1977] Treaty and rules and principles of general international law, as well as such other treaties as the Court may find applicable,

(a) whether the Republic of Hungary was entitled to suspend and subsequently abandon, in 1989, the works on the Nagymaros Project and on the part of the Gabcikovo Project for which the Treaty attributed responsibility to the Republic of Hungary;

(b) whether the Czech and Slovak Federal Republic was entitled to proceed, in November 1991, to the "provisional solution" [otherwise variant C] and to put into operation from October 1992 this system, described in the Report of the Working Group of Independent Experts of the Commission of the European Communities, the Republic of Hungary and the Czech and Slovak Federal Republic dated 23 November 1992 (damming up of the Danube at river kilometre 1851.7 on Czechoslovak territory and resulting consequences on water and navigation course);

(c) what are the legal effects of the notification, on 19 May 1992, of the termination of the Treaty by the Republic of Hungary.

(2) The Court is also requested to determine the legal consequences, including the rights and obligations for the Parties, arising from its Judgment on the questions in paragraph 1 of this Article."

2.02. Article 2(1) sets out three questions which the Court is asked to determine, and which were central to the dispute between Hungary and the Czech and Slovak Federal Republic prior to 31 December 1992. In essence those questions relate (a) to the suspension and subsequent abandonment of works on the Project by Hungary, (b) to the unilateral diversion of the Danube in October 1992, with its consequent effects, and (c) to the legality of the termination of the 1977 Treaty by Hungary on 19 May 1992.

2.03. Thereafter the Court is asked, by Article 2(2), to determine what are the legal consequences for the parties of the answers to the three questions enumerated in paragraph (1). This is a reference to the legal consequences, including the rights and obligations of the Parties, as they will be at the date of the Court's judgment. Accordingly the Court has jurisdiction to determine any other legal issue that may be necessary in order to decide what are those legal consequences at that date. The Court is not asked to decide hypothetical legal questions, divorced from the actual relations between Hungary and Slovakia since 1 January 1993. It is entitled to take into account events, transactions and statements since that date, to the extent that these are relevant in determining what are the actual legal consequences of the answers to the questions enumerated in paragraph (1) -- in other words, the actual rights and obligations of Hungary and Slovakia *inter se* at the date of the Court's judgment.

2.04. One obvious reason for the distinction drawn between the questions specified in paragraph (1) of Article 2 and the more general reference to consequences, rights and obligations contained in paragraph (2) is that the former questions did not arise between the parties to the present proceedings. Rather they arose between the Republic of Hungary and the Czech and Slovak Federal Republic, a State which ceased to exist on 31 December 1992. It is because of the dispute existing between Republic of Hungary and the Slovak Republic that the questions identified in paragraph (1) continue to be live issues between the parties.

2.05. Subject to what will be said below about Article 4,[1] the purpose of the Special Agreement was to confer on the Court jurisdiction to determine the questions specified in paragraphs (1) and (2) as between the parties. The Special Agreement does not prejudge any of those questions, nor does it limit or direct the Court in the grounds it may rely

1 See below, paras 2.09 - 2.12.

on in answering them. The Court has to determine those questions "on the basis of the Treaty and rules and principles of general international law, as well as such other treaties as the Court may find applicable". The Court has to determine, *inter alia*, whether the Treaty remained in force notwithstanding the Hungarian Declaration of Termination.[2] In doing so it must have regard not only to the Treaty itself but to the rules and principles of general international law. Thus, Article 2 does not establish any special hierarchy of norms to be applied: these are a matter for determination by the Court in the normal way, consistently with Article 38 of its Statute.

2.06. Preambular paragraph 2 of the Special Agreement reads as follows:

> "*Bearing in mind* that the Slovak Republic is the sole successor State in respect of rights and obligations relating to the Gabcikovo-Nagymaros Project;"

This is a reference to the fact that, as between the Czech Republic and the Slovak Republic as the successor States to the former Czech and Slovak Federal Republic, it was understood that the Slovak Republic would be solely concerned with the issue of "rights and obligations relating to the Gabcikovo-Nagymaros Project", and that this matter would be of no concern to the Czech Republic.

2.07. This understanding is evidenced by a *Note Verbale* of the Czech Republic to the Delegation of the Commission of the European Communities in Prague on 3 March 1993, which read in relevant part as follows:

> "The Ministry of Foreign Affairs of the Czech Republic ... has the honour to notify that on February 23, 1993 the House of Deputies of the Parliament of the Czech Republic approved that the Czech Republic would not become a succession state to the Treaty between the Czechoslovak Socialist Republic and the Hungarian People's Republic on the construction and operation of the Gabcikovo-Nagymaros system of locks ... and the contractual documents related to this Treaty."[3]

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2 Hungarian Declaration of Termination, signed by Hungarian Prime Minister J Antall, 16 May 1992; Annexes, vol 4, annex 82.

3 See Annexes, vol 4, annex 117.

2.08. Thus under Article 2 of the Special Agreement, the Court is entitled to determine, as between the Parties to this case:

(1) the meaning and effect of the 1977 Treaty;

(2) whether there was any relevant breach of the 1977 Treaty by either Party to that Treaty;

(3) whether certain work on the Project was lawfully suspended and subsequently abandoned by Hungary;

(4) whether, in the circumstances then obtaining, Hungary was entitled to terminate the 1977 Treaty by its Termination Declaration of 16 May 1992, transmitted to the Prime Minister of the Czech and Slovak Federal Republic by *Note Verbale* of 19 May 1992 and taking effect on 25 May 1992;[4]

(5) if not, whether the Treaty is nonetheless no longer in force by reason of subsequent events, including subsequent breaches by the Czech and Slovak Federal Republic;

(6) to what extent legal rights and obligations with respect to the Project have been assumed by the Slovak Republic, in accordance with relevant rules of international law;

(7) the legality of the conduct of Slovak Republic in relation to Variant C;

(8) the legal consequences for Hungary and the Slovak Republic of the answers given by the Court to these questions.

SECTION B: ARTICLE 4 OF THE SPECIAL AGREEMENT

2.09. The role of the Court under the Special Agreement is limited in one important respect by Article 4. This provides as follows:

"Article 4

(1) The Parties agree that, pending the final Judgment of the Court, they will establish and implement a temporary water management regime for the Danube.

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4 Annexes, vol 4, annex 83.

(2) They further agree that, in the period before such a regime is established or implemented, if either Party believes its rights are endangered by the conduct of the other, it may request immediate consultation and reference, if necessary, to experts, including the Commission of the European Communities, with a view to protecting those rights; and that protection shall not be sought through a request to the Court under Article 41 of the Statute.

(3) This commitment is accepted by both parties as fundamental to the conclusion and continuing validity of the Special Agreement."

2.10. Article 4(2) excludes the parties from applying for provisional measures in the period before the establishment of an interim water management regime. This exclusion was insisted upon by the Slovak Republic before it would agree to refer the present dispute to the Court. The Republic of Hungary in its turn insisted on a commitment on the part of the Slovak Republic not merely to discuss the possibility of an interim water management regime, but actually to "establish and implement" such a regime.[5] Without such a commitment, Hungary would not have foregone the right to seek an indication of provisional or interim measures from this Court.

2.11. As envisaged in Article 4(2), the mediation of the Commission of the European Communities has proved necessary in seeking to establish a temporary regime. The various recommendations made by the EC's Expert Group, and by the EC itself, are recorded in Chapter 3 of this Memorial.[6] It is also recorded that since 1 January 1993 the Slovak Republic has not complied with a single one of those recommendations.

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5 The earlier draft of Article 4(1), proposed by the Slovak Republic, provided as follows:

> "(1) The Parties agree that, pending the final Judgment of the Court, they will seek to establish and implement a temporary water management regime for the Danube."

It was at Hungary's insistence that the words "seek to" were deleted from this draft. In addition, the initial Slovak draft of Article 4(2) precluded the making of an interim measures application "in the absence of such an agreed regime". This phrase was changed, at Hungary's insistence, to read "in the period before such a regime is established or implemented".

6 See paras 3.208 - 3.223.

Nor has it been prepared to make any concession whatever to the Republic of Hungary in relation to a temporary water management regime.[7]

2.12. The question of a temporary regime, as required by Article 4 of the Special Agreement, remains unresolved at the time of completion of this Memorial. It will be the subject of a further report to the Court in the context of the Hungarian Counter-Memorial. For present purposes it is sufficient to indicate:

(a) that the commitment to establish a temporary regime sufficient to protect the rights of the Parties is expressed to be of fundamental importance, and is in fact of fundamental importance to Hungary; and

(b) that the Court is entitled to take into account the conduct of the Parties under Article 4 of the Special Agreement in assessing their good faith in relation to the resolution of the dispute submitted to it.

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7 See paras 3.193, 3.197, 3.200, 3.201, 3.204 - 3.206, 3.208, 3.210, 3.222.

PART II

ESSENTIAL ELEMENTS OF THE DISPUTE

CHAPTER 3

THE HISTORY OF THE DISPUTE

3.01. The questions referred to the Court in the Special Agreement arose in the period after 1989, and have been the subject of prolonged controversy since. But in an important sense the difficulties with the Project can be traced back to its origins, in Eastern Europe shortly after the end of the Second World War, when the idea of a Barrage System on the Danube in the region between Bratislava and the Danube Bend was first discussed. This factual background will be reviewed in this Chapter, under four chronological sections:

SECTION A (paragraphs 3.02. - 3.40.) deals with the origins of the Gabcikovo-Nagymaros Project from 1952 to 1977.

SECTION B (paragraphs 3.41. - 3.108.) deals with the period of attempted construction of the Project, from the entry into force of the Treaty of 1977 to Hungary's suspension of works at Nagymaros in 1989 and at Gabcikovo in 1990.

SECTION C (paragraphs 3.109. - 3.186.) deals with the failed negotiations for revision of the 1977 Treaty, the eventual termination of the Treaty in May 1992, and the unilateral diversion of the Danube in October 1992.

SECTION D (paragraphs 3.187. - 3.223.) deals with the impact of the diversion and the attempts under EC mediation to reach agreement on a temporary water management regime both with Czechoslovakia and subsequently with the newly independent Slovak Republic.

Each section is self-contained, and can be read on its own as an account of the period covered. The four Sections may also serve as a *catalogue raisonnée* to the annexed diplomatic correspondence and other documents relating to the Project.

SECTION A: THE ORIGINS OF THE GABCIKOVO-NAGYMAROS PROJECT: 1952-1977

(1) THE COMMENCEMENT OF NEGOTIATIONS

3.02. In the early 1950s, Hungary planned to construct one or two hydroelectric power plants in the Nagymaros region. The plans were part of an ambitious attempt -- as formulated *expressis verbis* in the first Five-Year Economic Plan[1] -- "to transform Hungary into a country of iron, steel and machinery", with a correspondingly increased need for electricity.

3.03. In a letter dated 5 November 1951 the Hungarian Representative to the Danube Commission sent a letter to the Soviet President of the Commission regarding the establishment of a hydro-electric centre in the Nagymaros-Visegrád region between rkm 1695 and rkm 1701.[2] The letter said that the water could be maximised in a reservoir at 108.5 metres asl.

3.04. Because of the need to store Danube water, the Hungarian project required the flooding of Czechoslovak lands. It was, therefore, necessary to enter into negotiations with Czechoslovakia. A Joint Governmental Committee consisting of the Hungarian and Czechoslovak Deputy Prime Ministers was given a mandate to study the hydroelectric possibilities for the shared section of the Danube.

3.05. At the first session of this Committee on 2 August 1952, Czechoslovakia presented its design for a dam and reservoir on its own territory directly below Bratislava, in opposition to Hungary's plan for a joint dam and reservoir system. Hungary in turn asked Czechoslovakia to compensate for any damage resulting from the storage of water in the reservoir. Hungary and Czechoslovakia formally agreed to study the possibilities for joint hydroelectric power utilisation of the Danube[3] and established a Joint Technical Experts Committee to co-ordinate the studies, investigations, and planning. Czechoslovakia accepted the Hungarian Plan regarding the Barrage in the Nagymaros-Visegrád

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1 Hungarian People's Republic, Act of Parliament No II, 19 May 1951.

2 Letter from Mr E Sík, Hungarian Permanent Representative, to Mr G Morozov, President of the Danube Commission, 5 November 1951.

3 Closing Minutes Concerning Utilisation of Hydroelectric Power, 18 July - 2 August 1956.

region, while at the same time it sought approval for its proposal for hydro-electric plants downstream of Bratislava.

3.06. At the first meeting of the Joint Technical Experts Committee on 17 March 1953, the Czechoslovak experts initially supported the left bank power canal option because of technical and financial considerations.[4] Hungarian experts agreed that "the existing power potential must be economically maximised", but were not prepared to accept the Czechoslovak proposal.

3.07. The Council for Mutual Economic Assistance (CMEA) provided another means of strengthening co-operation between Hungary and Czechoslovakia over the hydroelectric power plants of the Danube. Established in 1949, the CMEA operated without a Charter or legal norms for the first decade of its existence. At its Fourth Session on 26-27 March 1954 in Moscow, the Head of the Soviet delegation (and Chairman of the plenary) stressed that the CMEA countries had made "serious mistakes, namely. . . their plans were not co-ordinated enough", implying that Hungary was dragging its feet. The Czechoslovak delegation underlined the necessity of co-operation with Hungary on the construction of the Danube Power Plants and urged that Hungary reach a decision quickly.[5]

3.08. The two countries signed an Agreement on the settlement of technical and economic issues concerning frontier watercourses at Prague on 16 April 1954.[6] This Agreement required joint preparation and approval of hydro-technical projects and major changes to boundary waters.

3.09. In the light of CMEA's attitude, Hungary replied at the meeting of the Joint Governmental Committee on 10 July 1954:[7] the border

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4 Protocol of the Joint Technical Experts Committee, 17 March 1953.

5 Hungarian Report concerning the Fourth Session of the CMEA, 29 March 1954.

6 504 UNTS 231; Annexes, vol 3, annex 12. This superseded an Agreement relating to the Regulation of Technical and Economic Matters concerning the region of the Danube and the Tisza river below the mouth of Szamos, Budapest, 24 August 1937: 189 LNTS 404.

7 The Hungarian position was established by the leading body of the Hungarian Workers' Party (the ruling Communist Party) on 15 June 1954.

should be moved to the central line of a power canal to be built either on the left or right bank; additional investment should be jointly financed; the gravel deposits upstream of the Bratislava Barrage should be shared equally, and the left-bank power-canal could be accepted by consensus if the parties would evenly share the investment costs and energy production.

3.10. The Joint Governmental Committee was thus able to reach agreement in principle on 2 December 1954 on the following points:[8]

> "1. There must be the maximum profitable utilisation of the hydroelectric energy of the common Danube section.
>
> 2. The dam shall be built below Bratislava, where the best option from among a number of proposed variants must be selected with Soviet consultation. Furthermore, another dam shall be built at Visegrád.
>
> . . .
>
> 6. There may be an undesirable rise or reduction in the level of underground and surface waters, leading to a reduction in agricultural or forest productivity. In such cases, the necessary amelioration equipment shall be obtained, to the debit of the power plant responsible for such effects, in order to prevent losses therefrom.
>
> . . .
>
> 11. The Party who withdraws water from the system for amelioration or other purposes, may do so only to the debit of its share of hydroelectric energy. The amount of water or energy required for the provision of an appropriate rise or decrease in the level of underground waters necessary to prevent losses in the agriculture of the regions in question threatened by drought or excessive water, shall be determined by the Joint Technical Committee. The established amount of water or energy must be made available to the relevant party to the debit of the energy produced prior to the distribution of energy between the parties concerned."

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8 Closing Minutes of the Negotiations between the Government Committees of the Republic of Czechoslovakia and the Hungarian People's Republic concerning the utilisation of hydro-power of the River Danube between Devin and Visegrád, Budapest, 20 November - 2 December 1954; Annexes, vol 3, annex 14.

It also recommended that there be "joint consultations with Soviet experts regarding the utilisation of the section of the Danube in the region of Devin-Visegrád as soon as possible". The CMEA Secretariat and the Danube Commission[9] were to be notified of the results of the negotiations.[10] But no agreement was reached on such topics as national borders, the by-pass canal, costs related to the maintenance of the Danube bed or the share of energy production to be allocated to each party.

3.11. After 1954, negotiations under the auspices of the Joint Governmental Committee were suspended because of these differences, and Czechoslovakia began to consider building the Bratislava power plant with Austrian participation.

3.12. The CMEA gave the negotiations a new impetus. On 30 April 1956, the Seventh Session of CMEA passed a comprehensive Resolution on the utilisation of the Danube from Bratislava to the Black Sea. The CMEA's Permanent Commission for Energy Affairs adopted guidelines on a planned work programme and the basic elements of a utilisation plan.[11] Thereafter energy and water affairs experts met in Moscow between 26-28 June 1956. At this meeting there was a strong movement for the construction of separate but linked hydroelectric power plants. An agreement would be necessary only to the extent that the operations of one power plant would affect the other country.[12] Hungary emphasised that it was facing an increase in its energy deficit, but pointed out that dependence on a foreign country might cause problems in the future. It proposed maintaining the principle of joint utilisation, in accordance with the CMEA negotiations, and was willing to. . .

> "submit this question to the CMEA's Committee for Energy Co-operation and the Danube Commission for technical discussion.

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9 The Danube Commission was established in 1948 pursuant to the Belgrade Convention. See para 4.38.

10 Closing Minutes of the Negotiations between the Government Committees of the Republic of Czechoslovakia and the Hungarian People's Republic concerning the harnessing of hydropower of the River Danube between Devin and Visegrád, Budapest, 20 November - 2 December 1954.

11 Report on the Seventh CMEA Session, 30 May 1956; Annexes, vol 4, annex 2.

12 Meeting of Energy and Water Affairs Experts, 26 - 28 June 1956.

> By the way, the Soviet party has encouraged this course of action at the present session."[13]

3.13. CMEA's Permanent Committee for Energy Affairs, at a meeting held on 10-16 September 1957 in Moscow, adopted planning guidelines and a working programme for the construction of hydroelectric power plants as well as basic principles underlying the related utilisation scheme. These plans were prepared by Hydroprojekt, a Moscow engineering institute. But despite CMEA's continuing efforts, the disagreements between Hungary and Czechoslovakia on the Project were not resolved during 1957.

3.14. On 30 April 1957, an Austro-Czechoslovak Agreement was elaborated at governmental committee level on the construction of the Wolfstahl hydroelectric power plant.[14] Hungary considered that this Agreement created an entirely new situation because it fundamentally modified the prospects for a joint barrage system between Bratislava and Visegrád. Under Article 3 of the 1954 Agreement, Czechoslovakia was committed to consultations and a joint agreement with Hungary prior to any negotiations with Austria. In response to this objection, Czechoslovakia referred to the Soviet Union's 1956 warning to establish contracts with Austria without delay because Austrian plans concerning the utilisation of hydroelectric power would affect the joint Hungarian-Czechoslovak plans. Czechoslovakia denied that a completely new situation had come into existence, but admitted that there was a new technical situation. To the question:

> "does Czechoslovakia support Hungary's endeavour to give preference to the construction of the Visegrád power plant in view of the new situation and with reference to tensions adversely affecting Hungary's energy situation, and is it ready to support Hungary in this with the CMEA's Moscow Committee?"

Czechoslovakia replied:

> "a theoretical development plan concerning the whole Danube section must be presented to CMEA for approval."[15]

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13 Internal Report by Mr Gy Osztrovszky, Hungarian Deputy Minister of Chemical and Energy Affairs, 7 July 1956.

14 Report by CMEA of 6 August 1957 on the consultations in Prague.

15 Report on the Consultations of 16 - 20 June 1957, in Prague, 25 June 1957.

3.15. Between 10-15 January 1958, Hungarian, Czechoslovak and Soviet experts met to examine the utilisation scheme devised for the section of the Danube stretching from Wolfstahl/Bratislava to the section below Budapest. It was agreed that a technical sub-committee involving Soviet experts should work out a scheme for the necessary hydroelectric power plants and power canals and that:

> "Upon the request of the parties concerned, Hydroprojekt shall devise by the end of February 1958 a methodological directive for determining the economic parameters governing the dams concerned, and the distribution of related investment costs between individual sectors of the national economies in question. The said directive shall be sent out through CMEA to each planning agency engaged in the complex utilisation of the Danube for study and assessment. After considering assessments received, Hydroprojekt shall prepare the final wording of the directive and submit it to CMEA's Permanent Committee for approval."[16]

(2) The 1958 Decision to Develop the Project

3.16. From 1952 to 1958, 34 main and several subvariations of the projected technical plan were promulgated and co-ordinated by the water management agencies of the two countries. None of these plans considered the environmental impact of the project. CMEA's role was significant. At meetings held between 12-19 May 1958, the Joint Technical Experts Committee accepted the recommendations of the Soviet consultants, and proposed a multi-stage hydroelectric plant operating on a power canal on the upper section of the Danube with a second hydroelectric plant on the lower section of the Danube at Nagymaros.[17] Nonetheless, Hungary decided to recommence bilateral negotiations at the level of the Joint Governmental Committee and maintained its request for modifications to the common boundary.[18]

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16 Protocol on the Joint Negotiations aimed at the Investigation of the Utilisation Scheme of the Danube Section from Wolfstahl-Bratislava to the village of Fajsz, 10-15 January 1958; Annexes, vol 4, annex 3.

17 Protocol of Joint Technical Experts Committee, 19 May 1958.

18 Decision of the Hungarian Politburo, 5 August 1958.

3.17. At the meeting of 6-7 October 1958 of the Joint Governmental Committee, an agreement was reached "concerning tasks related to the joint construction of hydroelectric power plants on the Danube that would in the future provide for the growing demand for electric energy".[19] The parties agreed to carry out joint planning and investment, as "both countries think it desirable to utilise jointly the Danube's hydroelectric energy in the region of Bratislava-Nagymaros".

3.18. They agreed to include these hydraulic plants in their long term-plans (i.e., those through 1975). The first plant was to be constructed at Nagymaros between 1961-1965. It was also decided to revise the various options equally and that:

> "The committee of experts shall assess these options and shall make a recommendation to the relevant Government committees regarding the most advantageous option. . . The relevant documentation shall be submitted for assessment to the Hydroprojekt Institute of the Soviet Union by the end of 1960."[20]

3.19. Taking into account the Soviet recommendations, the essential technical components were determined at various meetings of the Joint Technical Experts Committee in 1960-61. The Nagymaros dam was selected as the lowest section of the Barrage System. Its purpose was to stabilise the water output of plants located on upper sections of the Danube operating in peak mode. Four options were suggested for the upper section of the Barrage System: (a) a single stage left-sided power canal; (b) a single stage right-sided power canal; (c) a two stage left- and right-sided power canal; (d) three river dams.[21]

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19 Protocol of the Joint Governmental Committees on Utilising Hydro-Power of the Danube between Bratislava and Nagymaros, 7 October 1958; Annexes, vol 4, annex 4.

20 Closing Protocol of the Joint Governmental Committees on Utilising Hydro-Power of the Danube between Bratislava and Nagymaros, 7 October 1958; Annexes, vol 4, annex 4.

21 Summarised in the Report of the Hungarian Scientific Director of the Project, 3 April 1963.

3.20. Despite progress by the experts, the necessary political decisions were not taken. The high-level Hungarian Committee for International Economic Relations emphasised on 31 October 1960 that, although. . .

> "the Resolution of 15 January 1958, adopted by the Central Committees of Hungary and Czechoslovakia concerning the joint construction of hydroelectric power plants must still be regarded as valid, the implementation of the resolution must however be suspended until CMEA takes a standpoint concerning the utilisation of the joint Hungarian-Czechoslovak section of the Danube and the complex plan for the utilisation of the Danube as a whole."[22]

Hungary was to invite the Joint Governmental Committee to evaluate the work-in-progress and. . .

> "to order their competent bodies to prepare and to submit to CMEA a proposal and related plans which treat hydroelectric power plants of joint Hungarian-Czechoslovak interest as a coherent system, as well as to investigate possibilities for the construction of hydraulic energy containers that would benefit a number of CMEA countries."[23]

(3) ADOPTION OF THE PROJECTS INVESTMENT PROGRAMME

3.21. A comprehensive plan for the Danube section from Bratislava to the Black Sea, including the Gabcikovo-Nagymaros hydroelectric power plants, was devised by Hydroprojekt between 1956-1961. This plan was approved and recommended by the CMEA Permanent Committees for Electric Energy, Agriculture and Transportation at a Joint Meeting held in September 1961. According to the newly adopted CMEA Charter,[24] the recommendation was obligatory after approval by the Hungarian and Czechoslovak governments. Moreover on 10-12 July 1962, the CMEA's Executive Committee established the Conference of Heads of Water Management Authorities, which for many years adopted compulsory "recommendations" concerning the Gabcikovo-Nagymaros

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22 Decision No 50/1960 NGKB/X.37, 31 October 1960.

23 Decision No 50/1960 NGKB/X.37, 31 October 1960. The resolution also dealt with a second hydroelectric power plant on Hungarian territory, in a region -- Prédikálószék -- later declared to be a protected area.

24 Charter of the CMEA (entered into force, 13 April 1960); 368 UNTS 253.

project. Following these CMEA "recommendations", on 23 March 1963 the Joint Technical Experts Committee adopted the left-bank version of the power canal (i.e., involving construction on Czechoslovak territory) and further agreed to construct a dam at Dunakiliti. . .

> "with the provision that the two Parties shall have equal access to the two main works, the dam and the hydroelectric power plant by way of the adjustment of state borders in the region concerned. Consequently, the border between the two countries shall lie along the central line of the dam, the hydroelectric power plant and the tail-race channel."[25]

Equal partition of costs and benefits was also prescribed.

3.22. The Hungarian preparatory documents for the Joint Governmental Committee's meeting of 22 April 1963 noted that, since its last meeting in 1958, the Joint Technical Experts Committee had conducted the planning studies, had consulted Hydroprojekt, and that the related documents had been approved by CMEA and its Permanent Committee.[26] In other words, Hungary was acting on the basis of CMEA's approval of hydroelectric power plants in the frontier region.

3.23. The Joint Governmental Committee met on 22 April 1963 and chose the left-bank power canal option. It ordered the joint investment programme to be concluded by 30 April 1964, on the basis of an international treaty to be signed between Hungary and Czechoslovakia.[27]

3.24. The joint investment programme was in fact compiled by 30 April 1964, but was not adopted until 25 May 1967. This final version was the Joint Investment Programme signed by the Hungarian Secretary of State of the National Water Management Authority and the Czechoslovak Minister of Agriculture, Forestry and Water Management. It included the left-bank canal, the Dunakiliti dam and concurrent Barrage System at Nagymaros.[28]

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25 Protocol of the Joint Technical Expert Committee, 23 March 1963.

26 Preparatory Report on the Preparation of the Next Meeting of the Joint Government Committee, 3 April 1963.

27 Protocol of the Joint Governmental Committee, 22 April 1963.

28 Protocol of the meeting of the Heads of Water Management Authorities of Hungary and Czechoslovakia, 17 - 25 May 1967.

3.25. The first draft of the proposed international treaty[29] envisaged a border adjustment, with a water flow of 100 m3/s along the section from rkm 1842 to rkm 1811. Ownership of the main installations was to be equally shared; other installations would be owned by the country on whose territory they were located. The second version of 11 March 1967 lowered the required discharge to 50 m3/s unless natural or other conditions should require a different output.[30] A single clause on water protection was included, according to which "the operators are interested in ensuring the purity of watercourses". This version reaffirmed the need for a border adjustment, with the proposed border running along the middle of the tail-race canal and returning to the existing border line at a 90° angle. It entrusted dispute resolution to joint authorities to be set up, although Hungary had proposed arbitration. But Czechoslovakia would not agree to the border adjustment, and the draft treaty was never finalised.

(4) Delays in the Commencement of the Project

3.26. Quite apart from this difficulty, the parties already planned to delay the project. In 1965, the Czechoslovak Planning Office had requested the elaboration of various options for implementing it. In 1966, the Hungarian Government decided not to commence work until the next Five-year Plan, starting in 1970.[31] In November 1967, the Czechoslovak Government suggested that a phased scheme would be both economically and environmentally more sensible, because it would involve "keeping the Danube in the current riverbed as much as possible", more favourable conditions for the ground water level in the surrounding areas and the least disturbances to "natural biological conditions".[32]

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29 Protocol of the Joint Drafting Group, 7 March 1964.

30 Protocol of the Joint Drafting Group, 11 March 1967.

31 Government of the Hungarian People's Republic, Declaration No 3346/1966 (X.6).

32 Memorandum of the Negotiations held between Representatives of the Governments of the Hungarian People's Republic and the Czechoslovak Socialist Republic, Budapest, 13 - 14 November 1967; Annex, vol 4, annex 5. The document is headed "Top Secret".

(5) ANTECEDENTS OF THE AGREEMENTS OF 1977

3.27. The delays in implementation were brought to the attention of CMEA, which again emerged to push the project forward. On 21-24 July 1970, CMEA's Executive Committee adopted a Report of the Conference of Heads of Water Management Authorities "concerning co-operation for the settlement of problems in the region of the Danube Basin."[33] On 6 August 1971, CMEA adopted a Complex Programme for the Further Deepening and Improvement of Co-operation and the Development of Social and Economic Integration of the CMEA, which ordered "the construction and operation of joint ventures for the production of electric energy" and "the increase of the proportion of hydroelectric energy in the balance of fuels and energy".[34]

3.28. With these CMEA antecedents, on 10 December 1971 the Hungarian-Czechoslovak Extended Joint Technical Committee, the leading organ of bilateral economic co-operation, adopted a Czechoslovak proposal that the Government Plenipotentiaries on Water Affairs should "resume consultations concerning technical and economic aspects of preparation for the joint construction of the Danube dams".[35] It also established a new Extended Joint Technical Committee to be chaired by high-level representatives of the two States.

3.29. The CMEA Permanent Committee for Electric Power reported in 1972 on the fundamental problems of co-operation in energy production, and stressed -- as a consequence of the Complex Program -- the need for co-operative establishment of great electric power plants, including hydroelectric plants, and their optimal use.[36]

3.30. At the first meeting of the Extended Joint Technical Committee on 17-19 July 1972, Czechoslovakia proposed the power canal version of the 1967 Joint Investment Programme as supplemented in 1970. The

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33 Report on the 48th Session of CMEA's Executive Committee, 26 July 1970.

34 The Complex Programme of CMEA, 6 August 1971.

35 Protocol of the Meeting of the Extended Joint Technical Committee, 10 December 1971.

36 Report of the CMEA Permanent Committee for Electric Power, May 1972.

Committee ordered the drafting of a Joint Construction Plan and an international treaty.[37]

3.31. At various later meetings, the Extended Joint Technical Committee, with contributions from the Joint Drafting Group and Joint Technical Group, recorded the issues on which there was agreement. These included:

* The construction of a joint dam system and the complex utilisation of the Danube, especially to provide an appropriate navigation line, the production of electric energy, and agricultural development;

* The old Danube bed must retain 50 m3/s of water flow. The Committee stated that "the dam system would not lead to a deterioration in the water quality of the Danube" and that "a separate agreement must be concluded in respect of water quality control, and appropriate measures must be taken to ensure that there is no deterioration in water quality as a result of the execution and operation of the project".

* The Agreement should contain provisions concerning riverbed maintenance, flood prevention, flood and ice management. Permanent installations should be installed for monitoring subsurface waters.[38]

3.32. Consensus was reached on the necessity of cooperation with the Soviet Union.[39] The parties would exchange information on their separate negotiations with the Soviet Union.[40] On the other hand, there were important points of disagreement, in particular as to the redrawing of state borders and the organisational structure for operating the Barrage System. At the meeting of Deputy Prime Ministers on 27 August 1973, Hungary reiterated the necessity of border modification, but Czechoslovakia still would not accept the proposal in any form.[41]

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37 For details see the letter from the Head of the Czechoslovakian Section to the Head of the Hungarian Section of the Executive Committee, July 1972.

38 Minutes of the Government Plenipotentiaries, 19 July 1973.

39 Minutes of the Government Plenipotentiaries, 15 October 1976.

40 Minutes of the Government Plenipotentiaries, 26 January 1977.

41 Protocol of Deputy Prime Ministers Meeting, 27 August 1973.

3.33. CMEA continued to remain closely involved with preparations for the project, including its finances. For example at a meeting on 9-11 April 1974 with the Plenipotentiary of the Hungarian Government, the General Secretary of CMEA confirmed CMEA's involvement in the project. At negotiations conducted between Deputy Prime Ministers on 26 July and 1 October 1974 the joint proposal explicitly stated that the project would serve direct Soviet interests: first, by improving navigational conditions (in 1971, the Soviet Union's share of Danubian traffic amounted to 29.4%), and, second, by reducing the Soviet Union's energy deliveries to Hungary and Czechoslovakia. In view of these Soviet interests, it was suggested that Hungary and Czechoslovakia receive a 100 million transferable rouble loan, with favourable interest conditions.[42] The loan would consist of technical plans for the project, as well as the generators, turbines and other parts. On 25 October 1974, the Hungarian and Czechoslovak Deputy Prime Ministers sent a joint letter to this effect to the Soviet Deputy Prime Minister.[43] In tripartite negotiations at Deputy Prime Ministerial level, the Soviet Union assured both parties of its support for the project, promised loans to both countries, and proposed separate negotiations to discuss the size of these loans.[44]

3.34. The Hungarian Prime Minister applied for a loan from the Soviet Union on 27 February 1975 and emphasised that the project would be part of the CMEA's Complex Programme. The Soviet Prime Minister responded on 9 June 1975, saying that the loan application would first be considered by the relevant experts, and later negotiated through the Hungarian Committee for International Economic Relations.[45] At the Hungarian-Soviet expert negotiations in 1976, the parties agreed that Hydroprojekt would prepare an expert assessment and that the relevant decisions concerning the provision of loans, in

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42 Minutes of Deputy Prime Ministers Meetings, 26 July 1974, 1 October 1974.

43 Letter from Mr Hussar, Hungarian Deputy Prime Minister and Mr Rohlicek, Czechoslovak Deputy Prime Minister, to Mr Lesetsko, Soviet Deputy Prime Minister, 25 October 1974; Annexes, vol 4 , annex 7.

44 Protocol of Tripartite Negotiations.

45 Letter from Soviet Prime Minister Kossygin to Hungarian Prime Minister Lázár, 9 June 1975; Annexes, vol 4, annex 8.

particular the deliveries of the materials, should be taken into account when co-ordinating activities for the 1981-1985 Five-Year Plan.[46]

3.35. CMEA activities on water quality protection were also significant for the Project. In October 1971, CMEA acknowledged the necessity for co-operation on water affairs in the Tisza river valley (involving Hungary, Czechoslovakia, Romania, Yugoslavia and the Soviet Union) and confirmed that it would be desirable to protect the Danube basin from flooding and pollution.[47] A CMEA Conference of the Heads of Water Management Authorities was commissioned to prepare a proposal for such co-operation. In January 1973, CMEA asked the Conference to formulate a draft international agreement on the Danube.[48] In September 1973, CMEA called a conference on the protection of the Danube's water quality.[49] The conference was never held because Romania demanded the participation of all countries located along the Danube (including Austria and the Federal Republic of Germany) and raised objections over the mandate given to the Conference of the Heads of Water Management Authorities. In January 1975, the CMEA Executive Committee accepted the proposal of the Conference of the Heads of Water Management Authorities, to formulate an overall treaty concerning water quality with the participation of the eight countries that had expressed interest in the matter.[50] At this meeting, the Czechoslovak member of the Executive Committee stressed that water quality protection measures should be enforced in each individual country in accordance with its national laws, taking into consideration the international obligations and economic conditions of each country. In fact a CMEA-sponsored treaty on water quality protection never came into being.

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46 Protocol of Hungarian-Soviet Expert Negotiations, 1 October 1976.

47 Report of the 55th Meeting of the CMEA's Executive Committee, October 1971.

48 Report of the 61st Meeting of the CMEA's Executive Committee, January 1973.

49 Report of the 64th Meeting of the CMEA's Executive Committee, September 1973.

50 Report of the 75th Meeting of the CMEA's Executive Committee, January 1975.

3.36. CMEA's endeavours acquired additional urgency given the considerable deterioration in the quality of the Danube's water. For example, on 6-15 June 1968, the bilateral Joint Technical Committee for Border Waters, established by the 1954 Treaty on Frontier Watercourses, stated that "the Danube's water quality is good within accepted parameters", but that extraordinary cases of pollution were nevertheless occurring.[51] At subsequent meetings, the issue of pollution was to receive increasing attention. Over the course of the late 1960s and early 1970s, Hungary protested repeatedly to Czechoslovakia about the continuous and repeated pollution of the Danube.[52] Czechoslovakia disputed this, rejected recommendations to commence water quality control, and declined to allow Hungary to participate in inspections on Czechoslovak territory. The Hungarian protests culminated in a *Note Verbale* of 24 January 1974 which reiterated that the water quality was deteriorating, that catastrophic cases of pollution had occurred and that Czechoslovakia had ignored its obligation to provide adequate forecasting, and requested further measures.[53]

3.37. On 24 July 1975, the Hungarian National Office of Water Affairs submitted to the Committee of International Economic Relations, and in September to the Council of Ministers, a Project for the Barrage System, together with the outline of a Hungarian-Czechoslovak Treaty. The proposal gave priority to energy production but also mentioned navigation and water management, identifying the latter with flood prevention. The proposal emphasised the Project's role in CMEA integration. As to the modification of state borders, the proposal recommended dropping the idea because there was no suitable Hungarian territory that could be offered, and because it would be costly and undesirable for border security. On 9 September 1975, the Hungarian Politburo withdrew its decision of 1958 concerning the modification of borders, and on 20 November 1975, the Hungarian Government adopted the investment programme for the project, and a schedule for implementation. But Hungary continued to link the project to approval of the Soviet loan.[54]

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51 Minutes of Joint Technical Committee for Border Waters, 15 June 1968.

52 *Note Verbale*, from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Republic, 23 January 1974; Annexes, vol 4, annex 6.

53 Ibid.

54 Government Resolution No 3050/1975 (XI.20).

(6) Conclusion of the Agreements of 1976-77

3.38. The negotiations between Hungary and Czechoslovakia resulted in the conclusion of the crucial agreements: on 6 May 1976 on the Joint Contractual Plan, and on 16 September 1977 on the establishment and operation of the Gabcikovo-Nagymaros Barrage System itself. These agreements will be analysed in Chapter 4.[55]

3.39. On 30 November 1977, the long-awaited Soviet loan was granted. The parties concluded an Agreement on Co-operation between the Governments of the People's Republic of Hungary and the USSR concerning the Construction of the Nagymaros Barrage on the River Danube, as Part of the 'Gabcikovo-Nagymaros' Barrage System.[56] However, as a consequence of a deterioration in the economy of the Soviet Union, the principal materials promised under the Loan Agreement were never provided to Hungary.

3.40. Some conclusions can be drawn from the lengthy development of the Project:

(1) The substance and parameters of the Project were worked out before the middle 1960s, and it represents a scientific, technological and water management approach which has long since been discredited. For example, no environmental impact assessment was made. While some environmental issues were raised, they were never conclusively settled. This approach may be explained by CMEA's confidence that technical solutions could be found for all problems and by the Soviet need to produce the greatest amount of energy. For example, the June 1977 report of the National Water Management Authority stated, without any scientific investigation, that an increase in output of 50 cm3/s would not have a noticeably positive effect, but would cause an unacceptable loss of energy; that underwater weirs could not be established because of the threat from ice; that the reduction of groundwater could be compensated by irrigation, and that occasional losses would be far exceeded by advantages deriving from complex utilisation.

(2) The facile nature of these answers must not obscure the fact that agreement on the Project was achieved as a result of pressure on the part of the CMEA and by reason of the priority given to the

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55 For the 1976 Agreement on the Joint Contractual Plan see para 4.03. For the 1977 Treaty see paras 4.04-4.23.

56 Annexes, vol 3, annex 23.

interests of Socialism. Successive Hungarian concessions concerning the location of the upstream dam, boundary modification, water pollution control, etc., were not mere chance. Only four years later, in 1981, the Hungarian Deputy Prime Minister qualified the 1977 Treaty as an unequal agreement detrimental to Hungarian interests.[57]

57 Statement of Hungarian Deputy Prime Minister, Marjai, 17 September 1981.

SECTION B: FROM PROJECT CONSTRUCTION TO PROJECT SUSPENSION: 1977-1989

(1) SEARCH FOR ALTERNATIVES AND IMPROVEMENTS

3.41. On 30 June 1978, the 1977 Treaty entered into force and work began under the auspices of the Government Plenipotentiaries. Questions unresolved by the 1977 Treaty continued to be discussed and new agreements reached on such matters as customs questions and border crossings.[58] The 1977 Treaty did not resolve the issue of the legal form of the enterprise that would operate the Barrage System, a problem of some importance since the joint operation was at that time a novelty between Socialist bloc countries. In fact no resolution to this problem was ever achieved.

3.42. Meantime the changing world economy and the deteriorating economic position of the Socialist bloc countries forced Central and Eastern European States to reconsider their development programs and priorities. In January 1980, the Hungarian Government commenced a review of its major financial undertakings. On 29 May 1980, in light of the information that Soviet credit and assistance foreseen in the Agreement of 30 November 1977[59] would not be forthcoming, it adopted an internal Government Resolution No 3162/1980, stating that it was necessary to postpone the construction of the Project "by a few years". The Czechoslovak Prime Minister, Lubomir Strougal, during his visit to Budapest on 1-2 June 1981 admitted that discussions were taking place in Czechoslovakia on "whether to postpone the project by only two or even more years because of the lack of investment resources."[60]

3.43. During the 21 September 1981, meeting of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation, the Deputy Prime Minister of Hungary, József Marjai, submitted a formal proposal to suspend the construction of the Project until 1990, stressing the vital need for postponement not only because of Hungary's economic situation, but also for further examination of its environmental impacts in October 1981, the National Planning

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58 For these various "related" agreements see Annexes, vol 3, annex 27.

59 See above, para 3.39. This fact had been revealed at a meeting in Moscow: Minutes of the Hungarian-Soviet meeting, 22 February 1980.

60 National Office of the Controller, Decision Making Process Concerning the Gabcikovo-Nagymaros Barrage System, First Part 1992, p 48, (in Hungarian).

Committee and the Economic Committee of the Hungarian Government (two bodies responsible for major State investment) decided in parallel to suspend all construction on Hungarian territory. Shortly thereafter, on 19 October 1981, Prime Minister Strougal formally responded in a letter to Hungarian Prime Minister György Lázár. The letter stated:

> "The Government of the Czechoslovak Socialist Republic. . . has concluded that the Czechoslovak Party cannot interrupt work on the Barrage System either for technical and economic reasons or for reasons of protection of the region. This would cause irreparable damage to work already completed and the protection of the region and would require an immense passive investment. The Czechoslovak Party could perhaps agree to a slowdown in the timetable of the work for a period of three years. For this reason, it proposed. . . that the experts of both nations examine both proposals and find a solution acceptable to both parties."[61]

3.44. Although this letter expressed Czechoslovakia's willingness to extend the deadlines by three years, the Vice President of the Czechoslovak Planning Committee, Karol Ujházy, later announced that Czechoslovakia was examining the possibility of the unilateral construction of the Gabcikovo Power plant.[62] According to an internal Hungarian memorandum, the Czechoslovak participants of the Joint Operational Group privately informed their Hungarian colleagues that the Czechoslovak Government had assigned the task of providing plans for diversion of the Danube on Czechoslovak territory to a Czechoslovak engineering planning company, which investigated two alternatives with different closure points. The results were discussed in the Czechoslovak Government, and the reasons for rejecting a unilateral solution may be summarised as follows:

* Such a solution would require 1-2 years of experiments with models which would delay the actual construction.

* The danger accompanying a flood with ice was evaluated by the hydrologist experts as extremely threatening.

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61 Letter from Czechoslovak Prime Minister L Strougal, to Hungarian Prime Minister Gy Lázár, 19 October 1981; Annexes, vol 4, annex 10.

62 Report from Mr P Havas on the Government Plenipotentiaries' negotiations, 27-29 October, 2-3 November 1982, p 3; Annexes, vol 4, annex 160.

* The dyke on the left bank of the Danube (forming the right side of the reduced reservoir) would be built under extremely unsuitable soil conditions and both of its sides would be submerged under water during large floods which would make them indefensible.

* Peak mode operation would be limited because of the diminished size of the reservoir, which could only be enlarged if three villages were destroyed.

* Extra costs in the range of 3.1 billion Czechoslovak korun would be involved.[63]

3.45. During this period the environmental impact of the Project was subject to increasing scrutiny in Hungary. On 30 April 1981 at the request of Deputy Prime Minister János Borbándi, an *ad hoc* committee was established under the auspices of the Hungarian Academy of Sciences[64] to review the available studies on the agricultural and environmental impacts of the Project. The Committee concluded in October 1981 that further research was necessary "to concretise and increase the benefits derived from the barrage system and to minimise possible harm."[65] Nonetheless, the Report favoured the Project, claiming that:

> "The preparations for the Gabcikovo-Nagymaros Barrage System took place at such level that it can be unambiguously ascertained that there are no reasons from agricultural and environmental aspects precluding or questioning its implementation. . ."[66]

3.46. But other researchers of the Academy criticised the report for its lack of comprehensiveness. Consequently, the President of the Academy

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63 Memorandum from the Government Plenipotentiary, Péter Havas to Deputy Prime Minister J Marjai, 6 January 1983; Annexes, vol 4, annex 161.

64 The Hungarian Academy of Sciences is a body of up to 300 distinguished scientists, with an important semi-official role in advising the Government on matters of scientific policy.

65 Report on the Agricultural and Environmental Impacts of the Gabcikovo-Nagymaros Barrage System, Working Group of the Hungarian Academy of Sciences, October 1981, p 52 (in Hungarian).

66 Summary of Report on the Agricultural and Environmental Impacts of the Gabcikovo-Nagymaros Barrage System, Working Group of the Hungarian Academy of Sciences, October 1981, p 5; Annexes, vol 5, annex 1.

submitted the report to the Government accompanied by a written comment saying that "the Presidency of the Hungarian Academy of Sciences finds it important, that issues related to the realisation of this grand project be investigated in a broader context in order to be complete."[67]

3.47. The disagreement within the Academy led to the formation of a second *ad hoc* committee in March 1982. On 28 April 1982, it reported that views on peak energy production were diverse and that the hydrology of the Szigetköz, as well as hydrobiological aspects of the Project generally, needed further investigation. The report queried whether the Nagymaros dam should be moved further west for environmental and landscape reasons, without reaching a definite conclusion.

3.48. These findings were communicated to Czechoslovakia, and a further comprehensive study was undertaken jointly by the Hungarian Academy of Sciences and the National Committee for Technical Development (the national body responsible for research and development in technical sciences). A 24 member commission, set up on 3 February 1982, completed a study in November 1983, covering the whole Hungarian section of the Danube to the Yugoslav border. Even this large study did not remove doubts concerning the environmental effects of the Project. The National Council on Environmental and Nature Protection in its decision of 21 June 1983 ordered the completion of a comprehensive environmental impact assessment by 30 June 1985.[68] According to the decision, the Joint Contractual Plan dealt inadequately with environmental impacts and consequences. This view was supported in a "Position paper of the Presidency of the Hungarian Academy of Sciences" of 20 December 1983,[69] which was widely circulated (although not formally published at that time). The Position Paper explained that:

> "(1) The Joint Contractual Plan did not deal with the environmental impacts and consequences of the Gabcikovo-

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67 Letter from Mr J Szentágothai, President, Hungarian Academy of Sciences, to Hungarian Deputy Prime Minister J Marjai, 23 December 1981.

68 National Council on Environmental and Nature Protection, Decision No 3/1983 (VI. 21), 21 June 1983.

69 Position Paper, Hungarian Academy of Sciences, 20 December 1983; Annexes, vol 5, annex 2.

> Nagymaros Barrage System. . . So far no survey has been done which would have investigated them systematically and considered the interactions of the technical, ecological, economic aspects and the risks attached to them."

It recommended "a comprehensive environmental impact statement. . . to be made within two years", and concluded:

> "9) . . . Taking into account the factors considered and not considered the Presidency considers that a significant delay of the investment, execution of appropriate substantial modifications, but above all cancellation of the investment is justified."

3.49. During the meetings of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation in 1982 and 1983, the Parties agreed to reschedule the Project and to postpone completion by four years so that the power plants would be put into operation between 1990 and 1994. This decision was formalised in a Protocol on the amendment of the 1977 Treaty of 10 October 1983.[70] At the same time the Mutual Assistance Agreement of 1977 was amended, modifying the distribution of electric power to be generated in the years 1990-1992 so as to compensate Czechoslovakia for works executed on behalf of Hungary.[71]

3.50. A meeting between the co-chairmen of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation on 9 July 1983 also revealed that environmental concerns had not been resolved by the postponement. After the meeting the co-chairmen declared that. . .

> "in the [1977] Treaty and the Joint Operational Plan measures for the protection of nature and environment were -- according to the then available knowledge -- taken into account. Both Parties, however, consider it necessary, to seek rational solutions through the necessary and possible modification of the technical plans for the avoidance of unfavourable consequences

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70 Protocol on the amendment of the 1977 Treaty, 10 October 1983; Annexes, vol 3, annex 29.

71 Agreement on Mutual Assistance during the Course of Construction of the Gabcikovo-Nagymaros System, Budapest, 16 September 1977; Annexes, vol 3, annex 22.

which may be identified and for the improvement of the environment. They also consider it necessary to establish the widest possible co-operation for this purpose."[72]

3.51. In May 1984 the Hungarian Government Plenipotentiary submitted a progress report which recalled many of the environmental concerns raised by the Hungarian Academy of Science reports and in public debates.[73] These included:

* water infiltrating from the Dunakiliti reservoir endangering the aquifer under Szigetköz;
* deterioration in the water quality of the Danube downstream of the reservoir;
* threat of catastrophic flood in the event of accident;
* "desertification" because of a decrease in groundwater level;
* loss of active water flow and of the Danube's character as a border river;
* lack of oxygen for the tributaries because at least 500 m3/s discharge would be needed;
* loss of navigation in the main navigation channel of the river;
* a threat from the waste water discharge of Győr stemming from the changing water levels accompanying peak-load operation.

3.52. The environmental impact statement produced under the auspices of the National Water Agency and VIZITERV (Water Planning Company, Budapest) in June 1985 generally affirmed the Project,[74] while calling for environmental corrections to the value of 1.5-2% of the planned investment. But its conclusions immediately became subject to stringent criticism. First, it was noted that there was no legislation in

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72 *Aide Memoire* on consultations of the co-chairmen of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation, 9 July 1983; Annexes, vol 4, annex 12.

73 Submission on current tasks related to the realisation of the Gabcikovo-Nagymaros Barrage system, May 1984.

74 National Water Board/National Board for Environmental and Nature Protection, *The Gabcikovo-Nagymaros Barrage System. Environmental Impact Statement*, Summary, June 1985; Annexes, vol 5, annex 4.

force concerning the methodology and standards for conducting an environmental impact assessment (hereinafter EIA). Secondly, crucial elements of the assessment process had been neglected or omitted, such as allowing for public participation. Even the authors of the background studies were not allowed to receive copies of background studies concerning other disciplines, which obviously negated the "complex" character of the statement.

3.53. At the request of the Central Committee of the Hungarian Socialist Workers Party, the Hungarian Academy of Sciences reviewed the environmental impact statement, and on 28 June 1985 adopted an Opinion stating that:

> "The incomplete state of the ecological research has not ceased to exist with the completion of the EIA. . . We consider the environmental impact statement of the Gabcikovo-Nagymaros Barrage system a pioneer undertaking. However, it only deals with the impacts to be expected upon the realisation of the Joint Contractual Plan or of its modernised concept. Therefore the producers of the study have neglected an examination and assessment of the impacts to be expected from alternative technical solutions."[75]

3.54. The Opinion went on to consider two modes of the operation of the Gabcikovo Power Plant (peak mode operation and continuous energy production) and favoured the second: postponement or abandonment of peak energy production would be desirable because of "economic interests" and because of the need for "prevention and correction of disadvantageous side effects." The Academy expressed concern that the non-building of additional environmentally-necessary installations because of "a misconceived concept of saving" could have "fatal consequences" and "generate irreversible ecological processes."[76]

3.55. Following the conclusions of the environmental impact statement, the Hungarian Government resolved that facilities essential to minimising the environmental impact of the Project be completed simultaneously with the Project itself.[77] It also called for the

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75 Hungarian Academy of Sciences, Opinion, 28 June 1985; Annexes, vol 5, annex 3.

76 Ibid, p 7.

77 Government Resolution No 3238/1985, 15 August 1985.

establishment of a monitoring system before the Barrage System came into operation and mandated that the original character of the Danube bed be preserved. Negotiations would be held with Czechoslovakia to find an operational mode for peak energy production based upon optimising hydrological, energy, ecological and navigational aspects. This ought to have been achieved by a study on peak load energy production mode completed by the National Water Agency in March 1986.[78] But once again the lack of agreement concerning the environmental impact of the Project became evident. The Hungarian Academy of Sciences argued in detail against several statements in the study, including its claim that a maximum of 200 m3/s water discharge into the old Danube bed was sufficient: it called for a much larger discharge, even at the cost of decreased energy production.[79]

3.56. On 28 May 1986, shortly after the repeal of administrative authorisation to build a barrage on the Danube in Hainburg, Austria, 20 kilometres above Bratislava, the Austrian construction company *Donaukraftwerke AG* entered into a private law contract with the Hungarian construction company to build the Nagymaros barrage at a faster speed than foreseen by the 1983 Protocol. This contract and the study on peak energy production served as a basis for the modified investment plan approved by the Hungarian Government.[80] The modified investment plan was the Hungarian national document describing the major elements of the Project, the schedule of construction and the financing.

(2) CONSTRUCTION UNDER CRITICISM

3.57. In the years 1986-1988 the construction gained momentum. The Austrian company, acting on behalf of Hungary proceeded with

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78 National Water Agency, Modified Investment Proposal for the Gabcikovo-Nagymaros Barrage System and the evaluation of its technical, ecological and economic cross-effects, July 1986 (in Hungarian).

79 Observations of the Hungarian Academy of Sciences concerning the "Submission on optimisation of the peak load operation mode of the Gabcikovo-Nagymaros Barrage System from the point of view of hydrology, energy, ecology and navigation and on the recent investigations concerning the regulation of the Old-Danube river-bed" 1986 (in Hungarian).

80 National Water Agency, Modified Investment Proposal for the Gabcikovo-Nagymaros Barrage System and the evaluation of its technical, ecological and economic cross-effects, July 1986; (in Hungarian); Hungarian Government Resolution No 3388/1986, 4 December 1986, (in Hungarian).

work at the Nagymaros Barrage. The Hungarian companies and their subcontractors were acting according to the Joint Contractual Plan on the Czechoslovak sections of the Project, as well as on other Hungarian sites, including the Dunakiliti weir. Protocols of the meetings of Government Plenipotentiaries and reports of the Joint Operational Group annexed to those Protocols in the years 1987, 1988 and 1989 do not reveal any major disagreements.[81] The main challenge came from the growing environmental movements, both within and outside Hungary. In 1986 a petition was submitted to Hungary's Presidential Council,[82] supported by 2655 signatures, urging a referendum concerning the desirability of the Project. The first major demonstration against the Project was held in Budapest, on 27 May 1988. Several thousand people protested in front of the Austrian Embassy against the Austrian involvement in the Project. A few months later, on 12 September 1988, more than 40,000 people demonstrated against the Project. Slogans identified the Project with Stalinism, and speakers criticised its environmental and economic deficiencies.

3.58. From 1987 onwards, international criticism of the plans also increased. On 9 April 1987 a delegation from the Austrian Green Party and People's Party paid an official visit to the site and raised critical questions to the representative of the Hungarian investor. In 1987 a world-wide campaign was started with a proclamation signed by Sir David Attenborough and Michael McCloskey, US national chairman of the Sierra Club. 232 organisations including Greenpeace, the Sierra Club and World Wildlife Fund USA signed the accompanying letter.[83]

3.59. The movement for public involvement in decision making became an issue in broader political life. Hungarian environmental organisations issued a declaration on 11 August 1988[84] calling for a

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81 Protocol of Negotiations of the Government Plenipotentiaries, Bratislava, 7-8 January, 1987; Annex 2; (in Hungarian) Protocol of Negotiations of the Government Plenipotentiaries, Bratislava, 13-14 January 1988, para 2; (in Hungarian) Protocol of Negotiations of the Government Plenipotentiaries, Budapest, 1-3 February 1989, point 1 (in Hungarian).

82 The "collective" Head of State, according to the Hungarian Constitution in force at that time.

83 See Annexes, vol 4, annex 174, for the text of the proclamation concerning Gabcikovo-Nagymaros Barrage System, signed by 232 organisations, 1987.

84 Declaration of Hungarian environmental organisations requesting a referendum on the suspension of works at Nagymaros, 11 August 1988.

referendum and the suspension of the works for the provisional navigation route at Nagymaros. It was signed on behalf of leading environmentalist groups and by politicians of the new parties just being created (Alliance of Young Democrats, Hungarian Democratic Forum, Alliance of Free Democrats).

3.60. The issue of the referendum was also discussed in Parliament. Although nearly all members of Parliament were still appointees of the single party system, the increasing perception of political freedom permitted a motion in the Parliament (which during this period was only in session for a few weeks a year) calling for the suspension of the construction and investigation of the option of cancelling the Nagymaros Barrage. On 30 June 1988 the Hungarian Parliament decided to examine the issues connected with the Project during the Autumn session, mandating that the Government prepare a report comparing alternatives of construction and suspension/abandonment of the Nagymaros barrage.

3.61. This decision forced the Hungarian Government to review the Project on 7 September 1988, before Parliament's autumn session.[85] The decision was in favour of the continuation of the construction under certain conditions, but it became clear that views differed substantially on the economic and environmental impact of the whole Project, and particularly of the Nagymaros section.

3.62. The Statement of the Hungarian Academy of Sciences[86] dated 29 September 1988 denied or challenged most of the economic calculations and forecasts relied on by the Government and concluded that:

> "- The. . . official explanation for the continuation of the construction of the Nagymaros power plant assume[s] the optimal conditions in connection with the completion, whereas the evaluation of the consequences to be expected after cancelling [the construction] tend to be characterised by the opposite extreme;
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> - The cancellation or postponement of the construction is still a real alternative to the continuation;

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85 Submission to the Government on the realisation of the Gabcikovo-Nagymaros Barrage System, September 1988 (in Hungarian).

86 Reproduced in: *The Flood After Us*, Duna Kör, Politikatudományi Tanszékcsoport, 1989, pp 192 - 206 (in Hungarian).

- Postponement of the construction at Nagymaros is a solution which may decrease economic burdens and which unequivocally entails smaller environmental risk."[87]

3.63. On 6-7 October 1988, Parliament debated whether the Nagymaros barrage should be completed or abandoned. At that time, not even the construction pit was completed at Nagymaros. Only the coffer dam surrounding the future construction site was being prepared.[88] Before the debate, the members of Parliament got in advance an extensive report prepared by the Government,[89] but did not receive the critical commentary of the Hungarian Academy of Sciences until the eve of the debate. The Hungarian Socialist Workers' Party had instructed its members, who constituted the overwhelming majority, to vote in favour of the Project, and the resolution accordingly passed. Nonetheless, the debate and vote was remarkable for that time. Some members of Parliament dared to resist the Government, in a rare moment of televised individual voting. 317 were in favour, 19 against with 31 abstentions. The Parliament's decision did not take the form of a statute or a formal resolution, but simply appeared as the approval of the Government's report. It also introduced several important new elements, including:

"2. The ecological risks have to be reduced to a minimum. For this reason, both in the course of the investment and the operation, ecological interests shall take priority over the economic ones. . .

. . As a guiding principle of operation it must be declared that the quality of the Danube river must not deteriorate. Peak-capacity operation should be commenced only after establishing the water treatment plants required on both sides of the river for safe operation of the system, free of environmental risks."[90]

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87 Reproduced in: *The Flood After Us*, Duna Kör, Politikatudományi Tanszékcsoport, 1989, pp 192 - 206 (in Hungarian), pp 205 - 6.

88 Nagymaros Barrage: Coffer Dam Surrounding the Construction Pit, Annex to the Government submission to the Parliament, September 1988.

89 Ministry for Environment and Water Management, Informational report on the actual state of the Gabcikovo-Nagymaros Barrage System investment, with Annexes, September 1988 (in Hungarian).

90 See Parliamentary Resolution, Record of the House 1988. 30th meeting, 6-7 October 1988, pp 2462 - 64; Annexes, vol 4, annex 145.

3.64. On 30 October 1988, demonstrations occurred against the Parliament's decision, in Budapest and in a number of major cities around the world.

3.65. The intensified perception of the need to preserve and improve water quality, reflected even in the Parliament's decision, was discussed at the meeting of the Hungarian and Czechoslovak Governmental Representatives for Border Waters on 7-8 December 1988.[91] The Hungarian Representative referred to the Parliament's decision and in particular to point 3 on water quality. The Representatives. . .

> "assigned the task to the subcommission on water quality to determine the water-quality related impact area of the Gabcikovo-Nagymaros Barrage System. . . and in the framework of this activity further specify a construction plan for the sewage water treatment plants on given areas of the two countries. The subcommission shall also determine the schedule of works and controls at locations needed for the extended protection of the water quality."[92]

3.66. The Hungarian Government also attempted to address some of the environmental concerns in a resolution of 6 January 1989,[93] adopted under the leadership of the newly-elected Prime Minister, Mr Miklós Németh.[94] It called on the Minister for Environment and Water Management, together with the Governmental Plenipotentiary, to

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91 *Aide Memoire* signed by Eng V Margetin, Czechoslovak Government Commissioner for Boundary Waters, and Dr M Varga, Hungarian Government Commissioner for Boundary Waters, 7 - 8 December 1988; Annexes, vol 4, annex 13.

92 *Aide Memoire* signed by Eng V Margetin, Czechoslovak Government Commissioner for Boundary Waters and Dr M Varga, Hungarian Government Commissioner for Boundary Waters, 7-8 December 1988; Annexes, vol 4, annex 13. According to the Minutes of the fifty second session of the Hungarian-Czechoslovak Boundary Water Commission, 11-15 November 1991, pp 40-41, the programme to establish the base level of the water quality of the Danube started in April 1989. 49 components were to be observed at 19 measuring points.

93 Government Resolution No 3004/1989; Annexes, vol 4, annex 146.

94 On 24 November 1988; Mr M Németh replaced Mr K Grósz, who retained his position as the Secretary General of the Hungarian Socialist Workers' Party.

"initiate a Hungarian-Czechoslovak agreement on the environmental aspects [of the Project] and an operational plan based on those aspects" and to prepare guidelines for those negotiations. The Plan of Action envisaged the modification and extension of the plans for the entire Project "[i]n order to minimise the ecological risks". It declared that "Peak-energy production mode may only commence after the establishment of the necessary waste water purification plants on both sides for the operation of the system without environmental risks." The Plan re-emphasised the need to conclude an agreement with Czechoslovakia identifying the necessary environmental conditions for minimising the risks.

3.67. The two Parties negotiated at various governmental levels on the possibility of entering into an agreement which would provide for the Project's environmental aspects. At a public function to bid farewell to the Czechoslovak Ambassador on 19 December 1988, Prime Minister Németh stressed the need for an additional agreement to deal with water purification plants on the Danube stretch affected by the Project. A decision of the Slovak Government of 18 January 1989 had stated that it would only permit the Project's operation if the short and long term environmental preconditions were guaranteed.[95]

3.68. The 23rd session of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation on 3 March 1989 resolved that:

> "The Parties have agreed that the state of the environment in the region affected by the Gabcikovo-Nagymaros Barrage System must not deteriorate because of its operation. The non-deterioration of the water quality of the Danube. . . is considered to be a fundamental requirement."[96]

3.69. Pursuant to the resolution Ministerial negotiations were held and a joint suggestion adopted on 8 April 1989 which stated, *inter alia*, that:

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95 *Aide Memoire* on the negotiations of Mr L Maróthy, Hungarian Minister for Environment and Mr V Margetin, Slovak Minister for Forest Management, Water Management and Timber Industry, 23 January 1989.

96 Protocol of the XXIII Session of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation, 3 March 1989, p 4; Annexes, vol 4, annex 14.

"- The Contracting Parties agree that risk-free peak energy production may only commence after the construction of installations necessary for the protection of water quality. This precondition has to be taken into account when determining the operational mode of the Gabcikovo-Nagymaros Barrage System.

- In order to achieve this goal, the Parties agree upon a program for the realisation of the necessary waste water purification plants before the start of peak energy production."[97]

3.70. In the meantime, the Hungarian Government continued to face increasing pressure to re-evaluate the Project. A renewed campaign to force the Parliament to set a referendum on the fate of the Project resulted in 140,000 signatures.[98] Hungarian law at that time did not contain procedural rules for a referendum, and this became a political issue. Prime Minister Németh announced on 8 March 1989 that no irreversible steps would be taken in connection with the Nagymaros barrage before Parliament reviewed the entire project in May 1989.

3.71. Popular pressure for the re-evaluation of the Project, or at least the Nagymaros sector, did not prevent the Government from taking the technical measure of concluding a Protocol on 6 February 1989 concerning the speeding up of construction. This was necessitated by the 1986 contract with Donaukraftwerke AG which had significant hydropower station constructing capacities. The Hungarian Modified Investment Plan of 1986 had already included the accelerated schedule, and negotiations had begun in 1986 to gain Czechoslovak approval for the new time schedule.[99] On 12 January 1988, the Parties agreed in principle to advance the various deadlines for completion by one year.[100]

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97 Report, Ministerial Negotiations, 8 April 1989; Annexes, vol 4, annex 15.

98 Petition lodged with the Speaker of the House on 7 February 1989. The move was unusual. Since 1945, no referendum had been held in Hungary.

99 Report of the Government Plenipotentiaries on the Gabcikovo-Nagymaros Barrage to the XXIst Session of the Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation, 20 March 1986.

100 *Aide Memoire* of the meeting of the working group, held on 11 - 12 January 1988. See also Protocol on the Negotiations of the Government Plenipotentiaries of the Hungarian People's Republic and the Czechoslovak Socialist Republic concerning the co-operation in the construction of the Gabcikovo-Nagymaros Barrage System, Bratislava, 13 - 14 January 1988.

A new Protocol was later signed at the regular Hungarian-Czechoslovak Commission on Economic, Scientific and Technical Co-operation meeting on 6 February 1989.[101]

3.72. Thus a decision, accepted by Czechoslovakia and Hungary in January 1988, took the form of an intergovernmental agreement in February 1989. The timing was a mere matter of convenience, arising from a Czechoslovak request not to organise a separate meeting for signing it, but to leave it to the next regular meeting of the Commission. The Protocol replaced the Protocol of 10 October 1983 amending the Mutual Assistance Agreement, but not the parallel Protocol amending the 1977 Treaty itself.[102] Consequently, an inconsistency concerning the legal obligations to complete the Project existed. The 1977 Treaty corresponded to its 1983 Protocol, with the longer deadlines. The Mutual Assistance Agreement, as amended by the 1989 Protocol, contained the accelerated deadlines. The contradiction was never resolved.

3.73. The 1989 Protocol fixing the new deadline for the completion of the Project had not been published, and the Government, alerted by public protests, decided to commission studies on the viability of the Project. The National Planning Office, the National Bank and other institutions were making calculations, frequently sharply criticised by outside experts. The only point on which all analysts agreed was that the Project would not be profitable even if the most beneficial discount rates were applied and if the various improvements in amenities were set at their highest possible valuation. For example, a report of the National Planning Office admitted a 1000 million Forints (more than US $140 million) loss in present value if the project was completed, whereas an independent study by one of the planners of the Barrage system demonstrated that 56,000 million Forints (more than US $700 million) could be saved if the Nagymaros sector was not built. However, the presumptions underlying the evaluations differed in some respects -- e.g. as to the investment needed to replace the lost capacity to produce electric energy or the amount of compensation to be paid to Czechoslovakia.

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101 Protocol concerning the amendment of the 1977 Mutual Assistance Agreement, 6 February 1989; Annexes, vol 3, annex 30.

102 Protocol concerning the amendment of the 1977 Treaty, Prague, 10 October 1983; Annexes, vol 3, annex 29.

(3) THE DECISION TO SUSPEND WORK

3.74. In March 1989, a team of independent non-Hungarian experts under the auspices of "Ecologia" released a Preliminary Report evaluating the Barrage System, acting upon a Fall 1988 request of the Hungarian Government.[103] In light of its well-documented concerns over the likely environmental impact of the Barrage System, a re-consideration of the Project commenced. On 3 May 1989, the Prime Minister and his Advisory Committee of independent experts met to examine the cost-benefit analysis of the National Planning Office and the commentaries on it and to meet members of the Danube Circle.[104] The Advisory Committee concluded that the abandonment of the Nagymaros Barrage would be the most reasonable choice both from the environmental and the economic point of view. But opinions reflected the enormous uncertainties surrounding the Project. The Minister for Industry and the President of the National Planning Committee admitted that there were great uncertainties in the calculations because changes in the energy industry could decrease the cost of abandoning the project by 1000 million Forints.

3.75. On 13 May 1989, the Hungarian Government adopted a resolution "On the suspension of the operations at Nagymaros". It only envisaged the *suspension* of the works at the Nagymaros site. Construction by Hungary at Dunakiliti and at other locations connected with the Gabcikovo Barrage were not affected. The Resolution obliged the competent ministers. . .

> "to commission further studies [concerning the consequences of the completion or the abandoning of the Nagymaros Barrage] in order to place the Council of Ministers [the Government] in a position where it can make well founded suggestions to the Parliament in connection with the amendment of the international treaty on the investment."[105]

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103 Ecologia and INFORT, Preliminary Report, *Gabcikovo Nagymaros Barrage Project Study*, March 1989; Annexes, vol 5, annex 5.

104 The Danube Circle was a citizens group, awarded an international prize for their fight for the preservation of the Danube's environment.

105 Government Resolution, No 3125/1989, 13 May 1985; Annexes, vol 4, annex 147.

The Resolution did not specify the length of the suspension but called on the competent ministers to complete the required studies before 31 July 1989. The studies were intended to enable the Government to respond to criticisms raised in Parliament concerning the Project and to pre-empt the popular initiative calling for a referendum to decide on the fate of the Nagymaros Barrage.

3.76. The Resolution requested Parliament to authorise preliminary negotiations with Czechoslovakia on modifications of the 1977 Treaty. The Government had decided to involve Parliament in the issues of substance, i.e., to determine whether concerns over the fate of the Nagymaros Barrage justified abandoning the Barrage or suspending works while further investigations took place. It also expressed the firm intention to refrain from any irreversible unilateral step

3.77. The decision of the Hungarian Government was endorsed by the Slovak Union of Nature and Landscape Protectors representing 1200 members and about 10,000 supporters, who stated in a letter addressed to the Hungarian Government and also forwarded to the Federal and Slovak Governments:

> "we adhere to the view that taking the long term perspective it is not only more [resource] saving from the ecological and the economic point of view, but also more forward looking from the political point of view to abandon the construction of the Nagymaros Hydroelectric Power Plant."[106]

Also in May, the Interim Report of Ecologia was released which stressed that "[a]ll construction of the BNB [GNB] project. . . should be suspended during this period of national debate. . . ."[107]

3.78. Some days later, Prime Minister Németh visited his Czechoslovak counterpart, Prime Minister Adamec in Prague on 24 May 1989 and informed him of the grounds for the Hungarian decision. Prime Minister Adamec expressed himself ready to examine new environmental and seismic factors. Prime Minister Németh in turn stressed that responsibility towards future generations must serve as a basis for

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106 Letter from Slovak Union of Nature and Landscape Protectors to the Hungarian Government, 24 May 1989; Annexes, vol 4, annex 166.

107 Ecologia and INFORT, Interim Report, *Gabcikovo Nagymaros Barrage Study; Program Options and Impacts*, May 1989, p 17; Annexes, vol 5, annex 6.

ecological considerations. The two Prime Ministers agreed to establish joint study groups to report in two months.[108]

3.79. The agreement reached at this meeting was reflected in a Protocol signed by the two Government Plenipotentiaries on 9 June 1989 in Bratislava. Although the Czechoslovak Plenipotentiary protested against the Hungarian decision to suspend construction, he agreed to set up bilateral expert committees to examine the ecological, seismological and other aspects.

3.80. On 2 June 1989 the Hungarian Parliament adopted Resolution No 9/1989 "Regarding the Report by the Council of Ministers on the Suspension of Work of the Gabcikovo-Nagymaros Barrage System in Progress at Nagymaros".[109] The Resolution authorised the Government to initiate preliminary negotiations with Czechoslovakia on amending the 1977 Treaty and on the possible consequences of such amendments.

3.81. In turn, Government Resolution 1071/1989 (VI.15) of 15 June 1989 instructed the Deputy Prime Minister to set up committees of experts to review and report on the possible consequences of continuation versus abandonment of the Nagymaros Barrage. Three groups, for technological and ecological issues, for legal issues and for economic issues, submitted reports in August 1989.[110] None favoured the continuation of the Project.

3.82. On 24 June 1989 Deputy Prime Minister Medgyessy wrote to Czechoslovak Deputy Prime Minister Pavel Hrivnak suggesting that joint scientific expert committees be set up to review (1) hydrological and ecological issues and (2) geological and seismological issues, and that intergovernmental expert groups be established to review the

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108 Report of Prime Minister M Németh to the Hungarian Government. The facts reported are confirmed by Government Plenipotentiary V Lokvenc, in "Statement. Position paper of the Czechoslovak Party in connection with the materials completed in connection with the decision of the Council of Ministers of the Hungarian People's Republic to temporarily stop the Nagymaros Barrage, handed over 26 June 1989"; Annexes, vol 5, annex 167.

109 The resolution became effective on 13 June 1989 upon publication in the *Official Gazette*; Annexes, vol 4, annex 148.

110 Government Plenipotentiary for the Gabcikovo-Nagymaros Barrage system, Studies and Investigations to Support the Decision Making. Working stage I-II: Investigations of the *Ad Hoc* Committee of the Hungarian Academy of Sciences, aide memoires of scientific discussions, and negotiations of international law experts, 1989, vol 3 (in Hungarian).

conditions under which the water quality requirements of Article 15 of the 1977 Treaty could be met. The letter together with the two studies summarising the Hungarian findings were presented during a meeting of the Governmental Plenipotentiaries on 26 June 1989.[111] The *Aide Memoire* of that meeting states that:

> "on 13 May 1989 the Hungarian Party had informed the Czechoslovak Party of the temporary suspension of works at Nagymaros."[112]

3.83. On 13 July 1989 Vladimir Lokvenc, Czechoslovak Government Plenipotentiary, confirmed that Czechoslovakia was ready to pursue negotiations in three professional working groups (hydrology-ecology, geology-seismology, soil and agriculture). He also suggested a fourth group on economics and completion of the Project, and handed over a 19 page document addressing the two studies handed over on 26 June.[113]

3.84. The consultations of the joint scientific expert groups took place on 17-19 July 1989. Views varied widely as to the presumed benefits and costs of the Project as well as on the risks and damage arising. Hungary stressed the need for further studies, including on site observations and long-term investigations requiring several years of unchanged environmental conditions, but Czechoslovak experts believed that risks associated with the Project could be minimised or eliminated during construction and operation.[114]

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111 See Hungarian Academy of Sciences, "Report on Environmental, Ecological, Water Quality and Seismic Aspects of the Nagymaros Barrage Construction or its Cancellation," 23 June 1989; Annexes, vol 5, annex 7. The other document was "The Co-ordinating Group for Problems of the Gabcikovo-Nagymaros Barrage System: Background Materials to the Council of Ministers of the Hungarian People's Republic on the suspension of the work on the Nagymaros Barrage and the actual risks and ecological dangers associated with the suspension decision", Budapest, June 1989 (in Hungarian).

112 *Aide Memoire*, Meeting of Governmental Plenipotentiaries, 26 June 1989; Annexes, vol 4, annex 17.

113 "Statement. Position paper of the Czechoslovak Party in connection with the materials completed in connection with the decision of the Council of Ministers of the Hungarian People's Republic to the Hungarian People's Republic to temporarily stop the Nagymaros Barrage", handed over 26 June 1989; Annexes, vol 5, annex 167.

114 See *Aide Memoire* on the Hungarian-Czechoslovak consultations of the scientific experts in connection with the temporary suspension of the works on the Nagymaros Barrage and its annexes reflecting the differing views, Budapest, 17-19 July 1989; Annexes, vol 4, annex 18.

3.85. On 20 July 1989 Prime Ministers Németh and Adamec met again in Budapest. Hungary sought further ways to resolve the disagreements between the scientific experts before irreversible steps were taken. Emphasising that it had yet to take a final decision on the continuation or abandonment of the Nagymaros Barrage it suggested two alternatives:

(1) bilateral suspension of the construction of all the components of the Barrage System, including those in Czechoslovakia, for 3-5 years and a joint investigation of the complex environmental problems of the Project with the help of international professional authorities, reserving the right of final decision to the two Parties. The conceivable outcomes would include continuation of the whole Project with adequate environmental guarantees, or its abandonment in whole or in part.

(2) suspension of the works at Dunakiliti, i.e., a postponement of the closure of the Danube bed by one year. This alternative envisioned the conclusion of an agreement on environmental concerns and an amendment of the 1977 Treaty to this effect. In addition, the technical preconditions and operating schedule would be revised and the Parties would undertake not to operate the Barrage System in full peak energy mode for a few years.

Although Czechoslovakia insisted on maintaining the 1977 Treaty, it agreed to further scientific investigations. It was understood that the two Prime Ministers would have a third meeting in that year.[115]

3.86. In accordance with the tenor of the negotiations, the Hungarian Government on the same day (20 July) adopted Resolution 3205/1989, extending the suspension of works at Nagymaros until 31 October 1989. It also suspended the preparatory works at Dunakiliti aimed at the diversion of the Danube in October 1989.

3.87. An intensive exchange of views ensued. Czechoslovakia, in a *Note Verbale* of 18 August 1989, asserted that the decision to discontinue preparations for the closure of the Danube was a new and unexpected element and a violation of Hungary's international

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115 Report of Hungarian Prime Minister M Németh to the Hungarian Government, 22 July 1989, (in Hungarian).

obligations, for which Czechoslovakia would be entitled to compensation.[116]

3.88. During negotiations between the Hungarian Ministry for Industry and the Ministry of Fuel and Energy of the CSFR held on 21-22 August 1989, Czechoslovakia formally threatened unilateral steps "securing the operation of the Gabcikovo Barrage" if Hungary did not proceed with the preparations for diverting the Danube.[117]The threat of unilateral steps was made clearer in the letter of Prime Minister Adamec of 31 August 1989:

> "[we] will be forced to take such actions on the sovereign territory of the CSR which will ensure the amount of water for the Gabcikovo Barrage according to the Treaty of 16 September 1977. The steps taken by the Czechoslovak Party would be only temporary as the CSR continues to remain ready to complete construction of the Gabcikovo-Nagymaros Barrage System on basis of the aforementioned Treaty, on the condition that the Hungarian People's Republic expresses her readiness to do the same and reimburses the Czechoslovak Socialist Republic for damages incurred as a result of the unlawful acts of the Hungarian People's Republic."[118]

3.89. On 1 September 1989 a Hungarian *Note Verbale* reiterated the two Hungarian proposals and rejected the Czechoslovak *Note Verbale* of 18 August 1989. It noted that, while refusing at the meeting of 20 July 1989 to amend the 1977 Treaty, Czechoslovakia had taken note of "the extension of the suspension and made no objection specifically to the suspension of the preparatory operations for closure of the Danube at Dunakiliti", and in those circumstances denied that Hungary had acted unilaterally. It gave notice. . .

> "that according to [her] assessment, Hungary, and Czechoslovakia also, are in a state of necessity. Acts of the two

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116 *Note Verbale* from Czechoslovak Ministry of Foreign Affairs to the Embassy of the People's Republic of Hungary, 18 August 1989; Annexes, vol 4 , annex 20.

117 *Aide Memoire* of the negotiations between Mr G Czipper, Hungarian Deputy Minister for Industry and Mr L Blazek, Czechoslovak Deputy Minister for Fuel and Energy, with the participation of the two Government Plenipotentiaries (signed by Mr T Láczai Szabó and Mr M Jaroslav, senior officials in the respective ministries), 21-22 August 1989; Annexes, vol 4, annex 21.

118 Letter from Czechoslovak Prime Minister L Adamec to Hungarian Prime Minister M Németh, 31 August 1989; Annexes, vol 4, annex 23.

> Governments have to be assessed accordingly. The Hungarian Party finds no explanation for the rigid denial of negotiations on environmental guarantees and optimal mode of operation.
>
> The Czechoslovak Party is not even willing to negotiate about questions which would bring about any amendment in the [1977] Treaty. . . not even then, when science raises fundamental doubts concerning the ecological harmlessness of the Barrage System. . .
>
> The Hungarian Party according to the basic principles of the [1977] Treaty proceeds from the fact that the profit and the possible material loss, the risks of intervening in nature and the prevention thereof or the burdens of averting it are common. Therefore the Hungarian Party does not see any basis to the determination of Czechoslovak demands for compensation without negotiations in the present period of suspension.
>
> The suspension of preparatory operations for the closure of the Danube bed at Dunakiliti by the Hungarian Party in itself neither interferes with the realisation of the conception of the Gabcikovo-Nagymaros Barrage System nor with the construction of the Gabcikovo Barrage. The suspension unquestionably delays the commencement of operation of the first hydro-electric generators but it must be taken into consideration that this period of suspension is the last possibility for the two Parties to confront thoroughly and for all times the joint work with the requirements of environmental protection. . .
>
> During the expert negotiations led by the Plenipotentiaries of the two Governments from 21 to 23 August 1989 in Budapest the Hungarian Party asked to be informed about the content of that technical counter-measure, which according to our information the Czechoslovak Party is contemplating. . .
>
> "[S]hold such a Czechoslovak measure indeed be taken, that would be regarded by the Hungarian Party as a material breach of the 16 September 1977 Treaty."[119]

3.90. Deputy Prime Ministers Medgyessy and Hrivnak met on 9 September 1989 and exchanged views. Hungary expressed its disappointment about the lack of response to the proposals submitted at

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119 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 1 September 1989; Annexes, vol 4, annex 24.

the meeting of 20 July 1989, and protested against Czechoslovakia's position as reflected in the *Note Verbale* of 18 August 1989 and the letter of Mr Adamec of 31 August 1989 which indicated that Czechoslovakia "felt forced" to take unilateral steps, that is to divert the Danube without the consent of the co-riparian state. It demanded information and documentation as to the planned unilateral solution.

3.91. Czechoslovakia confirmed its intention to proceed unilaterally if Hungary did not authorise it to execute the closure of the Danube on behalf of Hungary according to the original plans, stressing the provisional and temporary character of the "solution". Czechoslovakia was willing to complete the Barrage System according to the 1977 Treaty, if Hungary would agree and would compensate Czechoslovakia for the delay so far. The fundamental differences in their positions notwithstanding, the Deputy Prime Ministers agreed to arrange for further expert consultations.

3.92. At consultations of international legal experts on 18-20 September 1989 the delegations achieved nothing more than recording the fundamentally different views.[120] By contrast the scientists met on 25-27 September 1989 to discuss water quality and ecology related to the Dunakiliti-Hrusov reservoir,[121] and agreed that:

> "The amount of fitoplanktons (algae in open waters) will increase. The quality of underground waters must by all conditions be preserved for the provision of drinking water to the public. All necessary steps must be taken in order to prevent prejudice to the self-purifying capacity of the Danube water."[122]

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120 *Aide Memoire* with two annexes (in Hungarian), 18-20 September 1989.

121 *Aide Memoire* of the meeting between scientists to discuss water quality and ecology issues, with recorded separate opinions of both sides, 25-27 September 1989, published in (Government Plenipotentiary for the Gabcikovo-Nagymaros Barrage system, Studies and Investigations to Support the Decision Making; . Working stage I-II: Investigations of the *Ad Hoc* Committee of the Hungarian Academy of Sciences, aide memoires of scientific discussions, and negotiations of international law experts, 1989.

122 *Aide Memoire* of the meeting between scientists to discuss water quality and ecology issues, with recorded separate opinions of both sides, 25-27 September 1989; Annexes, vol 4 , annex 26.

The need for a permanent monitoring system was also agreed upon. Nevertheless, disagreement prevailed on several points. For example the Hungarian experts stated:

> "(2) We do not agree with the opinion of the Czechoslovak delegation that the majority of the problems raised can be studied and solved after the construction of the Barrage system and especially after filling up the Dunakiliti-Hrusov reservoir. In numerous cases not even the scope of alternative solutions can be defined, and, therefore, we consider the 1:1 scale 'experiment' to be run on the natural environment extremely risky.
>
> (3) We consider it a proven fact that in case of completing the Dunakiliti-Hrusov reservoir, trophity conditions will change adversely, characterised by a several-fold multiplication of algal biomass."[123]

3.93. Prime Minister Németh replied on 4 October 1989 to the letter of Prime Minister Adamec, and said:

> "Taking into consideration the progress of construction, both nations are presented now with a final opportunity to balance the joint plant with the demands of environmental protection. I am convinced that our Governments are being guided by the desire to make this complicated matter clear to our peoples and by a responsibility to future generations and that it is our common duty to make sure that our two nations harmonise our respective and joint interests fully and in a worthy manner. . .
>
> I would like to emphasise that the Hungarian Government used international environmental law as its starting point, which requires that in the event that environmental dangers are perceived, states have the right and obligation to suspend work in the interest of avoiding undesirable ecological effects and to commence negotiations. The Hungarian party considers these measures, to the best of its convictions, to be entirely lawful. Thus, I do not find your claims for compensation for damages, as communicated in your letters, to have any grounds. . .
>
> We propose that, for the purposes of minimising the environmental risks posed by the Dunakiliti-Hrusov reservoir, an

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123 *Aide Memoire* of the meeting between scientists to discuss water quality and ecology issues, with recorded separate opinions of both sides, 25-27 September 1989, Annex 2; Annexes, vol 4, annex 26.

agreement as to the development and realisation of a program for the complex system of water quality protection, technical, operational, and ecological guarantees be concluded. This must be achieved by further specifying the requirements provided for in Articles 15 and 19 of the [1977] Treaty, naturally taking into consideration as well, that the requirements set earlier have not been adhered to according to the time schedule. We recommend that said agreement be concluded by 30 July 1990, at the latest.

The Hungarian Government proposes that the Hungarian and Czechoslovak Parties invite international scientific organs to control the implementation of the system of guarantees pertaining to water quality protection and technical operation concerning the Dunakiliti-Hrusov Reservoir, the Dunakiliti Dam, the power canal, and the Gabcikovo Hydroelectric Power Plant and the Nagymaros section of the Danube.

Giving up the peak operation of the Barrage System, would not only result in the non-appearance of harmful environmental effects in the region surrounding the Nagymaros Reservoir, but it would also reduce them along the upper sections of the system. For this reason, the Hungarian Government proposes joint discussions regarding technical/economic corrections pertaining to the abandonment of the construction of the Nagymaros Barrage and the corresponding amendment to the Hungarian-Czechoslovak Treaty signed 16 September, 1977.

Dear Comrade Prime Minister!

During this period when the Eastern European region is rife with a great deal of tension and is in the process of socio-economic rejuvenation, we can, if we reach agreement, set an example for the peoples of Europe that we are jointly capable of bringing man and the natural environment into harmony and can act together in such a matter of great importance."[124]

3.94. The Hungarian position on the dangers and risks entailed in the Project was confirmed by research results during these months. For example, the World Wildlife Fund produced a comprehensive report on the Project, delivered on 28 August 1989, which concluded: (1) that the Project would have a negative impact on the environment; (2) that the available environmental and technical data were insufficient to support

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124 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister L Adamec, 4 October, 1989; Annexes, vol 4, annex 27.

the continuation of the construction and to justify putting the Project into operation, and (3) that a moratorium on all construction for at least three years was necessary.[125]

3.95. A Hungarian expert committee also concluded that the Government and Parliament should stop construction at Nagymaros and extend the suspension of Dunakiliti. It suggested that not only the Nagymaros Barrage but the Project as a whole could be environmentally unsound:

> "Ultimately it is realised that the [Project] is caught up in a vicious circle of trying to do away with the risks arising from its construction; therefore complete reversibility needs to be reviewed as well."[126]

3.96. In October 1989 the Parties made serious efforts to settle the dispute before the scheduled date for the closure of the Danube. On 11 October 1989, Prime Minister Németh proposed that the two Parties abandon the Nagymaros Barrage by way of an agreement which would incorporate complex environmental, water quality and technical guarantees for all the major installations which would be maintained in non peak-load production mode. If Czechoslovakia adopted this suggestion, Hungary would continue to prepare for the closure of the Danube and would actually close it after the conclusion of the agreement. He proposed the modification of the 1977 Treaty accordingly. Mr Németh further declared that in absence of agreement between the Parties the Hungarian suspension of the construction would last until environmental requirements were met. He pointed out that, in such a scenario, any costs incurred by Czechoslovakia arising from further construction would not be taken into account later when the Parties would agree upon allocating the losses of the Project.[127]

3.97. Prime Minister Adamec responded, emphasising the Czechoslovak need for energy, its interest in navigation and the fact that the Project's complexity required completion of all of its component

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125 WWF-Auen Institut, *Stellungnahme des WWF zum Staustufen-Projekt Gabcikovo-Nagymaros (Assessment of the WWF for the Gabcikovo Nagymaros Barrage Project)*, Rastatt, August 1989.

126 See the Hardi Committee Report, September 1989. The Report was commissioned by the Hungarian Government; Annexes, vol 5, annex 8.

127 Thesis of the Hungarian proposal and report on the negotiations, 11 October 1989 (in Hungarian).

parts. He again referred to Czechoslovakia's intention to initiate a "substitute technical solution" and added that:

> "This technical solution provides the water quantity set out in the joint contractual documents for the Mosoni Danube Branch as well as for the Old Danube bed and simultaneously it guarantees navigation as well."[128]

3.98. A further meeting of the two Prime Ministers was held in Bratislava on 26 October 1989. A *Note Verbale*, reflecting Mr Adamec's position at the meeting, was presented on 30 October 1989. It referred to the Hungarian proposal for an agreement concerning technical, operational and environmental guarantees with regard to the Barrage System, and expressed. . .

> "willingness to conclude such a convention within a short period of time, upon the condition that the Hungarian Party starts the preparatory operations for the closure of the Danube bed at Dunakiliti without delay. This suggestion of the Czechoslovak proposal is based on the presumption that the competent water management organs of the two States prepare the technical principles of the said agreement within two weeks which can be initialed at the level of Deputy Ministers for Foreign Affairs. After the initialing of those principles the Hungarian Party should start the actual closure of the Danube-bed. The text of the agreement has to be elaborated so that it could be signed before the end of March 1993.
>
> The Czechoslovak Government suggested the conclusion of a separate agreement in which both Parties would oblige themselves to limitation or exclusion of peak hour operation mode of the Gabcikovo-Nagymaros Barrage System. By way of this suggestion the Czechoslovak Party tried to clear away the misgivings of the Hungarian Party concerning the potential ecological effects of the peak-load operation mode. . ."[129]

3.99. The *Note Verbale* did include new elements, in particular the willingness to conclude an agreement on environmental guarantees. But

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128 Text of Mr Adamec's opening speech at the negotiations of 11 October 1989, handed over by the Deputy Minister for Foreign Affairs, Mr E Vacek, in Prague on 12 October 1989.

129 *Note Verbale* from the Czechoslovak Ministry of Foreign Affairs to the Hungarian Embassy, 30 October 1989; Annexes, vol 4, annex 28.

it was conditioned on Hungary preparing forthwith for the closure of the Danube and gave no hint of the eventual content of the guarantees. It also failed to address two of the most important Hungarian goals: the abandonment of the Nagymaros Barrage and the suspension of the closure of the Danube for at least one year, while investigations of the environmental issues could be made. The *Note Verbale* added that the Czechoslovak Government "did not see any ground for the modification of the 1977 Treaty and would demand damages if Hungary unilaterally and in violation of its international legal obligations decided not to realise the Nagymaros Barrage." The *Note Verbale* also referred to the "provisional substitute technical solution", i.e., to unilateral measures of diversion by Czechoslovakia.

3.100. The failure of these negotiations reflected the different perception of the historic changes taking place in Central Europe. Hungary, a few days after the adoption of the new Constitution, was laying the basis for a multiparty democratic political system. The political leadership in the German Democratic Republic was under extreme pressure for change. By contrast the *ancien régime* in Czechoslovakia seemed deeply rooted in the mentality and priority system of the CMEA period, willing to talk about unspecified environmental guarantees but only on the basis that the Barrage System be implemented in full, irrespective of the consequences, and backing up its view with continued threats of unilateral diversion, in precisely the same terms as in 1982.[130]

3.101. The Hungarian Government's programme was confirmed by Parliament on 30 October 1989.[131] Parliament supported the Government's intention to abandon the Nagymaros Barrage and not to proceed with the closure of the Danube until appropriate guarantees were secured against irreversible environmental harm and unreasonably large risks. It affirmed "the priority of ecological approach, scientific soundness and the representation of the national interest", and authorised the Government to negotiate with Czechoslovakia an appropriate amendment to the 1977 Treaty.

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130 See above, para 3.44.

131 Government Resolution No 3305/1989, 27 October 1989, as confirmed by Parliamentary Resolution No 24/1989 (XI.10) Regarding the Report by the Council of Ministers on the Suspension of Work in Progress at Nagymaros on the Gabcikovo-Nagymaros Barrage System; Annexes, vol 4, annex 150.

3.102. The Hungarian Ministry of Foreign Affairs in a *Note Verbale* of 3 November 1989 sought to initiate such an amendment. It stated:

> 'By putting the Barrage System into operation according to the original plans both Hungary and Czechoslovakia would find themselves in an ecological state of necessity, therefore the Hungarian Party deems necessary the elimination of the peak load operation of the Barrage System and accordingly it deems necessary the relinquishment of the construction of the Nagymaros Barrage."[132]

Hungary's precondition for the closure of the Danube was an agreement incorporating comprehensive and adequate environmental, water quality and technical guarantees for the major installations upstream and also the stretch of the Danube down to Nagymaros. A draft agreement would be proposed in November 1989.

3.103. On 30 November 1989 a preliminary draft was handed over.[133] It involved a modified 1977 Treaty, a new treaty on the completion of the Project without Nagymaros, a further agreement on environmental guarantees, and an agreement on the settlement of mutual financial claims. There was no reply from Czechoslovakia. On 10 January 1990, Prime Minister Németh went further suggesting that the question of amendment only be discussed after a thorough study of the Project's environmental impacts, based on scientific investigations involving international experts.[134]

3.104. The late months of 1989 which brought the "velvet revolution" to Prague, also saw an accident which reinforced the concerns of opponents of the Barrage System. On 2 December at the left shiplock at Gabcikovo, a 34m wide, 12.5m high iron shield, protecting the site while the permanent shiplock gates were mounted, was washed away and thrown to the bottom of the lock approximately 100 metres away. According to the expert report on the accident the cause of the malfunctioning-which could have killed 30-50 workers, had it not

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132 See Annexes, vol 4, annex 29.

133 The preliminary draft was attached to a *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 30 November 1989; Annexes, vol 4, annex 30.

134 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 10 January 1990; Annexes, vol 4, annex 32.

happened on a Saturday evening-was either faulty design or manufacture, with the consequence that the working load of the shield did not achieve 50% of the required level.[135]

3.105. The spirit of the fundamental changes in Central and Eastern Europe was reflected in the letter of Prime Minister Németh, addressed to the recently appointed Prime Minister of Czechoslovakia, Mr Marian Calfa. With a symbolic change in the title (Mr Prime Minister instead of Comrade) the letter of 10 January 1990 informed Czechoslovakia about Hungary's decision to abandon the Nagymaros Barrage, to terminate the private law construction contracts, and to suspend works at all Project sites pending negotiations on the future of the Barrage System as a whole. Prime Minister Németh recommended that. . .

> "a joint Czechoslovak-Hungarian scientific study, with the involvement of international scientific organisations, examine the complex ecological effects of the Dunakiliti-Hrusov Reservoir, the Gabcikovo hydro-electric plant and the power canal, along with the assessment of the present environmental situation and the recording thereof, and that we make the commencement of operation of the reservoir and Gabcikovo hydro-electric power plant dependent on the results thereof. On the basis of the results of the aforementioned, then, we would decide upon an amendment of the treaty or the conclusion of a new treaty. It is my opinion that the said study and the full assessment thereof can be completed in the first half of the year. Following this, in the second half of the year, negotiations as to the modification of the [1977] Treaty can commence. This timetable allows for the final decisions to be made by the new Governments and Parliaments which will be formed after the Hungarian and Czechoslovak elections."[136]

3.106. Hopes for agreement were raised by the meeting of the Hungarian State Secretary of the Ministry for Environment and Water Management with the Slovak Minister for Forest Management, Water Management and Timber Industry on 10 January 1990. The latter announced the Slovak official position accepting the Hungarian Parliament's decision not to build the Nagymaros Barrage, thereby

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135 Government Expert Report on the lower provisional flash boards at the Gabcikovo locks, 27 December 1989.

136 Letter from Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 10 January 1990; See Annexes, vol 4, annex 32.

eliminating peak load operation. He also declared a readiness to conclude an agreement on environmental guarantees.[137]

3.107. The brief response of the new Czechoslovak Prime Minister, of 15 February,[138] did not take issue with the statements in Mr Németh's letter of 10 January 1990 but agreed to take up negotiations "immediately" with a view to the putting into operation of the Gabcikovo Barrage in 1991.

3.108. A further letter of Mr Németh, dated 6 March 1990 called again for scientific investigations with the involvement of international scientific bodies. Negotiations should be resumed after the results of those investigations became available, and decisions should only be taken by the new Governments and Parliaments after the elections. In the meantime Hungary would only exercise activities necessary for flood protection and the preservation of the existing state, and would suspend all other construction. The letter concluded:

> "We suggest to the Czechoslovak Party that it also suspend works on the Gabcikovo power plant and its installations in a similar way and restrict itself to the prevention of damages. . . We should not let the historic opportunity offered by the social changes in our countries go by."[139]

Negotiations, however, were not resumed until the new Governments were actually formed.

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137 Report from Mr M Varga, Hungarian State Secretary of the Ministry for Environment and Water Management, to the Hungarian Government on the negotiations, 10 January 1990; Annexes, vol 4, annex 32.

138 Letter from Czechoslovak Prime Minister M Calfa to Hungarian Prime Minister M Németh, 15 February 1990; Annexes, vol 4, annex 163.

139 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 6 March 1990; Annexes, vol 4, annex 35.

SECTION C: NEGOTIATIONS, TREATY TERMINATION, DANUBE DIVERSION: 1990-1992

(1) After the Political Changes of 1989

3.109. The political changes of 1989 in East-Central Europe led to the first free elections since 1945: in Hungary on 25 March 1990, and in Czechoslovakia on 8 June 1990. In Hungary, three non-communist parties succeeded in forming the governmental coalition with Mr József Antall as the Prime Minister. In Czechoslovakia, the Federation's Prime Minister became Mr Marian Calfa. The Slovak Prime Minister became Mr Vladimir Meciar. Shortly after the elections, the federal Parliament elected Mr Vaclav Havel as President of Czechoslovakia.

3.110. The transition from a communist to a democratic political system diverted the attention of the two countries from the dispute for many months. However, the new Hungarian Government took a clear stand with regard to the Project from the beginning. When Mr Antall presented the programme of the Government on 22 May 1990, he announced, *inter alia*, that:

> "The Government, on the advice of experts, considers the construction of the Danube Barrage System a mistake and, as soon as possible, will initiate negotiations on remedying and sharing the damages with the Czechoslovak Government to be elected."[140]

3.111. At a meeting held on 31 May 1990 in Győr, the Hungarian Government Plenipotentiary handed over the relevant section of the programme to his Czechoslovak counterpart. On 27 September 1990, the new programme's slightly revised English text was presented to the Embassy of Czechoslovakia. According to the programme:

> "[t]he plan of the Danube hydroelectric power plant is a symbol of the executive power's insensitive measures, lacking all modern, technical-economic considerations. . . After due preparations, we wish to discuss once again [the 1977 Treaty]. We shall do all we can in order to prevent contradictions,

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140 National Renewal Programme (in Hungarian), presented by Prime Minister J. Antall to the Hungarian Parliament on 22 May 1990.

> arising out of investment plans from becoming a clash of interest between the two nations."[141]

3.112. The Czechoslovak response took the form of a letter of the Czechoslovak Plenipotentiary stating that:

> "I would like to assure you that it is also in our interest to turn all of our resources towards finding a solution to the further fate of our joint investment. . . [W]e are ready to begin preliminary negotiations regarding the full scope of the disputed questions."[142]

3.113. The first set of negotiations between two Plenipotentiaries, Mr Sámsondi and Mr Kocinger, took place on 6 September 1990 in Bratislava and on 17-18 October 1990 in Budapest. A Protocol of the discussions summarised the differing positions of the two Governments.[143] The Czechoslovak Plenipotentiary invited Hungarian experts to become involved in a two-year research programme of the Comenius University of Bratislava and by an "expert group of the Representative of the Government of the Czech and Slovak Federal Republic and the Slovak Republic for the construction and management of the Gabcikovo-Nagymaros hydropower system".[144] The original aim of the programme was to examine the environmental consequences of the *Gabcikovo sector* in the Slovak Zitny Ostrov area. Czechoslovakia had applied to the EC's PHARE fund to finance the programme.[145] The

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141 Excerpts from Hungary's National Renewal Programme. The First Three Years (1990-1992) of the Republic, 1993; Annexes, vol 4 , annex 152.

142 Letter from Mr D Kocinger, Czechoslovak Governmental Plenipotentiary, to Mr G K Sámsondi, Hungarian Governmental Plenipotentiary, 19 July 1990; Annexes, vol 4, annex 36.

143 Protocol of the Negotiations between the Plenipotentiaries of the Republic of Hungary and the Czech and Slovak Federal Republic held on 6 September 1990 in Bratislava and on 17-18 October 1990 in Budapest on Questions Related to the Gabcikovo-Nagymaros Barrage System; Annexes, vol 4, annex 37.

144 Czechoslovak Federal Committee for the Environment, Slovak Ministry of Water and Forest Resources and Wood Manufacturing Industry, Representative of Government of the Czechoslovak Republic and the Slovak Republic for the Construction and Management of Gabcikovo-Nagymaros Hydropower System, "Invitation of proposals. Surface Water and Ground Water Model of Danubian Lowland between Bratislava and Komarno: Ecological Model of Water Resources and Management," 1990.

145 PHARE, Poland-Hungary Aid for Restructuring the Economy, is the acronym for an EC-funded program which is currently titled Programme of Assistance for Economic Restructuring in the Countries of Central and Eastern Europe.

Hungarian Plenipotentiary replied on 15 November 1990, complaining that this invitation was contrary to earlier agreements "to set up joint professional groups and jointly choose non-partisan experts in order to assist decision-making in the resolution of the problems relating to the Barrage System."[146] But he did not exclude the possibility of Hungarian participation on appropriate terms. He attached to his response a list of joint Hungarian and Czechoslovak studies, and a list of Hungarian studies, which together had served as a basis of the Hungarian decisions in 1989.

3.114. Shortly thereafter, the Hungarian Government concluded that negotiations between the Governmental Plenipotentiaries would not be sufficient. The Hungarian Prime Minister in a letter to Prime Minister Calfa of 14 December 1990 supported a suggestion of the two Environment Ministers--who had also been meeting during 1990--and recommended the establishment of. . .

> "a joint intergovernmental committee to prepare an amendment of the Treaty between the two Governments. The work of the committee could be assisted by the experts of the European Communities, according to our agreement with [EC] Commissioner Ripa de Meana."[147]

3.115. Thus, at the end of 1990, the Hungarian Government had again reiterated its desire to negotiate a bilateral settlement of the dispute. An unpublished Resolution of the Government on 20 December 1990 also reflected this position, providing, *inter alia*:

> "In keeping with its programme, the Government considers the decision to construct the Gabcikovo-Nagymaros Barrage System and the 1977 Treaty concluded for that purpose as ill-founded because they neglected to consider ecological consequences. Thus the Government supports and reaffirms the contents of the earlier decisions of the Government on the suspension of construction work.
>
> The responsible ministers and the Governmental Plenipotentiary should start negotiations with the Government of the

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146 Letter from Mr G K Sámsondi, Hungarian Governmental Plenipotentiary, to Mr D Kocinger, Czechoslovak Governmental Plenipotentiary, 15 November 1990; Annexes, vol 4, annex 38.

147 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 14 December 1990; Annexes, vol 4, annex 40.

Czechoslovak Federal Republic on the termination of the 1977 Treaty by mutual consent and on the conclusion of a treaty addressing the consequences of the termination."[148]

3.116. A Resolution of the Slovak Government on 14 December 1990 indicated that it too was prepared to negotiate on technical, economic, environmental and legal issues related to the Project.[149] It had even appointed responsible bodies to examine possible amendments to the 1977 Treaty. In international legal terms, the Federal Government had decision-making power in all questions related to the Treaty, but informal decision-making authority lay in most aspects with the Slovak Republic.

3.117. On 9 January 1991 in Bratislava, the Hungarian Plenipotentiary handed over reports prepared by the Hungarian Academy of Sciences on the environmental risks of the Project, and a 1989 study prepared by an expert group of the World Wide Fund for Nature in response to a Hungarian request.[150] The Czechoslovak Plenipotentiary reported on the Federal Government's Resolution of 14 December 1990 to enter into negotiation at an intergovernmental level with Hungary, but only "within the framework of the valid inter-state Treaty". Thus, the Czechoslovak Government did not seem to be ready to discuss the Hungarian proposal for termination of the 1977 Treaty. Nevertheless, the Czechoslovak Plenipotentiary asked about the amount of money Hungary would be willing to pay by way of compensation if the Treaty were terminated.

3.118. On 15 January 1991, the Czechoslovak Prime Minister responded to Prime Minister Antall's letter of 14 December 1990 and expressed his readiness to start negotiations at an intergovernmental level.[151]

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148 Resolution of the Government of the Republic of Hungary No 3507/1990, 20 December 1990; Annexes, vol 4, annex 153.

149 Resolution of the Government of the Slovak Republic No. 595, 14 December 1990.

150 *Aide Memoire* of the Meeting Between the Hungarian and Czechoslovak Plenipotentiaries, Bratislava, 9 January 1991, Annexes, vol 4 , annex; WWF-Auen-Institut, *Stellungnahme des WWF zum Staustufen-Projekt Gabcikovo-Nagymaros*, August 1989 (Rastatt).

151 Letter from Czechoslovak Prime Minister M Calfa to Hungarian Prime Minister J Antall, 15 January 1991; Annexes, vol 4, annex 42.

3.119. On 15 February 1991, the Czechoslovak Plenipotentiary wrote that:

> "during our meeting of 9 January 1991, I made a promise that I would send you the Czech and Slovak position on the materials I received from you at the meeting by 15 February 1991. . . . [However, these materials] did not contain any new problems which have, as yet, not been discussed."[152]

He complained that Mr Sámsondi had not sent all the studies listed in his letter of 15 November 1990. In fact, the documents listed in Mr Sámsondi's letter were already known to Czechoslovakia.

3.120. On the same date, Mr Sámsondi sent Mr Kocinger a draft agreement on the joint termination of the Treaty and stated that he would send a list of principles that could form the basis for a new Treaty.[153] However, this was the last contact at Government Plenipotentiary level.

(2) NEGOTIATIONS AT INTERGOVERNMENTAL LEVEL

3.121. The Hungarian Parliament had empowered the Government to commence intergovernmental negotiations with Czechoslovakia on the fate of the Project in its Resolution of 16 April 1991. The Resolution provided:

> "1. Recognising the fact that putting into operation of the Barrage System or of any major installation thereof, would result in serious ecological and economic consequences throughout the affected areas, the Parliament requests the Government
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> - to conduct negotiations. . . on the termination by mutual consent of the [1977 Treaty]. . .
>
> - to initiate concurrently the conclusion of a new inter-state treaty to settle the issue of the consequences of the non-

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152 Letter from Mr D Kocinger, Czechoslovak Governmental Plenipotentiary, to Mr G K Sámsondi, Hungarian Governmental Plenipotentiary, 15 February 1991; The text of the draft agreement was identical with the one handed over by Hungary at the first intergovernmental negotiations on 22 April 1991; Annexes, vol 4, annex 44.

153 Letter from Mr G K Sámsondi, Hungarian Governmental Plenipotentiary, to Mr D Kocinger, Czechoslovak Governmental Plenipotentiary, 15 February 1991; Annexes, vol 4, annex 44.

construction (abandonment) of the Barrage System and all related major installations, taking into account the following values, in the order as follows:

(a) the restoration and preservation of the region's ecological and natural values and, most importantly, the protection of the drinking water reserves;

(b) flood protection;

(c) provide [the necessary conditions] for navigation in accordance with the region's natural environment. . . .

2. Parliament finds necessary the further suspension of work aimed at the completion of the Barrage System and does hereby reaffirm any measures taken by the Government to this end.

The Parliament requests the Government to seek for an agreement as early as possible at the negotiations, in accordance with the earlier Hungarian proposals, on the suspension of construction work on the territory of the Czech and Slovak Federal Republic."[154]

3.122. Negotiations commenced soon after with the first of three series of intergovernmental meetings held during 1991. In the meantime, however, the Hungarian authorities had learned that the Slovak Government had approved the plans for Variant C[155] and also discovered that on 29 March 1991, the State Water Management Construction Co of Bratislava had submitted a plan to the Environment Committee of the Slovak Parliament on the "Putting into operation of the Gabcikovo Plant as a provisional solution on the territory of CSFR", requesting the Committee to approve the plan in accordance with the Slovak Law on

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154 Resolution of the Hungarian Parliament No. 26/1991 (IV. 23), regarding the Government's Responsibility In Connection With the Gabcikovo-Nagymaros Barrage System, 16 April 1991; Annexes, vol 4, annex 154.

155 See second para from end of the *Aide Memoire* of the Negotiations Between the Experts of the Hungarian and the Slovak Academies of Sciences, signed by Dr M Ruzicka, President of the Environment Committee of the Slovak Academy of Sciences, and Mr Á Berczik, Director of Research Institute for Ecology and Botany of the Hungarian Academy of Sciences, 14 February 1991; Annexes, vol 4, annex 43.

Waters.[156] This information corresponded with a statement of the Czechoslovak representative, Mr Abaffy, at the meeting of the Danube Sub-Committee of the Hungarian-Czechoslovak Boundary Waters Committee in Győr in March 1991, as well as to earlier indications. According to this statement the Slovak Government had ordered the start of work on Variant C on 2 April 1991. Mr Király, Head of the Secretariat of Hungarian Minister Mádl, wrote on 25 March 1991 to Mr Lexa, Head of the Secretariat of the Slovak Prime Minister, requesting clarification but did not receive any answer.[157]

3.123. The term "Variant C"[158] stemmed from a list of seven "hypothetical" alternatives described by the Bratislava-based company Hydroconsult and had been presented for the first time by Czechoslovak Environment Minister Vavrousek to his counterpart Mr Keresztes on 5 September 1990. The "Variants" were as follows:

Variant A - Completion of the Project according to the original plans.

Variant B - Unilateral operation of the Gabcikovo sector, diversion of the Danube at Czechoslovak territory, abandonment of the Nagymaros sector.

Variant C - Operation of the Gabcikovo sector according to the original plans but without the Nagymaros sector, thus, without peak mode operation.

Variant D - Operation of the Gabcikovo sector without the Hrusov reservoir.

Variant E - No power plant in operation, the existing power canal is used for navigation and flood protection.

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156 Art 14 of the Law on Waters No 138/1973; Submission of Vodohospodárska vystavba státny podnik No. 1912-730/1991, 29 March 1991; See the Note of the Slovak Environment Committee, 25 June 1991; Annexes, vol 4, annex 168.

157 Letter from Mr M Király, Head of the Secretariat of Mr F Mádl, the Hungarian Minister Without Portfolio, to Mr I Lexa, Head of the Secretariat of the Slovak Prime Minister, 25 March 1991; Annexes, vol 4, annex 46. Prof Ferenc Mádl was a Minister Without Portfolio between 1990 and 1992. As a member of the Hungarian Government, he was responsible for the Gabcikovo-Nagymaros Project.

158 See description above paras 1.17 - 1.18.

Variant F - Stopping all work and "freezing" all construction until further decision.

Variant G - Demolition of the constructions at Gabcikovo and restoration of *status quo ante*.[159]

3.124. At the first presentation by Mr Vavrousek concerning the seven Variants, Variant C was Variant B and vice-versa. The unilateral diversion appears later under Variant C. Mr Vavrousek had proposed that these "Variants" be studied and evaluated by the Parties. However, during the following two years, apart from unilateral operation of the Gabcikovo sector, with the diversion of the Danube, none of the other Variants was ever seriously studied by Czechoslovakia. The Czechoslovak negotiators always stressed that either the Original Project should be completed, or the Federal Government would proceed to construct Variant C.

3.125. Thus, when the *first intergovernmental negotiations* since the political changes were held on 22 April 1991, the Hungarian delegation was aware of Slovak preparatory work on Variant C. The Hungarian delegation, led by Minister Ferenc Mádl, stressed the protection of natural conditions for human life, as well as the continuation of friendship and co-operation between the two nations. He noted that during the time of the suspension of construction, Hungary had become increasingly certain that it would pose a serious risk of irreversible and damaging environmental processes, with adverse consequences to both countries.

3.126. Hungary handed over four documents. The *first* was a draft of a bilateral treaty containing the following elements:

> "1. The State Parties shall, on the basis of joint agreement, terminate the [1977] Treaty.. . .
>
> 2. The State Parties declare that they will continue to consider valid the boundary lines established by the Peace Treaty signed on 10 February 1947.
>
> 3. The States Parties will begin, without delay, the assessment of any investment work that may have been completed according to the Treaty of 1977. For this purpose, they will establish working groups which will prepare their reports as to

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159 See letter from Mr G K Sámsondi, Hungarian Government Plenipotentiary, to Mr G Szalóki, Chief Counsellor, Hungarian Parliamentary Committee on Environmental Protection, 17 September 1990; Annexes, vol 4, annex 164.

the result of said assessment by ..... 1991 to the Governments of the State Parties.

4. The State Parties shall, on the basis of said reports, determine any losses which are the result of unnecessary work. In the determination of losses, only those expenses may be counted which

- are attributable exclusively to the construction of the Barrage System, regardless of the nationality of the companies undertaking the related work;

- cannot be used for other purposes;

- were completed prior to the date when one State Party first brought into question the advisability of the construction of the entire Barrage System.

Lost profits do not constitute damages.

5. Losses shall be borne by the State Parties equally. The State Party whose losses exceed one half of the total amount is entitled to reimbursement of the difference.

6. The State Parties shall, in a separate agreement, settle the question of what is to be done with those installations already completed, of how to resolve the problems of navigation and flood protection along the common boundary of the river and how to execute the physical/natural reconstruction of the region, attempting to take advantage of international resources."[160]

As far as the losses were concerned, the Hungarian delegation underlined during the negotiations that, since much more work had been done by Czechoslovakia, Hungary would be ready to compensate a significant part of Czechoslovak losses.

3.127. In the *second* document Hungary, with an eye on Variant C, proposed that the two Parties suspend construction until 30 September 1993 and refrain from unilateral steps until after that date. Accordingly, Hungary would not begin restoration of the Nagymaros area and

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160 Proposal of the Government of the Republic of Hungary Regarding Termination of the Treaty Concluded in 1977 between the Hungarian People's Republic and the Czechoslovak Socialist Republic concerning the Construction and Operation of the Gabcikovo-Nagymaros Barrage System, 22 April 1991. The text of this Proposal was handed over first by Mr G K Sámsondi, Hungarian Governmental Plenipotentiary, to Mr D Kocinger, Czechoslovak Governmental Plenipotentiary, at their meeting on 15 February 1992; Annexes, vol 4, annex 48.

Czechoslovakia would not continue construction on the works leading to the diversion of the Danube on Czechoslovak territory. Environmental and other research would be undertaken during the suspension of work in order to explore all possible consequences of the Project. If necessary, experts of third countries or institutions could be invited to participate. Paragraph 4 of the proposal stated:

> "The Czech and Slovak Federal Republic takes notice of the fact that the [Hungarian] Council of Ministers. . . suspended work in progress at Nagymaros and that the Government of the Republic of Hungary does not desire to resume said work, but that it shall, at the same time, begin work to rehabilitate the region. The Republic of Hungary is prepared to begin negotiations with the Czech and Slovak Federal Republic to discuss the legal consequences of the Governmental decision referred to in this paragraph, subsequent to the conclusion of studies undertaken regarding the whole of the Barrage System."[161]

3.128. The *third* document contained an opinion of the Hungarian Academy of Sciences on the ecological-environmental impacts of the Project, which stated that:

> "(A) As a result of the impoundment, the water velocity in the reservoirs will decrease, stagnant areas will develop, piling of sediment will accelerate and groundwater levels will rise. . .
>
> (B) . . .Water supplementation and moisture content of the flood plains in the Old Danube's abandoned bed and along surrounding areas will decrease and the groundwater level may also decrease as a result of the siphoning of groundwater.
>
> (C) . . .Changes in the hydrodynamic situation and the displacement of the biogeochemical processes thereby induced and the deterioration in water quality will lead to the impoverishment and deterioration of the ecosystem.
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> (D) . . .From a geological point of view, the lack of knowledge regarding the region presents the greatest risk. . . No geological

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161 Proposal of the Government of the Republic of Hungary on the Suspension of Work on the Gabcikovo-Nagymaros Barrage System on Basis of Joint Agreement, 22 April 1991; Annexes, vol 4, annex 48.

or geophysical documentation of the area affected by the Gabcikovo Barrage was ever prepared."[162]

The document recommended further research to be carried out jointly by the Parties.

3.129. The *fourth* document proposed replacing energy that would be produced by the Project with special gas turbines, and summarised briefly Hungary's success with this means of production, offering assistance to Czechoslovakia.[163]

3.130. The Czechoslovak delegation, led by then Slovak Prime Minister Meciar,[164] conceded the importance of environmental aspects but reiterated its determination to complete construction in line with the 1977 Treaty. According to the Czechoslovak assessment, technical interventions could lessen the ensuing damage from the Project. Czechoslovakia proposed the establishment of joint working groups to study the various problem areas where the two Parties had different stances, but refused to consider suspension of construction, contending that the Gabcikovo plant was already 90% complete in 1989, at the time Hungary suspended construction. The Hungarian delegation objected, stressing that the plant was far from being complete in 1989 and that Czechoslovakia had continued large scale work in an uninterrupted fashion since 1989. From the Hungarian perspective, Czechoslovakia had not in any way attempted to minimise its damages, but rather appeared to carry on unilaterally with the Gabcikovo plant as an aspect of its threatened unilateral measures.

3.131. Thus no agreement was reached. No joint working groups were established because Czechoslovakia was not ready to suspend construction while research and further studies were undertaken.[165]

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162 Statement of the Government of the Republic of Hungary and the Hungarian Academy of Sciences on the Ecological-Environmental Impacts of the Gabcikovo Plant, 22 April 1991; Annexes, vol 4, annex 10.

163 Proposal of the Government of the Republic of Hungary regarding the Joint Resolution of the Questions of Energy Resulting from the Abandonment of the Gabcikovo-Nagymaros Hydroelectric Plant System, 22 April 1991; Annexes, vol 4, annex 56.

164 On all three occasions in 1991 the Czechoslovak (i.e., federal) delegations were led by the Slovak Prime Minister, duly authorised to act on behalf of the Federation.

165 Report of Mr F Mádl, Hungarian Minister Without Portfolio, regarding the Negotiations with the Czechoslovak Governmental Delegation, 22 April 1991.

3.132. Between the first and the second intergovernmental negotiations the process of fundamental change in the political landscape in East-Central Europe had been completed. According to earlier bilateral agreements the last Soviet troops left Czechoslovakia on 27 May 1991 and Hungary on 16 June 1991. On 28 June 1991 the member states of COMECON signed a Protocol in Budapest on the dissolution of the "socialist" economic organisation.[166] On 1 July 1991, at the last Moscow meeting of the Political Consultative Committee of the Warsaw Pact, another Protocol was signed on the dissolution of the "socialist" military organisation. Hungary and the Soviet Union had been settling their trade accounts in US dollars since the beginning of 1991.[167] Thus full sovereignty and independence of the two countries was restored after 46 years of foreign control. Making use of the new opportunities, in the middle of 1991, negotiations were already in progress on the association of Hungary and Czechoslovakia with the European Communities.[168]

3.133. A Czechoslovak response to the Hungarian Academy of Sciences' statement on the Gabcikovo plant argued that the ecological-environmental risks and dangers catalogued there were either scientifically unfounded or could be minimised by special technical solutions.[169]

3.134. The *second intergovernmental meeting* took place in Bratislava on 15 July 1991. The Czechoslovak delegation was led by the new Slovak Prime Minister, Mr Ján Carnogursky; Mr Mádl continued to lead the Hungarian delegation. The Czechoslovak delegation asserted that some 240 volumes had already been prepared by their experts, proving

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166 Protocol of the 46th Session of the Council of Mutual Economic Assistance in Budapest, 18 June 1991.

167 Until 1991 all COMECON member states had been trading in a strict bilateral system, settling their account formally in "transferable roubles". In practice, trade had been arranged without using any currency, i.e., by a barter system.

168 Hungary signed a European Agreement on Association with the European Communities on 16 December 1991; Czechoslovakia did the same but the agreement did not come into force as a consequence of the dissolution of Czechoslovakia. New Agreements are being negotiated between the EC and the two successor states.

169 Position of the Czecho-Slovak Governmental Delegation, 11 July 1991; Annexes, vol 4, annex 52. For the Hungarian Academy of Sciences study see above, para 3.128.

that the Project would cause no harm to the environment. Hungary responded that none of the studies actually received from Czechoslovakia addressed the long-term ecological effects on the largest underground water reserve in Central Europe, nor did they demonstrate that ecological damages would not ensue in the long run.

3.135. At the meeting, Czechoslovakia affirmed its intention to put the Gabcikovo Barrage into operation, stating that existing studies and data permitted an evaluation of the effects of the four possible operational scenarios: (1) completion and operation of the entire Project according to the 1977 Treaty; (2) abandonment of the Nagymaros Barrage, but operation of the Gabcikovo barrage according to the original plans; (3) abandonment of the Nagymaros Barrage, but operation of the Gabcikovo barrage with use of the power canal, but without filling up the Dunakiliti reservoir; or (4) abandonment of the whole Project, with restoration of the *status quo*.[170]

3.136. Scenario (3) was not identical with Variant C, because it did not involve the unilateral diversion of the Danube. However, the concept of diversion had come up during the negotiations. Czechoslovakia proposed the establishment of a trilateral (Hungarian, Czechoslovak and EC) expert committee to assist in finding technical solutions to the problems arising from the operation of the Gabcikovo sector within a short time frame. Czechoslovakia noted that a failure to agree on the issue would leave the Government with no choice but to put the barrage into operation through further construction on Czechoslovak territory: this construction would merely be a "provisional solution", which would leave open the possibility of the whole Project being eventually implemented in accordance with the 1977 Treaty.

3.137. Hungary replied that unilateral diversion of the Danube would infringe the Hungarian territorial integrity, the Boundary Waters Convention of 1976 and the 1977 Treaty itself. It would change the character of the border between the two States as laid down in the 1920 and 1947 Peace Treaties. Hungary proposed the establishment of a bilateral Committee for the assessment of environmental consequences, conditioned on work on Czechoslovak territory being suspended. Since Czechoslovakia was unwilling to suspend work on Variant C, the two

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170 Report from Mr F Mádl, Hungarian Minister Without Portfolio, to the Hungarian Government regarding the Negotiations with the Czechoslovak Governmental Delegation, 15 July 1991; Annexes, vol 4, annex 165.

States could not agree on setting up either a trilateral or a bilateral Committee to investigate the environmental impacts of the Project.[171]

3.138. A few weeks later the Hungarian Government received information that construction on Variant C had commenced. In a letter dated 24 July 1991, addressed to Mr Carnogursky, Mr Mádl protested against this unilateral action:

> "Hungarian public opinion and the Hungarian Government anxiously and attentively follow the [Czechoslovak] press reports of the unilateral steps of the Government of the Slovak Republic in connection with the barrage system. The preparatory works for diverting the water of the Danube near the Dunakiliti dam unilaterally are also alarming. These steps are contrary to the 1977 Treaty and to the good relationship between our nations."[172]

3.139. In reply Mr Carnogursky confirmed the Czechoslovak press reports and informed Mr Mádl that both the Slovak and the Federal Governments had made the necessary decisions on the construction of Variant C.[173] On the same day, the Slovak Prime Minister informed Mr Antall of the governmental decision. . .

> "to continue work on the Gabcikovo power plant, as a provisional solution, which is aimed at the commencement of operations on the territory of the Czech and Slovak Federal Republic."[174]

3.140. In July 1991, the Hungarian Government also learned that the Czechoslovak construction company was filling the power canal by pumping water from the Danube through pipelines. A Hungarian *Note*

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171 Report from Mr F Mádl, Hungarian Minister Without Portfolio, to the Hungarian Government regarding the Negotiations with the Czechoslovak Governmental Delegation, 15 July 1991.

172 Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to Slovak Prime Minister J Carnogursky, 24 July 1991; Annexes, vol 4, annex 54.

173 Letter from Slovak Prime Minister J Carnogursky, to Mr F Mádl, Hungarian Minister Without Portfolio, 30 July 1991; Annexes, vol 4 , annex 55.

174 Letter from Slovak Prime Minister J Carnogursky, to Hungarian Prime Minister J Antall, 30 July 1991; Annexes, vol 4 , annex 56.

Verbale of 30 July 1991 protested against this.[175] The reason for the Czechoslovak action was that the bed of the power canal had started to erode: some vegetation had grown and the asphalt cover of the dyke had become cracked. The Czechoslovak authorities thought that the filling would prevent the growth of vegetation, while Hungary perceived the action as a further unilateral step

3.141. Hungary protested primarily against the preparation of Variant C. In a letter of 9 August 1991 to Mr Carnogursky, Mr Mádl expressed outrage at the Czechoslovak decision to continue work on Variant C. The decision was "regrettable and unacceptable since our firm aim is to continue the negotiations; this could be undermined by any unilateral step". He added:

> 'I am convinced that we cannot find a [mutually] acceptable solution by using coercive means. . . I do protest against any unilateral step that would be in contradiction with the interests of our nations and international law. I consider it very important that I receive information as early as possible on the details of the provisional solution."[176]

3.142. On 27 July 1991, Mr Antall met Mr Calfa in Dubrovnik at an international conference. The two agreed to a request that their respective Parliamentary Committees commence talks on the dispute. In letters addressed to Mr Calfa and Mr Carnogursky on 12 and 14 August 1991,[177] the Hungarian Prime Minister stressed the importance of a negotiated settlement of the dispute.

3.143. Accordingly, the two Parliaments' Committees of Environmental Protection met in Budapest between 9 and 11 October 1991. They did not reach a common standpoint with regard to the basic issue, but stressed in their Joint Declaration that:

> "[A]n expert committee should be set up in order to evaluate on the basis of a common methodology all realistic scenarios, as

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175 *Note Verbale* from Ministry of Foreign Affairs of the Republic Hungary to the Czechoslovak Embassy, 30 July 1991; Annexes, vol 4 , annex 57.

176 Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to Slovak Prime Minister J Carnogursky, 9 August 1991; Annexes, vol 4, annex 58.

177 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 12 August 1991, and to Slovak Prime Minister J Carnogursky, 14 August 1991; Annexes, vol 4 , annex 59.

determined by the committee. This committee will evaluate -- giving priority to ecological aspects -- the. . . consequences of various scenarios."[178]

3.144. The *third intergovernmental meeting* took place in Budapest on 2 December 1991. The two Parties agreed that it would be reasonable to set up a Joint Expert Committee to review the whole question. Both had prepared proposals for the mandate and task of the Committee. Hungary accepted the Czechoslovak proposal to complement the Committee with experts from the European Communities. The Hungarian delegation pointed out that the goal of the work of the Committee would be to prepare a properly based common decision. Thus, if Czechoslovakia continued its work towards the implementation of Variant C, the Committee's work would be meaningless. The head of the Czechoslovak delegation responded that the suspension of construction, even temporarily, was unthinkable. Nevertheless, the experts of the two delegations prepared principles for rules of procedure for a Joint Expert Committee, foreseeing the participation of the representatives of the European Communities.

3.145. Mr Mádl declared at the end of the negotiations that the Committee could begin work if, within ten days, the head of the Czechoslovak delegation informed the Hungarian Government that no unilateral work towards the implementation of Variant C would be carried out on the Czechoslovak side until June 1992 while the Committee undertook its work. Otherwise the Hungarian Government would be compelled to take necessary measures, which could include the termination of the 1977 Treaty.[179]

(3) Termination of the 1977 Treaty and Diversion of the Danube

3.146. The Czechoslovak Government did not respond to the Hungarian request within ten days. In a letter dated 18 December 1991, Mr Carnogursky said:

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178 Joint Declaration of the Committees of Environmental Protection of the Republic of Hungary and the Federal Assembly of the Czechoslovak Republic, 11 October 1991; Annexes, vol 4, annex 64.

179 Report of Mr F Mádl, Hungarian Minister Without Portfolio, to the Hungarian Government regarding the Negotiations with the Czechoslovak Governmental Delegation, Budapest, 2 December 1991.

> 'I am repeatedly stressing that, because of the high state of readiness of the Gabcikovo plant, the only solution that is acceptable for us is one which takes into account the putting into operation of the Gabcikovo plant."

3.147. He added that "Czechoslovakia does not carry out any work in the riverbed of the Danube until June 1992", but made no commitment with respect to the discontinuation of work on Variant C. In fact work on the bed itself would only come at a later stage, and not during the summer high water period. The letter, however, contained an important sentence with regard to the Nagymaros sector:

> "As far as the fate of the Nagymaros plant is concerned, it should be solved in connection with compensating the CSFR for damages caused by Hungary's non-compliance with the [1977] inter-state Treaty and its related documents."[180]

3.148. The Hungarian Government interpreted this statement to mean that the Czechoslovak Government no longer considered the completion of the works at Nagymaros as a requirement.

3.149. Mr Mádl responded on 23 December 1991,[181] stating that under the conditions described in the letter (i.e., continuation of the work on Variant C), the Joint Expert Committee could not start its work. In reply,[182] Mr Carnogursky reiterated the willingness of Czechoslovakia to set up the trilateral committee, but did not refer to any change in the Czechoslovak position on Variant C. Prime Minister Antall also responded in a letter addressed to Czechoslovak Prime Minister Calfa on 19 December 1991. After summarising the more recent events in connection with the Project, Mr Antall stated that both parties "should be open to the conclusions of the experts, instead of putting improper pressure upon them by accelerating the work and suggesting the irreversibility of the construction." But he warned that if work on Variant C proceeded. . .

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180 Letter from Slovak Prime Minister J Carnogursky to Mr F Mádl, Hungarian Minister Without Portfolio, 18 December 1991; Annexes, vol 4, annex 69.

181 Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to Slovak Prime Minister J Carnogursky 23 December 1991; Annexes, vol 4, annex 71.

182 Letter from Slovak Prime Minister J Carnogursky to Mr F Mádl, Hungarian Minister Without Portfolio, 8 January 1992; Annexes, vol 4, annex 72.

> "the Government of the Republic of Hungary would be compelled to review the consequences of the discontinuation of the negotiations, the fate of the 1977 inter-state Treaty and the necessary counter-measures."[183]

3.150. Mr Calfa responded on 23 January 1992, noting that the Czechoslovak Government had confirmed the continuation of the work on Variant C in a Resolution of 12 December 1992. . .

> "in the interest of minimising the increasingly cumulative economic and ecological damages on Czechoslovak territory and so that the energy potential at our disposal is optimally utilised and that the Danube's bed becomes suitable for the fulfilment of the absolutely indispensable needs of navigation. . . In the event that the conclusions [of the Committee] and the monitoring of the Gabcikovo Barrage's test plant prove that the negative ecological consequences are greater than the expected profit, Czechoslovakia is ready to stop work on the provisional solution and to continue construction based on mutual agreement."[184]

3.151. In other words, Czechoslovakia was unwilling to suspend construction of Variant C and would put into operation the Gabcikovo Barrage by all means, independently of the work of the Joint Expert Committee.

3.152. In a *Note Verbale* of 14 February 1992 the Hungarian Ministry of Foreign Affairs protested against the unilateral work "which is aimed at diverting the Danube from its place as a common border river". The decision of the Czechoslovak Government and the work carried out on Czechoslovak territory was. . .

> "in contravention of both. . . provisions of the [1977 Treaty] and the 1976 Convention on Management of Border Waters. . . with the principles of sovereignty and territorial integrity, with the inviolability of state borders, as well as with the general

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183 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 19 December 1991; Annexes, vol 4, annex 70.

184 Letter from Czechoslovak Prime Minister M Calfa to Hungarian Prime Minister J Antall, 23 January 1992; Annexes, vol 4, annex 73.

customary norms on international rivers and the spirit of the 1948 Belgrade Convention on the Danube."[185]

3.153. On 17 March 1992,[186] the Czechoslovak Ministry of Foreign Affairs rejected the substance of the protest, repeating many of the points contained in the 23 January 1992 letter of Mr Calfa quoted in paragraph 3.150 above.

3.154. On 26 February 1992, Prime Minister Antall again wrote to Mr Calfa, deploring the unilateral work on Variant C, and adding that "during the time which has since passed, news has arrived that the pace of construction has accelerated." Mr Antall stressed that Hungary did not violate the rules of international law by suspension of the work on the Project, in contrast with Czechoslovakia's serious breach of international law by diverting the Danube. He stated:

> "If the Government of the Czech and Slovak Federal Republic were to reject our proposals anyway and continue the work aimed at the diversion of the Danube, which is a serious breach of international law, then it will create a very difficult situation. This would demonstrate not only the further breach of a series of international treaties, but with its unilateral act the Czech and Slovak Party is in breach of the 1977 inter-state Treaty itself, is questioning its continued effectiveness, and is considering the Treaty to no longer be in effect. The Government of the Czech and Slovak Federal Republic would thus be placing the Hungarian Government into a state of necessity forcing it to terminate the Treaty. . . Insofar as. . . the Government of the Czech and Slovak Federal Republic does not find the opportunity to commence trilateral inquiries within a rational period of time and simultaneously suspend the unilateral work while said inquiries are underway, the Hungarian Government will have no choice but to respond to this situation of necessity by terminating the 1977 inter-state Treaty."[187]

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185 *Note Verbale* from the Hungarian Ministry of Foreign Affairs, to the Czechoslovak Embassy, 17 February 1992; Annexes, vol 4, annex 74.

186 *Note Verbale* from the Czechoslovak Ministry of Foreign Affairs, to the Hungarian Ministry of Foreign Affairs, 14 March 1992; Annexes, vol 4, annex 76.

187 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 26 February 1992; Annexes, vol 4, annex 75.

The Hungarian Government would ask Parliament for prior authorisation of the termination.

3.155. No response came from Mr Calfa.[188] The Hungarian Government, concluding that there was no longer any possibility of reaching a compromise, proposed a Parliamentary Resolution on the termination of the 1977 Treaty.

3.156. On 5 March 1992, Prime Minister Antall turned to EC President Jacques Delors, requesting the assistance of the European Communities. The Prime Minister wrote:

> "I kindly request your assistance, Mr President, in halting the escalation of the dispute... I ask you to support our goal of cancelling the unilateral Czechoslovak construction work... and our proposal for the commencement of trilateral expert studies."[189]

3.157. On 24 March 1992 the Hungarian Parliament passed a Resolution which stated:

> "Recognising the fact that continued construction and/or operation of the Gabcikovo-Nagymaros Barrage System or any of the main installations thereof would result in serious ecological and economic damage; taking into consideration the fact that the Government of the Czech and Slovak Federal Republic has passed a decision regarding the unilateral completion and commencement of the Gabcikovo Barrage and that it entails the unilateral diversion of the Danube in contravention to the relevant international conventions and the amendment of the character of the state border, and that, by these actions, the Government of the Czech and Slovak Federal Republic have made questionable the validity of the Treaty concluded on 17 September 1977. . . the Parliament authorises the Government to terminate the 1977 Treaty and all agreements concluded between the Parties and/or their bodies for executing the Treaty, if the Government of the Czech and Slovak Federal Republic does not cancel the work being done in contravention to the 1977 Treaty by 30 April 1992."[190]

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188 Prime Minister M Calfa responded to Prime Minister J Antall's letter only on 23 April, 1992; see below, para 3.159.

189 Letter from Hungarian Prime Minister J Antall to European Commission President Delors, 5 March 1992.

190 Resolution of the Hungarian Parliament No 12/1992 (IV.4), 24 March 1992; Annexes, vol 4, annex 156.

Thus Parliament again set a new deadline for negotiations, based on suspension of Variant C.

3.158. Three weeks after the Resolution was passed, EC Vice President Andriessen confirmed the willingness of the European Commission "to participate in and to chair a Committee of independent experts with representatives of the two countries". Possible Commission involvement would depend on the following:

> "(i) receipt of a joint letter, or two letters of similar text, inviting the Commission to participate, and setting out the terms of reference or mandate for the work of the Committee;
>
> (ii) the acceptance that the outcome of this assessment would provide the agreed scientific/ecological and legal basis for subsequent decision-making; and
>
> (iii) each Government would not take any steps, while the Committee is at work, which would prejudice possible actions to be undertaken on the basis of the report's findings."[191]

3.159. One week before the deadline set in the Resolution of the Hungarian Parliament, the Czechoslovak Prime Minister responded to Prime Minister Antall's letter of 26 February 1992. In a letter dated 23 April 1992, Mr Calfa called the Hungarian request an "ultimatum" and refused to accept the Hungarian proposal before 30 April 1992. He stated that:

> "Czechoslovakia has shown enough good intentions and a readiness to negotiate, but it can no longer give consideration to the time-wasting and delays which are being used by Hungary, and thus, it cannot suspend work related to the provisional solution. . . [T]he Government of the CSFR. . . is interested in the creation of this [trilateral] Committee without preconditions."[192]

3.160. The words "without preconditions" meant that Czechoslovakia would not comply either with the Hungarian or the EC conditions. As an indication of his determination Slovak Prime Minister Ján Carnogursky

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191 Letter from Mr F Andriessen, Vice President of the Commission of the European Communities, to Mr G Jeszenszky, Hungarian Minister for Foreign Affairs, 13 April 1992; Annexes, vol 4, annex 78.

192 Letter from Czechoslovak Prime Minister M Calfa to Hungarian Prime Minister J Antall, 23 April 1992; Annexes, vol 4, annex 79.

-- accompanied by his brother, the Director of Hydrostav, the construction company of the Gabcikovo sector, paid a well-publicised visit to the construction area of Variant C. He stated that the closure of the Danube would take place in the early winter of 1992 when the water level was at its lowest.[193]

3.161. Against this background, the Hungarian Government decided on 7 May 1992 to terminate the 1977 Treaty. Its decision offered one last chance for reaching a compromise to avoid termination, providing that:

> "Immediately or at the latest by 15 May [1992], negotiations should be held with Prime Minister Ján Carnogursky, in conjunction with the participation of the EC Ambassadors to Prague and Budapest, on a six month suspension of the work on the provisional solution (Variant C) in order to commence trilateral negotiations. . . [If the negotiations] do not lead to a result, the Government of the Czech and Slovak Federal Republic should be informed of the termination by 20 May [1992] through diplomatic channels".[194]

The decision suggested that a new treaty should be concluded to delineate the consequences of the termination.

3.162. On 11 May 1992, Mr Carnogursky informed Mr Mádl that the Slovak (not the Federal) Government had discussed the issue. He stated:

> "We are ready to negotiate with you on a possible modification of the deadline for the diversion of the Danube. . . But we think it would be inappropriate to limit the theme of negotiations by preconditions. . . [The Slovak Government considers] negotiations. . . on the fulfilment of the 1977 inter-state Treaty. . . desirable, especially because the proposal of the Commission of the European Communities on the setting up of a trilateral experts Committee should also be dealt with."[195]

3.163. Mr Carnogursky added that he had appointed Government Plenipotentiary Kocinger to prepare for negotiations with his Hungarian

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193 *Új Szó* (Bratislava), 23 April 1992.

194 Resolution of the Hungarian Government No. 3190/1992, 7 May 1992; Annexes, vol 4, annex 15.

195 Letter from Slovak Prime Minister J Carnogursky to Mr F Mádl, Hungarian Minister Without Portfolio, 11 May 1992.

counterpart. However, the negotiations did not take place, because Mr Carnogursky told Mr Mádl by phone on the same day that the Slovak Government would not negotiate under the "ultimatum" and the "preconditions" determined by Hungary, i.e., the suspension of work on Variant C.[196]

3.164. The Hungarian Government did not receive any communication on this question from the Federal Government. Taking into consideration that the negotiations failed to take place before 15 May 1992, the Hungarian Government felt it had no option but to terminate the 1977 Treaty. As Hungarian Foreign Minister Jeszenszky explained to Mr Andriessen:

> "Mr Marian Calfa. . . informed Prime Minister József Antall of Hungary about the position of the Czechoslovak Government regarding the Project. He stated, *inter alia*, that the Czecho-Slovak side could not suspend the activity connected with the construction of the so called 'temporary solution'. . . [This] decision as communicated by the Head of the Czecho-Slovak Government is considered by the Government of the Republic of Hungary as being not in accordance with the third of the conditions set down in your letter of 13 April [1992]. Therefore, the Hungarian Government, in compliance with the relevant decision of the National Assembly, will be compelled to terminate [the 1977 Treaty]."[197]

3.165. The notice of termination took the form of a *Note Verbale* handed to the Czechoslovak Embassy on 19 May 1992.[198] It was accompanied by a letter from Prime Minister Antall to Prime Minister

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196 Speech of Mr F Mádl, Hungarian Minister Without Portfolio, in the Hungarian Parliament, 11 May 1992, explaining the reasons of termination; Annexes, vol 4, annex 158.

197 Letter from Mr G Jeszenszky, Hungarian Minister for Foreign Affairs, to Mr F Andriessen, Vice President of the Commission of the European Communities, 19 May 1992; Annexes, vol 4, annex 84. The Hungarian Minister of Foreign Affairs referred to the condition of the EC Commission according to which neither Government would take any steps, while the proposed trilateral Committee is at work, which would prejudice possible future actions by the three Parties: see above, para 3.158.

198 *Note Verbale* of the Hungarian Ministry for Foreign Affairs to the Czechoslovak Embassy, 19 May 1992; Annexes, vol 4, annex 83.

Calfa[199] and by a Declaration on the legal and scientific grounds for the termination.[200] In the letter, Mr Antall underlined that "it is unacceptable that the [Czechoslovak] negotiating Party produces a *fait accompli* during the negotiations" by continuing work on Variant C. This was the main reason for terminating the 1977 Treaty. He noted that. . .

> "a study of your letter led the Hungarian Government to conclude at its meeting of 7 May 1992 that the Czechoslovak Government is unable to meet our request for a moratorium and was unwilling to fully accept the conditions set for co-operation by the European Communities in an effort to promote a common agreement, thus jeopardising a promising opportunity for negotiations seeking joint action. . . [I]t was with renewed hopes for joint action that I received the Federal Government's statement to the press, made after its meeting of 14 May [1992], envisaging a suspension of construction, intended as a temporary solution during the activity of the Trilateral Expert Committee. Again, however, I had to note with disappointment the official communication, which made no reference to a readiness for a suspension of construction. That had definitely put an end, as it were, to our attempts to reach a common agreement regarding the 1977 inter-state Treaty. . ."[201]

3.166. Czechoslovakia refused to recognise the validity of the termination. A Czechoslovak *Note Verbale* of 22 May 1992 stated that "the Republic of Hungary has no legal basis for the unilateral termination" of the 1977 Treaty, and that "the *Note Verbale* of the Hungarian Ministry of Foreign Affairs dated 19 May 1992 cannot legally affect the validity" of the 1977 Treaty and related agreements. The Government. . .

> "reserve[d] the right to set forth its opinion in detail with regard to all arguments of the Government of the Republic of Hungary, including the compensation of damages of the Czech and

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199 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 19 May 1992; Annexes, vol 4, annex 82.

200 Declaration of the Government of the Republic of Hungary on the Termination of the 1977 Treaty, 19 May 1992; Annexes, vol 4, annex 82.

201 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 19 May 1992; Annexe, vol 4, annex 82.

> Slovak Federal Republic as a result of the non-compliance with the legal duties of the Republic of Hungary."[202]

However, Hungary never received any substantive response to its *Note Verbale* or the accompanying Declaration.

3.167. In order to complete the legal process of termination, Hungarian Act No XL of 9 June 1992 rescinded earlier Acts that had promulgated the 1977 Treaty and its 1983 modification.

3.168. On 6 August 1992 Prime Minister Antall wrote to the new Czechoslovak Prime Minister, Mr Strásky, indicating the possibility of bringing the case before this Court. Prime Minister Antall complained that:

> "our letter and proposals have not been answered, meanwhile, the Czechoslovak construction company is continuing the completion of the preparatory works in readiness for the commencement of the operation of the Gabcikovo power plant. . . For this reason, the Hungarian Government will consider the involvement of highly respected non-partisan authorities in the resolution of the Danube dispute, first of all the International Court of Justice in The Hague."[203]

3.169. He stated again that "it would be reasonable to involve EC experts from third countries" too. A copy of the letter was sent to Mr Meciar, the Slovak Prime Minister.

3.170. Unaware of this communication, Prime Minister Strásky, in a letter sent the same day to Prime Minister Antall, reiterated his Government's standpoint on the invalidity of the termination of the 1977 Treaty, but expressed support for the involvement of the EC. The Czechoslovak Government. . .

> "on 14 May 1992 welcomed this activity and nominated the members of a delegation to be given a broad mandate and sent

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202 *Note Verbale* from the Czechoslovak Embassy to the Hungarian Foreign Ministry, 22 May 1992; Annexes, vol 4, annex 85. In response, a Hungarian *Note Verbale* dated 10 June 1992 expressed the regret of the Hungarian Government and stated that: "On behalf of the Government of the Republic of Hungary the Ministry of Foreign Affairs affirms the contents of the Declaration dated 19 May 1992 and the requests that all work be stopped in connection with the Gabcikovo-Nagymaros Barrage System." *Note Verbale* from Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 10 June 1992; Annexes, vol 4, annex 86.

203 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister J Strásky, 6 August 1992; Annexes, vol 4, annex 90.

> to Vienna in order to reach a reasonable solution of the dispute. At the same time the then Prime Minister of CSFR in his press declaration. . . made known his readiness to enter into negotiations combined with a suspension of work on the provisional solution."[204]

3.171. Despite this letter the Hungarian Government never received any indication of the readiness of Czechoslovakia to suspend the work on the "provisional solution", nor any invitation to meet in Vienna.

3.172. On 5 August 1992, the Czechoslovak representative to the Danube Commission informed the Director of its Secretariat that "on the territory of the CSFR, work on severing the Danube's flow will begin. . . at the 1851.759 river kilometre line" on 15 October 1992 in order to provisionally put into operation the Gabcikovo Barrage. It would be necessary. . .

> "to suspend navigation from Bratislava to Palkovicovo for about 10 days some time between 15 and 30 of November 1992. . . The line of navigation will be relocated to the power canal and the lock-chambers of the Gabcikovo plant. . . At the same time all necessary nautical installations will be put into operation, including the lock-chambers of the Gabcikovo plant."[205]

3.173. The Hungarian representative to the Commission protested against the planned action in a letter of 17 August 1992.[206] He demanded more detailed information and questioned the meaning of the word "provisional". The substance of Hungary's protest was communicated to the President of the Danube Commission on 28 August 1992.[207]

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204 Letter from Czechoslovak Prime Minister J Strásky to Hungarian Prime Minister J Antall, 6 August 1992; Annexes, vol 4, annex 89.

205 Letter of Mr R Chmel, Vice President of the Danube Commission to Mr H Strasser, Director, Secretariat of the Danube Commission, 5 August 1992; Annexes, vol 4, annex 88.

206 Letter from Mr I Bába, Deputy State Secretary of the Hungarian Ministry for Foreign Affairs and Permanent Representative to the Danube Commission, to Mr R Chmel, Vice President of the Danube Commission, 17 August 1992; Annexes, vol 4, annex 91.

207 Letter from Mr I Bába, Deputy State Secretary of the Hungarian Ministry for Foreign Affairs and Permanent Representative to the Danube Commission to Mr I Diaconu, President of the Danube Commission, 28 August 1992; Annexes, vol 4, annex 93.

3.174. In a further letter to Mr Strásky on 18 August 1992, Prime Minister Antall stated that:

> "The Government of the Republic of Hungary would like to solve the dispute once and for all in accordance with international law... I therefore propose that the Government of the Czech and Slovak Federal Republic and the Government of the Republic of Hungary mutually agree to submit the dispute over the implementation of Variant C to the International Court of Justice and request a decision. In addition to recognising the jurisdiction of the Court, the representatives of our Governments should determine in writing the questions to be submitted to The Hague Court of Justice."[208]

The letter was copied to Slovak Prime Minister Meciar.

3.175. Mr Meciar met Mr Antall in Budapest on 9 September 1992. He agreed that preliminary talks should be held among the experts of the three Governments (of Budapest, Prague and Bratislava) on the submission of the dispute to the International Court of Justice and on the environmental problems. These talks never took place, because Czechoslovakia, for the next several months, reconsidered its approach of bringing the case before this Court.

3.176. On 23 September 1992, Federal Prime Minister Strásky responded to Mr Antall's letter of 18 August 1992,[209] stating that the Czechoslovak stance with regard to the termination of the 1977 Treaty was "contained in my letter dated 6 August 1992". As to the Hungarian proposal to submit the case to the Court, Mr Strásky raised the question "what would the good offices or mediation offered by the European Communities mean from the aspect of the unfinished negotiations?" He was disappointed that Hungary "did not participate in the trilateral negotiations which were planned for 18 May 1992 in Vienna with the participation of the European Communities". The Czechoslovak Prime Minister was not ready to submit the case to the Court (as proposed by Hungary), but preferred the involvement of the European Communities. The same view was taken by Czechoslovak Foreign Minister Moravcik on the same day, 23 September 1992. He stated:

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208 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister J Strásky, 18 August 1992; Annexes, vol 4 , annex 92.

209 Letter from Czechoslovak Prime Minister J Strásky to Hungarian Prime Minister J Antall, 23 September 1992; Annexes, vol 4, annex 96.

"the idea to submit the dispute to the International Court of Justice would virtually prolong the process of finding the solution to the dispute, exactly then, when the time became a crucial factor."[210]

3.177. In response to Mr Strásky, Mr Antall expressed his indignation that:

"the work on the so called provisional solution, leading to the unilateral diversion of the Danube is being concluded, threatening the sovereignty and territorial integrity of the Republic of Hungary. . . On the other hand, I agree with you, there are some aspects of the inter-state dispute which seem to require setting up a trilateral expert Committee with the participation of experts of the European Communities."[211]

3.178. Mr Strásky responded on 2 October 1992, welcoming the willingness of Hungary to prepare a common request to the European Communities. With regard to the role of the Court, he stated that:

"I am afraid that the proposal submitted by you, in your letter dated 23 September 1992, to take our dispute to the International Court of Justice in The Hague was influenced by a misunderstanding of the reasons for our position on the issue. Today, when time has become an extremely important factor, I am of the opinion, that it is urgent that we finish negotiations on the participation by the Commission of the European Communities in the solution to our dispute. The submission of our dispute to The Hague International Court of Justice would mean that the results of our negotiations with the European Communities to date, would come to nothing. Czechoslovakia's reconciliation to the Czechoslovak Constitutional provisions prior to the submission of our dispute before the International Court of Justice in The Hague would require a great deal of time indeed."[212]

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210 Letter from Mr J Moravcik, Czechoslovak Foreign Minister, to Mr G Jeszenszky, Hungarian Foreign Minister, 23 September 1992; Annexes, vol 4, annex 97.

211 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister J Strásky, 28 September 1992; Annexes, vol 4, annex 98.

212 Letter from Czechoslovak Prime Minister J Strásky to Hungarian Prime Minister J Antall, 2 October 1992; Annexes, vol 4, annex 99.

3.179. Having learned about the planned diversion of the Danube, high ranking politicians and international organisations raised their voices against the diversion and sought to convince the Czechoslovak Government to continue the negotiations. German Foreign Minister Kinkel, for example, urged. . .

> "the Governments of Prague and Budapest to accept the international mediation [offered by the Commission]. . . Exactly the Czech and Slovak Party, on its way to separation and independence, should seriously take into consideration the consequences [of the diversion] on the future co-operation with their partners. . . If the Parties took precipitate measures creating a *fait accompli*, they would endanger the goodwill of the European Communities. . ."[213]

3.180. The European Parliament passed a Resolution on 29 October 1992 stating that it was. . .

> "profoundly alarmed at the growing tension in Central Europe which could threaten democratic renewal in this region;
>
> conscious that if irreversible steps are taken the possible ill effects in terms of environmental impact will extend far beyond Slovakia. . ."[214]

It referred to "the serious ecological and international political implications of this project which has been undertaken without any serious impact assessment and without the population concerned being adequately consulted. . . " and concluded that:

> "the construction work relating to the power station is currently affecting the whole tracts of countryside, thus potentially damaging the environment and endangering drinking water supplies."[215]

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213 MTI (Hungarian Press Agency), Reuter, 26 October 1992.

214 Resolution of the Parliament of the European Communities on the Gabcikovo-Nagymaros Power Station Construction Project, 29 October 1992; Annexes, vol 4, annex 175.

215 Resolution of the Parliament of the European Communities on the Gabcikovo-Nagymaros Power Station Construction Project, 29 October 1992; Annexes, vol 4, annex 175.

There was no response from either the Federal or the Slovak Government to the international criticism.

3.181. At a meeting in Bratislava on 13 October 1992, the two Parties attempted to agree on the invitation of the representatives of the EC Commission in order to contribute to the solution of the dispute. Czechoslovak Deputy Foreign Minister Pirek stated that the conditions contained in the letter of Mr Andriessen dated 13 April 1992 were no longer timely, because the work on Variant C had been completed. Thus the trilateral Committee would have to investigate the dispute in a comprehensive way. In response, State Secretary Martonyi[216] stressed that the prerequisites for EC involvement were still valid, and that no unilateral step such as diverting the Danube could be made while the expert Committee examined the situation. No agreement could be reached.

3.182. In the Autumn of 1992, the work on Variant C was accelerated. According to press reports,[217] about 2000 people were working in the area day and night, in three shifts, with five hundred trucks delivering stones and gravel for the closure of the river. A large amount of material was brought from 50-100 kilometre distances, from stone mines of Nové Zámky, Levice, Ziar and Hronom and Prividza. Cubic meter concrete blocs were delivered to Cunovo. These blocks had been prepared earlier by a Hungarian factory for closing the Danube at Dunakiliti according to the original plans. Some foreign companies -- including the Austrian Keller Grundbau and Porr AG -- were working in co-operation with the Slovak main constructor, Hydrostav.[218] A number of international and local organisations, like Eurochain, protested against the closure on the spot. But police and security guards surrounded the construction area in order to prevent any hostile action. Rumours spread in Bratislava that Hungary had moved sixty armoured vehicles close to the border in the vicinity of the construction area; the deputy commandant of the Slovak border police denied these rumours.[219] The Hungarian Ministry of

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216 In 1992 State Secretary of the Ministry for Foreign Affairs, Mr J Martonyi became the representative of the Hungarian Government in questions related to the Gabcikovo-Nagymaros Project.

217 *Magyar Nemzet* (Budapest), 15 October 1992.

218 *Magyar Nemzet* (Budapest), 19 October 1992; The Austrian Government did not support the participation of Austrian companies.

219 *Új Szó* (Bratislava); *MTI* (Hungarian News Agency), 21 October 1992.

Defence summoned the Slovak military attaché and protested against the rumours; he also requested information on unusual Slovak military activities close to the border.[220]

3.183. Given the extraordinary efforts to complete the construction by the end of October 1992, Hungary looked for the assistance of a multilateral forum. In the framework of the CSCE Mechanism for Consultation and Co-operation With Regard to Emergency Situations, Hungary requested in a *Note Verbale* of 12 October 1992 that the Czechoslovak Government explain its planned actions for diverting the Danube, and in particular that it answer certain questions:

> "(1) Does the Government of the Czech and Slovak Federal Republic confirm. . . that it is going to divert the Danube at 1851 river km into the Gabcikovo power canal on 20 October 1992?
>
> (2) Is the Government of the Czech and Slovak Federal Republic ready to suspend the construction work aimed at the diversion of the border river while a joint expert committee investigates the disputed questions?
>
> (3) Does the Government of the Czech and Slovak Federal Republic consider the planned diversion of the Danube within the norms of. . . international law. . .?
>
> (4) How will the Government of the Czech and Slovak Federal Republic avoid the political tension and instability resulting from the diversion of the Danube?"[221]

The Czechoslovak Government responded in a *Note Verbale* dated 27 October 1992[222] that "[t]he Government of the Czech and Slovak Federal Republic maintains the legal position expressed in previous statements by the responsible authorities of the Czech and Slovak Federal Republic". With this response, the CSCE procedure came to an end.

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220 *Népszabadság* (Budapest), 21 October 1992.

221 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Ministry of Foreign Affairs, 12 October 1992; Annexes, vol 4, annex 100.

222 *Note Verbale* from the Czechoslovak Ministry of Foreign Affairs to the Hungarian Ministry of Foreign Affairs, 27 October 1992; Annexes, vol 4, annex 103.

3.184. On the initiative of the EC Commission, trilateral negotiations took place in Brussels on 21-22 October 1992 in order to set up an expert Committee and to determine its mandate. On the first day of the negotiations, the Czechoslovak Ministry of Foreign Affairs handed over a *Note Verbale* to the Hungarian Embassy, stating that the Government...

> "is ready to accept all conditions set by the Commission of the EC with regard to the setting up a trilateral Committee, and has decided that it will not start the closure of the Danube until the beginning of the work of the Committee, more precisely, until 2 November."[223]

3.185. The Hungarian delegation received this text at the Brussels meeting. Yet, the Czechoslovak delegation declared at the meeting that the closure of the Danube had to be carried out in October, otherwise "grave ecological catastrophe and flooding" would endanger the surrounding area. Hungary did not see the danger of a catastrophe if the Danube would *not* be diverted and unsuccessfully sought compliance with the conditions described earlier by EC Vice President Andriessen.

3.186. On the next day, 23 October 1992 -- the anniversary of the 1956 Hungarian revolution and of the 1989 proclamation of the Republic of Hungary -- the closure of the Danube commenced. It was completed four days later, on 27 October. A pontoon-bridge was built over the Danube on Czechoslovak territory from river-barges; large stones were thrown into the riverbed and fortified by concrete. The flow of the river was diverted into the new, 10 kilometre long power canal that led in the direction of the Gabcikovo plant. The Czechoslovak construction company invited the international media -- including the Hungarian press and television -- to the event. A small ceremony was held. A tribune was set up, speeches were delivered and flags -- including that of the European Communities -- were flown.

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223 *Note Verbale* from the Czechoslovak Ministry of Foreign Affairs to the Embassy of Hungary, 21 October 1992; Annexes, vol 4, annex 101.

SECTION D: NEGOTIATIONS ON SPECIAL AGREEMENT AND TEMPORARY WATER MANAGEMENT REGIME: 1993-1994

3.187. As a consequence of the diversion between 24 and 28 October, the water level in the old riverbed decreased by three metres and the water discharge dropped from 800-900 m3/s to less than 230 m3/s.[224] The average width of the river decreased by 55 metres. The side branches of the river were isolated from the main riverbed and the water disappeared immediately from them. The ecological balance of the side branches became seriously disturbed. The water disappeared from the harbours between rkm 1811-1850 at Ásványráró, Dunaremete and Dunakiliti. In the Old Danube, commercial navigation became impossible. The groundwater table decreased considerably.[225] The fish fauna of the floodplain almost disappeared. The forest in the area close to the river began to dry out. Downstream of the Variant C structure, the danger of ice floods and/or demolition of the riverbed greatly increased, due to the lack of proper installations.

3.188. Despite the diversion, work on Variant C had not yet finished -- indeed at the time of writing this Memorial this is still the case. First of all urgent protection and fortification work had to be carried out, because the structures created by the end of October 1992 were unsafe. To prevent erosion of the canal between the inundation weir and the Danube, excavations were needed to a level corresponding to the average bottom level of the Danube. It was also planned to erect a lock for smaller ships, a spillway weir, a small hydropower plant, a subsidiary lock and a number of other items. This work was planned for the following 1-3 years.[226]

3.189. The Hungarian Government continued its pursuit of a judicial resolution of the dispute. Czechoslovakia had not accepted the jurisdiction of the International Court of Justice under Article 36 of the Statute, but Hungary submitted an "Application of the Republic of

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224 The diversion was carried out at the time of lowest water level in the year.

225 Mission Report of the Commission of European Communities Prepared by the Fact Finding Mission on Variant C of the Gabcikovo-Nagymaros Project, Bratislava, 31 October 1992, p 12; Annexes, vol 5, annex 13.

226 Report by the Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks on Temporary Water Management Regime, Bratislava, 1 December 1993, p 7; Annexes, vol 5, annex 19.

Hungary v the Czech and Slovak Federal Republic on the Diversion of the Danube River" to the Court on 23 October 1992. Hungary requested the Court to deal with the illegality of Variant C and of the shifting of the main navigation channel from the border; it also sought provisional measures.[227] It was understood that if the Hungarian Application were to be examined by the Court, all legal problems in connection with the Project would be raised.

3.190. Czechoslovakia responded to the Hungarian Application after the diversion of the river, on 18 November 1992. The Czechoslovak Minister of Foreign Affairs informed the Court that the "Czech and Slovak Federal Republic is interested in a comprehensive examination by the International Court of Justice of the whole problem with the implementation of the [1977] Treaty".[228]

3.191. In the meantime, the Commission of the European Communities made further efforts to assist. Using the opportunity of a summit meeting between the members of the EC and the Visegrád Group (Hungary, Czechoslovakia, Poland), the British President of the EC Council invited the representatives of the three States to London on 28 October 1992. The Parties reached agreement on some aspects of the dispute, and signed an Agreed Minutes (known as the London Agreement) on the same day. This stated, *inter alia*:

> "It was agreed that all works on Variant C of the Gabcikovo/Nagymaros Project will be stopped at a date specified by the EC Commission on the basis of the fact finding mission composed of one expert from each side (Commission, Czech and Slovak Federal Republic and Hungary), taking into account the risk of damage to existing structure including navigation, of ecological damage to the region and of flooding... The Czech and Slovak Federal Republic undertakes to guarantee to maintain the whole (not less than 95%) traditional quantity of water into the whole old Danube river-bed,

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227 Application of the Republic of Hungary v the Czechoslovak Republic on the Diversion of the Danube River, 22 October 1992; Annexes, vol 4 , annex 102.

228 See the enclosure to the letter from Mr E Valencia-Ospina, Registrar, to Mr F Mádl, Hungarian Minister Without Portfolio, 4 December 1992; Annexes, vol 4, annex 106.

including the section between Rajka and Palkovicovo, and to refrain from operating the power plant."[229]

3.192. The negotiating Parties agreed to set up a Fact Finding Mission, composed of experts from the three sides in order to investigate the situation. In addition, after lengthy discussion, Czechoslovakia accepted the Hungarian proposal for outside adjudication, as reflected in the Agreed Minutes:

"Both the CSFR and the Hungarian delegations expressed their commitment to submit the dispute connected with the Gabcikovo/Nagymaros Project with all its aspects, including legal, financial and ecological elements, to binding international arbitration or to the International Court of Justice."[230]

3.193. Returning from the London summit, however, Slovak Prime Minister Meciar announced at a press conference on 29 October 1992 that "for the Danube, the laws of nature are valid and not political decisions". According to him those who constructed Variant C merely wanted to prevent the area "from flood, from a natural catastrophe". As far as the political side of the dispute was concerned, he said that "some factions of the MDF [the leading Hungarian coalition party] are proclaiming the necessity of changing the frontiers and. . . striving for the revision of the Trianon [Peace] Treaty. For them Gabcikovo is not a goal but a means. If it was a goal, we would be able to agree."[231]

3.194. The tripartite Mission, mentioned in the Agreed Minutes, met first in Bratislava and prepared a Report on 31 October 1992 which contained the first rough description of the component parts of Variant C.[232] Czechoslovakia never presented any plans and data regarding the

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229 Agreed Minutes of the Meeting Between the European Commission, the CSFR and Hungary, on the Gabcikovo-Nagymaros Project, 28 October 1992, London; Annexes, vol 3, annex 31. The words in parentheses appeared as a footnote to the word "whole" in the Agreed Minutes.

230 Agreed Minutes, London, 28 October 1992; Annexes, vol 3 annex 31.

231 *Új Szó* (Bratislava), 30 October 1992.

232 Mission Report of the Commission of the European Communities, Prepared by the Fact finding mission on Variant C of the Gabcikovo-Nagymaros Project, Bratislava, 31 October 1992, p 4. Annexes, vol 5, annex 13.

diversion. (Nor did Slovakia do so after its independence, until as late as December 1993, in spite of repeated Hungarian requests.[233])

3.195. The Report added that "the connecting dyke between the downstream part of the reservoir and the left hand side of the Danube is currently not fully fortified". As far as the flood plain weir is concerned, "at present none of the gates can be operated and only four gates have the full hydraulic capacity". With regard to the intake structure for the Moson Danube "the concrete works at the construction are not completed".[234]

3.196. Another Report was prepared on 23 November 1992, the conclusions of which contained important ecological value preferences. The experts recommended. . .

> "To give the *highest priority* to maintain or improve
>
> the hydrological and ecological regime in the whole affected area, especially in the downstream floodplain area;
>
> the ground water quality; and
>
> the navigation;
>
> and to give a *lower priority* to
>
> the production of hydropower; and
>
> the water quality in the downstream part of the reservoir."[235]

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233 Hungary repeatedly requested the detailed description of the structure of Variant C at various negotiations. At the 82nd meeting of the Joint Operative Group from 17 to 21 June 1991, the Czechoslovak delegate stated that he was not empowered to provide these descriptions. Preparing the Memorial for the procedure before the Court, Hungary requested again the detailed plans of construction and documentation in a written form on 1 and on 14 December 1993. Slovakia handed over some maps in December 1993. As far as further details were concerned, Slovakia stated on 1 February 1994 in a *Note Verbale* that other documents could be obtained from the Governmental Plenipotentiary, Mr Kocinger; Annexes, vol 4 annex 136. By contrast Mr D Kocinger stated that "the Slovak Republic has not authorised me. . . to release any fundamental information to the [Hungarian] party in relation to the proceedings before the International Court of Justice". Letter from Mr Kocinger, Slovak Governmental Plenipotentiary, to Mr L Zsámboki, Managing Director of OVIBER. Annexes, vol 4, annex 138.

234 Mission Report of the Commission of the European Communities, Fact finding mission on Variant C of the Gabcikovo-Nagymaros Project, 31 October 1992, pp 5-6; Annexes, vol 5, annex 13.

235 Report of the Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project, Budapest, 23 November 1992, p 31 (emphasis added); Annexes, vol 5, annex 14.

3.197. As far as water management for the coming months was concerned, the Group stated that "Scenario A (95% of the average discharge to the Danube using the existing structures) should be followed as soon as possible, but not later than January 1, 1993."[236] Since 23 October 1992, the discharge regime has (even on the days of the highest flood) never approached this level, notwithstanding the clear commitment in the London Agreement and the recommendations of the EC Mission.

3.198. The construction of Variant C did not prove safe. On 23 and 24 November 1992 a flood caused grave damage in the installations. Large metal sections of the floodplain weirs broke off and were washed away. Damage occurred at the Gabcikovo plant, too: the left lock chamber became unusable. The representatives of the construction company complained about the "unexpected" nature of the flood at this time of the year and announced that because of the reparation work no more water could be let into the old bed of the Danube for a lengthy period.

3.199. The next trilateral meeting took place in Brussels on 27 November 1992. The representative of the Commission informed the Committee on the findings of the Mission and described, in his personal capacity, five possible scenarios regarding water discharge:

(1) 95% of the quantity of the water would be returned to the old riverbed.

(2) The recent situation would be maintained which would continue discharging only a very small quantity of water to the old riverbed, with catastrophic consequences for the environment.

(3) 50% discharge of the water would be provided to the old riverbed (originally a Czechoslovak proposal).

(4) The flow of the river would be returned entirely to the old riverbed either directly by removing the dam or by digging a short by-pass canal (originally a Hungarian proposal).

(5) The discharge to the old riverbed would be decreased step-by-step from 95% to 50%. In the meantime construction work would be done in order to diminish the harmful environmental effects of the changes in the volume. A monitoring system would also be arranged.[237]

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236 Report of the Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project, Budapest, 23 November 1992, p 31; Annexes, vol 5, annex 14.

237 Agreed Minutes of the Meeting between the CSFR, Hungary and the European Commission on the Gabcikovo-Nagymaros Project. Brussels, 27 November 1992; Annexes, vol 4, annex 105.

3.200. The Czechoslovak delegation stated that it was not empowered to make any concessions regarding a higher quantity of discharge into the old riverbed. Thus, EC Director General Benavides underlined the importance of first agreeing to bring the case before the International Court of Justice. The proposal was accepted. Agreed Minutes of 27 November 1992 provided:

> "On the basis of the London Agreed Minutes of October 28, 1992 and the report [of the Mission] the following was agreed: The CSFR and Hungary reconfirmed their commitment to submit the dispute in connection with the Gabcikovo-Nagymaros Project with all its aspects, including legal, financial and ecological elements, to the International Court of Justice. To this end they undertake to establish jointly, on the basis of the progress made so far, the special agreement for the submission in the very near future. . . The CSFR and Hungary agree to apply, pending the judgement by the International Court of Justice, a temporary regime of management of the Danube water along the lines of the London Agreed Minutes of October 28, 1992 and based upon the report of the Working Group of experts."[238]

3.201. No Special Agreement was reached before the end of 1992. At the meeting of the trilateral Committee on 10-11 December 1992 no progress was made in connection with the division of the water discharge so as to create a "Temporary Water Management Regime" (TWMR). The head of the Hungarian delegation did not see any willingness on the Czechoslovak side to supply the quantity of water in the Old Danube prescribed by the London Agreed Minutes, but said that Hungary would be ready to compromise if the Special Agreement was accepted by Czechoslovakia. The head of the Czechoslovak delegation stated that it would be very difficult to provide a larger quantity of water because the "unexpected flood" of 23-24 November had caused serious damage to the installations of Variant C, which could not be repaired until the end of 1993. For the same reason, agreement on the TWMR would be difficult. He offered only 400 m3/s before the middle of 1993 and 600 m3/s afterwards. Finally. . .

> "The Czechoslovak Delegation informed the meeting that it will use all means and take all necessary measures to repair the damage caused by the floods of 23-24 November [1992] as soon

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238 Agreed Minutes of the Meeting between the CSFR, Hungary and the European Commission on the Gabcikovo-Nagymaros Project. Brussels, 27 November 1992; Annexes, vol 4, annex 105.

> as possible, so that the Temporary Water Management Regime envisaged at the Tripartite Meeting on 27 November [1992] will start to function."[239]

3.202. At that time it was already decided that Czechoslovakia would cease to exist as of 31 December 1992. In response to a Slovak request for recognition, Hungary stated:

> "The Government of Hungary accepts the request of the Government of the Slovak Republic to establish, as of January 1, 1993, diplomatic relations at the level of Embassies. . . The Government of the Republic of Hungary is furthermore ready to enter, within the shortest possible time, into negotiations with the Government of the Slovak Republic on questions relating to state succession in respect of treaties."[240]

3.203. As a matter of fact, Slovakia became the successor with regard to the dispute over the Project, since Variant C was located in Slovak territory and continued to be operated under Slovak auspices.

3.204. A meeting between experts of Hungary and Slovakia took place on 14 January 1993 in Bratislava, in the presence of EC representatives to examine the technical aspects of the TWMR Their report was discussed at the next trilateral meeting in Brussels on 19 January 1993. The head of the Slovak delegation, Mr Tomka, provided information on the state of Variant C following the floods of 23-24 November 1992 and the climatic conditions which had interrupted repairs. Some installations had been repaired but others were still under reconstruction. Navigation on the Danube had recommenced on 13 January 1993, having been halted for about three months. In the Agreed Minutes the three Parties underlined "[t]he urgency of completing the [reparation] works".[241] The

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239 Agreed Minutes of the Meeting between Czechoslovakia, Hungary and the European Commission on the Gabcikovo-Nagymaros Project, Brussels, 11 December 1992; Annexes, vol 4, annex 107.

240 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Slovak Ministry of Foreign Affairs, 23 December 1992; Annexes, vol 4, annex 110. Slovakia responded 11 months later in a *Note Verbale* to the Embassy of Hungary, 15 November 1993, stating that: "The Slovak Ministry of Foreign Affairs is ready. . . to enter into negotiations on the succession by the Slovak Republic of those bilateral agreements and treaties which had been concluded by the former Czechoslovak Republic and the Republic of Hungary;" Annexes, vol 4, annex 128.

241 Agreed Minutes of the Meeting between Hungary, Slovakia and the European Communities on the Gabcikovo-Nagymaros Project. Brussels, 19 January 1993; Annexes, vol 4, annex 113.

Parties also had a "detailed exchange of views on the guiding principles on which the Temporary Water Management Regime should be based and presented several proposals".[242] Mr Tomka proposed to provide 50% of the water at 1200 m3/s discharge, while above that level a higher proportion of the water had to be supplied to the power canal. According to Mr Martonyi, the Hungarian Delegate, this proposal did not accord with the figure (95%) prescribed by the London Agreed Minutes (a standard earlier accepted by the EC Mission).

3.205. The EC Mission as a compromise recommended a water discharge to be directed to the Danube riverbed according to seasonal factors, i.e., for the period between November and February (when vegetation is dormant) a distribution of 50-50%, whatever the flow. For the vegetation period between March and October it recommended 75% of the flow up to 1200 m3/s; 60% of the flow between 1200 m3/s and 2500 m3/s, and 50% of quantity in excess of 2500 m3/s. It proposed a minimum of 600 m3/s at all times.[243]

3.206. The Slovak representatives did not accept this proposal. The Agreed Minutes stated merely that the Parties "agreed on the need to ensure the preservation of the Danube and the surrounding environment, as well as the need to take into account other relevant considerations and legitimate interests of both Parties".[244]

3.207. The Parties finalised the text of the Special Agreement at the next trilateral meeting in Brussels, on 16 February 1993.[245] At Slovak insistence, Article 4 of the Special Agreement excluded a party applying to this Court for provisional measures; at Hungarian insistence, the same article contained a commitment to agree on and implement a TWMR But at the meeting there was again no such agreement.[246]

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242 The Agreed Minutes did not include these proposals. The figures are mentioned in the Report of Hungarian State Secretary J Martonyi to the Hungarian Government.

243 Agreed Minutes of the Meeting between Hungary, Slovakia and the European Communities on the Gabcikovo-Nagymaros Project. Brussels, 19 January 1993; Annexes, vol 4, annex 113.

244 Agreed Minutes of the Meeting between Hungary, Slovakia and the European Communities on the Gabcikovo-Nagymaros Project. Brussels, 19 January 1993; Annexes, vol 4, annex 113.

245 The Agreement was signed by the representatives of Hungary and Slovakia on 7 April 1993; see above, para 2.01 - 2.12. for an analysis of the Special Agreement.

246 According to the Communiqué issued after the 16 February 1993 talks, the Hungarian and the Slovak representatives agreed merely that they will "refer these issues to the highest political level for decision": Final Communiqué of the Tripartite Meeting between Hungary, Slovakia and the European Communities on

3.208. The Hungarian Government felt that no satisfactory progress had been made on the negotiations concerning water discharge. Since the London Agreement of 28 October 1992, Slovakia had offered always a smaller and smaller quantity of water for the old riverbed, and the amount actually provided always fell short of the most recent prior commitment. In a letter to Slovak Prime Minister Meciar on 5 February 1993, Prime Minister Antall stated:

> "Since the Agreement of London was achieved, the Hungarian Government has repeatedly made more and more substantial concessions and at present accepts that proposal of the EC Commission which would divide the whole water flow of the Danube between the Old-Danube and the operating power canal under a system differing seasonally and depending on the volume of water discharge. . . Failing to reach an agreement would result in the cessation of the good will activity of the Commission and would imply disadvantageous consequences to our countries."[247]

3.209. A Resolution of the European Parliament on 10 March 1993, stated that the Parliament, *inter alia*. . .

> "1. is alarmed at the stagnation that has occurred, now no progress can be made in finding solutions for a temporary water management regime;
>
> . . .
>
> 9. urgently appeals to the Slovak Government to be more flexible and to cooperate in finding solutions to the outstanding problems."[248]

3.210. This truth was Slovakia was not ready to negotiate about the central issue of a water discharge system. The next meeting scheduled for April 1993 did not take place. Hungarian State Secretary Martonyi

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the Gabcikovo-Nagymaros Project. Brussels, 17 February 1993; Annexes, vol 4, annex 116.

247 Letter from Hungarian Prime Minister J Antall to Slovak Prime Minister V Meciar, 5 February 1993; Annexes, vol 4, annex 114.

248 Resolution of the Parliament of the European Communities on the Gabcikovo-Nagymaros Barrage, 10 March 1993; Annexes, vol 4, annex 176.

urged Slovakia to continue the negotiations in letters written to his counterpart on 14 May 1993 and on 2 June 1993.[249]

3.211. This concern was equally reflected by the European Parliament which in a further resolution of 25 June 1993:

. . .

> "1. Reiterate[d] its concern about the possible increase in political tension in this region as a result of this conflict;
>
> 2. Expresse[d] its concern that a solution to the question of a temporary water management regime, which is acceptable to both Slovaks and Hungarians, has still not been found; [and]
>
> 3. Criticise[d] the Slovak Government for its continuing unwillingness to agree to the compromise proposals formulated in the consultations of 16 February [1993] and the failure to implement measures so that the procedures at the International Court of Justice in The Hague may be started."[250]

3.212. But Slovakia did not respond either to Mr Antall's letter or to the resolutions of the European Parliament. The growing season had started and the water supply of the side branches at Szigetköz was insufficient. Five months after the last trilateral meeting (February 1993) the next trilateral meeting was convened in Brussels on 13 July 1993. At the meeting, the Commission informed the Parties that some EC experts had visited the area of Variant C. They observed that the old riverbed received merely 250-400 m3/s, many fish had disappeared and vegetation was damaged. The Hungarian representative confirmed this information, but the Slovak representative asserted that the old riverbed received more water (about 400-500 m3/s).

3.213. At the end of the meeting the Commission presented a proposal submitted in a written form to the Parties on 19 July 1993. According to the proposal. . .

> "a Water Measuring System should be set up in which the two sides jointly measure discharges at relevant points. . . Hungary and Slovakia should jointly assemble objective data on other relevant aspects such as the effects of constructions, remedial

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249 Letters from Mr J Martonyi, State Secretary of the Hungarian Ministry of Foreign Affairs, to Mr J Lisuch, State Secretary of Slovak Ministry of Foreign Affairs, 14 May 1993, 2 June 1993; Annexes, vol 4, annex 119.

250 Resolution of the Parliament of the European Communities on the Gabcikovo-Nagymaros Barrage, 25 June 1993; Annexes, vol 4, annex 177.

measures, water level, volume and quality of surface water, general ecological effects, electricity production, etc."[251]

3.214. On this basis a Commission Working Document of 26 August 1993 proposed to set up a Group of Independent Monitoring and Water Management Experts,[252] to consist of one Hungarian, one Slovak and three EC-appointed experts. It would submit reports and recommendations based on consensus. In the case of a dispute among the members of the Group, the three EC experts would submit separate recommendations.

3.215. Rather than dealing with the urgent issue of a temporary water management regime, Slovakia preferred to revert to the question of the construction of the dam at Nagymaros. On 7 July 1993 the Hungarian Parliament amended the national budget so as to appropriate financial resources for the restoration of the Nagymaros sector.[253] In a *Note Verbale* of 13 July 1993[254] Slovakia insisted that the restoration -- removing the coffer dam erected before the suspension of the work -- not be done before the judgement of this Court was obtained on the merits, on the ground that the coffer dam was jointly owned property. In response, Hungary stated on 25 November 1993 that:

"The coffer dam at Nagymaros was erected as a temporary structure and was not one of the installations covered by the provisions of the Treaty of 1977 to which [Slovakia] refers. The coffer dam, as a temporary structure was warranted safe only for a few years and its safety cannot be relied on. Moreover, the purpose for which the coffer dam was constructed has lapsed with the disappearance of the Treaty of 1977... Hungary was fully entitled to seek from the Parliament

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251 Letter from Mr P Benavides, Director General for External Political Relations of the European Commission, to Mr J Martonyi, State Secretary of the Hungarian Ministry of Foreign Affairs, 19 July 1993; Annexes, vol 4, annex 122.

252 Establishment of a Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks. Brussels, 26 August 1993, contained as Appendix in EC-Hungary-Slovakia, Data Report, 2 November 1993; Annexes, vol 5, annex 18.

253 Work on the restoration of the Nagymaros site was commenced on 26 October 1993.

254 *Note Verbale* from the Slovak Ministry of Foreign Affairs to the Embassy of the Republic of Hungary, 13 July 1993; Annexes, vol 4, annex 121.

appropriation of money with the view to the demolition of the coffer dam at Nagymaros."[255]

3.216. The first meeting of the Group of EC experts took place in Bratislava on 8-9 September 1993,[256] the second in Budapest on 27 October-2 November 1993. At the latter meeting the Group found that:

"In the Old Danube the discharge has in 1993 been reduced to in average about 400 m3/s corresponding to about 20% as compared to the pre-dam conditions. . . In the upstream part of the Old Danube the 1993 water levels have been reduced by 2-4 metres as compared to pre-dam conditions, and have thus reached a level 2 metres below the lowest recorded values. . . Significant erosion occurred the first 500 metres downstream to Cunovo structures under the November 1992 flood event. This material has been deposited downstream in the Old Danube. . . Most likely, sedimentation of the total bed load and a substantial part of the suspended load have occurred in the reservoir. . . It appears. . . that in the middle part of Szigetköz between Dunakiliti and Ásványráró ground water levels have decreased in areas close to the main Danube. . . The Gabcikovo hydropower plant has produced 150-200 Gwh/month in 1993. This corresponds to about 10% of Slovak's electricity consumption."[257]

3.217. At the third meeting on 1 December 1993 in Bratislava, the three experts appointed by the EC Commission recommended figures and measures with regard to water discharge.[258] They were presented to the two Parties by EC Director General Benavides, requesting a response by 15 January 1994. The recommendations were as follows:

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255 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Slovak Republic, 25 November 1993; Annexes, vol 4, annex 129. Slovakia rejected the Hungarian arguments in its Note Verbale, dated 12 January 1994; Note Verbale from the Slovak Ministry of Foreign Affairs to the Embassy of the Republic of Hungary, 12 January 1994; Annexes, vol 4, annex 131.

256 Data Report by the Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks. Executive Summary, 2 November 1993, Budapest; Annexes, vol 5, annex 18.

257 Communiqué of the Second Meeting of the Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks, Budapest, pp 56-57, 27 October-2 November 1993; Annexes, vol 4, annex 127.

258 Report by the Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks on Temporary Water Management Regime, Bratislava, 1 December 1993, p 64; Annexes, vol 5, annex 19.

"Minimum discharge in Old Danube of 400 m3/s.

Average discharge in Old Danube of 800 m3/s. . .

1- 3 floods of more than 3500 m3/s per year into the old Danube (to the extent hydrologically possible). . .

30-70 m3/s into the side branches on the Hungarian side. . .

Improvement of the daily discharge capacity of Variant C structures from present 600 m3/s to 940 m3/s by May 1994.

Construction of an underwater weir [in the Old Danube] at river kilometre 1835 enabling direct contact between the main river and the Slovakian side branches. . .

Construction of an underwater weir at river kilometre 1845.5 for operational reliability of water supply from the inundation weir. . .

Deposition of gravel between the inundation weir and the underwater weirs in the [Old Danube].

Construction of fish passes at Cunovo."[259]

3.218. The Hungarian Government accepted the above figures by letter dated 14 January 1994. Mr Martonyi wrote to Mr Benavides that:

"The [Hungarian] Government has decided, provided that the Slovak Republic shall, by January 15, 1994, have given a similar commitment on its part, to negotiate an agreement [with Hungary] to give effect to the recommendation by the EC members of the Working Group, on the establishment and implementation of the Temporary Water Management Regime. . . [T]he Government of the Republic of Hungary believes that the proposed regime falls short of the minimum necessary to provide real protection to the environment, including natural resources, of the region. It is in no way a model or even an indication of an acceptable long-term solution."[260]

3.219. The Commission welcomed the Hungarian response. Mr Benavides stated in his reply dated 27 January 1994:

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259 Letter from Mr P Benavides, Director General for External Economic Relations of the European Commission, to Mr J Martonyi, State Secretary of the Hungarian Ministry of Foreign Affairs, 22 December 1993.

260 Letter from Mr J Martonyi, State Secretary of the Hungarian Ministry for Foreign Affairs, to Mr P Benavides, Director General for External Economic Relations of the European Commission, 14 January 1994; Annexes, vol 4, annex 132.

> "I would like to express the great appreciation of the European Commission for the Hungarian Government's conclusion. . . The efforts made by the Hungarian Government to reach this constructive position only further heighten our appreciation. . . Please be sure that I have also taken careful note of all other points raised in your letter."[261]

3.220. Slovakia responded to the recommendation of the Commission three weeks after the deadline, on 8 February 1994. The letter of Slovak Deputy Foreign Minister Lisuch stated:

> "The [Slovak] Government is of the view that the measures the realisation of which is still the object of different opinions on both sides, should be further discussed. The negotiations would be facilitated by further monitoring which can bring new information and thus promote an agreement in still opened questions. . ."[262]

He agreed that Hungary should build underwater weirs, as recommended by the EC Experts, but stated that the question of additional discharge into the old bed "has very important implications [and] should be further considered. . . " He attached a formal proposal according to which Hungary should first build the underwater weir, the impact of which would then be monitored in order to see whether additional water might be required.

3.221. Thus, contrary to the EC recommendation, Slovakia was not prepared to increase water discharge to the old Danube. This was a clear refusal of the EC proposal, since the Commission's experts recommended an *immediate* increase in water discharge; the construction of underwater weirs was part of a package, and accepted by Hungary as such. The Commission interpreted the Slovak response as a refusal. As Mr Benavides stated in his letter addressed to Mr Martonyi on 18 February 1994:

> "sur un plan quantitatif l'absence d'un engagement slovaque sur le débit minimum d'eau dans le Danube rend tout compromis extrêmement difficile et la Commission ne saurait souscrire aux propositions slovaques. . . . Sur la base de cette réaction. . . une

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261 Letter from Mr J Benavides, Director General for External Economic Relations, to Mr J Martonyi, State Secretary of the Hungarian Ministry of Foreign Affairs, 27 January 1994; Annexes, vol 4, annex 135.

262 Letter from Mr J Lisuch, Deputy Foreign Minister of Slovakia, to Mr P Benavides, Director General for External Political Relations, 8 February 1994; Annexes, vol 4, annex 137.

> démarche de la Troika auprès du Premier Ministre Meciar a eu lieu pour souligner. . . le risque que l'Union se désengage dans la poursuite de ses bons offices et. . . la nécessité d'approcher. . . le problème sur des bases politiques."[263]

3.222. The EC Experts had also been asked to comment on the respective replies of the two Governments. The leader of the Group replied, in part:

> "As far as we can see the Slovakian letter/proposal is a political response aiming at delaying the final decision regarding the necessary discharge into the old Danube. To our knowledge there are no new arguments and no movement in the fundamental positions from both sides, that can justify to start further discussions. . .
>
> The main factor in our recommendations is the discharge into the Old Danube. Raising the discharge, together with the implementation of the other recommended measures, will have an immediate positive impact on the environment. . .
>
> It may be that the evaluation scale for environmental impacts in the Slovak Republic is quite different, but every expert in the rest of Europe will regard it as a significant environmental damage if the average discharge of a river is reduced to about 20% as compared to natural conditions, if 4500 ha of alluvial forests are seized (see the Fauna-Flora-Habitat Directive of the Commission of the EC), if there is a reduction of the natural fluctuations of the ground and surface water levels nearly to zero and so on." [264]

3.223. At the time of the completion of this Memorial the vegetation period is imminent, but there is no sign at all of Slovak's compliance with Article 4 of the Special Agreement.

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263 Letter of Mr P Benavides, Director General for External Political Relations, to Mr J Martonyi, State Secretary of the Hungarian Ministry of Foreign Affairs, 18 February 1994; Annexes, vol 4, annex 140. For Mr J Martonyi's reply see Letter of State Secretary, Hungarian Ministry of Foreign Affairs, to Mr P Benavides, Director General of External Political Relations, 23 February 1994; Annexes, vol 4, annex 141.

264 Letter from Professor J Schreiner, Head, EC Experts Group, to Mr P Benavides, Director, External Political Relations, European Commission, 10 February 1994; Annexes, vol 4, annex 139.

PART II

CHAPTER 4

THE TREATY OF 1977 AND RELATED AGREEMENTS

4.01. The lengthy historical background to the 1977 Treaty was outlined in Chapter 3. The aim of this Chapter is to describe the main features of that Treaty in the light of its object and purpose, and to relate it to the network of other treaties, bilateral and multilateral, to which Hungary and Czechoslovakia were parties and which concerned the Project itself,[1] or their common boundary, or the Danube as a shared river in terms of such matters as navigation and fisheries. Specific issues of the interpretation of the 1977 Treaty, or of the other treaties and agreements referred to, will be dealt with later in this Memorial as they become relevant.

SECTION A: THE OBJECT AND PURPOSE OF THE TREATY

4.02. The 1977 Treaty was signed in Budapest on 16 September 1977, in Hungarian and Slovak, both texts being equally authentic. It was subsequently registered under Article 102 of the United Nations Charter.[2]

4.03. The 1977 Treaty was not the first agreement between the two States concerning the Project. In addition to a number of earlier informal agreements which have been referred to in Chapter 3,[3] an Agreement regarding the Drafting of the Joint Contractual Plan for the Gabcikovo-Nagymaros Barrage was signed at Deputy-Minister level in Bratislava on 6 May 1976.[4] It was not registered with the United Nations. It provided a framework for the drafting of the Joint Contractual Plan, i.e. the

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1 See above, paras, 1.15 - 1.16 for a description of the essential elements of the Gabcikovo-Nagymaros Barrage System.

2 1109 UNTS 236; also published in 32 ILM 1247. See Annexes, vol 3, annex 21 for the two authentic tests (Hungarian and Slovak) and the English and French translations.

3 See above, paras 3.17, 3.21, 3.24, These Agreements related to earlier versions of the Barrage System during its long gestation.

4 Annexes, vol 3, annex 18.

substantive plans and specifications for the Barrage System (Article 3), specified the Hungarian and Czechoslovak agencies which would be involved (Article 4), and laid down arrangements for drafting the Plan (Articles 5-6) and financing the planning process (Article 7). Disputes were to be resolved by reference to a Hungarian-Czechoslovak Expanded Joint Technological Committee (Article 8; see also Article 4(2)). The 1976 Agreement is significant in that it distributed responsibilities for particular aspects of the Barrage System between the parties. For example, Czechoslovakia had specific responsibility for carrying out "the complex examination of the barrage on the environment" (see Appendix 2, d. Other research, Item 2). On the other hand, the 1976 Agreement did not give the Joint Contractual Plan as eventually concluded any additional authority or binding force; this was a matter dealt with by the 1977 Treaty itself.

4.04. The object and purpose of the Hungarian People's Republic and the Czechoslovak Socialist Republic in concluding the 1977 Treaty are accurately stated in the preamble. They were essentially two-fold, economic and strategic.

4.05. The *economic* aim was outlined in the first preambular paragraph:

> "Considering their mutual interest in the broad utilisation of the natural resources of the Bratislava-Budapest section of the Danube river for the development of water resources, energy, transport, agriculture and other sectors of the national economy of the Contracting Parties . . ."

This primary economic concern was also stressed in the body of the Treaty itself, for example in Article 1 (the Barrage System as a "joint investment", with a "joint investment programme"), Article 2 (complementary "national investment"), Article 3 ("realisation of the joint investment" through government delegates), Article 4 ("joint investment shall be carried out in conformity with the joint contractual plan"), Article 5 ("costs of carrying out the joint investment"), Article 6 ("agencies responsible for the realisation of the joint investment"), Article 7 ("settlement of costs in excess of the joint investment"), Article 8 ("ownership of works carried out under the joint investment"), Article 9 (equal share in the economic benefits of the Barrage System), Article 12 (operating and other costs), Article 14 (costs of additional withdrawals of water), Article 24 (power entitlements to be free of financial levies).

4.06. There was also an important *strategic or political* aim, referred to in the second preambular paragraph:

> "Recognising that the joint utilisation of the Hungarian-Czechoslovak section of the Danube will further strengthen the fraternal relations of the two States and significantly contribute to bringing about the socialist integration of the States members of the Council for Mutual Economic Co-operation..."

4.07. As demonstrated in Chapter 3, the Project had been planned as part of an overall design for industrial and economic development of Eastern Europe.[5] It had significant Soviet backing, both because it was intended to reduce the demand for Soviet oil supplied to Eastern Europe at well below market rates under the bartering system of the Council for Mutual Economic Co-operation, and because of the Soviet interest in improved communications within the Eastern European bloc, including river communications. In addition, hydropower plants used to be one of the most characteristic symbols of Communist economic/industrial development. The initial planning was done by Hydroprojekt, a Soviet engineering institute.[6] The whole timetable for the Project depended on undertakings of Soviet economic assistance, as the 1976 Agreement on the Drafting of the Joint Contractual Plan made clear. Article 3(5) of the 1976 Agreement provides in part:

> "The timetable for the planning, research and excavation work will be worked out on the basis of the result of the loan negotiations with the Soviet Union..."

4.08. The earlier negotiations for a Soviet loan were described in Chapter 3. Hungary applied for a loan equivalent to 100 million convertible roubles on 27 February 1975, and by the time of signature of the Treaty with Czechoslovakia on 16 September 1977 it was understood that the loan would be granted.[7] The expectation was fulfilled on 30 November 1977 when the Soviet Union signed the bilateral Agreement on Cooperation concerning the Construction of the Nagymaros Dam on the River Danube, as Part of the Gabcikovo-Nagymaros Barrage System. Under the Agreement substantial aid, taking the form of the provision of equipment (including turbines) and specialist services, was to be

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5 See above, paras 3.12, 3.21, 3. 27, 3. 33.

6 See above, paras 3.13, 3.21.

7 See above, para 3.33.

provided.[8] In 1980, however, it was revealed that the promised aid would not be forthcoming.[9] The balance of economic advantages and disadvantages of the "joint investment" was thus left to depend on its own merits as an investment rather than on Soviet subsidies.

SECTION B: SPECIFIC FEATURES OF THE TREATY

4.09. Against the background of the purposes the Barrage System was supposed to fulfil, the main specific features of the Treaty will be outlined.

4.10. First, the Barrage System as envisaged by the 1977 Treaty was an *integrated project*. Under Article 1 (1)...

> "...the System of Locks shall comprise the Gabcikovo system of locks and the Nagymaros system of locks and shall constitute a single and indivisible operational system of works."

Similarly Article 10(1) of the Treaty provided that:

> "Works of the System of Locks constituting the joint property of the Contracting Parties shall be operated, as a co-ordinated single unit and in accordance with the jointly-agreed operating and operational procedures, by the authorised operating agency of the Contracting Party in whose territory the works were built."

The works referred to in Article 10(1) were the key installations at both Gabcikovo and Nagymaros. The point had indeed been anticipated in the 1976 Agreement regarding the Drafting of the Joint Contractual Plan for the Gabcikovo-Nagymaros Barrage, Article 3(4) of which stressed the need to assure "the unity of the Joint Contractual Plan".[10]

4.11. Secondly, it was a *cooperative project*, one which required close partnership, continued negotiation and the possibility of adjustment as circumstances required. The major vehicle for this cooperation and adjustment was the government delegates appointed under Article 3: their responsibilities included, *inter alia*, "supervision and co-ordination

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8 The Agreement was signed in Moscow, and came into effect immediately. See Annexes, vol 3, annex 23.

9 See above, para 3.42.

10 See above, para 4.03. Annexes, vol 3, annex 18.

of the activities of the national agencies responsible for the operation of the System of Locks" (Article 11(2)). Cooperation also involved such matters as sharing of costs (Articles 5, 7, 12), joint ownership of the major elements of the Barrage System (Article 8), shared use and benefits of the system (Article 9), joint liability for damages (Article 25), etc. So far as sharing of costs was concerned, under Article 12(6):

> "The annual amount of jointly-borne operating costs shall be expressed in national currencies converted into transferable roubles. If, at the commencement of operations, no generally applicable exchange rates are available, the financial authorities of the Contracting Parties shall come to a decision on them."[11]

4.12. In terms of its functioning, according to Article 10(1):

> "Works of the System of Locks constituting the joint property of the Contracting Parties shall be operated, as a co-ordinated single unit and in accordance with the jointly-agreed operating and operational procedures, by the authorised operating agency of the Contracting Party in whose territory the works were built."

Other elements in the system were to be "independently operated or maintained by the agencies of that Contracting Party in the jointly prescribed manner" (Article 10(2)). The overall aim was to ensure "operating conditions that satisfy the requirements for co-ordinated and effective operation of the entire System of Locks" (Article 10(3)).

4.13. Thirdly, the Barrage System was *a blueprint, and not a rigidly pre-determined scheme*. Many matters had to be resolved by other agreements or arrangements, whether in the Joint Contractual Plan, or in regulations laid down by the government commissioners, or in accordance with the national laws and procedures of one of the parties.[12] Indeed this was true of the settlement of disputes itself. Article 27 of the 1977 Treaty provided:

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11 Under Art 10(7), as far as possible amounts owing under the cost-sharing formula were to be paid in kind.

12 For an example of the latter, Art 17 dealt with water-use permits and water-use supervision, which was to be carried out by each Contracting Party in accordance with its own laws and regulations.

"1. The settlement of disputes in matters relating to the realisation and operation of the System of Locks shall be a function of the government delegates.

2. If the government delegates are unable to reach agreement on the matters in dispute, they shall refer them to the Governments of the Contracting Parties for decision."

There was no suggestion that disputes should be settled by any third party procedure, let alone judicial procedure. Negotiation was the regular, in practice the *exclusive*, means of settling disputes. The hall-mark was flexibility.

4.14. The Joint Contractual Plan, rather than the Treaty itself, was the basis for a great deal of the substance of the Project. As stipulated in the 1977 Treaty, the Plan was to include such matters as technical specifications (Article 1(4)), dimensions, work schedule and responsibility for costs of operating, maintenance and repair (Articles 4(2), 12(2)), the crucial matter of the specification of the water balance (Article 14(2)), as well as the elaboration of the means of protection of water quality (Article 15(1)) and of nature (Article 19).

4.15. Several points should be made about the relationship between the 1977 Treaty and the Joint Contractual Plan:

(a) The Joint Contractual Plan had not been concluded when the 1977 Treaty entered into force, as Article 3(2) reveals. The Plan was not even a single document, but more a filing system of specifications, and was of enormous size.[13] Even after the conclusion of the Plan, it was subject to numerous amendments. It was essentially a management tool, subordinate to and conditional upon the continuing validity of the Treaty. Thus when the Treaty specified (as in Articles 15 and 19) that something was to be achieved "by the means specified in the Joint Contractual Plan", it did not imply that achievement of the object was *subordinated* to the Joint Contractual Plan. For example Article 15 imposed an obligation as to the quality of groundwater, which was to be fulfilled through the means provided in the Plan: the Parties had an obligation to ensure that the provisions of the Plan were adequate for that purpose, and if they were not, to change them.

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13 It is neither necessary nor practical to translate the whole of the Plan for the purposes of these proceedings. The Summary of the Plan is contained in Annexes, vol 3, annex 24.

(b) The Joint Contractual Plan was not concluded in the form of an interstate treaty, and was not as such an instrument governed by international law, whatever may have been the status of the 1976 Agreement for the drawing up of the Plan.[14] It was subject merely to "approval" in conformity with national laws and regulations (Article 4(3)), rather than signature and ratification, as in the case of the 1977 Treaty itself.

(c) Where the parties wished to impose an obligation in relation to the Project, this was done in the 1977 Treaty itself. For example, Article 5(9) provided that:

> "The Contracting Parties shall ensure, and shall be responsible to each other for doing so, that the planning and execution of works and operations are in accord with the approved joint contractual plan."

(d) In practice, and notwithstanding even the best laid Joint Contractual Plans, the Treaty scheme could not be realised as envisaged. Under Article 4(4)...

> "Operations relating to the joint investment shall be organised by the Contracting Parties in such a way that the power generation plants will be put into service during the period 1986-1990."

(The period 1986-90 was to be the period of the seventh Five Year Plan, under the system of centralised state economic planning still in force in the Soviet bloc in 1977.) In fact, there was never the slightest possibility that the Barrage System would come on line during that quinquennium, and this was not because of fault attributable to one or other party but simply because neither could afford to do so, given their other priorities, and the failure of the promised Soviet economic assistance.

4.16. Fourthly, the Treaty reflected a *"fix-it" mentality* with respect to matters of economic, environmental and even structural risk. It did not entirely ignore those risks. But it was based on the assumption that any difficulties that emerged could be remedied by technical means. For example, Article 7, which dealt with settlement of unforeseen costs, provided in part as follows:

> "1. Subsequent to the apportionment of labour and supplies under the joint investment, there shall be no settlement between

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14 For the 1976 Agreement see above, para 4.03.

> the Contracting Parties of additional costs under the joint investment relating to the construction of the System of Locks, save in the following cases:
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> ...
>
> (b) The emergence of unforeseeable geological conditions;
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> ...
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> 2. The expression 'unforeseeable geological conditions' means a situation where the geological conditions determined in the course of construction differ markedly from the conditions determined on the basis of the exploration conducted for the purposes of the joint investment programme and the joint contractual plan. Additional costs arising from faulty exploration, planning errors or faulty methods of construction may not be regarded as consequences of unforeseeable geological conditions."

It was simply assumed that any newly-discovered geological problems could be fixed by the application of more money, irrespective of their implications for the economic viability, the environmental sustainability or even the physical safety of the Project.[15]

4.17. The position was similar with respect to environmental risk. No environmental impact assessment had been carried out before the conclusion of the Treaty. There had been no integrated study of environmental impacts. The individual studies that were commissioned were done in the context of a centrally-planned undemocratic political system in which it had already been decided from above that the Barrage System would be built.

4.18. Nonetheless provisions were included relating to the environment, in the expectation that problems of protection of water quality and of nature could be as readily resolved as questions of unforeseen geological conditions. Article 15 dealt with protection of water quality in the following terms:

> "1. The Contracting Parties shall ensure, by the means specified in the joint contractual plan, that the quality of the water in the Danube is not impaired as a result of the construction and operation of the System of Locks.

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15 For the seismological problems that may be associated with the Project see below, paras 5.99 - 5.105.

> 2. The monitoring of water quality in connection with the construction and operation of the System of Locks shall be carried out on the basis of the agreements on frontier waters in force between the Governments of the Contracting Parties."

4.19. Chapter VII, entitled "PROTECTION OF THE NATURAL ENVIRONMENT", contained two articles. Article 20 dealt with fishing interests.[16] Article 19 dealt with "Protection of Nature". It provided that:

> "The Contracting Parties shall, through the means specified in the joint contractual plan, ensure compliance with the obligations for the protection of nature arising in connection with the construction and operation of the System of Locks."

4.20. The interpretation of Articles 15 and 19 will be discussed in Chapter 6 of this Memorial.[17] The point to be made here is simply this: the Parties evidently proceeded on the basis that the Barrage System *could* be operated consistently with the preservation of water quality and the obligations for the protection of nature. The region was, as they knew, singularly dependent on the Danube even for drinking water, as well as for many other uses. The Gabcikovo area contained huge and valuable water reserves and a major wetland. Against this background, Articles 15 and 19 assumed particular importance: they *required* the parties to construct and operate the Barrage System so as to produce certain goals (maintenance of water quality, protection of nature). If it turned out that these goals could not be achieved, or could only be achieved by expenditures which would make the Project completely uneconomic, a fundamentally new situation would arise.

4.21. *To summarise*, the 1977 Treaty had the following key characteristics. It was:

(1) a COMECON Treaty, with the avowed aim of furthering "socialist integration" and the strategic interests of the Soviet bloc, to which both parties belonged (preambular paragraph 2);

(2) "a joint investment", one which would be economically beneficial and provide regular supplies of electricity in an economic way to meet industrial and other needs (Article 1(1)), also preambular paragraph 1);

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16 See below, para 4.50.

17 See below, paras 6.13 - 6.26.

(3) a blueprint for "a single and indivisible operational system" (Article 1(1)). It was nowhere envisaged that the project or any variation of it could be operated separately, let alone unilaterally;

(4) a framework treaty, one which could be modified or adjusted by agreement in the light of changing circumstances. Timetables were included in the language of treaty obligation but were not complied with for economic reasons or because of conflicting priorities *on both sides* (Article 5(4));

(5) a treaty which was consistent with the maintenance of water quality and with environmental protection generally (Article 5(5)(a)(5), 5(5)(b)(13), 5, 19): in this respect priority was given to the Treaty and the Boundary Waters Convention over the Joint Contractual Plan, which was merely the "means" of protection.

4.22. The 1977 Treaty was accompanied by a separate bilateral Agreement on Mutual Assistance during the Course of Construction of the Gabcikovo-Nagymaros Barrage System, signed on the same day.[18] The Mutual Assistance Agreement laid down a Schedule for completion of the Barrage System, beginning with preparatory work in 1978 and with the overall completion of construction in 1991 (Article 1). It already modified the 1977 Treaty in providing for Czechoslovakia to undertake work over and above that contemplated in the Treaty, in return for an assignment from Hungary of some of the Gabcikovo power output (i.e. for the years 1986-88).

4.23. As noted in Chapter 3, a Protocol to the 1977 Treaty, concluded on 10 October 1983, amended Article 4(4) of the 1977 Treaty so as to substitute for the 1986-90 period the next succeeding Plan period, 1990-1994.[19] More extensive changes were made at the same time to the Mutual Assistance Agreement, resulting in a further assignment of the Gabcikovo power output (for the years 1990-1992) from Hungary to

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18 Hungary-Czechoslovakia Agreement on Mutual Assistance during the Course of Construction of the Gabcikovo-Nagymaros Barrage System, Budapest, 16 September 1977, hereafter referred to as the "1977 Mutual Assistance Agreement". It was never registered with the United Nations. For the text, see Annexes, vol 3, annex 22.

19 Hungary-Czechoslovakia, Protocol on the Amendment of the Treaty concerning the Construction and Operation of the Gabcikovo-Nagymaros Barrage System, Prague, 10 October 1983; Annexes, vol 3, annex 28 For discussion of the 1983 Protocol see above, para 3.49..

Czechoslovakia.[20] The Mutual Assistance Agreement was again amended on 6 February 1989, with yet another rescheduling of work and an assignment of further output from the Gabcikovo plant, also for the years 1990-1992.[21] The 1977 Treaty itself was not amended.

SECTION C: RELATIONSHIP OF THE 1977 TREATY TO OTHER AGREEMENTS BETWEEN THE PARTIES

4.24. The 1977 Treaty was one of many treaties and agreements, between Hungary and Czechoslovakia relating to such matters as their common boundary along the Danube, navigation and fisheries. Some of these agreements, in particular, the Agreement on the Regime of the State Boundary of 1956 and the Boundary Waters Convention of 1976, are of considerable significance for the present dispute. This Section will outline the relevant agreements, and their relationship to the 1977 Treaty. By far the most important of these were the treaties relating to the interstate boundary and to the management of boundary waters.

(1) BOUNDARY AND BOUNDARY WATERS TREATIES

4.25. It is not necessary for the purposes of the present case to discuss the earlier history of the Hungarian-Czechoslovak boundary. It is sufficient to say that under Article 1(4) of the Treaty of Peace of 10 February 1947,[22] the pre-1938 boundary was restored, but with one exception. Under Article 1(4)(c), three villages and their surrounding land on the Hungarian side of the Danube were ceded to Czechoslovakia, thus giving Czechoslovakia (and now the Slovak Republic) territory on the right side of the Danube for the first time. In consequence of Article 1(4)(c) and of its subsequent implementation by a bilateral Protocol,[23] a

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20 Hungary-Czechoslovakia, Protocol on the Amendment of the Agreement on Mutual Assistance in the Course of Building the Gabcikovo-Nagymaros Dam, Prague, 10 October 1983; Annexes, vol 3, annex 29.

21 Hungary-Czechoslovakia, Protocol on the Amendment of the Agreement on Mutual Assistance in the Course of Building the Gabcikovo-Nagymaros Dam, Prague, Budapest, 6 February 1989; Annexes, vol 3, annex 30.

22 Treaty of Peace with Hungary, Paris, 10 February 1947, 41 UNTS 135; Annexes, vol 3, annex 2.

23 Closing Protocol regarding the Work of the Border Drafting Commission consisting of representatives of the Hungarian and Czechoslovak Governments, in accordance with Article 1, paragraph 4, subparagraph d of the Peace Treaty of Paris, Bratislava, 22 December 1947; Annexes, vol 3, annex 3.

stretch of the Danube approximately 30 river kilometres in length opposite Bratislava became wholly controlled by Czechoslovakia. One of the three villages was Cunovo, where the Variant C diversion dam would later be built.

4.26. Below this stretch, in the area now affected by Variant C, the *status quo ante* was to prevail. This was defined in a Supplementary Minute of 11 October 1948, which provided that:

> "the original definition of the borderline extending through the Danube, as determined between 1922-1925, remains valid; that is, the border is defined by the thalweg of the River's main navigable bed at the lowest water level."[24]

4.27. At the same time Hungary had expressed concerns at the consequences of these changes in terms of such matters as water management and flood defence. In response, it was agreed that a bilateral water management agreement would be concluded, and that so far as the section of the Moson Danube to which Czechoslovakia had now become a riparian state.

> "...Czechoslovakia obligates itself not to undertake any sort of artificial interference which would alter the branch's present flow."[25]

This obligation was subsequently incorporated in Article 3(1) of a bilateral Convention of 9 October 1948.[26]

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24 Supplementary Protocol No I to the Closing Protocol of the Meeting of the Hungarian-Czechoslovak Border Drafting Commission, 11 October 1948, Art 3(2); Annexes, vol 3, annex 6.

25 Closing Protocol regarding the Work of the Border Drafting Commission consisting of representatives of the Hungarian and Czechoslovak Governments, in accordance with Article 1, paragraph 4, subparagraph d of the Peace Treaty of Paris, Bratislava, 22 December 1947; Annexes, vol 3, annex 3.

26 Agreement between the Republic of Hungary and the Czechoslovak Republic on certain issues of water management and cession of territories pursuant to Article 1 paragraph 4, subparagraph c of the Peace Treaty of Paris, Bratislava, 9 October 1948; Annexes, vol 3, annex 5. Another bilateral agreement concluded at about this time involving an undertaking to maintain the average annual flow of a shared river was the Hungarian-Czechoslovak Convention regarding the Agreement on certain issues of water management along the Sajó River, 29 November 1950; Annexes, vol 3, annex 8.

(a) Agreement Concerning the Settlement of Technical and Economic Questions pertaining to Frontier Watercourses, 1954

4.28. In 1954, Czechoslovakia and Hungary concluded an Agreement concerning the Settlement of Technical and Economic Questions pertaining to Frontier Watercourses.[27] The Agreement remained in force until 1976.[28] It dealt with flood-control and river regulation, as well as safeguarding the fairway of boundary watercourses. Article 14 regulated extraction of gravel and sand for purposes other than river regulation or navigation. It provided that:

> "The competent water resource agencies of the Contracting Parties shall jointly determine where in a specified sector of a frontier watercourse, to what depth and in what quantity needed gravel and sand may be extracted for other than regulatory and navigational purposes. Permission for extraction within the limits thus laid down shall be granted by the competent agency of the Contracting Party in whose territory the material is to be extracted."

Article 23(2) provided:

> "The Contracting Parties shall refrain from granting any water use permit for the execution on frontier watercourses of hydraulic works which might adversely affect the discharge condition or the bed."

(b) Treaty Concerning the Regime of State Frontiers, 1956

4.29. The next relevant instrument was the bilateral Treaty concerning the Regime of State Frontiers, signed at Prague on 13 October 1956.[29] Article 3(1) provides that:

> "On sectors where it runs over water, the frontier line shall vary with the changes brought about by natural causes . . . in the main navigable channels of navigable rivers. The frontier line shall not be affected by other changes in the flow of a frontier water course unless the Parties conclude a separate agreement to that effect."

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27 Prague, 16 April 1954, 504 UNTS 231; Annexes, vol 3, annex 12.

28 For its replacement see below, para 4.33.

29 300 UNTS 150; Annexes, vol 3, annex 15.

Under Article 13(1), the parties agreed "to take all steps to prevent deliberate damage to the banks of frontier waters". Violations of Article 13 give rise to a specific obligation "to compensate the other Party for the damage arising therefrom" (Article 13(6)).

4.30. Article 14 provides:

> "The natural flow of frontier waters in inundated areas may not be altered or obstructed by the erection of installations or structures in the water or on the banks, or by any other works, unless the Parties so agree."

4.31. To similar effect, Article 19 provides:

> "(1) The two Parties shall maintain the existing structures and installations in frontier waters (dams, dykes and the like). No removal or reconstruction of any such structure or installation which is liable to entail a change in the bed or in the level of the water in the territory of the other party may be carried out except with the consent of both Parties.
>
> (2) New bridges, ferries, dams, dykes, sluices, bank supports and other hydraulic installations shall not be erected in frontier waters except by agreement between the two Parties."

4.32. Taken together, these provisions confirm that no new structures may be built which will affect the level of frontier waters, nor may the natural flow of frontier waters be affected by any works, without the agreement of the affected State. Frontier waters are defined by Article 9 as "rivers, streams or canals along which the frontier line runs".

(c) Convention Regarding the Regulation of Issues Surrounding Boundary Waters, 1976

4.33. These provisions were supplemented by the bilateral Convention Regarding the Regulation of Issues Surrounding Boundary Waters concluded at Budapest on 31 May 1976.[30] Under Article 23(3), the Boundary Waters Convention replaced the 1954 Agreement concerning the Settlement of Technical and Economic Questions

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30 Annexes, vol 3, annex 19.

pertaining to Frontier Watercourses.[31] It was intended to be *additional* to the 1956 Treaty concerning the Regime of State Frontiers.[32]

4.34. Article 1 of the Boundary Waters Convention defines boundary waters as "all rivers and other naturally flowing waters, as well as all canals . . . along which the Boundaries between the State parties run; further, all surface and subsurface waters intersected by the State Boundaries" (Article 1). Under Article 2 . . .

> "The Material Scope of this Convention shall include any water management activity performed on the boundary waters, which may bring about changes in the natural water conditions, such as, in particular: the regulation of water courses, the construction of reservoirs and flood control dykes, the improvement of land to increase the water holding capacity of soil, the utilisation of water resources, the protection of surface and subsurface waters from pollution, hydroelectric development, the maintenance and marking of waterways, the location of navigational routes, the control of floods, excess groundwater and ice drift, as well as all water management activities, which may result in changes in the jointly defined water conditions in the upstream and downstream sections of the boundary reaches of water courses, furthermore, in the section of boundary waters."

4.35. The principal obligations of the parties under the Boundary Waters Convention are set out in Article 3:

> "(1) The Contracting Parties do hereby undertake that they:
>
> a) shall not carry out any water management activities without mutual agreement, which would adversely affect the jointly defined water conditions;
>
> b) shall maintain in good condition the beds of water courses, reservoirs, and equipment located on boundary waters on their

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31 See above, para 4.28.

32 This is shown by Article 30(3) of the bilateral Agreement concerning Cooperation and Mutual Assistance along the Czechoslovak-Hungarian Border, Prague, 19 November 1976. Article 30(3) spells out carefully which earlier Agreements and Minutes it replaces, and to what extent: in particular, it replaces Articles 10-21, 16-18 and 22-24 of the 1956 State Frontier Agreement, but not Articles 13, 14 and 19, which have been quoted already (above, paras 4.28 - 4.30). For the 1976 Agreement, see Annexes, vol 3, annex 18.

own territories and shall operate the same in such a manner as to cause no damage to each other;

c) shall mutually inform each other about their long-term development plans for water management, principally about the effect of water management activities on boundary waters;

d) shall engage in prior negotiations on the effects of water management activities, which alter the water conditions in the sections defined jointly under Article 2.

(2) The Contracting Parties -- unless they agree otherwise -- shall be entitled to one half of the natural amount of water flowing through the boundary waters, and not increased by engineering intervention."

A Boundary Waters Commission is established by Article 5, and given the tasks of laying down guidelines for technical planning of water management projects (Article 7 (1)), endorsing plans for such projects (Article 7(2)), and determining annually "the necessity, location, amount and manner of dredging" (Article 12).[33]

(d) Agreement Concerning Cooperation and Mutual Assistance along the Czechoslovakian-Hungarian Border, 1976

4.36. Reference should also be made to the bilateral Agreement concerning Cooperation and Mutual Assistance along the Czechoslovakian-Hungarian Border, concluded at Prague on 19 November 1976.[34] Article 4(e) requires the border delegate appointed under the Agreement "to inform the border delegate of the other Contracting Party about the operations performed near the border which might cause damage on the territory of the other country or might endanger the life, the corporeal integrity or health of the inhabitants".

(e) The 1977 Treaty

4.37. The 1977 Treaty itself contemplated a minor modification of the agreed boundary consequential upon the completion of the Barrage System. Article 22(1) recited that:

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33 See also Appendix 1 (By-Laws of the Boundary Waters Commission), especially Art 2; decisions of the Commission required ratification by the Parties (Art 5). See Annexes, vol 3, annex 19.

34 Annexes, vol 3, annex 20.

> "The Contracting Parties have, in connection with the construction and operation of the System of Locks, agreed on minor revisions of and changes in the character of the State frontier between the Hungarian People's Republic and the Czechoslovak Socialist Republic..."

It then set out in some detail the course that the boundary would take "subsequent to the construction of the System of Locks". The position between rkm 1840 and rkm 1811 was to be unchanged. Between rkm 1840 and rkm 1842 and in the Dunakiliti-Hrusovo head-water area, the existing hydraulic boundary "along the centre-line of the present main navigation channel" would become a fixed boundary. Beyond that, however, there was to be a minor exchange of territory ("to the extent of about 10-10 hectares") to enable a straight line boundary to be drawn.

4.38. Despite this abundance of detail, Article 22(2) provided that:

> "The revision of the State frontier and the exchange of territories provided for in paragraph 1 shall be effected by the Contracting Parties on the basis of a separate treaty."

In addition the parties agreed to comply with existing rights and obligations with respect to navigation notwithstanding the shift in the main navigable channel (Article 22(3)).

4.39. These changes were minor. They would only take place "[s]ubsequent to the construction of the System of Locks", an event which never occurred. Moreover the boundary changes would not take place by force of the 1977 Treaty itself, but "on the basis of a separate treaty" (Article 22(2)). No such treaty was ever concluded. The 1977 Treaty was not a boundary treaty, deliberately not. And the reason is clear. As has been demonstrated in Chapter 3, the parties could not agree on the original Hungarian demand that the boundary line be shifted so as to follow the main navigation channel through the Gabcikovo power canal and locks. Czechoslovakia was adamant in its refusal to contemplate this.[35] The function of Article 22 was to *dissociate* the Barrage System from the agreed boundary, while recognising that the navigation channel would no longer follow or be identified with the boundary in this locality. So insistent were the parties on separating the 1977 Treaty from the boundary regime that the minor adjustment that would be required when the Barrage System came into operation was not

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35 See above, paras 3.25, 3.32, 3.37.

included in the 1977 Treaty itself, as it could easily have been, but was to be the subject of a separate treaty.

(2) TREATIES RELATING TO NAVIGATION ON THE DANUBE

4.40. The principle of freedom of navigation on the Danube goes back to the nineteenth century. It was extended by the post-World War I peace treaties: for example, Article 274 of the Treaty of Trianon gave nationals of the Principal Allied and Associated Powers a unilateral right to engage in cabotage (internal trade) in Hungarian ports and waters.[36] This inequality was removed by the Peace Treaty of Paris of 1947, which simply declared navigation on the Danube to be free and open to the nationals of all States, but which excluded cabotage.[37]

(a) Convention Concerning the Regime of Navigation on the Danube, 1948

4.41. Since 1948, the regime of navigation on the Danube has been governed by the Convention concerning the Regime of Navigation on the Danube, concluded in Belgrade on 18 August 1948 between seven riparian States.[38] The Convention reiterated the principle of freedom of international navigation on the Danube and established a new Danube Commission to supervise its implementation. Regulation of navigation in particular sectors of the Danube is a matter for the riparian States concerned, having "regard to the basic provisions governing navigation on the Danube established by the Commission" (Article 23).

4.42. The issue of navigation in the Gabcikovo-Gönyű Sector (rkm 1821 to rkm 1791) was specifically addressed in Annex II of the Belgrade Convention, which recited that the costs of "the works necessary to ensure normal conditions of navigation... in the general interest" in this sector "far exceed those which could reasonably be

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36 Treaty of Peace, Trianon, 4 June 1920, Art 290 (in *The Treaties of Peace 1919-1923* (New York, Carnegie Endowment for International Peace, 1924) vol 1, 457), Art 274; Annexes, vol 3, annex 1. Art 277 expressly provided that the right was not reciprocal. See also Arts 285-91 (special clauses relating to the Danube).

37 Treaty of Peace with Hungary, Paris, 10 February 1947, Art 2, 38, 41 UNTS 135; Annexes, vol 3, annex 2.

38 33 UNTS 181; Annexes, vol 3, annex 4. The Federal Republic of Germany and Austria were not parties, although the admission of Austria was foreshadowed in annex I. Austria became a party in 1960.

required of the riparian States concerned", and referred the issue to the Commission to consider whether a special river administration should be established for this sector. Following a resolution of the Danube Commission in 1950, an agreement was concluded covering the Rajka-Gönyű sector (rkm 1850 to rkm 1791) in 1952.[39] Article 33 of the Agreement concerning the Settlement of Technical and Economic Questions pertaining to Frontier Watercourses of 16 April 1954[40] provided that the provisions of the 1954 Agreement would not apply to the Rajka-Gönyű sector "during such time as the River Administration in the Rajka-Gönyű sector of the Danube is functioning". However the 1952 Agreement was never ratified or implemented.

4.43. In 1968, the parties concluded a further agreement, the Agreement regarding the Creation of a River Directorate for the section of the Danube extending from Rajka to Gönyű.[41] That Agreement entered into force immediately upon signature, but it is very doubtful whether the River Directorate it established was a "functioning" one within the meaning of Article 33 of the 1954 Agreement. There are several reasons for this. First, notwithstanding its resolution of 1950, the Danube Commission never recognised the new River Directorate. Secondly, that Directorate was never operative or effective: it consisted of a single official in an office in Komarno. In 1974 the two Government representatives decided to wind up the Directorate, and this was done. The 1968 Treaty, however, remained formally "on the books"; indeed it had been registered with the United Nations.

4.44. Thus, as a matter of law the Agreement concerning the Settlement of Technical and Economic Questions pertaining to Frontier Watercourses of 16 April 1954 remained in force for the Rajka-Gönyű sector until 1976, when it was terminated by the Boundary Waters Convention.[42] That Agreement also applies to all boundary sectors without exception.

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39 Agreement regarding the Creation of a River Directorate along the Rajka-Gönyű section of the Danube, Budapest, 25 April 1952, signed 29 May 1952; Annexes, vol 3 annex 9.

40 504 UNTS 231; Annexes, vol 3, annex 12. See also above, para 4.28.

41 Prague, 27 February 1968, 640 UNTS 49; Annexes, vol 3, annex 17.

42 See above, para 4.36.

(b) Treaty Concerning the Regime of State Frontiers, 1956

4.45. Article 10 of the Treaty concerning the Regime of State Frontiers of 1956 deals with bilateral navigation rights on boundary waters generally, without of course affecting the multilateral Convention of 1948.[43] It entitles ships of the two Parties to navigate freely "at all times . . . over the full width of frontier waters". Taken in conjunction with Article 3 of the same Treaty, it is obviously inconsistent with unilateral action rendering a stretch of boundary waters non-navigable.

(c) The 1977 Treaty

4.46. Article 18 of the 1977 Treaty was the only provision of that Treaty dealing specifically with navigation. Article 18 provided:

> "1. The Contracting Parties, in conformity with the obligations previously assumed by them, and in particular with Article 3 of the [Belgrade] Convention concerning the regime of navigation on the Danube . . . shall ensure uninterrupted and safe navigation on the international fairway both during the construction and during the operation of the System of Locks.
>
> 2. The construction of the System of Locks will, when the Dunakiliti dam is put into service, make it necessary to re-route shipping and, for a short time, to interrupt shipping. Shipping shall be re-routed through the Dunakiliti navigation lock in such a way as to require the minimum interruption of navigation. The re-routing of shipping and the movement of shipping through the Dunakiliti lock shall take place at the time of least shipping traffic so as to be able to continue for the minimum period specified in the joint contractual plan.
>
> 3. Navigation in the System of Locks shall be governed by the regulations of the navigation authorities of the Contracting Parties.
>
> 4. The conditions for navigation in the old bed of the Danube shall be specified in the operating and operational procedures."

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43 See above, paras 4.29 - 4.41. See also Hungary-Czechoslovakia, Agreement concerning Cooperation and Mutual Assistance along the Czechoslovak-Hungarian Border, Prague, 19 November 1976, Art 14, 17; Annexes, vol 3, annex 20.

4.47. What the 1977 Treaty did was to relocate the main navigational channel through the Gabcikovo canal and locks. As a change in the *character* of the boundary, this required Hungarian consent. But since the change was without prejudice to the general regime of navigation on the Danube established by the 1948 Convention, it was essentially a bilateral matter.

(3) TREATIES RELATING TO DANUBE FISHERIES

4.48. Fisheries have always had both economic and recreational significance along the Danube, and they are regulated by a number of provisions, multilateral and bilateral. So far as relevant, these are as follows:

(a) Convention Concerning Fishing in the Waters of the Danube, 1958

4.49. The principal instrument regulating Danube fisheries is a multilateral treaty, the Convention concerning Fishing in the Waters of the Danube concluded at Bucharest on 29 January 1958.[44] Article 3 defines "waters of the Danube" very broadly, so as to include "lakes, estuaries and pools permanently connected with the Danube, in the Danube flood-basin in the territory of the Contracting Parties". Article 5 requires contracting parties to construct water engineering works on the Danube to "prepare in advance and apply jointly a plan of action to safeguard the normal migratory movements of fish", and generally "to ameliorate the natural conditions for the breeding, growth and normal increase in stocks of fish of economic importance".[45] The Danube Fisheries Convention was concluded between the four lower riparians, but both Hungary and Czechoslovakia subsequently became parties to it.

(b) Treaty Concerning the Regime of State Frontiers, 1956

4.50. In addition certain provisions in bilateral treaties between Hungary and Czechoslovakia deal with the issue of fisheries. Article 22 of the Treaty concerning the Regime of State Frontiers of 13 October 1956[46] regulates bilateral fisheries in various ways, and contemplates

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44 339 UNTS 23; Annexes, vol 3, annex 16.

45 See also Art 7 (prevention of contamination and pollution of the river). Under Art 14, other Danubian States could accede to the Convention.

46 See above, para 4.29.

that separate agreements will be reached for the protection of fish and the prohibition of fishing for certain species.

(c) The 1977 Treaty

4.51. The issue was also addressed in Article 20 of the 1977 Treaty, which provides that:

> "The Contracting Parties, within the framework of national investment, shall take appropriate measures for the protection of fishing interests in conformity with the Danube Fisheries Agreement, concluded at Bucharest on 29 January 1958 . . ."

Under the 1977 Treaty, national investments were related expenditures borne by each individual party (see Article 2). Thus Article 20 obliged each State party in constructing the Barrage System to engage in national investment so as "to safeguard the normal migratory movements of fish" and "to ameliorate the natural conditions for the breeding, growth and normal increase in stocks of fish of economic importance" and to comply with the other substantive and procedural requirements of the Bucharest Convention.[47]

(4) OTHER AGREEMENTS RELATED TO THE BARRAGE PROJECT

4.52. The first preambular paragraph of the Special Agreement to the Court refers to differences "regarding the implementation and the termination of the Treaty concerning the Construction and Operation of the Gabcikovo-Nagymaros Barrage System, Budapest, 16 September 1977 and related instruments (hereinafter referred to as 'the Treaty')". The reference to "related instruments" can be understood if one goes back to the Hungarian Declaration of 16 May 1992. That declaration terminated the 1977 Treaty itself, as modified by the 1983 Protocol "including all related agreements specified in its Annex" (i.e. in the Annex to the Declaration).

4.53. The agreements listed in the Annex were those which were dependent on the 1977 Treaty itself for their continued operation or meaning. It was these, and only these, agreements or instruments that would automatically terminate with the termination of the 1977 Treaty. Specifically, the following agreements are "related instruments" within the meaning of the Special Agreement:

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47 Annexes, vol 3, annex 16.

* Hungary-Czechoslovakia, Agreement regarding the Drafting of the Joint Contractual Plan for the Gabcikovo-Nagymaros Barrage, Bratislava, 6 May 1976;[48]

* Hungary-Czechoslovakia, Agreement on Mutual Assistance during the Course of Construction of the Gabcikovo-Nagymaros Barrage System, Budapest, 16 September 1977 (as twice amended);[49]

* Hungary-Czechoslovakia, Agreement as to customs questions related to the preparation, construction and operation of the Gabcikovo-Nagymaros Barrage System, Bratislava, 19 January 1979;[50]

* Hungary-Czechoslovakia, Agreement as to the common operational regulations of Plenipotentiaries fulfilling duties related to the construction and operation of the Gabcikovo-Nagymaros Barrage System, Bratislava, 11 October 1979;[51]

* Hungary-Czechoslovakia, Agreement as to the questions of border crossings in relation to the preparation, construction and operation of the Gabcikovo-Nagymaros Barrage System, Rajka, 5 February 1980.[52]

The 1976 Agreement on the Joint Contractual Plan,[53] and the 1977 Mutual Assistance Agreement,[54] have already been discussed. The other five agreements contained machinery provisions of a minor character related to the construction of the Barrage System. All these Agreements obviously depended for their validity and continuation on the 1977 Treaty, and stood or fell with it.

4.54. All other existing bilateral and multilateral treaties between Hungary and Czechoslovakia remained in force after 25 May 1992. Of course, several later agreements were also concluded relating to the

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48 Annexes, vol 3, annex 18.

49 Annexes, vol 3, annex 22.

50 Annexes, vol 3, annex 25.

51 Annexes, vol 3, annex 26.

52 Annexes, vol 3, annex 27.

53 See above, para 4.03; Annexes, vol 3, annex 18.

54 See above, para 4.22.

water management regime applicable to Variant C in the period after the diversion -- specifically the London Agreement of 22 October 1992 and Article 4 of the Special Agreement itself. These are discussed elsewhere in this Memorial.[55]

SECTION D: SUMMARY AND CONCLUSION

4.55. To assist the Court, a table is attached, setting out the treaties and agreements surveyed in Section 3 above, that is to say, the treaties which relate specifically to the boundary waters or to the Danube as a common resource.

4.56. Three general conclusions can be drawn from this survey.

* *First*, the 1977 Treaty was not concluded in a vacuum but was part of a matrix of bilateral and multilateral treaties specifically applied to the common boundary and its waters, or to the Danube generally. Taken overall, those treaties emphasised the joint management of the common resource, and the imperative need for exchange of information, cooperation and negotiation. They are entirely inconsistent with the idea of unilateral action affecting other riparian States.[56]

* *Secondly*, the treaties in question sometimes remained in the realm of aspiration rather than the world of reality. Implementation was uneven, and there was considerable room for renegotiation and adjustment. For example, the 1968 Treaty on the Creation of a River Directorate for the section of the Danube extending from Rajka to Gönyű, although formally in force, was never recognised by the Danubian States as effective and was informally "discontinued" in 1974.[57] The Agreement on Cooperation concerning the Construction of the Nagymaros Dam on the River Danube, as Part of the Gabcikovo-Nagymaros Barrage System of

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55 For the London Agreement see above, paras 3.19 - 3.192; for the Special Agreement, Art 4, see above, para 2.01 - 2.12.

56 There are, of course, many multilateral treaties and other instruments of a general character relevant to the dispute. These are surveyed in Chapter 6 and are referred to as relevant throughout this Memorial.

57 See above, para 4.42.

30 November 1977 between Hungary and the Soviet Union was also "inoperative".[58]

* *Thirdly*, however, the treaty norms themselves were consistent with the developing body of international law. Notwithstanding the notorious environmental difficulties of the region, its member States, Hungary and Czechoslovakia included, adhered to a range of commitments seeking to ensure environmental protection of shared resources. These commitments reflected and even incorporated multilateral standards. To take just two examples, Article 3 of the 1976 Boundary Waters Convention included a commitment by the parties to operate "equipment located on Boundary waters on their own territories... in such a manner as to cause no damage to one another",[59] a clear statement of the *sic utere tuo* principle of general international law. Article 19 of the 1977 Treaty required the parties through means to be specified in the Joint Contractual Plan to "ensure compliance with the obligations for the protection of nature arising in connection with the construction and operation of the System of Locks", thus incorporating the standards of general international law relating to nature protection.[60]

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58 See above, para 4.08.

59 See above, para 4.35.

60 See above, para 4.19, and see below, para 6.26.

Selected Treaties and Agreements relevant to Hungarian/Czechoslovak Boundary Waters on the Danube

Treaty & parties	Relevant provisions	Remarks	Annex
Convention regarding specific questions of water management raised in connection with the cession of territories under Article 1 paragraph 4(c) of the Peace Treaty of Paris, 1948 (Cz, H)	Art 3(1)	Guarantees minimum flow in Moson-Danube	5
Convention concerning the Regime of Navigation on the Danube, 1948 (multilateral)	Art 23	Regulates navigation entrusted to riparians subject to Commission guidelines	4
Agreement concerning the Settlement of Technical and Economic Questions pertaining to Frontier Watercourses, 1954 (Cz, H)	Arts 14, 23(2)	Regulated extraction of gravel and sand; issuing of water permits. Terminated, 1976.	11
Treaty concerning the Regime of State Frontiers, 1956 (Cz, H)	Arts 10, 13, 14, 19, 22	Prohibits damage to banks of frontier waters, alteration of flow of frontier waters, unauthorised installations, etc.	15
Convention concerning Fishing in the Waters of the Danube, 1958 (multilateral)	Arts 5,7	Parties to safeguard normal migratory movements of fish, maintain suitable breeding environment, prevent contamination of pollution	16
Convention regarding the Regulation of Issues Surrounding Boundary Waters, 1976 (Cz, H)	Arts 2, 3, 12	Regulates water management activities affecting natural aquatic relationships; general principle of cooperation, *sic utere tuo*, etc.	19
Agreement concerning Cooperation and Mutual Assistance along the Czechoslovak-Hungarian Border, 1976 (Cz, H)	Art 4(e)	Duty to inform the other party about impending damage etc.	20
Treaty concerning the Construction and Operation of the Gabcikovo-Nagymaros System of Locks, 1977 (Cz, H)	Art 18, 20	Parties to ensure uninterrupted navigation, protection of fisheries & nature	21
Agreed Minutes on the Gabcikovo-Nagymaros Project, 1992 (Cz, H)	para 1)	Duty to maintain whole (not less than 95%) traditional quantity of water in Danube bed	31
Special Agreement for Submission of Differences concerning the Gabcikovo-Nagymaros Project, 1993 (H, Sl)	Art 4	Obligation to agree on and implement temporary water management regime with EC mediation	32

PART II

CHAPTER 5

A CHRONICLE OF RISKS AND DAMAGE

5.01. The Barrage System envisaged by the 1977 Treaty would have caused substantial damage to the environment, and would have imposed unacceptable risks of damage, especially to water resources. This damage, and these risks, existed for both parties in respect of the Gabcikovo sector, but for Hungary much more than Czechoslovakia in respect to the Nagymaros sector. Variant C, as operated by Slovakia, has already significantly damaged Hungary and the damage will accumulate in the absence of major changes to the discharge regime. Variant C also imposes risks on both parties, in some respects similar to the risks that would have been entailed by the Original Project, in other respects greater or less.

5.02. This Chapter will summarise the damage and risks entailed by the Original Project and Variant C, and will sample the scientific evidence. Detailed descriptions of many of these problems are contained in the Appendices and Annexes, to which this Chapter will serve as a guide. Their legal implications will be discussed in later chapters.

5.03. The structure of this Chapter is as follows:

Section A (paragraphs 5.09-5.29) will describe the three regions affected in Hungary.

Section B (paragraphs 5.30-5.93) will assess the damage and risks that would have stemmed from the Original Project linking the Gabcikovo and Nagymaros sectors and its associated peak-mode operation.

Section C (paragraphs 5.94-5.126) will focus on that damage and risks ensuing from Slovakia's unilateral operation of Variant C.

5.04. Three preliminary comments must be made. *First* and most important, the assessment of complex risks in a project of this kind is a difficult task, with many uncertainties. The task is an interdisciplinary one, which involves seismology, hydrology, hydrobiology, water chemistry, sediment transport, river morphology, the soil sciences, forestry, biology, ecology, environment impact assessment, and economics (including environmental economics). Although a great deal of data exists, the process of assembly and integration is a source of

difficulty. Many of the most serious potential problems have a time scale measured in decades rather than years or months -- not surprisingly, since they relate to a natural system built up over thousands of years.

5.05. These problems were underscored by two Slovak scientists working on groundwater issues:

> "The problems in the . . . area are complex, because the ground water is not only influenced by operation of the hydraulic structure. In this connection the ground water plays a crucial role, not only for the drinking water supply, but for ecological questions as well. The problems are extraordinarily complex, interdisciplinary in their basis, unique from the expert point of view and of extreme importance . . . . "[1]

5.06. In fact the research project that they are describing relates only to the Slovak side, although it is necessary to observe the overall impact on the whole region, because environmental impact is not confined by international boundaries.

5.07. A *second* general difficulty, relates to the rate of change imposed on the region through human activity and the application of new technology, against the background of substantial changes imposed through river regulation beginning in the mid-nineteenth century. Natural systems are by definition not static, and the extent of anthropogenic change over the past 30 years has imposed considerable stress on the environment and natural systems of the region.

5.08. *Third*, this account is necessarily provisional. Variant C has been in operation only for a single growing season: at the time of completion of this Memorial, the second growing season is about to start. Every season has its own special features, and data compiled from a single season are of limited predictive value. For example, 50-100 years of record may be considered inadequate to characterise hydrological variability. Although Variant C would cause harm to Hungary however operated, the extent of harm depends on the actual water management regime, including the levels of water fluctuation and the discharge levels. There is no sign that Slovakia is willing to comply with its commitment

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1 See I Mucha & E Paulikova, "Ground Water Quality in the Danubian Lowland Downwards from Bratislava," (1991) 1(5) *European Water Pollution Control* 13, at p 16; Annexes, vol 5, annex 11.

to agree on and implement an interim water management regime.[2] If this were done shortly, it would certainly reduce the damage.

5.09. For these reasons this Chapter's findings are in the nature of an interim report. A further and more detailed report on the scientific issues will be presented in the Hungarian Counter-Memorial, based on further studies and data collected in the current season.

SECTION A: THE AFFECTED REGION

5.10. As explained in Chapter 1,[3] the affected region consists of an area extending from just below Bratislava to just above Budapest. More specifically, it consists of two main sectors, corresponding to the locations of the two main Barrages of the Original Project: Dunakiliti-Gabcikovo and the surrounding area, in particular the Szigetköz, in the upstream sector, and Nagymaros and its surrounds, including Budapest in the downstream sector.[4]

> * The Dunakiliti-Gabcikovo sector contains approximately 8,000 hectares of interconnected floodplain biotopes (flora and fauna uniquely adapted to their environment) and the largest potable ground water reserve in Europe of quality. The importance of the alluvial forests and plains to Hungary and Slovakia and its interest to the rest of the world is evidenced by the number of organisations which have undertaken comparative studies to analyse the effects of the Barrage System on the region.[5]

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2 See above, para 2.10 for the obligation under Art 4 of the Special Agreement to implement an interim water management regime; see paras 3.187 - 3.223 for the recent history of non-compliance with that obligation.

3 See above, paras 1.06 - 1.14.

4 See Maps Nos 1, 2, 3; Annexes, vol 2.

5 See e.g., Equipe Cousteau, *The Final Report, The Danube ... for Whom and For What?, (*March 1993) (hereinafter called *"Final Report"*) (general report analysing the situation along the entire Danube River, in which the Gabcikovo Dam report is summarised). Excerpts from the *Final Report* appear in the Annexes, vol 5, annex 16. The Equipe Cousteau Report was prepared in several stages pursuant to a 1991 contract with the European Bank for Reconstruction and Development (EBRD). The Reports all focused on the Danube River. See *The Danube ... for Whom and For What?, The Gabcikovo Dam: A Textbook Case*, September 1992 (hereinafter called *"Sept. 1992 Report"*); Annexes, vol 5, annex 12. (focusing on the Dam); *The Danube ... for Whom and For What?, The Gabcikovo Dam: A Textbook Case, ... A Survey of Resources of the Danube Bend* (Sept. 1992) (focusing exclusively on the resources of the Danube); see also World Wildlife Fund, *A New Solution for the Danube: WWF Statement on the EC Mission Reports of the Working Group of Monitoring and Management Experts and on the Overall Situation of the*

* Within the Nagymaros sector bank-filtered water provides 60% of the water for Budapest, Hungary's capital with over two million inhabitants. This is also the richest area in Hungary from the perspective of history and archaeology.

5.11. Much of the damage and many of the risks addressed in this Chapter stem from decreases in water quantity and the deterioration of water quality. Apart from obvious direct effects on aquatic ecosystems and surface and groundwater resources, these are intricately connected with the quality and fertility of soil, and, in turn, affect agriculture, forestry, flora and fauna, that is to say, the entire ecological balance of the region. A cycle of ecological deprivation has commenced, with an escalating effect on the environment, character and life of the region.

5.12. A major problem in an impact assessment of construction projects on alluvial floodplains and forests is that the interaction of the river and the aquatic and terrestrial habitats of the floodplain comprises one of the most complex, highly diverse, constantly interacting ecological systems. They include running rivers and their active branches and tributaries; stagnant waters connected permanently or periodically to the river; temporary waters; and terrestrial plant associations that are accustomed to variable flooding periods. The diversity of floodplain landscapes and the communities that live on them are due, in part, to annual and seasonal hydrological fluctuations, erosion, and sedimentation.[6]

5.13. Nonetheless, given that the water discharge to the Danube from the Gabcikovo reservoir has dropped from the average of 2000 m3/s to approximately 200-350 m3/s it is clear that, soon after implementation of

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Gabcikovo Hydrodam Project, 13 December 1993 (hereinafter called "*1993 WWF Statement*"); Annexes, vol 5, annex 20; Hydro-Québec International, *Rapport d'opinion sur certains aspects du project affectant la mise en exploitation de la centrale Gabcikovo* (December 1990) (hereinafter called *Hydro-Québec Study*); Annexes, vol 5, annex 9; Slovak Union of Nature and Landscape Protectors, *Damming the Danube*, March 1993; Annexes, vol 5, annex 17; Other studies not reproduced in the Annexes include World Wildlife Fund, *Das Projekt Gabcikovo-Nagymaros-Auswirkungen auf Natur und Naturhaushalt (The Gabcikovo-Nagymaros Project -- Impact on Nature and Environment* (November 1986) and World Wildlife Fund, *Stellungnalme des WWF Zum Staustufen-Projekt Gabcikovo-Nagymaros (Assessment of the WWF for the Gabcikovo-Nagymaros Barrage Project)* (August 1989).

6 Equipe Cousteau, *Final Report*, p 31; Annexes, vol 5, annex 16.

Variant C, substantial damage has occurred.[7] A letter from the EC Experts[8] dated 10 February 1994, which responded to the 8 February 1994 Slovak rejection of the EC recommendations for an interim water management regime and in particular to Slovakia's suggestion that no damage had been demonstrated, said, *inter alia*:

> ". . . every expert in the rest of Europe will regard it as a significant ecological damage if the average discharge of a river is reduced to about 20% as compared to natural conditions, if 4,500 ha of alluvial forests are seized (see the Fauna-Flora-Habitat Directive of the CEC [Commission of the European Communities]), if there is a reduction of the natural fluctuations of the ground and surface water levels nearly to zero and so on."[9]

5.14. This comment was noteworthy in light of the fact that the EC Data Reports and Recommendations "underestimate and even ignore the warning signs of the environment that indicate the increasing degradation after one year" to Hungary.[10] Their conclusions often understate the true extent of damage. In addition, their analysis of environmental consequences is limited, due to staff and resource constraints.[11]

(1) PANORAMA OF THE NATURAL CHARACTERISTICS OF THE AFFECTED REGIONS

5.15. The territory affected by the Original Project and operation of Variant C is a large alluvial plain bordering the Danube, rich in floodplain forests and wetlands, and possessing a beautiful landscape. The two main sectors that would have been affected by the Original Project correspond to three major areas in Hungary: (a) the Szigetköz, a 375 square kilometre area between the main navigational channel of the

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7 See Map No 7 for a Flow Rate Chart; Annexes, vol 2.

8 See above, paras 3.187-3.223 for an explanation of EC involvement in the dispute between Slovakia and Hungary.

9 Letter from Mr J Schreiner, Professor and Head of the Norddeutschen Naturschutzakademie and Head of the EC Experts Group, to Mr P Benavides, EC Director General of External Political Relations, 10 February 1994, p 2; Annexes, vol 4, annex 139. This letter from the EC Experts was an opinion on the Slovak response to the recommendations of the EC Working Group on a Temporary Water Management Regime.

10 1993 WWF Statement, p 3; Annexes, vol 5, annex 20.

11 1993 WWF Statement, p 4; Annexes, vol 5, annex 20.

Danube and the Moson Danube;[12] (b) the Danube Valley, which encompasses the area downstream from the Szigetköz to the Danube Bend area; and (c) Budapest and the Danube Bend area, the latter including Esztergom, Nagymaros and Visegrád, continuing downstream to the northern part of Szentendre Island, and Budapest.

(a) The Szigetköz

5.16. The Szigetköz is perhaps the most special of the three areas: it consists of a braided channel system on an alluvial cone, a fan-shaped deposit, mainly formed by coarse sediment from Alpine streams. The Szigetköz (together with Zitny Ostrov) forms the last major inland delta in Europe, the remnant of an ancient inner delta of the Danube of three million years ago.[13]

5.17. The alluvial zones sheltering the Danube River are some of the richest natural regions in Europe in terms of biodiversity, biomass and productivity. Although they cover less than one percent of the entire Danube basin area,[14] their variety of habitats allows for extensive diversity. The fluctuation of the water level promotes active mineralisation and recycling of organic matter, allowing for higher productivity than in more stable aquatic or terrestrial conditions.

5.18. Alluvial floodplains play a vital role in the support system of a river.[15] A variety of flora and fauna develop there, depending on the floodplain for migration corridors, for spawning and as refuges from

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12 Of this, approximately 280-300 square kilometres would suffer from a drop in ground water and a decline in agriculture production. See map of Environmental Impact Area, Map No 9; Annexes, vol 2.

13 Equipe Cousteau, *Final Report*, p 29; Annexes, vol 5, annex 16.

14 Equipe Cousteau, *Final Report*, p 30; Annexes, vol 5, annex 16.

15 Results derived from research carried out on the Slovak side of the Danube floodplain indicate that the phyto- and zooplankton in the Danube side arms are highly productive and contribute to the productivity of the main channel because plankton is washed out of the floodplain channels during the receding of flood waters. Preliminary results obtained from forested floodplain systems of the South-eastern coast of the USA show that the organic matter inputs from the floodplain into the river outweigh the primary production of the river and are of the same importance as the inputs from the upstream watershed. They represent a substantial food source sustaining the riverine communities. E Castella, J F Fruget, C Amoros, & AL Roux, *Les Fonctions des Zones Humides et des Milieux Aquatiques des Plaines Alluviales en Relation avec le Cours Principal des Fleuves*, Premier Rapport Intermédiaire à la Fondation Cousteau, pp 39-40 (January 1992).

pollution. The plains also serve as protection from flooding by slowing the pace of the water flow and providing the water with space to spread out. The vegetation along the riverbanks and in the plain generates friction, further slowing the water's speed, and its water retention capacity decreases downstream flood levels.[16]

5.19. Alluvial floodplains, and especially alluvial forests, create a most efficient system of water purification and recycling of organic matter. According to Equipe Cousteau, "the assimilation of nutrients (phosphates, nitrates) by terrestrial and aquatic plant life in the alluvial plain offers an important low-cost and efficient means to purify not only the water of the river but also the ground water."[17] The natural filtering capacity of the riverbed can provide high quality drinking water for large populations.

5.20. The active alluvial floodplain in the Gabcikovo sector covers approximately 6,000 hectares on the Hungarian side and 23,000 hectares on the Slovak side.[18] This alluvial floodplain, now threatened by Variant C, is one of the few of its size remaining intact in Central and Eastern Europe.[19] Its diverse habitats in a comparatively small area allow for rich species diversity.[20] At least 30-50% of all species of Hungarian flora and fauna are present in the Szigetköz.[21] The alluvial aquifer fed by the Danube extends for approximately 750 squ km on the Hungarian side of the river. The water in the aquifer on the Hungarian side totals 5,000 million m3 out of the 12,000 million m3 which is shared with Slovakia, and is the largest drinking water reserve of Hungary. Soils, agriculture and natural ecosystems throughout this greater area depend on ground water levels and hence on Danube flows.

5.21. Owing to its special features, the Szigetköz has unique fresh water and terrestrial fauna, both in terms of rare species and species combination and composition. The main stream of the Szigetköz belongs to the sub-montane zone of the river. It has a slope gradient of 40 centimetres a kilometre and a mean velocity of approximately 2

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16 Equipe Cousteau, *Final Report*, pp 172-174; Annexes, vol 5, annex 16.

17 Equipe Cousteau, *Final Report*, p 13; Annexes, vol 5, annex 16.

18 Equipe Cousteau, *Final Report*, p 29; Annexes, vol 5, annex 16.

19 For a discussion of the increasing loss of European floodplain forests, see E L Wenger, A Zinke, & K A Gutzweiler, "Present Situation of the European Floodplain Forests", in (1990) 33/34 *Forest Ecology and Management* 5-12.

20 See A Vida; Appendix No 2; see also F Mészáros; Appendix No 1.

21 See F Mészáros; Appendix No 1.

metres per second, providing habitat for rare species.[22] Of the fauna present in the Szigetköz, three hundred species are protected, either pursuant to the Bern Convention,[23] the Hungarian Red Book[24] or the Endangered Species Convention.[25] Szigetköz will soon be included in the Ramsar Convention because of its importance as an "overwintering area" for aquatic birds.[26] Currently, some 10,000-12,000 ducks overwinter there, including a number of threatened or endangered species.[27] Its inclusion in the Important Bird Areas Project is also imminent.[28]

5.22. In the Szigetköz there are 96 species of crustaceans (out of 150 present in Hungary), 206 species of birds (of which 166 species are protected), 11 species of amphibia, and a large number of other taxa, many including protected or endangered species.[29] The ice-age relict Microtus oeconomus, a very rare species which is otherwise only found in northern Europe, also exists here.[30] There is an unusually high number of species of molluscs.

5.23. 65 species of fish, constituting 80% of the native Hungarian fish species, may be found in the Szigetköz.[31] One species is listed in Appendix II of the Bern Convention[32] and 30 (40% of listed species) are

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22 A Vida; Appendix No 2.

23 Convention on the Conservation of European Wildlife and Natural Habitats, Bern, 19 September 1979, ETS 104.

24 *Hungarian Red Book* (1989).

25 Convention on International Trade in Endangered Species, Washington, 3 March 1973; 993 UNTS 243 (1973).

26 Convention on Wetlands of International Importance, 996 UNTS 245 (1979).

27 F Mészáros; Appendix No 1.

28 R F A Grimmett and T A Jones, Important Bird Areas in Europe, ICBP Technical Publication No 9 (Cambridge, UK 1989).

29 F Mészáros, Appendix No 1. Other invaluable species can be found in this region, many of which are endangered or threatened. For example, there are 45 species of odonata, which constitutes more than one-half of those present in Hungary, 1124 species of lepidoptera, 42 species of neuropteroidea, and approximately 2,000 species of beetles. Ibid.

30 F Mészáros; Appendix No 1.

31 See F Mészáros; Appendix No 1.

32 Appendix II lists 580 strictly protected species of fauna "which must not be captured, killed, exploited or intentionally disturbed in any way, or their habitats

included in Appendix III.[33] 21 fish species (32% of Hungarian fish species) are listed in the *Corine Biotopes Manual* published by the Commission of the European Communities.[34]

Table 1

Comparative ichthyofaunistic analysis of the Szigetköz water types [35]

Water types in Szigetköz	Total number of fish species	Number of threatened species	Number of species endang-ered in Europe
Main stream	57	41 (72%)	14 (25%)
Flood plain backwaters	52	36 (69%)	7 (13%)
Irrigation canals	27	16 (59%)	3 (11%)
Disconnec-ted backwaters	23	14 (61%)	3 (13%)
Moson-Danube	54	38 (70%)	11 (20%)

interfered with." Convention on the Conservation of European Wildlife and Natural Habitats, Bern, 19 September 1979, ETS 104.

33 Appendix III lists "species of fauna which must be protected, but for which some hunting may be authorised". Convention on the Conservation of European Wildlife and Natural Habitats, Bern, 19 September 1979, ETS 104.

34 This is a manual setting forth lists of threatened species in an effort to identify and describe consistently sites of major importance for nature conservation. Its list of fish includes species considered endangered and vulnerable by various institutes and studies.

35 A Vida; Appendix No 2.

5.24. The Szigetköz is equally rich in flora. All the plant species characteristic of floodplains are present. There are near-natural associations of forests, one of which, Derék Forest, has not changed since 1930. Approximately 70 floodplain plant associations are present, of which 17% are considered highly valuable from a nature protection perspective.[36] According to botanical surveys of recent years, more than one-third of Hungary's vascular plant species are found here, which is remarkable considering its small area. Trees that only exist in wetland areas are present, some of which are quite uncommon in Europe because few wetlands remain. There is also one of the few surviving hardwood riparian forests in Europe.[37] Many of the forests, especially the poplars, are of primary economic value to Hungary's forestry industry.

(b) The Danube Valley

5.25. The Danube Valley consists of the intensively farmed Kisalföld (Little Hungarian Plain), the steep, wooded Pilis Hills, and historic and archaeological sites. The Nagymaros Barrage would have required the reinforcement and extension of levees along both banks of the Danube to contain the water fluctuations resulting from peak power production. If the proposal to impound the entire area had been adopted, the islands in the river would have been submerged and the remaining riparian zones destroyed.

(c) The Danube Bend and Budapest

5.26. Over time the Danube has carved and shaped the landscape of steep hills, cliffs and gorges of the Danube Bend. The size and speed of the river as it sweeps through the Pilis and Börzsöny highlands provides a panorama unmatched in Hungary. On this bend is the city of Visegrád, now facing the coffer dam of Nagymaros.[38] The special character of the Danube Bend area has been internationally recognised and the Pilis

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36 See F Mészáros; Appendix No 1.

37 See F Mészáros; Appendix No 1. Hungary's floodplain forests currently comprise only 4.6% of all Hungarian forests. In the last 20 years approximately one third of Hungarian forests have disappeared including, primarily, the hard-wood forest. E L Wenger, A Zinke, & K A Gutzweiler, "Present Situation of the European Floodplain Forests", in (1990) 33/34 *Forest Ecology and Management* 5-12, at 11.

38 See Annexes, vol 2, Photo Nos 29, 30, 31.

district has been designated as a World Biosphere Reserve.[39] Hungary has plans for a new national park in the Pilis and Börzsöny highlands.

5.27. More than 90% of water used by Budapest is bank-filtered water produced from the Danube. This is a vital natural resource. In the 36 kilometre section of the Danube between Nagymaros and Budapest, there are 17 water works, which produce more than 700,000 m3 of water per day, amounting to 60% percent of the total water production for Budapest's 2,000,000 inhabitants and its industrial use. Budapest accounts for one-third of Hungary's water usage.

5.28. The Danube Bend retains deep historic and cultural associations.[40] It formed the northeastern border of the Roman Empire at its height in the 1st-4th centuries CE. It was a centre of life and culture during the early Arpadian Dynasty from 997-1301, and important sites remain from this period. In the Middle Ages it was the seat of the Hungarian kings: at Esztergom in the Danube Valley from 970-1323 and later at Visegrád in the Danube Bend from 1323-1405. The ruins of the castle and summer palace of King Mátyás (1458-1490), who during his reign successfully held back the Turks, are here.

5.29. The Danube Bend also important from a nature protection perspective. A large number of birds overwinter there; fauna typical of the wet habitats live there, as well as animal communities of the dry-warm sand and slope-steppe areas. Remnant patches of alluvial hard-wood riparian forests survive on isolated sections of the Danube shore. Flora typical of wet habitats as well as of dry habitats exist, including many species valuable from a species composition perspective.[41]

SECTION B: DAMAGE AND RISK ASSOCIATED WITH THE ORIGINAL PROJECT

5.30. The 1977 Treaty envisaged a dam at Dunakiliti and an artificial channel to supply the power plant of the Gabcikovo barrage, and a

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39 Ecologia and INFORT, *Gabcikovo-Nagymaros Barrage Study, Program Options and Impacts (Interim Report)*, May 1989 (report prepared at the request of the Hungarian Government and Parliament by a team of American scientists, engineers, economists, planners and lawyers assembled by Ecologia under the supervision of INFORT, a Hungarian company engaged in technology development and transfer) (hereinafter called *Ecologia Interim Report*), p 47; Annexes, vol 5, annex 6.

40 See Archeological Map, Map No 8; Annexes, vol 2.

41 See F Mészáros; Appendix No 1.

further barrage and power plant at Nagymaros.[42] The peak-mode operation planned for Gabcikovo would have produced large surges of water during particular times of day. The water flowing through the Danube Valley would have had significant daily fluctuations in velocity and level. The water levels at the upper end of the Nagymaros reservoir at Palkovicovo would have fluctuated 4.38 metres every day, and even 50 kilometres downstream from the Gabcikovo power station, the water would have fluctuated more than one metre daily. To protect the river bank, large levees would have been built or reinforced upstream from Nagymaros.[43]

(1) RISKS AND DAMAGE TO SURFACE AND SUBSURFACE WATERS

5.31. In introducing a description of the complex impact on the Danube's hydrological system, a few general remarks are appropriate.

5.32. There is a direct connection between surface water and groundwater. Impact on either will have effects on the other. At least five factors are relevant.

5.33. First, the impact area of the Original Project incorporates by far the largest bank filtered water resource in Europe, as we have seen. This not only provides a large proportion of Hungary's current water supply, but also represents a major unused reserve of national strategic importance. At present the drinking water produced by these natural filters requires practically no treatment.

5.34. Secondly, experience is not available for barrage systems of a comparable size with by-pass channels and peak operation mode. For example, dams on the upper Danube and the Rhine are either much smaller or of different design.

5.35. Third, the conception of the Project goes back to the 1950s, its design to the 1960s and early 1970s. There have been only minor corrections since. It is not likely that anyone would design the Project in this manner today, given current understanding of potential environmental impact. Having built a dam on the Rhine at Iffezheim in 1969, Germany and France were planning to construct a further one at Neuburgweiher (an agreement to this effect had been concluded in

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42 See Map Comparing Original Project to Variant C, Map No 5; Annexes, vol 2.

43 See also description above, paras 1.06 - 1.14 and Summary, Joint Contractual Plan; Annexes, vol 3, annex 24.

1976). But the parties decided to break the vicious circle of correcting the negative impacts of a barrage by building a further barrage downstream and opted for the controlled addition of riverbed material with the use of specially-designed barges. To achieve ecological improvements and safer flood control, reconnection of the floodplain and the channel is occurring on the Rhine.

5.36. Fourth, many relevant examples can be quoted of adverse water quality impacts from existing reservoirs and similar schemes.[44] To take one example of longer term effects, experience gained in connection with the impounding of the Moselle has shown that changes in the water quality from infiltration galleries have been observed with a delay of 5 to 10 years. Monitoring and discussion of the results led to the conclusion that, although there are advantages to river impoundments, the disadvantages from reduced groundwater and aquifer dynamics as well as the potential enhancement of eutrophication outweigh these to a large extent.

5.37. Fifth, the reservoirs of the planned Project would have been - and the now existing reservoir actually is - subject to pollution by a number of direct sewage discharges and highly polluted tributaries. This is contrary to basic design principles and will exacerbate many of the adverse effects observed for other schemes. The impoundment of the water in reservoirs increases the residence time, which leads to increased sedimentation and clogging. This is accompanied by increased transparency of the water body, which together with the high nutrient concentration in the Danube water leads to potential eutrophication. The growth and the decay in algal biomass increases the deposition of organic material, with an associated reduction of infiltration from the reservoir to the groundwater. The higher organic material content of the sediment and a shift to anaerobic conditions may release iron, manganese and ammonium into the subsurface waters, causing the latter to deteriorate.

5.38. Indirect effects must also be considered. For example, peak power production would have created significant water quality problems for certain tributaries, with the river reversing course daily and waste water backing up.[45]

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44 P Liebe, *Environmental-Ecological Effects of the Gabcikovo-Nagymaros, Subsurface Waters*; Appendix No 3.

45 L. Somlyódy, "Application of Systems Analysis in Water Pollution Control: Perspective for Central and Eastern Europe", (1991) 24 (6) *Water Science and Technology* 73-87.

(a) Dunakiliti-Hrusov reservoir

5.39. The Original Project envisaged a larger upper reservoir of approximately 60 square km, including the head race canal, whereas the Cunovo reservoir as operated by Slovakia is about 30% smaller.

5.40. The risk of damage associated with the reservoir[46] includes a number of elements.

5.41. The organic content of the Danube water and its nutrient state render it unfit for retention in a reservoir. In addition, bacteriological contamination is known to occur. As stated in a recent study:

> "Data of special target examinations, carried out recently, limited in time but extending to a great number of parameters show, that the investigated segment of the Danube is affected by strong pollution of anthropogenic (communal, agricultural and industrial) origin. . . [F]rom the bacteriological point of view the water of the Danube can be qualified as being in very bad condition (in the range of 6 classes, it belongs to the V-VI class)."[47]

5.42. It is likely that the surface water quality of the reservoir would deteriorate, especially in dry years and summer periods due to eutrophication. It is estimated that the algal biomass could be doubled and peak chlorophyll-a concentrations could exceed 200 mg/m3.[48] Although the most important implications relate to groundwater quality, the impaired surface water quality would have had further serious impacts downstream, for example, where the water would have entered the main Danube section. It would also have prohibited the use of the reservoir for recreational purposes.

5.43. One of the most serious risks of the impoundment is the contamination of the gravel aquifer below Szigetköz and Zitny Ostrov.[49]

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46 Most of the changes referred to in this sub-section also apply to Variant C.

47 VITUKI Hydrological Institute, *Evaluation of the Water Quality of the Hungarian-Czechoslovak Section of the Danube* in Researches on the Bank Filtered Water Bases. Subsurface Water Supplies and Biological Turnover of Substances in the Danube and Szigetköz, Appendix I, p 7 (March 1993).

48 L. Somlyódy, "Application of Systems Analysis in Water Pollution Control: Perspective for Central and Eastern Europe", (1981) 24 (6) *Water Science and Technology* 73-87.

49 See Thickness Map of the Near-Surface Aquifer, Map No 11 and Thickness Map of the Main Aquifer, Map No 12; Annexes, vol 2.

This is likely to be a long term process, taking some decades. The result could be, however, that a 12,000 million m3 drinking water reserve might become unusable, because treatment of the water, even if technically feasible (which is open to doubt) would be prohibitively expensive. The 5,000 million m3 Hungarian part of this reserve has a water exploitation potential of 0.5-1 million m3 per day. This is recognised as the only large-scale drinking water reserve for the country in the National Water Management Framework Plan of 1984. Approximately 90% of the water in the aquifer is supplied by the flowing Danube -- and not by local precipitation and infiltration. Thus, the size and quality of the underground reserve, previously determined by the infiltration from the main arm of the Danube and to a lesser extent from the side branches, will depend on the new pattern of recharge from the reservoir and river channels.[50]

5.44. The danger of harmful impacts of the reservoir on groundwater was recognised by the Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project. Its Report of 23 November 1992 stated that under certain conditions . . .

> "due to eutrophication in the downstream part of the reservoir the groundwater quality is most likely to be threatened at the Samorin Water Works, which produces about 40% of the water supply for Bratislava. This threat is associated to sedimentation of organic material due to stagnant water and algae growth in the downstream part of the reservoir. A layer of organic material at the reservoir bed, from where the infiltration to the aquifer takes place, may result in anoxic groundwater conditions. Hence this effect may be serious starting with the growth season during the 1993 summer."[51]

5.45. Other adverse effects are expected to result from changes to the groundwater flow regime caused by the reservoir. Increased groundwater recharge will occur due to infiltration through the bed of the reservoir,

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50 Figure 8 in Liebe, *Environmental-Ecological Effects of the Gabcikovo-Nagymaros Project, Subsurface Waters*; Appendix No 3 illustrates the observed movement of tritium from the Danube into the aquifer over a 30-year period. It is a useful guide to the time-scale of contaminant travel.

51 Commission of the European Communities, Czech and Slovak Federal Republic, Republic of Hungary, *Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project*, 23 November 1992, p 37; Annexes, vol 5, annex 14.

although this is expected to reduce due to sedimentation.[52] Direct impacts of contamination from recharge water have been noted. However, increases in groundwater levels and changes in flow paths may also result in increased pollution of groundwater from domestic, agricultural and industrial sources.

5.46. A primary concern was the reduction of discharge to the main Danube channel downstream of the reservoir and the pattern of water release to other rivers and side channels, upon which the hydrology of the Szigetköz depends.[53]

5.47. The flushing of the reservoir would re-suspend sedimented material, leading to a concentrated outflow of (micro)pollutants and other hazardous materials.

5.48. In the reservoir of the Original Project approximately 4-5 million tons of sediment per year were expected to be deposited due to the decrease in average discharge flow velocity from approximately 2.0 m/s to 0.11 m/s. Its organic matter content is estimated to have been between 13-15%, originating mostly from decayed planctonic organisms and sedimented organic pollutants.[54] However, toxic materials and heavy metals would have also accumulated in the sediment, which could have required specific treatment after being dredged and deposited as hazardous industrial waste. The Joint Contractual Plan did not provide for proper disposal.

5.49. The establishment of the reservoir was to lead to the disappearance of the previous river ecosystem, which occupied the territory, destroying islands, side branches and wetlands.

(b) The Hydrology of the Szigetköz Region

5.50. The section below the dam of the upper reservoir (Dunakiliti under the Original Project; Cunovo under Variant C) and the junction between the by-pass canal and the main riverbed (Palkovicovo) is the only section of the Project where impoundment does not occur but a drastic decrease in water discharge takes place. Both the water management regime as envisaged by the Joint Contractual Plan and that practised in connection with Variant C are bound to have a large negative impact on the hydrological conditions of the Szigetköz,

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52 See above, para 5.43.

53 These issues are discussed below in para 5.42.

54 Effects of organic degradation on recharge water quality have been discussed above in paras 5.42-5.43.

impairing agriculture, forestry and fisheries, its recreational value as well as its unique natural value and biological diversity. This section concentrates on the surface and subsurface waters.[55]

5.51. Hydrological conditions of the Szigetköz are essentially determined by the Danube's flow through the most elevated sequence of its alluvial fan in a hanging channel. Water filtering into the riverbed percolates in a south-south-east direction, establishing a direct relationship between the water discharge and water level in the main riverbed and the subsurface waters of the Szigetköz. In short there is a single integrated entity of surface and ground water.[56]

5.52. The potential for adverse changes in the quantity and quality of surface waters filtering into the ground has been mentioned already in connection with the Dunakiliti-Hrusov reservoir.[57] Under natural conditions, the riverbed itself is the major source of infiltration, as are its frequently flushed side branches. The annual average discharge of the Danube in this section was approximately 2,000 m3/s. Under the Joint Contractual Plan, this was to be reduced to 50 m3/s. The Plan was subsequently amended to allow for a 200 m3/s discharge. Reductions of this order (85-97% of average flow) would have lowered the depths of surface water, reduced the areal extent of surface water and thus caused a drastic decrease in the amount of infiltration. In addition, diminished water discharge also changes the direction of groundwater flow; instead of being a source of infiltration, the main channel now acts as a drain. Should the average discharge return to the main channel, infiltration would be limited due to sediment deposition (colmatation) occurring during the times of diminished water discharge.

5.53. Chemical changes associated with sediment deposition are anticipated, similar to those described above for reservoir sedimentation. Eutrophication occurring in the side branches and the increased organic load in the water leaving the reservoir will further affect the quality of the water entering the subsurface system. Since the underground water moves "laterally" at a relatively high speed (300-400 metres per year), and since this movement occurs in a south-south-easterly direction on the Hungarian side of the Danube, water infiltrating through the reservoir bed as well as water coming from the main Danube channel end up in the Hungarian aquifer under the Szigetköz. Thus, both the decreased water

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55 Other consequences will be discussed separately below.

56 Hungarian Geological Survey, *Geological Setting of the Szigetköz* (1993) p 34.

57 See above, para 5.43-5.45.

supply and its toxic quality are likely to impair the potability of the waters stored in the Szigetköz aquifer, possibly to a level at which they became unusable. The potential to establish bank-filtered wells along this section of the Danube -- the cheapest and most efficient way to produce drinking water -- might be lost.[58]

5.54. The diversion into the power canal was expected to cause a drop in the groundwater level in the several-kilometres-wide floodplain area by up to 3 metres, especially in the central part of the affected river section. A smaller, but still very significant drop of groundwater level of up to 2 metres was forecast for the protected area. This would have inevitably led to the decay of the unique flora of the floodplain, especially its forest communities, and to losses in agricultural production.[59] Underwater weirs that raise the water level would not have provided a long term solution. Although increased water levels tend to increase water pressure, the low velocity of the surface water flow contributes to sedimentation and clogging. These would have decreased the permeability of the riverbed and given rise to water quality problems.

5.55 The radical change in the discharge pattern would have led to bank failures caused by a drop of average water-levels after the damming and to gradual degradation of the riverbed.

5.56. There is an additional and important factor relating to coenological succession. Ecosystems can adapt, given time and gradual change. However sudden succession of unpredictable changes, of varying and uncertain periodicity, prevents adaptation. The diminished and stabilised flow rate entails the loss of natural discharge and water level fluctuation, which are essential for the ecotones of the region. New types of ecosystems reflecting the altered conditions could develop under the changed conditions. But since flood flows (in excess of 4,000 m3/s) would have required the use of the main riverbed, whatever ecosystems could develop under the reduced flow regime would be washed away, disrupting the freshly formed riparian zones.

(c) Nagymaros Reservoir

5.57. The 123 km long reservoir including the Danube Valley upstream of Nagymaros would have radically changed the hydrological conditions. Sediment transport studies predicted suspended sediment settling along the Lábatlan-Nagymaros section of the reservoir. Deposition of silt on the infiltration surface of bank-filtration wells

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58 *1989 Hardi Report*, p 7; Annexes, vol 5, annex 8.

59 See below, paras 5.70, 5.73, 5.79.

above the dam could have resulted in adverse water quality changes. The leaching of iron and manganese and the increase of ammonium concentration in the bank-filtered well waters would have been a likely effect.[60]

5.58. There would also have been a danger of the low quality impounded waters infiltrating into the valuable karstic water reservoir near Esztergom.[61]

5.59. The operation of the Nagymaros Barrage would have caused erosion of the riverbed downstream of the dam, along Szentendre Island. Bed degradation would have caused a drop in the yield of the bank-filtered wells. Large scale dredging in the 1960s and 1970s, done partly to prepare for the Nagymaros Barrage and partly for other commercial purposes, demonstrated the danger. As a consequence of the 0.60 metre average degradation of the riverbed, at least 10% loss in capacity of the bank-filtered wells was recorded (that is 80,000-100,000 m3/day)[62]. In addition, flushing of fine sediment from the reservoir was proposed, which could have led to localised sediment deposition. The content and amount of deposited sediment would have impaired the filtering capacity. Adverse water quality effects would also have been expected, as had indeed been observed for the Budapest water supply from the Danube as a consequence of localised sediment deposition.[63] This would have led to a significant and non-replaceable loss in water production, threatening the safe and reliable supply of water to Budapest.

(2) RISKS AND DAMAGE TO SOILS

5.60. Soils are a key element of the natural environment and are of fundamental importance to natural ecosystems and agriculture. The most important impacts on soils would occur in the Szigetköz region

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60 Bechtel Environmental Inc., *Environmental Evaluation of the Gabcikovo - Nagymaros River Barrage System*, February 1990, p 2-12. See also Liebe, *Environmental-Ecological Effects of the Gabcikovo-Nagymaros Project, Subsurface Waters*; Appendix No 3.

61 This problem was pointed out in 1989, see Lorberer *et al, Investigation of the Relationship Between River Danube and the Karstic Water Reservoirs in the Area Affected by the Gabcikovo-Nagymaros Barrage System Hydropower Scheme, I-V.* (in Hungarian) Budapest, VITUKI, 1989.

62 Liebe; Appendix No 3. There are estimates which indicate an even larger loss in capacity ranging between 200,000 and 300,000 m3/day, Ibid, p 39.

63 F. László, Zs. Homonnay, & M. Zimonyi, "Impacts of River Training on the Quality of Bank-Filtered Waters", (1990) 22(5) *Water Science & Technology*, pp 167-72.

with its rich soil diversity, an aspect of its general diversity.[64] The nature and fertility of the soil is dependent on many factors, but in the Szigetköz, the water regime of the surface layers is perhaps the most fundamental. The groundwater level plays an important role in this regime. Changes in groundwater level or character will impact on the soil and on all those elements dependent on it.

5.61. The groundwater of the Szigetköz has a direct connection with the Danube. The Danube flows are the predominant source of groundwater recharge and control groundwater levels throughout the region.

5.62. The soils of the Szigetköz have developed from alluvial material under the influence of climate, vegetation and groundwater conditions. Groundwater levels thus determine long-term soil formation and also make an important contribution to the soil moisture regime and hence to the water balance of the area. This contribution depends critically on the depth of the water table with respect to the interface between fine-grained topsoil and the underlying gravel alluvium. Where the water table is located within the topsoil, capillary effects supply the root zone from the groundwater for plant use. This subsurface input is essential to support current agricultural production and natural vegetation and also plays a key role in reducing vulnerability to drought. The seasonal responses of the Danube result in high flows (and hence high water table conditions) during the late spring and summer, when plant water requirements are the greatest. If the water table falls below this interface, this subsurface water supply is effectively lost.[65]

5.63. Preliminary estimates indicate that for average summer conditions, more than 50% of the area previously receiving subsurface water would not have continued to do so under the Original Project's design.

5.64. Apart from direct effects on soil water, the water table location is also critically important for soil chemistry, and thus to soil structure and fertility. The soils have a high natural calcium carbonate content, due to their alluvial origin. This is mobilised by plant activity and gradually leached to the base of the root zone. Groundwaters are also high in carbonates, and hence carbonate-rich water is drawn up by capillary action, as discussed above. Changes in the water table level

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64 See Map No 10; Annexes, vol 2.

65 For the various impacts on the soil depending on their location in the Szigetköz, see Liebe; Appendix No 3.

will disturb the natural profile chemical equilibrium. A lowered water table will induce additional leaching; a higher water table, additional upwards transport. Increased evaporation (of pure water) from a near-surface water table will concentrate salts and carbonates in the upper part of the soil structure, with adverse effects on plant growth and soil structure.

5.65. Carbonate accumulation is of particular concern in those areas where the frequent fluctuation of water table levels would be expected due to peak power operation. If the water table lies close to the top-soil alluvium interface, the frequent upwards movement of carbonate-rich groundwater into the topsoil would be expected to cause carbonate precipitation to form an impervious hard pan.[66]

5.66. The problem of carbonate accumulation is known to occur in the Szigetköz and has been widely recognised as a problem in the Slovak Zitny Ostrov area.[67] Its acceleration would lead to limited plant root development, reduction in soil moisture availability to plants in the summer, and problems of poor drainage in the winter, with obvious adverse effects on agriculture and natural ecosystems.[68]

5.67. The Original Project is likely to have caused a large drop in the level of groundwater. The above-mentioned changes to the soil regime would have ensued.

(3) DAMAGE AND RISKS TO AGRICULTURE AND FORESTRY

5.68. The 1977 Treaty proceeded on the basis that damage would occur to agriculture and forestry, but that the production structure for both could be changed to compensate for some of the losses.[69] The filling of the reservoir would have led to a rise in the groundwater table which would have resulted in total saturation in the surrounding area for 50 squ km (in both Czechoslovakia and in Hungary).[70] Due to the

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66 See Fig XX, From Gy Várallyay, "Soils in the Szigetköz Region, With Special Regard to their Water Region," (in Hungarian), 34 (No 1) *Acta Ovariensis*, 65-73 (1991).

67 J Hrasko, "Carbonate Profile and Carbonate Forms in Chernozyemic Soils of the Danubian Lowland", (1985) 13 *Vedecké Vyskumného Ustavu Podoznaléctva a Vyzivy Rastlin 9-17*; J Hrasko, "Salt Sources of Alkali Soils in South Slovakia", (1968) 17 *Agrokémia és Talajtan* (Suppl) 105-112.

68 See Hungarian Academy of Sciences, 23 June 1989, p 4; Annexes, vol 5, annex 7.

69 See Joint Contractual Plan, Summary; Annexes, vol 3, annex 24.

70 Equipe Cousteau, *Sept. 1992 Report*, p 24; Annexes, vol 5, annex 12.

almost 90% reduction of the water discharge into the Danube, the Szigetköz would have suffered a drop in ground water. The quality of the water and soil would have been substantially modified,[71] with negative effects on agriculture and forestry. These changes would have required modifications to the types of crops planted and the trees cultivated in the region.

(a) Agriculture

5.69. Intensive agricultural production is carried out in the Szigetköz region. The crop yield of wheat, corn, sunflower, and alfalfa, major crops for Hungary, is normally about 15-20% higher in the Kisalföld, including Szigetköz, than nationally, and often of higher quality.

5.70. In the areas near the reservoir, where the groundwater level would have been extremely high, shallow rooting crops were to be grown because only the top layer of the soil would have been suitable. In the areas where the groundwater level would have decreased substantially, replacement, deeper rooting crops were to be grown. These would either have been extremely dependent on precipitation, in which case the security of yield would have significantly decreased,[72] or on irrigation. Only 8-13% of the farmland in the Szigetköz is currently irrigated. Irrigation not only would be costly, but it has a range of potential disadvantages including adverse effects on soil structure.

5.71. The Slovak Union of Nature and Landscape Protectors had predicted that the Barrage System would have caused a substantial decrease in agricultural production on more than 107,000 hectares of agricultural land in Czechoslovakia and Hungary.[73] The most affected lands would have totalled approximately 26,000 hectares of which 6,000 are in Hungary. Total annual production loss for the two countries would have been equivalent to about 40,000 tons of wheat or equivalent crop annually.[74]

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71 See above, paras 5.53 and 5.62 - 5.66 on water and soils.

72 Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10.

73 See Slovak Union of Nature and Landscape Protectors at sec 4; Annexes, vol 5, annex 17.

74 Some have said that the new species of tree would take 100-130 years to harvest. See Slovak Union of Nature and Landscape Protectors at sec 4; Annexes, vol 5, annex; see also Hydro-Québec which, after commissioned by Slovakia to do a study, found that the Project "pourrant ainsi nuire à l'agriculture à moins de mesures correctrices." *Hydro-Québec Study* at paras 2.3, 2.1, p 36; Annexes, vol 5, annex 9.

(b) Forestry

5.72. The forest plays an important role in the ecosystem. In the Szigetköz, the alluvial forests, primarily poplars, are of great direct economic value, as compared with other indigenous species such as ash, elm, and oak. This area constitutes one of the most important raw material resources for cellulose production.

5.73. Changes in the groundwater table and water regime negatively influence the growth and yield of these forests. Specifically, these changes would have threatened the softwood riparian forests of poplar and willow present in those areas.[75] Although species requiring less water could have been planted, their biomass production and annual yields would have been much less than that of poplars. It has been suggested that new, slowly growing forests would not have been able to be harvested for 60-120 years.[76]

5.74. Additional forests would have been cleared in the Danube Bend and the Danube Valley had the Nagymaros reservoir been completed. The peak power fluctuations twice a day would have inundated the surrounding floodplains, killing off the forests. The few remaining patches of hardwood riparian forests on small islands, peninsulas, and isolated shore sections would have been endangered.

(4) DAMAGE AND RISK TO FLORA AND FAUNA

5.75. "Szigetköz" means "island regions", and these small islands (patches, mosaics) are vulnerable.[77] The Szigetköz's mosaic of landscapes with its variety of habitats and ecosystems, would have significantly deteriorated because of the diversion of the Danube into a by-pass canal for 31 km as planned pursuant to the Original Project.[78] These, in turn, would have affected flora and fauna. Two factors would have been responsible for the negative effects: the decrease in water flow, followed by a drop of water levels, and the absence of regular water level fluctuations.

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75 F Mészáros; Appendix No 1.

76 See Slovak Union of Nature and Landscape Protectors at sec 4; Annexes, vol 5, annex 17.

77 See Geomorphological Map of the Szigetköz, Map No 4; Annexes, vol 2.

78 For Hungary's concerns as to the impact of the barrage system on flora and fauna, see Hungarian Declaration on the Termination of the 1977 Treaty, pp 21-22; Annexes, vol 4, annex 82.

5.76. No longer would the water level supporting the ecosystems in the Szigetköz have fluctuated naturally with each season. Fluctuations ensured by the flush of Danube water in the side branch system during floods would have also ceased. The level would have been lower, and rather steady.

5.77. Water fluctuations are necessary to maintain these ecosystems along the river. Repeated flooding and the ensuing immigration of species are important for the maintenance of botanical and zoological diversity. Flood waters entering floodplains bring a substantial amount of nutrients, which are available for plant growth and are partly responsible for the high nutrient level of alluvial ecosystems. The uptake of these nutrients by the floodplain vegetation represents a potential purification mechanism for the river's surface water.[79]

5.78. Under the Original Project, it was assumed that flooding would occur for approximately 16-20 days a year. But this could not adequately represent the natural seasonal fluctuation. Fish production of fluvial wetlands and floodplain waters is highly correlated to periodic flooding. The maintenance of connections between the various bodies of water is necessary because if they are too isolated and infrequently flooded, their biomass productivity becomes low. Thus, the Original Project's impact on water fluctuations would have negatively affected the fish of the Szigetköz.

5.79. The change in the water discharge in the Szigetköz region would have transformed the plant associations and thus affected the habitats of fauna as well as their reproductive capacity.[80] The disappearance of water or decreases in water level would have isolated aquatic ecosystems and fragmented the floodplains. The main Danube riverbed would have become desiccated, with new and less valuable species replacing the former species.[81]

5.80. The fish population in the main channel would have decreased due to isolation from the floodplain. Fish species that live in strong

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79 E Castella, J F Fruget, C Amoros, A L Roux, *Les Fonctions des Zones Humides et des Milieux Aquatiques des Plaines Alluviales en Relation avec le Cours Principal des Fleuves*, Premier rapport intermédiaire à la Fondation Cousteau (January 1992), at p 40.

80 Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10.

81 For example, a species of beetles normally characteristic of extremely dry regions has just appeared in the Szigetköz region since the diversion. See F Mészáros; Appendix No 1.

currents with high oxygen levels and low water temperatures would have been likely to disappear. Species wishing to migrate would have faced difficulties even if the fish ladder had been built for the Dunakiliti weir. Aquatic life would have suffered from the immediate drop in water levels associated with the diversion.

5.81. In the Szigetköz, spawn laid along the bank or side branches could not have survived the water level reduction or the silt build up.[82] Due to the high diversity of the area, 80% of Hungarian fish species are present, and it is a significant spawning area. Eliminating the flow of water would have undermined the productive base of the entire stretch.[83] The Danube would have lost its sub-montane character, thus affecting, indeed transforming fish fauna, and decreasing its biological value.[84]

5.82. The likelihood of these changes is borne out by experience elsewhere in Europe. In regulated rivers such as the Rhone, Rhine and the German-Austrian Danube, the fish communities have shifted from floodplain spawners to main channel spawners. The species diversity of the fish has decreased because of the decrease in habitat diversity.[85]

5.83. If the side-arms of the floodplain were to disappear completely with construction of the Barrage System, it has been predicted that the total ichthyomass would decrease by 57% in the section between Bratislava and the Nagymaros Reservoir, available production by 75%, and potential yield by 82-91%, although the losses would have been less if some of the side-arms had been preserved.[86] The highest losses would have been in Hungary, adjacent to the Danube bed, since the production

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82 Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10; A Vida, Appendix No 2.

83 *Ecologia Interim Report*, p 80; Annexes, vol 5, annex 6.

84 Even Hydro-Québec, commissioned by the Slovak Government to do a study expressed concern that "les espèces rares ou menacées . . . serait pratiquement disparue depuis la construction du canal de dérivation." See sec 4.3. 2.2, p 93; Annexes, vol 5, annex 9.

85 E Castella, J F Fruget, C Amoros, & A L Roux, *Les Fonctions des Zones Humides et des Milieux Aquatiques des Plaines Alluviales en Relation avec le Cours Principal des Fleuves*, Premier Rapport Intermediaire à la Fondation Cousteau (Jan 1992), at p 43.

86 J Holcik, I Bastl, M Ertl & M Vranovsky, "Hydrobiology and Ichthyology of the Czechoslovak Danube in Relation to Predicted Changes after the Construction of the Gabcikovo-Nagymaros River Barrage System," (1981) 3 *Práce Laboratória Rybárstva a Hydrobiológie* 19-158, at pp 126-27.

of the floodplain and accompanying yield increases in high water years would have ceased to exist.

5.84. Peak power operation as envisaged in the Original Project would have affected both the entire Gabcikovo and Nagymaros sectors, as well as their tributaries (the Rába, the Moson Danube, the Garam, Rábca, Lajta and Ipoly). In particular, it would have modified the seasonal diversity in water level, with consequences for the shoreline flora and fauna, where the most valuable habitats are found. Further downstream, the large waves caused by peak power operation would have interfered with spawning in the side branches (which is dependent upon specific physical-chemical parameters), with the hatching of roe and with fry development.

5.85. Plant associations along the shoreline would have been threatened by changes in groundwater, and changes to plant associations would have affected the fauna living there. The area's biggest aquatic mammal, the otter, almost completely disappeared because of the Nagymaros construction. Birds nesting and overwintering in the area might have been deterred, leading to a significant loss in diversity.

5.86. Most of the fish remaining now in the Danube are those able to exist in flowing waters. Many of them require a sand or gravel bottom habitat or stable shoreline for spawning. Neither the Dunakiliti reservoir nor the shores above Nagymaros would have allowed for either, because of the impoundment of the water and high daily fluctuations in water level.[87] Freshwater species or species requiring the presence of sand or gravel during their cycles would have been replaced by lacustrine or opportunist species.[88] The high rate of sediment deposit in the Dunakiliti reservoir (5-9 cms a year) would have blanketed spawning areas below the highest level of water fluctuation.[89]

5.87. The extensive destruction of biological resources could not have been evaded, even by the most careful operation of the Gabcikovo Barrage. Changes in the water table, disappearance of the seasonal fluctuations, and modification of the oxygen supply of water all have their effect.

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87 Report of Experts of the Hungarian Academy of Sciences, 23 June 1989, p 3; Annexes, vol 5, annex 7; see also *Ecologia Interim Report*, p 80; Annexes, vol 5, annex 6.

88 Equipe Cousteau, *Sept. 1992 Report*, p 25; Annexes, vol 5, annex 12.

89 *Ecologia Interim Report*, p 80; Annexes, vol 5, annex 6.

5.88. Physico-chemical and biological alterations to water quality stemming from increased release of sediments would have negatively affected the fauna. On the Rhone downstream from Geneva, substantial amounts of sediment are released every 2 or 3 years in order to empty and clean two reservoirs. The increase in sediment resulted in physico-chemical and biological alterations to the water quality. These alterations had different biological effects on various species of fauna. The effects were more marked on invertebrates than on organisms having an entirely aquatic life-cycle. The restoration of those affected species took longer than those of aerial species such as insects.[90]

5.89. New conditions of competition, predation and other interactions in the new environment would have been likely to lead to the local extinction of species or their degradation. Both plant and animal species have to colonise new habitats with the changing conditions. This process is necessarily accompanied by decreased population sizes (a bottle-neck effect) and consequently diminished gene pools. Only numerous, genetically diverse populations can adapt to major environmental changes. The decrease in genetic diversity and a consequent lack of adaptability could have caused further extinctions.[91] Thus, a reasonable prognosis would have predicted a severe regional degradation of the region and a serious percentage decline in the number and the diversity of species.

5.90. After the completion of the Barrage System, "the entire Danube section stretching between Bratislava and Nagymaros will [would] have only [had] a minimal biological importance, and moreover the fish populations of both the lower and upper Danube sections can be [could have been] expected to show considerable decreases."[92] It would have

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90 A L Roux, "The Impact of Emptying and Cleaning Reservoirs on the Physico-Chemical and Biological Water Quality of the Rhone Downstream of the Dams," in *Regulated Rivers* 16-70 (Lillehammer & Saltveit, eds 1984).

91 Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10.

92 J Holcik, I Bastl, M Ertl & M Vranovsky, "Hydrobiology and Ichthyology of the Czechoslovak Danube in Relation to Predicted Changes after the Construction of the Gabcikovo-Nagymaros River Barrage System", (1981)3 *Práce Laboratória Rybárstva a Hydrobiológie* 19-158, at 131.

wiped out the floodplain, which, together with its branch systems, constitute the productive basis of the region.[93]

(5) RISKS TO NAVIGATION

5.91. Peak mode operation would have entailed certain risks to navigation. Although the by-pass channel would have somewhat increased the reliability of the navigational route, the large waves and high water velocities would have impaired navigation for several hours per day. Smaller boats (approximately 8-10 metres in length) would have been especially vulnerable and they would have been banned from using the by-pass canal.

(6) RISKS TO LANDSCAPE AND RECREATIONAL VALUES

5.92. The Barrage System as envisaged under the Joint Contractual Plan would have caused the drying up of the Szigetköz especially in its central region. The lack of water in the side branches would have rendered investment in tourism useless. Areas previously available to fishermen, canoeists, bicyclists and others would have ceased to exist. The benefits to tourism of the Original Project, by contrast, were greatly overestimated.

5.93. The landscape along the Danube downstream of Palkovicovo would have also greatly changed. Gravel banks, islets and fringe forests would have disappeared. Peak mode operation would have resulted in a wide barren strip on both sides of the river ranging between 3-12 metres depending on the slope and location.[94]

5.94. The Nagymaros Barrage, as originally planned, would have had an overwhelming visual impact. According to earlier designs, a tall smokestack, overhead transmission lines, large building complexes, and tracts of box-like housing would have transformed the Danube Bend into a heavy industrial district.[95] These plans were modified in the 1980s, but despite the modifications the Barrage would have introduced "an alien architectural mass and form into a region of traditional village architecture".[96]

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93 According to Hydro-Québec, the project would have caused a "modification majeure de l'équilibre biologique de cette région." *Hydro-Québec Study*, p 36, see 2.3. 2.1; Annexes, vol 5, annex 9.

94 Report of Experts of the Hungarian Academy of Sciences, 23 June 1989, p 5; Annexes, vol 5, annex 7.

95 See Map No 6 of Nagymaros Coffer Dam and Barrage; Annexes, vol 2.

96 *Ecologia Interim Report*, pp 53-54; Annexes, vol 5, annex 6.

5.95. The Barrage would have been visible from river level throughout the central portion of the Danube Bend, from the western end of Verőcemaros to Dömös (approximately 10 kilometres).[97] Construction of the dam has already had a significant visual impact on the old towns of Nagymaros and Visegrád.[98] From the surrounding hills, the facility would have been clearly visible over a wider area, including the well-known views from the Fellegvár Castle and Salamon Towers. It would have been clearly visible from most of the major roadways flanking the Danube in the Danube Bend. The dam would have been located in the steep valley of the Danube, and views focus on that valley floor.

5.96. The Nagymaros Dam would have created the only automobile bridge across the Danube between Budapest and Komárom,[99] attracting transit traffic, which would have increased the traffic related pollution of this scenic area.

(7) ARCHAEOLOGICAL RISKS

5.97. There are significant archaeological sites, remains and artifacts dating back to the Neolithic Period (3,500-2,500 BCE).[100] Roman remnants include one of the densest clusters of watch-towers and fortifications of the Empire; these were used to guard the border against invasion. Many of these were threatened and to some extent destroyed by the Barrage project. A total of 45 archaeological sites were endangered in the area upstream of the Nagymaros Barrage: 5 in Dömös, 14 in Pilismarót, and 26 in Esztergom. Of these, 16 are important for science, 12 having universal importance and 4 having outstanding national importance. Three of the 45 sites were destroyed by construction activities. The threatened universal sites include the Royal Town of Esztergom, the remains of a Stephanite church in Szentkirály, remains from the Bronze Age, Celtic, Roman and Medieval eras on Sziget Island and the Víziváros (Water Town) in Esztergom. The other threatened sites include 12 of the 20 Roman watch-towers and 4 fortifications that line the river between Esztergom and Nagymaros.[101]

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97 See Map No 3; Annexes, vol 2.

98 See Photo Nos 29, 30 and 31; Annexes, vol 2.

99 *Ecologia Interim Report*, p 54; Annexes, vol 5, annex 6.

100 See Map No 18, in Annexes, vol 2. See also *Ecologia Interim Report*, p 49; Annexes, vol 5, annex 6.

101 See *Ecologia Interim Report*, pp 49-50; Annexes, vol 5, annex 6 (discussing conclusions of I. Horváth, the Director of the Bálint Balassa Museum in Esztergom,

5.98. With the completion of the Original Project, the groundwater table would have risen to endanger excavation of these sites. The dredging and rapid construction would have destroyed many of them (with limited or no time for rescue digs).[102] Many Roman fortifications would have been submerged.[103] The river terraces to be covered by the dyke system were among the most important sites for early settlement.

(8) GEOLOGICAL AND GEOPHYSICAL RISKS

5.99. From the point of view of geology, the greatest risk is the lack of detailed knowledge of the area. Without such knowledge, technical planning and environmental risk assessment cannot arrive at sound results. A reliable prognosis can only be made based on systematic studies revealing geological conditions.

5.100. The Gabcikovo Barrage is built near a geologically young fault.[104] The planning of the Barrage System was not preceded by a detailed geological survey of the region.[105] There was no deep drilling in the area of the Barrage System to explore the structure of the area.

5.101. Research results obtained separately in Hungary and Czechoslovakia have never been integrated. For example, the Gabcikovo fault line discovered in Slovakia has not been traced further in Hungary. After the fault line was discovered, the Gabcikovo Barrage was relocated 600 metres away. But it was nevertheless built in the immediate vicinity of a geologically young fracture-line, as well as close to the Rába line, when the African and European continental plates intersect.

5.102. Research done after suspension of Hungarian construction at Nagymaros has shown that the seismic risk initially set forth in the Joint Contractual Plan was underestimated.[106] In 1990, when Czechoslovakia claimed that the Gabcikovo part of the Project was almost complete, a

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in his work, *Defence of Archaeological-Historical and Monumental Values and Interests in the Region Above the Nagymaros Dam* (1985)).

102 *1989 Hardi Report*, p 27; Annexes, vol 5, annex 8.

103 *Ecologia Interim Report*, p 48; Annexes, vol 5, annex 6.

104 Slovak Union of Natural and Landscape Protectors, sec 4; Annexes, vol 5, annex 17.

105 For a discussion of the lack of seismic research in the area of the Barrage System, see Declaration of Hungary on the Termination of the 1977 Treaty, pp 16-17; Annexes, vol 4, annex 82.

106 See Slovak Union of Nature and Landscape Protectors, sec 4; Annexes, vol 5, annex 17.

joint plan was prepared for the seismic monitoring of the area of the dam system. The plan was never implemented.[107]

5.103. In 1991-92 under the coordination of the Ad Hoc Committee of the Hungarian Academy of Sciences, within the framework of the Hungarian-Czechoslovak research programme on the development and rehabilitation of regions of the common section of the Danube, a detailed and comprehensive analysis became possible in certain technical fields (such as the determination of seismic risk exposure). The research concluded that the seismological base data used in the course of the facility's design work were not correct and that the impact of an earthquake would be five to ten times greater than assumed in the design.

5.104 To summarise, the seismology of the region is of great concern.[108] The seismicity values of the Joint Contractual Plan are not useful, because the compulsory building codes have not been applied. For example, the expected intensity estimated for the Dunakiliti area based upon historical data is 8.7-9.0 MSK at the normal security threshold, while the plans for the Original Project assumed 6.0 MCS. Studies have shown that within 100 years the likelihood of an earthquake occurring which registers 6.4 MSK is 30%, 7.0 is 10%, and 7.3 is 5%.[109]

5.105. Water would have been dammed between Esztergom and Nagymaros above the highest recorded flood level during peak hours of operation. If the dam at Gabcikovo Barrage were to have failed due to an earthquake or for other reasons, a flood wave would have been created exceeding the highest recorded flood on the river, affecting the whole area from Gabcikovo to Nagymaros.

SECTION C: DAMAGE AND RISKS FROM VARIANT C

5.106. In general, environmental effects of Variant C are expected to be similar to those outlined above for the Dunakiliti-Hrusov reservoir and Szigetköz region. Impacts on the Nagymaros area will largely stem from those upstream effects. The focus of this section will therefore be to identify differences in impact with respect to the Original Project, to

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107 Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10.

108 See Report of Experts of the Hungarian Academy of Sciences, 23 June 1989, pp 6-8; Annexes, vol 5, annex 7; Hardi Report, 1989, pp 11-12: Annexes, vol 5, annex 8.

109 See Summary of Final report, *Research Programme Related to the Development and Rehabilitation of the Hungarian-Czechoslovakian Common Danube Stretch and Connected Areas - Stage I* (in Hungarian), 20 January 1992, pp 11-29.

review observed effects and to consider implications of the Variant C structures.

5.107. The EC Experts Group[110] and other bodies have recognised the damage caused by Variant C. In a recent report of the World Wildlife Fund, it was stated:

> "Based on the year's experience gained from this section of the Danube, other rivers and similar engineering projects, it must be stated that the river diversion and the operation of Gabcikovo *inevitably* will result in detrimental alterations for the hydrology/biogeochemistry (ground- and surface waters), for the geomorphological processes (sedimentation/erosion) and for the floodplain ecology (diversity of biocenoses and especially adapted species) during the next years in the wetland and adjacent areas. Even though many impacts are not yet visible to the public, they can already be monitored by experts."[111]

5.108. In a number of respects the impact of Variant C on the region may be less than the 1977 Barrage System would have been. The principal reason is the smaller reservoir at Cunovo, operating in continuous mode.[112] This leads to a shorter residence time of water in the reservoir and thus decreases the risk of eutrophication. Nonetheless, the danger of eutrophication and all of its negative impacts remains, as the Report of the Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project has observed.[113]

5.109. In other respects the impact of Variant C is or is likely to be more severe, especially on the Szigetköz. There are a number of reasons for this:

(1) Hungary did not plan short term technical fixes to compensate for the water loss because there was no accurate timeline information provided about Variant C and no consultations on its design or operation.[114] Nor was there any opportunity for the diversion to

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110 See above para 3.215.

111 *1993 WWF Report*, p 8 (emphasis in original); Annexes, vol 5, annex 20.

112 See Map No 5 comparing Original Project and Variant C; Annexes, vol 2.

113 Commission of the European Communities, Czech and Slovak Federal Republic, Republic of Hungary, *Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project*, 23 November 1992, pp 55-56; Annexes, vol 5, annex 14.

114 See Flow Rate Map, Map No 7; Annexes, vol 2.

be introduced gradually, allowing for some adjustment in downstream ecosystems. The change was imposed within a few days.[115]

(2) Hungary receives absolutely no benefit from Slovakia's unilateral activity.

(3) Hungary has no control over the supply of water, and attempts to achieve some sort of cooperative solution to the problems (e.g., though a temporary water management regime) have failed due to Slovakian intransigence.[116]

(4) As will be shown in Chapter 10, the economic situation in the region has changed drastically in the period since 1988-89, rendering a change in production structure extremely difficult.[117]

(5) If the Barrage System had been built as originally planned, the river would have been diverted for 31 kilometres between rkm 1842 and rkm 1811. Under Variant C, the river is diverted for 41 kilometres between rkm 1852 and rkm 1811.

5.110. The specific consequences of Variant C may be summarised as follows.

(1) Impact on Surface and Subsurface Waters

(a) Abrupt Drying-out of the Szigetköz

5.111. Shortly after the diversion, the riverbed and its side branches were left practically without water. The discharge fell from approximately 1000 m3/sec to 150-300 m3/s,[118] well below the minimum ever registered. The water level decreased by 3.0 m at rkm 1850 and by 2.4 m at rkm 1825 in less than 4 days.[119] On 31 October

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115 See Photo Nos 11 and 12 and also Photos before and after the diversion, Photo Nos 13-28; Annexes, vol 2.

116 See above, paras 3.187 - 3.223.

117 See below, para 10.74.

118 Commission of the European Communities, Czech and Slovak Federal Republic, Republic of Hungary, *Working Group of Independent Experts on Variant C of the Gabcikovo-Nagymaros Project*, 23 November 1992, Appendix H-1, Annexes, vol 5, annex 14.

119 Commission of the European Communities, Czech and Slovak Federal Republic, Republic of Hungary, *Fact Finding Mission on Variant C of the Gabcikovo*

1992 the discharge at Bratislava was more than 2200 m3/s, as compared to less than 230 m3/s, 20 km downstream at Rajka. The width of the river decreased 55 metres on average, with some sections losing 110 metres of width. This abrupt change had a severe impact on living communities in the region, especially on fish.

5.112. The immediate consequences of the diversion included the following:

* the side branches were cut off from the main channel;

* the water from the downstream part of the side branches disappeared immediately;

* the groundwater table decreased up to 3 metres in the floodplain and up to 1.5 metres on the protected side, threatening or terminating water abstraction from some dug wells used by people; and

* water has disappeared from the navigation ports of Ásványráró, Dunakiliti and Rajka along a forty km long stretch (rkm 1850 to rkm 1811);

(b) Longer Term Impacts

5.113. The longer term consequences of the diversion are determined by the radically decreased discharge and flow velocity, the drop in water level, the disappearance of seasonal fluctuation and the lack of water entering the side branches. The consequences of the minimal discharge, well below the lowest minimum ever registered under conditions prior to Variant C, are expected to be similar to those described in connection with the Original Project and need not be repeated here.[120] A major difference between the Original Project and Variant C is that the lower end of the reservoir is located 8 km upstream from Dunakiliti, depriving the Danube bed between rkm 1851.7 and rkm 1843 of 80-90% of its water. Under the Original Project this section would have formed part of the reservoir.[121] As a consequence, instead of a rise of groundwater levels in the vicinity of Dunakiliti, a significant decrease has been experienced.[122]

Nagymaros project, Mission Report, Bratislava, 31 October 1992, p 12; Annexes, vol 5, annex 13.

120 They are summarised above in paras 5.42 - 5.44 and 5.52 - 5.56

121 See Map No 5, comparing Original Project to Variant C; Annexes, vol 2.

122 Data were submitted in the Data Report of the Hungarian Party, 21 October 1993, Figure 7 in chapter: Ground Water Level (Submitted to the Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks).

(c) Problems with Ice

5.114. A specific danger linked with Variant C is that the Cunovo dam is incapable of releasing ice accumulating in the reservoir. Due to their size and relatively high sill level, the gates of the Cunovo by-pass weir are incapable of letting through large blocks of ice, which in turn are forced to enter the power canal where they may form an ice barrier, as happened in January 1993. This caused a stoppage of navigation, and if an unusual warming had not solved the problem by thawing the ice barrier (which the operating company had been unable to remove), the ice accumulating in the head race canal 11.2-13.4 km above Gabcikovo could have had unpredictable consequences. This state of affairs poses a continuous threat to navigation.

(d) Flood Design and Construction Problems

5.115. During the "unexpected" flood in November 1992, shortly after the closure, 2-3 million m3 of sand and gravel eroded from the stretch running 500 metres downstream from the Cunovo dam, a consequence of the unfinished state of the construction.[123] The river deposited this enormous amount of material in an unpredicted and unregulated way, at some places raising the riverbed by 1 metre. Reconstruction of the navigation route in the main channel will be significantly more expensive as a consequence.

5.116. The risk to the structure from extreme floods is extremely serious. As stated in the Report of the Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks of 1 December 1993, the faulty design of the Slovak by-pass weir at Cunovo only permits the discharge of less than half of what had been claimed to be its capacity (600 m3/s instead of 1460 m3/s). Since the total capacity of the canal in flood situations is approximately 4500 m3/s and that of the floodplain (inundation) weir at Cunovo 4600 m3/s, if the water level is at 131.1 above sea level (but only 1200 m3/s if it is at 129.0 m asl), even a flood of 10,000 m3/s[124] can only pass if every part of the system operates perfectly. This is an unrealistic presumption taking into account that there have been many weeks since October 1992 when either the Cunovo by-pass weir or one or both of the Gabcikovo shiplocks could

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123 See Photo Nos 9 & 10; Annexes, vol 2.

124 There is 1% probability that such a flood will occur. Taking the risk of an event with such high probability is only accepted for brief (construction) period. A structure meant for a hundred years operation must be capable to handle events the occurrence of which are to be expected once in 10,000 years. (0.01% probability)

not be operated even in emergency situations.[125] The structure is therefore built to standards that fall well short of accepted practice.[126]

(e) Unilateral Slovak Control of Water Flow

5.117. Under Variant C the Slovak authorities determine the flow-rate in the Danube. In case of floods, they decide on the amount of water to be discharged. Without warning, in a matter of hours, a several metres rise in the surface water levels of the main riverbed and the side branches in the Szigetköz may occur.

5.118. The exclusive Slovak control over the Cunovo dam deprives Hungary of the possibility of occasionally letting down larger amounts of water through the Danube bed to satisfy urgent needs of nature protection or pollution prevention. In contrast to the present situation, Article 14(3), of the 1977 Treaty entitled both Parties to unilateral water withdrawal at the expense of their allocation of electric energy production.

(2) IMPACT ON SOIL AND AGRICULTURE

5.119. Expected impacts on soil structure and chemistry will be primarily long term.[127] Short term soil water changes have occurred in response to the fluctuations in groundwater level.[128] For agriculture, of 1900 hectares of arable land in Middle Szigetköz between Dunasziget and Ásványráró, previously characterised by an adequate amount of groundwater, the water level decreased on average by 100-150 cms during the growing season. On a further 2100 hectares, the groundwater level decreased by an average of 60-100 cms. In these areas, the groundwater level used to fluctuate permanently or occasionally in the top soil layer, whereas it stays now in the gravel layer, which means that there is no supply of moisture available. According to measurements made in March 1993, in 150 cms of soil, 40-100 % of the moisture was

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125 Up to November 1993, there were 14 days when none of the shiplocks could be operated: Commission of the European Communities, Republic of Hungary Slovak Republic, *Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks Data, Report*, 2 November 1993, p 55; Annexes, vol 5, annex 18.

126 The Slovak Union of Landscape and Nature Protectors also cited findings of experts indicating that the Gabcikovo Dam Project would magnify hazards of flooding. See sec 4; Annexes, vol 5, annex 17.

127 See above paras 5.60 - 5.67.

128 See above para 5.112.

absent. The 1993 crop yield in these areas lagged behind the average of the region.

5.120. In the areas in the Middle Szigetköz, where the ground water level has decreased substantially, replacement, deeper rooting crops will have to be grown. Even these will be extremely dependent on precipitation or irrigation. Again the security of yield will be significantly decreased.[129]

5.121. There is a major difficulty in interpreting short term effects given the dependence of soil moisture on climate and groundwater. However, the reduced crop yields for the region are an indication of such an effect.

(3) FORESTRY

5.122. The EC Expert Report stated that forestry would be "mainly positively affected in Slovakia and mainly negatively in Hungary."[130] Specifically, if current conditions remain, there are likely to be the following effects:

> "On the Hungarian inundation area (side branches plus forests) the decrease of the water level fluctuations makes the site conditions worse for floodplain biocenoses. On the Hungarian inundation area the reduction of deposition of fine material (nutrients!) by floods in the alluvial forests makes their growing conditions worse . . ."[131]

5.123. After June 1993, partial water deficiency could be seen in the alluvial forests of Szigetköz. Yellow patches appeared on the leaves and branches began to shrivel. From June on, trees started to lose their leaves. By mid-June, 3% of the alluvial forests were classified as dead. At the end of 1993, 5% of the trees were classified as dead.

5.124. Spring-early summer timber, which has the largest water demand, suffered severely in 1993. The circumference of the trunks was compared to the averages of 1991-92 (calculated from the beginning of

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129 This was already the prognosis in the Report of Experts of the Hungarian Academy of Sciences, 1991; Annexes, vol 5, annex 10.

130 EC-Hungary-Slovak Republic, *Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks, Report on Temporary Water Management Regime*, 1 December 1993, p 33; Annexes, vol 5, annex 19.

131 EC-Hungary-Slovak Republic, *Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks, Report on Temporary Water Management Regime*, 1 December 1993, p 33; Annexes, vol 5, annex 19.

the growing season to 31 July). It demonstrated a decrease in growth in trunk circumference ranging from 59-70% depending on the site. The data was gathered by the Hungarian Research Institute of Forestry every week with 0.1 mm accuracy in several sample fields of the Szigetköz floodplain.

5.125. If the water table does not improve for 1994, accelerating deterioration of the alluvial forests will occur. This is a direct negative effect of Variant C's operation. Damage similar to that which had been predicted for the Szigetköz region from operation of the Barrage System[132] is now occurring.

(4) IMPACT ON FLORA AND FAUNA

5.126. The original plans had counted on taking about 6 months to fill the Dunakiliti reservoir, while the waters on the floodplain and on the protected side branches would have received a continuous water supply. Variant C resulted in the serious loss of water within the course of a few days, multiplying the negative effects on flora and fauna,[133] in particular to fish.

5.127. This impact is of course continuing. According to the EC Experts:

> "Water velocity in the Old Danube is an important factor for the river ecosystem. The present situation is, that, due to the lower water velocity, the originally clean gravel bed is covered with silt and other fine material and therefore it fails as habitat for river benthos organisms and for fish species spawning on gravel ground."[134]

5.128. Of the 53 known spawning-grounds for economically valuable fish species, 20 ceased to function in 1993. The number of developed fish decreased to 65-70% of the number before the diversion. The amount of second-summer-old fry decreased by 20-30%. 150-450 thousand kilograms of fish disappeared from Hungary or perished. Approximately 30% of those were economically valuable fish.

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132 See Hungarian Declaration on the Termination of the 1977 Treaty, pp 21-22; Annexes, vol 4, annex 82.

133 F Mészáros, Appendix No 1.

134 Letter, From Mr J. Schreiner, Professor and Head of the EC Experts Group, to Mr P Benavides, EC Director General of External Economic Relations, February 1994, p 3; Annexes, vol 4, annex 139.

5.129. The lakes of Lipót and Ásványráró-Öntésszíget, specially protected nature conservation areas, became dry temporarily during the summer of 1993, due to a complete loss of water. By the second part of the summer, water was pumped artificially into the Mortlake of Lipót.

5.130. It is clear that long-term effects and damage will occur to the flora and fauna. If the surface water and groundwater level stabilises at its present level and there is no change in the discharge regime, the mosaicity of the landscape and the presence of a highly diverse and wide range of habitats is likely to be lost. Those features were unique to the Szigetköz. It is likely that the size of the populations will decrease considerably: the predicted long term effect is a decline in biological diversity.[135]

5.131. Changes in alluvial ecosystems which are likely to flow from Variant C were detailed in the EC Expert Report which noted, *inter alia*, that . . .

> "Reduction of discharges in the Old Danube leads to reduction of the water body, the flow velocity and to sedimentation of fine material. This will cause the loss of species typical for streams, of rheophile organisms, especially of fish species spawning on gravel ground.
>
> The flow velocities in the main river are not large enough to provide adequate living conditions for the species requiring higher flow velocity, for example, fish species like Streber. . ."[136]

(5) NAVIGATION

5.132. The operation of Variant C has made commercial navigation and the transit of international shipping in the Danube between rkm 1852-1811 impossible, and has deprived Hungary of its riparian rights. The lack of an emergency navigation route implies the danger that in case of an accident rendering the by-pass canal or the shiplocks

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135 F Mészáros; Appendix No 1.

136 EC-Hungary-Slovak Republic, *Working Group of Monitoring and Water Management Experts for the Gabcikovo System of Locks, Report on Temporary Water Management Regime*, 1 December 1993, pp 32-33; Annexes, vol 5, annex 19.

inaccessible, international navigation must be suspended.[137] Variant C has eliminated growing small-boat tourism.

(6) GEOLOGICAL AND GEOPHYSICAL RISKS

5.133. The implementation of Variant C without adequate knowledge as to the geological and seismic risks is unacceptable as it would have been for the Original Project.[138]

(7) DESIGN AND SAFETY RISKS

5.134. Concerns have been expressed as to the slipshod nature of the design of Variant C. The construction on the dam prior to the planned diversion resulted in flaws and cracks in the dam wall and canal, suggesting that at that time the Project might not comply with the required specifications concerning structural stability.[139] Matters were made worse with the rapid implementation of Variant C, which showed its deficiencies within a month in the flood of November 1992.

(8) ENVIRONMENTAL PROTECTION

5.135. On 25 June 1991, the Slovak Environmental Commission, the central authority for water economy, issued a binding "Statement" under Section 14 of the Slovak Water Act.[140] According to this statement, 19 conditions had to be complied with as a legal prerequisite for using the water and operating Gabcikovo. In summary, they included:

1. the documentation of the self cleaning processes and mechanisms;
2. the documentation of pollution of the soil and groundwater;
3. the evaluation and documentation of the impact of the Gabcikovo barrage and the provisional solution [Variant C] on the groundwater system;

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137 The danger materialised, when after a ship accident on 11 February 1994 in the right shiplock – which led to the shipwreck lying in the shiplock chamber for more than 50 days – another accident in the left shiplock on 20 March 1994 (break of a 500 ton downstream gate) made access to the shiplocks impossible. The international navigation on the Danube became irreparably paralysed and is still in that condition as of 30 March 1994.

138 See above paras 5.96 - 5.105.

139 See Slovak Union of Nature and Landscape Protectors, sec. 4; Annexes, vol 5, annex 17.

140 Water Act No 138/1973 Zb, cited by *1993 WWF Report*, p 7; Annexes, vol 5, annex 20.

4. the drafting of a prognosis for the upgrade of the quality of the groundwater used for the public drinking water supply;

5. the proof of the impact of the provisional solution on the groundwater quantity;

6. the determination of the side effects of the modified reservoir;

7. a provision for analysing the colmatation process in the reservoir region and in the region of the insulated head-race canal "because accelerated colmatation of the reservoir bed is to be expected in the aftermath of the increased hydraulic gradients, particularly on the reservoir's right side";

8. the assessment of effects to the Danube riverbed on the groundwater system on both banks of the Danube following the closure of the Danube;

9. the solving of the organisation and navigation of the Danube from Palkovicovo to the Ipoly estuary, particularly in conjunction with the neutralisation of intensive erosion between the Palkovicovo-Moson-Danube estuary;

10. the proper storage of sediment produced from the reservoir;

11. the guarantee that the branch system will be linked to the Danube;

12. the guarantee of construction of facilities to handle shipping accidents, particularly from fossil fuel damage;

13. the assurance of the Moson-Danube water supply in accordance with the 1947 Agreement and Paris Peace Treaty;

14. the demonstration that damage would be prevented or limited while work on the project took place;

15. the assessment of the draining of flood water and removal of ice;

16. the operation of continuous monitoring projects both in the Gabcikovo area and in the by-passed Danube bed;

17. the consideration of the preparation of the draft plan entitled "The summary of flood protection provisions";

18. the guarantee of water output of approximately 1300-1500 m3/s for vegetation of the floodplain region in the Danube and the maintenance of the natural physiological processes of the growing season for the necessary time period (especially for the months of March and September) the guarantee of a constant water output in

the main riverbed which would allow for groundwater level contact with the soil horizon; and

19. the guarantee of flood protection provisions in the area of the right drainage canal.

5.136. The company responsible for Variant C at no stage before the implementation of Variant C complied with these conditions. It was fined for non-compliance with licensing and permit procedures.[141] In short, the construction of Variant C was unlawful *under Slovak law*. On 17 April 1993, a specific permit for use of the Danube water was granted apparently replacing Condition No 18 for an interim period because the technical situation (in particular, the design deficiencies) did not allow for a higher discharge.[142] According to a letter of the Slovak state attorney on 19 August 1993, the company received permission on 17 May 1993 to dam the water. Apparently, the specific order was granted by the authority under the conditions that a minimum flow of 600 m3/s be guaranteed in the Danube.[143] That condition has not been complied with as of 1 April 1994.

5.137. According to an information release by the Slovak Environmental Commission of March 1993, the operation of the system was then only in compliance with conditions 9, 10, 12, 14, 15, 16, and 19. Those were the conditions of least importance to Hungary.[144] One year later, most of the conditions are still not met -- those of greatest importance to Hungary.

CONCLUSIONS

5.138. For the reasons explained in paragraph 5.04, it is not possible to be definitive about issues of risk and damage at this stage. This is especially so with respect to those elements of the Project which were never constructed (i.e., Nagymaros Barrage) or which never operated (e.g., peak power production).

5.139. Despite this, the catalogue of risk and damage presented here demonstrates that harmful irreversible processes have started and will continue to emerge. This calls into question not merely the operation of

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141 1993 WWF Report, p 7; Annexes, vol 5, annex 20.

142 1993 WWF Report, p 7; Annexes, vol 5, annex 20.

143 1993 WWF Report, p 7; Annexes, vol 5, annex 20.

144 See Information Release, March 1993; Annexes, vol 4, annex 172 (describing non-compliance of majority of provisions, as well as the actions taken to be in compliance of remaining provisions.)

Variant C but the underlying conception of the Barrage System as originally planned and ultimately constructed. As originally conceived the Barrage System carried substantial risks, including risks to the drinking water supply of the capital city and to Hungary's most important water reserve. It would have damaged a wetland area of European value. Variant C carries many of the same risks to the water reserve and to the wetland, together with a number of additional risks due to its design and mode of construction. To the extent that any benefits can be attributed to Variant C, they apply almost entirely to the Slovak side, the result of its unauthorised appropriation of the waters of a border river for more than 40 rkms.

5.140. The consequences of this conclusion will be spelled out, within the framework of the applicable legal rules and principles, in Parts III and IV of this Memorial.

PART III
BREACHES OF THE LAW ATTRIBUTABLE TO CZECHOSLOVAKIA AND SLOVAKIA

CHAPTER 6

BREACHES OF THE 1977 TREATY AND OF OTHER RELEVANT RULES OF INTERNATIONAL LAW IN RELATION TO THE ORIGINAL PROJECT

6.01. Against the historical and factual background set out in the preceding Chapters, this Part of the Memorial sets out and demonstrates the breaches of international law which are attributable to Czechoslovakia and subsequently to the Slovak Republic. The present Chapter focuses on breaches of relevant treaties, and of general international law, committed by Czechoslovakia prior to the construction and implementation of Variant C. Chapter 7 will deal with the illegality of Variant C itself. Chapter 8 will discuss the issue of the attribution of these unlawful acts to the Slovak Republic, and the consequential obligations of reparation.

6.02. Certain preliminary comments are however necessary concerning the attribution of rights and responsibilities to Czechoslovakia and the Slovak Republic.[1]

6.03. Prior to 1 January 1993, the Slovak Republic did not exist as a State or a legal person of international law. Under the constitutional arrangements governing the Czech and Slovak Federal Republic, international competences and responsibilities were vested in and exercised exclusively by the Federation, and the component States had no separate international existence. Prior to that date, the relevant treaties, including the 1977 Treaty, were necessarily treaties concluded with Czechoslovakia. The Slovak Republic was never a party to the 1977 Treaty or its associated agreements.

6.04. On 1 January 1993 the Czech Republic and the Slovak Republic came into existence as new persons of international law, and the Czech and Slovak Federal Republic ceased to exist as a legal person. Neither

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1 See also above, paras 2.03 - 2.07.

the Czech Republic nor the Slovak Republic claimed to be continuous with or the same State as the former Federal Republic. Both applied for and were admitted as new members of the United Nations and of the Council of Europe, whereas the Czech and Slovak Federal Republic was an original member of the United Nations and a member of the Council of Europe since 1991. There was thus a succession of States on 1 January 1993, the consequences of which are to be regulated by agreement between those concerned in accordance with the applicable rules of international law governing succession of States.

6.05. Paragraph two of the preamble to the Special Agreement recites that "the Slovak Republic is one of the two successor States of the Czech and Slovak Federal Republic and the sole successor State in respect of rights and obligations relating to the Gabcikovo-Nagymaros Project". On 3 March 1993 the Czech Republic notified the European Commission

. . .

> "that on February 23, 1993 the House of Deputies of the Parliament of the Czech Republic approved that the Czech Republic would not become a successive [sic] state to the Treaty between the Czechoslovak Socialist Republic and the People's Republic of Hungary on the construction and operation of the Gabcikovo-Nagymaros system of locks, signed at Budapest on September 16, 1977 and the contractual documents related to this Treaty."[2]

The subsequent discussions between the Slovak Republic and Hungary on succession issues are outlined in Chapter 10. Although the Slovak Republic sought Hungarian agreement to its succession to the 1977 Treaty, the Republic of Hungary declined to agree to this. For its part the Slovak Republic proposed to negotiate succession to bilateral treaties on a case-by-case basis, a procedure accepted by the Republic of Hungary.[3]

6.06. The Special Agreement draws a distinction between the 1977 Treaty as such (referred to in the first preambular paragraph) and the Gabcikovo-Nagymaros Project (referred to in the second preambular

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2 *Note Verbale* from the Czech Republic to the EC Commission, 3 March 1993; Annexes, vol 4, annex 117.

3 *Note Verbale* from Ministry of Foreign Affairs of the Slovak Republic to the Embassy of the Republic of Hungary, 15 November 1993; Annexes, vol 4, annex 128.

paragraph). It is obvious why such a distinction was necessary: the Slovak Republic was never a party to the 1977 Treaty and breaches of that Treaty committed by the Czech and Slovak Federal Republic were not as such attributable to it. Moreover the 1977 Treaty had been terminated by the Republic of Hungary, and effectively repudiated by the Czech and Slovak Federal Republic, prior to 31 December 1992. It has *never* been in force between the parties to the present case.

6.07. Nonetheless the questions of suspension, breach and termination of the 1977 Treaty are matters for the Court to decide under Article 2 of the Special Agreement.[4] The reason is that they relate to questions which are in dispute between the Republic of Hungary and the Slovak Republic -- that is to say, the legal consequences for the present parties of the transactions which occurred before one of them came into existence as a State. Under normal circumstances questions as to the legality or illegality of conduct as between the Republic of Hungary and a third State which has ceased to exist would be moot questions,[5] and would not be within the adjudicatory competence of the Court. This is not so in the present case because *and to the extent that* legal consequences for the parties may flow from the answers to those questions.

6.08. The Special Agreement specifies three questions which the Court is requested to decide: these are directly addressed in this Memorial.[6] But it does not embody any agreement between the Parties as to the extent to which rights or obligations which arose between the Republic of Hungary and the Czech and Slovak Federal Republic are included within the "rights and obligations relating to the Gabcikovo-Nagymaros Project" which are applicable or in force as between the Republic of Hungary and the Slovak Republic. That is a matter for the Court to decide, applying relevant rules of international law. But the extent to which particular rights or obligations may subsist between the parties

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4 See above, paras 2.01 - 2.05.

5 Cf *Northern Cameroons Case*, ICJ Rep 1963, p 15. This is quite separate from any constraints imposed by the *Monetary Gold* principle: *Case concerning Monetary Gold Removed from Rome in 1943*, ICJ Reports 1954, p 32.

6 The question identified in Article 2(1)(a) (suspension and termination of works) is addressed in Chapter 9; the question identified in Article 2(1)(b) (legality of the "provisional solution") is addressed in Chapter 7; the question identified in Article 2(1)(c) (termination of the 1977 Treaty) is addressed in Chapter 10.

cannot be determined in the abstract: it will be addressed as needs require in this Memorial, and in particular in Chapters 8 and 11.

SECTION A: BREACH OF PERTINENT BILATERAL TREATIES

6.09. It is now proposed to detail the various breaches of relevant treaties, and of general international law, committed by Czechoslovakia prior to the construction and implementation of Variant C. Questions relating to Variant C will be dealt with in Chapter 7.

6.10. It is true that Variant C came into the picture at a comparatively early stage. According to a publication of the Slovak Republic, the decision to proceed with Variant C was taken in January 1991,[7] and threats to do so were made 18 months before that.[8] At a certain point the threat of damaging unilateral action could not be separated from the whole dispute over the Barrage System. Nonetheless it is useful to discuss the legality of Czechoslovak conduct in relation to the Original Project, and in the context of imperative concerns raised by Hungary as to its continuation. In particular, as will be seen in Chapter 7, although introducing the radical novelty (and new illegality) of its unilateral character, the decision to set up Variant C and the specific way chosen to implement it were also, to a significant extent, based on the continuation of actions performed in breach of Czechoslovakia's international obligations, in particular the 1977 Treaty and the 1976 Boundary Waters Convention.

6.11. As will be demonstrated in the following paragraphs, Czechoslovakia was in breach of the 1977 Treaty, in particular Articles 15 and 19, as well as of other bilateral treaties, in particular the 1976 Boundary Waters Convention. These breaches antedated the suspension and abandonment of works by Hungary, and were never remedied. They formed one of the grounds for subsequent Hungarian termination.

(1) BREACH OF THE 1977 TREATY

6.12. As was noted in Chapter 4, a number of articles of the 1977 Treaty directly aimed at environmental protection. Article 15 concerned

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7 Vodohospodarska Vystava sp Bratislava, "Gabcikovo-Nagymaros Project. The Temporary Solution of the Territory of the CSFR-Slovakia" (Bratislava) 1993; Annexes, vol 4, annex 173.

8 See below, para 9.07.

the protection of water quality, Article 19 the protection of nature, Article 20 the protection of fishing interests.

(a) The scope of Article 15

6.13. Article 15 provided as follows:

> "1. The Contracting Parties shall ensure, by the means specified in the joint contractual plan, that the quality of the water in the Danube is not impaired as a result of the construction and operation of the System of Locks.
>
> 2. The monitoring of water quality in connection with the construction and operation of the System of Locks shall be carried out on the basis of the agreements on frontier waters in force between the Governments of the Contracting Parties."

The aim of Article 15 was to maintain water quality. In that context the reference to boundary waters agreements in force was legally significant. When the 1977 Treaty was concluded the relevant frontier waters agreement was the Boundary Waters Convention of 1976. It is still in force, and contains precise obligations with regard to water quality.[9] The point of Article 15 was to ensure that no additional pollution would be caused by the construction and the operation of the Barrage System, and the standard established by the 1976 Convention could not have been intended to be relaxed or reduced. On the other hand, that Convention was not the last word: subsequent boundary waters agreements might be concluded, and their standards would in turn be relevant. Thus Article 15 also had the objective of enabling the Contracting Parties to reach such higher standards as might be required by evolving domestic and international norms to fulfil health and environmental protection requirements.

6.14. The broad scope of Article 15 can be seen from the definition of the words "the water in the Danube", and the definition of the impairment of the quality of the water. Reference should also be made to the phrase "by the means specified in the joint contractual plan", which is common to Articles 15 and 19 and obviously has the same meaning in both.

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9 See above, paras 4.33 - 4.35. The 1976 Boundary Waters Convention is an agreement relating to the regime of a boundary and is therefore also in force between the Republic of Hungary and the Slovak Republic: see also below, para 10.111.

6.15. The term "water in the Danube" in Article 15 included the underground waters connected with the river as well as the waters in the main course of the river. The intention of the parties was manifest in this regard. Article 15 referred to monitoring of water quality "on the basis of the agreements on frontier waters in force". The purpose of monitoring was to maintain water quality as required by Article 15(1). The definition of water quality for the purpose must have been the same and, in the absence of any definition in the 1977 Treaty itself, can be derived from the "agreements on frontier waters in force". The frontier water agreement in force in 1977 and throughout the dispute was the 1976 Boundary Waters Convention. That Agreement is quite clear in referring both to "all surface and sub-surface waters intersected by the State boundaries" (Article 1), and in including within its scope "the protection of surface and subsurface waters from pollution" (Article 2).

6.16. The inclusion of subsurface waters within Article 15 conformed to general rules of international law on international watercourses. To illustrate, the Declaration on Waters adopted by the UN Economic Commission for Europe in 1980, systematically associated surface and ground water.[10] Hungary and Czechoslovakia participated in the drafting of this Declaration. Subsequent international instruments confirm that surface water and groundwater resources must be considered as a unit in preserving their quality.[11] The Draft Articles on the Law of the Non-navigational Uses of International Watercourses adopted by the International Law Commission on 11 September 1991 reflect State practice and agreements, in this and other respects. Article 2(c), as adopted, provides that:

> "watercourse means a system of surface and underground waters constituting by virtue of their physical relationship a unitary whole and flowing into a common terminus."[12]

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10 Principles 1, 3, 5, 13. See E/ECE/1084 ECE/WATER/38, pp 1 - 5.

11 ECE Declaration of Policy on the National Use of Waters, 1984, Principle 3(e), 5; ECE Decision D (XXXVII) on International Co-operation on Shared Water Resources, 1982; ECE Charter for the Management of Groundwater, Decision E (44), 1989, E/ECE/1197, ECE/ENVWA/12. According to Art 1 of the 1992 Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes: "'Transboundary waters' means any surface or ground waters which mark, cross or are located on boundaries between two or more States..." (E/ECE/1267).

12 UN Doc A/46/405 (11 September 1991).

6.17. Having regard to Article 1 of the 1976 Boundary Waters Convention, the term "the water in the Danube" clearly included the underground water of the concerned area as well as the water in the riverbed itself.

6.18. The phrase "the quality of the water . . . is not impaired" equally had a broad sense. Impairment of quality meant damage or deterioration and in its interpretation the different uses of water had to be taken into consideration. It certainly included pollution. In international law, the ordinary meaning of pollution was at that time . . .

> "the introduction by man, directly or indirectly, of substances or energy into the environment resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems, and impair or interfere with amenities and other legitimate uses of the environment."[13]

This definition includes not only effective damage by pollution, but also the appreciable risk of damage. It includes changes in the chemical composition, temperature or other characteristics of the waters of the Danube in such a way as to injure the interests of either of the Parties or of any third States.

6.19. Each of the two terms "of such a nature" (certain treaties use the words "likely to") and "as to endanger" in this definition encompassed the concept of risk in the definition of pollution: read together, they confirmed the inclusion of risks and potential dangers in the concept of pollution.

6.20. The obligations of the two Contracting Parties were thus to avoid pollution or the risk of pollution of the water of the Danube and of the underground water related to it "as a result of the construction and operation of the System of Locks". The obligation was continuous: it

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13 This definition results from the Recommendation proclaiming principles relative to transfrontier pollution, adopted by the OECD Council in 1974 (Recommendation C(74)224, 14 November 1974), the terms of which were reproduced in numerous international instruments: e.g. Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution, 16 February 1976, Art 2(a), (1976) 15 ILM 290, as well as a series of conventions drafted by UNEP for the protection of regional seas; Convention on Long-Range Transboundary Air Pollution, Geneva, 13 November 1979, Art 1, (1979) 18 ILM 1442; See also UN Convention on the Law of the Sea, Montego Bay, 10 December 1982, Art 1(1)(4), (1982) 21 ILM 1261.

arose at the onset of the planning process, existed throughout the construction phase and was intended to operate throughout the lifetime of the System of Locks.

6.21. Finally, brief reference should be made to the phrase "by the means specified in the joint contractual plan" in Articles 15 and 19. This by no means signified that the implementation of these Articles was subordinated to the Plan. The Articles concerned draw a clear distinction between the *obligation* to ensure a particular result and the *means* to be used to do so. It would be contrary both to their ordinary meaning as well as to their object and purpose to interpret the reference to the Joint Contractual Plan as potentially negating them. This is especially so in that the Joint Contractual Plan itself had not been concluded when the 1977 Treaty was signed. The 1977 Treaty was clearly intended as the dominant instrument. The Joint Contractual Plan, in contrast, was essentially as a management tool and a means of handling the large amount of detail involved in the Original Project without the need for numerous amendments.[14]

(b) The scope of Article 19

6.22. Article 19 provided that:

> "The Contracting Parties shall, through the means specified in the Joint Contractual Plan, ensure compliance with the obligations for the protection of nature arising in connection with the construction and operation of the System of Locks."

6.23. Here again, several elements must be considered: the meaning of the "protection of nature"; the meaning of "obligations . . . arising in connection with the construction and operation of the System of Locks"; and the identification of "obligations for the protection of nature".[15]

6.24. A broad interpretation of nature is reflected in the title of Chapter VII, "Protection of the Natural Environment" which includes the protection of nature under Article 19 and the protection of fishing interests under Article 20. The broader term "protection of nature " thus included all other elements of the "natural environment" to be protected in general in all regions outside urban and industrial areas: native fauna

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14 See above, para 4.15.

15 For the meaning of the reference to "the means specified in the joint contractual plan", see above, para 6.31.

and flora, habitats of wildlife, the alluvial plain and their interrelationships. In this respect, it should be noted that, the term "nature" is not strictly limited to fauna and flora; it would include the natural environment in general, including soil and forest.

6.25. The words "obligations . . . arising in connection with the construction and operation of the System of Locks" meant that the duty to protect the natural environment began upon commencement of the planning process, and extended throughout the construction phase and the whole lifetime of the Barrage System.

6.26. The commitment to "ensure compliance with the obligations for the protection of nature" arose as between the Parties with the entry into force of the 1977 Treaty and was to end only with the definitive closing down of the Barrage System. The language itself clearly referred to independent international obligations for the protection of nature pursuant to other agreements or to customary international law, whether these existed prior to the 1977 Treaty or arose subsequently. It implied the establishment of a system of environmental impact assessment, in order to gather information for the Contracting Parties as to the consequences of the construction and operation of the various aspects of the entire Project upon water quality, nature and natural resources, and fish stocks.

(c) The scope of Article 20

6.27. Article 20 provided that:

> "The Contracting Parties, within the framework of national investment, shall take appropriate measures for the protection of fishing interests in conformity with the Danube Fisheries Agreement, concluded at Bucharest on 29 January 1958."

The aim of Article 20 was to incorporate by reference the substantive and procedural obligations set forth in the 1958 Danube Fisheries Convention. These included the obligation to ameliorate the natural conditions for certain fish stocks (Article 5), the preparation in advance and application of a joint plan to safeguard normal migratory movements (Article 5), and the obligation to work out and apply measures to prevent the contamination and pollution of the Danube River and its waters (Article 7).

6.28. It is true that Article 20 required the Parties only to "take appropriate measures" for the protection of fishing interests, and that this

language contains a flexible and even discretionary element not present in Articles 15[16] or 19.[17] On the other hand the measures taken had to be "in conformity with" the Danube Fisheries Convention, and as has been seen in Chapter 4, these obligations were clear and substantial.[18]

6.29. For present purposes the effect of Article 20 was two-fold. First, it incorporated obligations which were additional to the Article 19 obligations. Second, it served to emphasise the importance placed by the Parties to the 1977 Treaty on the protection of fishing interests.

(d) Czechoslovakia's conduct in relation to the 1977 Treaty

6.30. In respect of these obligations, Czechoslovakia consistently asserted that adequate technical solutions could be found to remedy the environmental damage that would be caused by the Barrage System.[19] Such an approach violated the clear obligations of the 1977 Treaty, which referred to general international environmental obligations. The first such obligation, universally agreed on, is the *prevention* of damage caused to the environment.

6.31. Appendix 2 of the Agreement of 6 May 1976 between Hungary and Czechoslovakia regarding the drafting of the Joint Contractual Plan established the division of work between the two contracting parties. According to Section B of the Appendix, Czechoslovakia was to complete the hydrological and hydraulic examinations regarding the natural condition of the section between Rajka and Bratislava and regarding the development of new conditions between Nagymaros and Bratislava. Czechoslovakia also had the task to initiate the examination of flooding and to check samples of the shifting riverbed, taking into consideration the protection of Bratislava and the circumstances of water management, as well as "the complex examination of the effect of the barrage on the environment". Other tasks were shared by the two countries, such as a more accurate determination of the forecast of the

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16 Art 15: "shall ensure, by the means specified in the joint contractual plan, that the quality of the water in the Danube is not impaired...". See above, para 6.13.

17 Art 19: "shall, through the means specified in the joint contractual plan, ensure compliance with the obligations for the protection of nature...". See above, para 6.22.

18 See above, para 4.48.

19 See in particular, Position of the Czechoslovak Governmental Delegation, signed by Mr J Carnogursky, 11 July 1991; Annexes, vol 4, annex 52.

level of the groundwater in the surroundings of the abandoned bed, taking into consideration the situation subsequent to the proposal and building, and the effect of the barrage on water quality and the region's drinking water.

6.32. In particular, environmental assessment requirements and environmental obligations were not carried out adequately. Potential environmental effects of the construction were assessed by Czechoslovakia only between 14 September and 12 November 1990, in implementation of a decision of 27 August 1990 of the Office of the Prime Minister of the Slovak Republic. Some expert reports complained that all necessary data were not available. Negative effects on the quality of the subsurface water were stressed, and the sub-commissions which examined different aspects of the variants obtained such diverging results that at the final meeting at Bratislava, on 12 November 1990, no conclusion could be reached. It was explicitly stated that the proposed solutions reflected political concerns not satisfying environmental considerations.[20]

6.33. In a *Note Verbale* of 1 September 1989 the Hungarian Government recalled that it . . .

> "has submitted a proposal in two variations for the joint investigation of the feasibility of the Gabcikovo-Nagymaros Barrage System and invited the Czechoslovak Government to make an assessment of the proposal and to hold joint discussions on the matter.
>
> The submitted version of the proposal suggested that joint investigations be conducted over a period of either 3-5 years or in the alternative version 1 year, and the working out of ecological guarantees and an optimal system of operations. The Hungarian Party also proposed that international scientific organisations be involved in the said joint scientific work."[21]

6.34. According to a study prepared by Hydro-Québec International at the request of the Czechoslovak Government and published in December 1990:

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20 Report of Hydroconsult on the Gabcikovo-Nagymaros Barrage System, Bratislava, 14 September and 12 November 1990.

21 See Annexes, vol 4, annex 25. The Hungarian position also appears in Appendix 1 of the *Aide-Memoire* of the Government Plenipotentiaries, Bratislava, 9 September 1989.

"des études environnementales [sic] ont été entreprises parallèlement à la construction des ouvrages du complexe, soit vers l'année 1975. La solution technique étant déjà choisie, ces études ne portaient pas sur une comparaison de variantes, mais bien plutôt sur l'optimisation du projet retenu . . . De façon générale, les principaux enjeux gouvernementaux considérés dans ces études ont trait surtout à la qualité et à la propagation de la nappe d'eau souterraine liée à l'agriculture, l'exploitation forestière, l'industrie et l'approvisionnement en eau potable . . . Il convient toutefois de mentionner que ces éléments ont été étudiés presqu'exclusivement en rapport avec leur exploitation économique. Quant à l'évaluation des impacts du projet, elle ne respecte pas un cadre méthodologique précis. En effet, l'identification des sources d'impacts ainsi que les impacts eux-mêmes ne se retrouvent pas de façon systématique et explicite dans les différents rapports de synthèse consultés. Les impacts se retrouvent plutot dans la définition de la zone d'étude et dans les mesures proposées. Ces mesures proposées relèvent plus d'un objectif de mise en valeur du milieu que de l'atténuation ou la correction des impacts appréhendés . . . "[22]

6.35. On 25 June 1991, the Slovak Ministry of Environment decided to submit the authorisation of the functioning of the Barrage System to 19 conditions, primarily aimed at assuring the protection of underground water. As of December 1993, few of the 19 conditions had been met.[23]

6.36. On 3 October 1991, 14 years after the conclusion of the 1977 Treaty, the Czech and Slovak Federal Parliament adopted a resolution requesting the Federal Government of the country to . . .

"achieve an unequivocal position with regard to the continuation of doubts about the quality of the building work of the Gabcikovo-Nagymaros Hydroelectric System."

It also asked the Government to . . .

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22 Hydro-Québec International, *Rapport d'opinion sur certains aspects du projet affectant la mise en exploitation de la centrale de Gabcikovo. Rapport Général* (December 1990); Annexes, vol. 5, annex 9.

23 For a brief discussion of each of the 19 conditions see above para 5.135. For the full text, see Slovakian Environmental Protection Committee, Declaration, Bratislava, 25 June 1991 (Ref 356/91-OSS II). For the Committee's assessment of compliance see its Information Release (Bratislava, nd), Annexes, vol 4, annex 172. See also, above, paras 5.135 - 5.137.

"initiate the establishment of a professional committee in cooperation with the Government of the Slovak Republic, which will assess the ecological, economic, social and the international legal consequences occasioned by the completion of the Gabcikovo-Nagymaros Hydroelectric System . . . "[24]

6.37. Even later, a Resolution of the Slovak National Council adopted on 31 January 1992 determined that:

"The Slovak government did not properly use the proposal made by the Environmental Protection Committee of the National Council, number 4,116, dated 22 March 1991, especially as regards the evaluation and judgment of the final decision, or the proposal made by the Committee during the first quarter of 1990 and the proposal made by the committees no 1-5, working as a committee evaluating the conclusions of a panel of independent experts during the second half of 1990."[25]

6.38. The Resolution requested the Government of the Slovak Republic to . . .

"re-examine the plans for sewage water purifiers at Bratislava, with special attention to Petrzalka and the areas affected by the barrage whose sewage flows directly into the Danube and make the commencement of operations of the Gabcikovo Hydroelectric power plant contingent upon the completion of the construction of the purifiers."[26]

6.39. In other words, the "remedial measures" which were supposed to eliminate the damaging environmental consequences of the Barrage System (and which were the specific responsibility of Czechoslovakia under the 1976 Agreement) were not determined at the beginning of 1991, fourteen years after the conclusion of the 1977 Treaty.

6.40. According to a report of independent experts published in 1993:

"The solutions envisaged for environmental problems are 'added on'. Rather than removing the causes of problems, new

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24 Resolution No 200, no 3(b), (d).

25 Slovak National Council, Resolution No 246, 31 January 1992; Annexes, vol 4, annex 170.

26 Slovak National Council, Resolution No 246, 31 January 1992; Annexes, vol 4, annex 170.

> technical devices are designed which are intended to correct the consequences of preceding technical devices. The results sometimes attain the absurd. For example, the installation of a network of pumps was imagined in order to compensate for the water table level variations downstream from the dam. These pumps would have consumed a large part of the electricity produced by the dam!"[27]

6.41. Since the beginning of the 1980s, scientific bodies have stressed that no survey has been done to investigate and monitor systematically the ecological impacts and consequences of the project and consider the interactions of the technical, ecological, economic aspects and the risks attached to them.[28] In 1989, three studies by independent expert groups stressed the dangers of the continuation of the construction without assessing all questions concerning its impacts on the environment.

6.42. According to the first:

> "Our principal finding is that the unresolved questions concerning the potential ecological and economic impacts of the [Gabcikovo-Nagymaros] project require that all construction be suspended during the period of decision making on the fate of this project."[29]

6.43. The second was an expert report of the World Wildlife Fund, which recommended in August 1989 the suspension of the construction for three years and the constitution of another independent expert group for studying the ecological consequences of the barrage.[30]

6.44. A third group, composed of independent Hungarian scientists, concluded that:

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27 Equipe Cousteau, *The Danube, for Whom and for What? European Bank for Reconstruction and Development Agreement, November 1991. Final Report* (1993) pp 173 - 74; Annexes, vol 5, annex 16.

28 Position Paper of the Hungarian Academy of Sciences, 20 December 1983; Annexes, vol 5, annex 2.

29 Ecologia and INFORT, *Gabcikovo-Nagymaros Barrage Study, Program Options and Impacts* (May 1989), p 17; Annexes, vol 5, annex 6.

30 WWF, *Stellungnahme des WWF zum Staufen-Project Gabcikovo-Nagymaros* (Rastatt, August 1989).

> "As indicated by the ecological analyses, the detrimental consequences of a hydro-electric barrage system are irreversible in most of the cases while the actual scope of the project is still unclear . . . [T]he ecological, seismological and other factors and the consequential requirements call for a revision of the blueprints."[31]

6.45. An expert report initiated in 1991 and published in 1993 also declares that:

> "Basic reflection on the matter must be engaged in incorporating the technical, ecological, economic and social data and drawing on international experts, the public and non-governmental organisations for environmental protection. It must lead to an exhaustive and detailed cost/advantages analysis of all alternative solutions. It must be carried out in a spirit of transparency and its conclusions must guide decisions concerning Gabcikovo's future".[32]

6.46. The numerous proposals for cooperation in the assessment of the ecological consequences of the construction of the Barrage System, which the Hungarian Government addressed to the Czechoslovak Government can be understood in the context of demanding compliance with the obligations of the 1977 Treaty. Faced with such proposals, the Czechoslovak authorities insisted on proceeding with the Barrage System, on the basis of an assertion that adverse consequences would not occur or could be remedied after the event. This attitude was inconsistent with Articles 15 and 19 of the 1977 Treaty, since it was inconsistent with the obligation to ensure that no important impairment of the natural environment in general or of water quality in particular would occur.

6.47. As explained in Chapter 5, implementation of the 1977 Treaty would evidently have an impact on the environment in both countries. Articles 15 and 19 were intended to limit this impact, by aiming to

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31 Committee of Independent Specialists, Hardi Report, *Expert Review Concerning the Ecological, Environmental, Technological, Economic, International and Legal Issues of the Gabcikovo-Nagymaros Barrage System* (Budapest, September 1989), pp 3, 16; Annexes, vol 5, annex 8.

32 Equipe Cousteau, *The Danube, for Whom and for What? European Bank for Reconstruction and Development Agreement, November 1991. Final Report* (1993), p 179; Annexes, vol 5, annex 16.

ensure that the water of the Danube would not be impaired and that the natural environment would be protected. These prescriptions implied that the content of the two clauses had to be carefully attended to and that the steps which scientific studies revealed as necessary should be taken. Articles 15 and 19 were not applied, for political reasons and because of the low priority given to ecological values at the time in Eastern Europe, even when those values were incorporated in treaties.

6.48. After the fundamental changes in the political situation, the Hungarian Government tried to avoid consequences which seemed very serious and potentially irreversible:

> "The Government of the Hungarian People's Republic wishes to draw the attention of the Government of the CSR to the fact that according to its assessment Hungary, and Czechoslovakia also, are in a state of necessity. Acts of the two Governments have to be assessed accordingly. The Hungarian Party finds no explanation for the rigid denial of negotiations on ecological guarantees and optimal mode of operation. The Czechoslovak Party is not even willing to negotiate about questions which would bring about any amendment in the [1977] Treaty concluded on the construction and operation of the Gabcikovo-Nagymaros Barrage System, not even then, when science raises fundamental doubts concerning the ecological harmlessness of the Barrage System. The Hungarian Party nevertheless hopes that the Czechoslovak Party will finally adopt a responsible attitude and take an active part in binding a solution acceptable to both sides."[33]

6.49. At that time it was already clear that, although the environment of both countries would suffer from the execution of the Project, the damage caused to the environment would particularly affect Hungary, especially regarding surface water and sub-surface water, and that this would produce serious consequences on other sectors of the environment and the economy. The refusal to cooperate by accepting meaningful negotiations involved lack of good faith in the performance of a bilateral treaty based, according to its preamble, on the "mutual interest" and the "fraternal relations" of the two countries. Thus Czechoslovakia violated the generally recognised principle of good faith, reflected in Article 26

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33 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 1 September 1989; Annexes, vol 4, annex 24.

of the Vienna Convention on the Law of Treaties, in the context of its performance of the 1977 Treaty.

(2) BREACH OF OTHER BILATERAL TREATIES

6.50. As has been seen in Chapter 4, a matrix of bilateral and multilateral standards applied to the Danube region whether as a common resource or as a boundary between the two States. In particular, the 1976 Boundary Waters Convention combined both elements. The general safeguards of the 1976 Convention -- applicable in any event since the Barrage System was either located on or directly affected the boundary waters covered by the Convention -- were made specifically applicable to the Barrage System by a bilateral agreement of 11 October 1979. Under Article 10(1) of [the] bilateral agreement on the common operational regulations of Plenipotentiaries fulfilling duties related to the construction and operation of the Gabcikovo-Nagymaros Barrage System:

> "The procedure for the permission of water rights, water management work, measures for the utilisation of water reserves, protection against the pollution of surface and groundwater, maintenance of the navigational route and provision thereof with signs, preservation of the Danube's bed, protection against water logging, protection against flood and the protection against ice flow shall be effected by the Plenipotentiaries according to the [1976] Convention regarding the regulation of boundary water management issues concluded by the Hungarian People's Republic and the Government of the Czechoslovak Socialist Republic."[34]

6.51. Thus the 1976 Boundary Waters Convention had an important role in the system established between the two countries for the management and the utilisation of the water of the Danube. According to its Article 2:

> "The material scope of this Treaty shall include any water management activity performed on the boundary waters, which may bring about changes in the natural water conditions, such as, in particular: the regulation of water courses, the construction of reservoirs and flood control dykes, the

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34 Agreement as to the Common Operational Regulations of Plenipotentiaries fulfilling duties related to the Construction and Operation of the Gabcikovo-Nagymaros Barrage System, 11 October; Annexes, vol 3, annex 26.

improvement of land to increase the water holding capacity of soil, the utilisation of water resources, the protection of surface and subsurface waters from pollution, hydroelectric development, the maintenance and marking of waterways, the location of navigational routes, the control of floods, excess groundwater and ice drift, as well as all water management activities, which may result in changes in the jointly defined water conditions in the upstream and downstream sections of the boundary reaches of water courses, furthermore, in the section of boundary waters."

6.52. Article 11 deals with defence against water pollution. It provides that:

"(1) The Contracting Parties shall make every effort to maintain the purity of the boundary waters and, as far as their economic and technical opportunities allow, to reduce any pollution present by building and modernising pollution treatment plants.

(2) The competent authorities of the Contracting Parties shall, regularly control the purity of the boundary waters, take joint water samples, analyse them and compare [harmonise] the results of these analyses.

(3) If an extraordinary pollution event occurs affecting boundary waters, the competent authorities of the Contracting Parties upon whose territory said pollution has occurred shall, without delay, inform the competent authorities of the other Contracting Party and shall further take immediate action to close the source of said pollution and prevent further pollution from occurring again."

Appendix I to this Treaty set up a Hungarian-Czechoslovak Boundary Waters Commission which functioned regularly, but the investigations of which were limited to the presence of certain pollutants. It only decided at its 52th meeting, held on 11-15 November 1991, that its hydrobiological sampling and investigation would include, by January 1992, systematic physical, chemical and microbiological tests for the segment of the Danube between Bratislava and Visegrád; hydrogeological tests, for the area of Szigetköz-Zitny Ostrov; and tests for detecting plankton eutrophication for the secondary branches.

6.53. Prior to 1992, neither the conditions of the 1976 Boundary Waters Convention nor those of the 1977 Treaty were satisfied as far as investigations and control concerning water pollution were concerned.

6.54. The obligation to reduce pollution by building and modernising pollution treatment plants was not implemented either. As described in paragraph 6.34, the Slovak National Council had, in January 1992, requested the Government of the Slovak Republic to re-examine the plans for sewage water purifiers.[35]

6.55. The absence of adequate sewage treatment plants was a problem on both sides of the border. The essential problem, no doubt, was one of lack of infrastructure capital, as the reference to "economic and technical possibilities" in Article 11(1) of the Boundary Waters Convention itself recognised. But the point is that, faced with these problems, Czechoslovakia nonetheless insisted on pressing ahead with a Project which would in all probability aggravate both the causes and the effects of the pollution. This was inconsistent with the obligation to "make every effort to maintain the purity of the Boundary waters".

SECTION B: BREACH OF GENERAL INTERNATIONAL LAW

6.56. In addition to the breach of bilateral treaties existing between the Parties, Czechoslovakia also violated rules of general international law in its approach to the concerns raised by Hungary about the Project.

(1) BREACH OF THE OBLIGATION OF PREVENTION, IN THE LIGHT OF THE PRECAUTIONARY PRINCIPLE

6.57. Since the end of the 1960s environmental law has developed with an unprecedented intensity and speed. There are now thousands of national laws and regulations, approximately 350 international multilateral treaties, hundreds of bilateral agreements, more than 200 EC instruments and several hundred non-binding international declarations and resolutions aiming at the protection of the environment or containing provisions with that objective. Although not all these texts are duly implemented, international practice shows a general respect for the principle that the environment must be protected. At the Rio de Janeiro Conference in June 1992, 172 States (out of the 178 which then existed) were represented by approximately 10,000 delegates, including 116 heads of State or of government. All the relevant international organisations were present. Such events show the general concern that is felt all over the world for halting the degradation of the planet's environment.

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35 Slovak National Council, Resolution No 246, 31 January 1992; Annexes, vol 4, annex 170.

6.58. Within this framework the Final Act of the 1975 Helsinki Conference on Security and Co-operation in Europe had considerable significance. As far as water pollution control and fresh water utilisation are concerned, the 1975 Helsinki Final Act sought to promote . . .

> "Prevention and control of water pollution, in particular of transboundary rivers and international lakes; techniques for the improvement of the quality of water and further development of ways and means for industrial and municipal sewage effluent purification; methods of assessment of fresh water resources and the improvement of their utilisation, in particular by developing methods of production which are less polluting and lead to less consumption of fresh water."[36]

6.59. The Final Act foresees as other aims of cooperation:

> "Protection of nature and nature reserves; conservation and maintenance of existing genetic resources, especially rare animal and plant species; conservation of natural ecological systems; establishment of nature reserves and other protected landscapes and areas, including their use for research; tourism, recreation and other purposes."[37]

6.60. Despite its non-obligatory character, the 1975 Final Act had an great influence on further developments. In the present case it has a special importance since the Final Act was part of a move towards the rapprochement of Western and Eastern Europe, and gave legitimacy to environmental concerns in the latter. There is no doubt that the Contracting Parties to the 1977 Treaty were aware of and influenced by these developments.

6.61. Almost all legal instruments, national or international, are based on the principle of prevention of environmental damage at the earliest possible stage. One of the best formulations of the principle is that inserted in successive EC Programmes of Action on the Environment since 1973:

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36 (1975) 14 ILM 1292 at p 1299.

37 (1975) 14 ILM 1292 at p 1308.

"The best environmental policy consists of preventing the creation of pollution or of nuisances at the source, rather than subsequently trying to counteract their effects."[38]

6.62. The principle of prevention underlies the totality of international instruments related to environmental protection. Apart from a few exceptions which mainly concern liability for environmental harm - but which also may have a preventive effect - all the internationally agreed rules and procedures concerning the environment aim to prevent its degradation: prohibition of or standard-setting for the discharge of polluting substances in the atmosphere, the stratosphere, the sea or in continental waters; prohibition or regulation of the disposal or transboundary movements of dangerous wastes; prohibition or regulation of activities in protected areas, or of hunting, fishing or international trade in endangered species. The reason for this emphasis on prevention is that damage to the environment often cannot be repaired, even if the causal link between the pollutor and the damage may be established and evaluated. Even if the damage is reparable, the costs of rehabilitation can be prohibitive. Moreover, damage can have unpredictable and far-reaching effects.

6.63. The main principle of international environmental law is that environmental degradation must be prevented. The principle of

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38 EEC Programme of Action on the Environment, 22 November 1973, *Official Journal*, No C 112, 20 December 1973. Later, the principle of prevention was proclaimed by the Single European Act of 17 February 1986, (1986) 25 ILM 506 at p 515, and by the Maastricht Treaty on European Union, 7 February 1992 ((1992) 31 ILM 247 at p 285), according to Art 130R para 2) of which "Community policy . . . shall be based on the precautionary principle and on the principle that preventive action should be taken, that environmental damage should as a priority be rectified at source . . ." Art 35 of the Fourth EEC-ACP Convention of Lomé, 15 December 1989, provides that:

"The dimension of the environmental problem and of the means to be deployed mean that operations will have to be carried out in the context of overall, long-term policies, drawn up and implemented by the ACP States at national, regional and international level with international support.

To this end, the Parties agree to give priority in their activities to:

- a preventive approach aimed at avoiding harmful effects on the environment as a result of any programme of operation..."

(1990) 29 ILM 783 at p 816.

prevention, which forms the basis of all environmental law, must be considered an *erga omnes* obligation.

6.64. The precautionary principle is the most developed form of the general rule imposing the obligation of prevention. Its proclamation at a universal level can be considered one of the most important results of the 1992 Rio de Janeiro Declaration on Environment and Development. Principle 15 provides:

> "In order to protect the environment, the precautionary principle shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[39]

Article 3(3) of the 1992 Convention on Climate Change uses almost the same language.[40] Similarly, the preamble to the 1992 Convention on Biological Diversity states that:

> "where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat."[41]

6.65. Many other examples could be given. The precautionary principle appeared, for example, in successive regional declarations adopted by the International North Sea Conference in 1987. On 15 May 1990, the environment ministers of the 34 member States of the UN Economic Commission for Europe (including the representative of Czechoslovakia) and the representative of the EC, adopted a Declaration on Sustainable Development which states:

> "In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a

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39 14 June 1992, UN Doc A/CONF 151/26, vol I, p 8.

40 UN Doc UNGA A/C 237/18 (Part II) Add 1.

41 UN Doc UNEP/Bio.Div/CONF/L.2.

reason for postponing measures to prevent environmental degradation."[42]

6.66. Almost no new international instrument, whether regional or universal, drafted since 1989, ignores the precautionary principle.[43] Particularly important is in this regard is Article 2 of the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 17 March 1992, drafted in the framework of the UN Economic Commission for Europe. It provides that in taking all appropriate measures to prevent, control and reduce any transboundary impact and in particular pollution of waters causing or likely to cause transboundary impact, the Parties shall be guided by . . .

> "the precautionary principle, by virtue of which action to avoid the potential transboundary impact of the release of hazardous substances shall not be postponed on the ground that scientific research has not fully proved a causal link between those substances, on the one hand, and the potential transboundary impact, on the other hand."[44]

6.67. The effective application of the obligation of prevention can be jeopardised, due to scientific uncertainty, and this can result in irremediable environmental damage. Thus, action must be taken at an early stage based upon models of potential consequences. This is the precautionary principle. As an aspect of the obligation of prevention, the precautionary principle seeks to avoid serious environmental damage. It is of particular cogency when there is a danger that the deterioration of the environment would be irreversible.

6.68. One of the implications of the precautionary principle is that the causal link may be assumed in certain situations even in the absence of

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42 Principle 7. See (1990) 20/3 *Environmental Policy and Law* 100.

43 See, e.g., Convention on the Protection of the Marine Environment of the Baltic Sea, Helsinki, 9 April 1992, Art 3(2); Convention for the Protection of the Marine Environment of the Northeast Atlantic, Paris, 22 September 1992, Art 2(2)(a) (1993) 32 ILM. 1069; Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Bamako, 29 January 1991, Art 4(3)(f) (1992)31 ILM. 163; Maastricht Treaty on European Union, 7 February 1992 ((1992) 31 ILM 247 at p 285), Art 130R para 2) (cited above, para 6.53).

44 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Helsinki, 17 March 1992 (1992) 31 ILM 1312.

scientific certainty. Combined with the general obligation not to cause damage to another country's environment, this means that the State whose activities are likely to damage the environment of another State must show that the proposed action will not have such effects. If this cannot be done, the proposed activity must be modified or even abandoned.

6.69. It flows from the history of the Barrage System, as recorded in Chapter 3, that the Czechoslovak Government failed in its obligation to prevent environmental harm by refusing to take the necessary measures for this purpose, starting with the refusal to investigate in a satisfactory way the environmental effects of the Project. In the proposals made to the Czechoslovak Government to investigate the environmental problems caused by implementation of the Barrage System, the Hungarian Government referred to the precautionary principle and to the irreversibility of the damage that could result from the construction. Having ignored its demands and refused to take the necessary precautionary measures, Czechoslovakia was in breach of the obligation to prevent serious environmental harm.

(2) BREACH OF THE OBLIGATION TO COOPERATE

6.70. In international relations, the prevention and the control of environmental deterioration is necessarily based on cooperation between the concerned States. For example, the first judicial precedent regarding transfrontier pollution, the *Trail Smelter Arbitration*, recommended that the two States parties should cooperate in the future and regulate polluting activities taking place on Canadian territory.[45] Similarly, Principle 24 of the Stockholm Declaration on the Human Environment states that:

> "International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on an equal footing. Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States."[46]

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45 *Trail Smelter Arbitration* (1935) 3 UNRIAA 1911 at p 1938.

46 UN Doc A/Conf 48/14/Rev.2.

6.71. This principle appears, for example, in Chapter 5 of the Helsinki Final Act of 1975, which advocated close international cooperation for the solution of environmental problems.[47] It is the cornerstone of the Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilisation of Natural Resources Shared by Two or More States, adopted by the United Nations Environment Programme on 19 May 1978.[48] Subsequent practice as expressed by different international instruments and in particular by those adopted at the 1992 Conference on Environment and Development attests to the fundamental character of the principle of cooperation.[49] All the international environmental treaties and other instruments, including resolutions and principles proclaimed by different international bodies, without exception include a requirement of international cooperation. This requirement was also an explicit basis of the bilateral treaties between Hungary and Czechoslovakia in relation to such matters as boundary waters, as has been seen in Chapter 4.[50] It cannot be treated as without effect.

6.72. Such cooperation existed at the beginning. On 2 December 1954, Hungary and Czechoslovakia reached an agreement on the prevention of damage and, if necessary, the compensation for such damage caused by the sinking of the level of the underground water and on the sharing of the water of the Danube.[51] The Joint Contractual Plan was intended to be the principal tool for implementing the obligations foreseen, in particular Article 15 concerning the protection of water quality and Article 19 related to the protection of nature. These instruments represent an implementation of the general international duty to cooperate. But when doubts concerning the ecological consequences of the construction of the

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47 (1975) 14 ILM 1307.

48 UN Doc UNEP/IG 12/ (1978), Principle 1; reprinted in (1978) 17 ILM 1097.

49 Declaration on Environment and Development, UNCED, UN Doc A/CONF.151/5, Principle 7; Framework Convention on Climate Change, UNGA, UN Doc A/C 237/18 (Part II) Add.1, preamble, Arts 3(1)(2), 4; Convention on Biological Diversity, UN Doc UNEP/Bio.Div/CONF/L.2, Art 5; Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests, UNCED, UN Doc A/CONF.151/6/Rev.1.

50 See above, para 4.55.

51 Final minutes of the negotiations between Hungary and Czechoslovakia, 2 November-2 December 1954 on the use of the hydrological energy of the Danube between Devin and Visegrád, Annex 1.

Barrage System could be expressed following the political changes, Czechoslovakia refused to amend the 1977 Treaty, or to engage in meaningful negotiations aimed at alleviating the legitimate concerns of the Republic of Hungary.[52] Czechoslovakia also refused renewed formal proposals to initiate a joint Czechoslovak-Hungarian scientific study, with the involvement of international scientific experts or organisations.[53]

6.73. Finally, during an inter-governmental meeting on 2 December 1991, it was agreed that the Project constituted a complex technical-scientific problem and that it would be reasonable to set up a Joint Expert Committee. The Hungarian delegation accepted the Czechoslovak proposal to complement the Committee with experts designated by the Commission of the European Communities. However, the Czechoslovak Government declared that work towards the implementation of Variant C would not be stopped during the inquiry of the Joint Expert Committee. This would have made such inquiry useless, since its results could not have produced any concrete effect.[54] On 26 February 1992, a new formal proposal was submitted to Czechoslovakia. It proposed that a Joint Expert Committee should prepare an assessment of all technical alternatives to the Barrage System on a basis of a complex synthesis, taking especially into account the protection of the natural environment, effects on subsurface waters, navigation, electrical energy production and security, as well as water-related social and psychological correlations and economic conditions. During the investigation work on Variant C would be suspended on both banks of the Danube.[55] This proposal was also rejected.

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52 See above, paras 3.130, 3.144, 3.155, 3.162 - 3.163, 3.166, 3.171, 3.175, 3.181, 3.183

53 See, e.g., Letter from Hungarian Prime Minister M Németh, to Czechoslovak Prime Minister M Calfa, 10 January 1990; Annexes, vol 4, annex 32; Recommendation of the Hungarian Government, 22 April 1991; Annexes, vol 4, annex 50; Letter from Mr F Mádl, Hungarian Minister, to Slovak Republic Prime Minister J Carnogursky, 8 October 1991; Annexes, vol 4, annex 63; Letter from F Mádl, Hungarian Minister, to Mr J Vavrousek, Minister of Environmental Protection of the Czech and Slovak Federal Republic, 6 December 1991; Annexes, vol 4, annex 68.

54 See above, para 3.144. - 3.145.

55 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 26 February 1992; Annexes, vol 4, annex 75.

6.74. Such an attitude is contrary to the rules adopted in common by the 1977 Treaty and other instruments related to the construction of the Barrage System. It also violates the most general legal principles governing environmental problems concerning more than one State, with which the 1977 Treaty conformed and which it incorporated in Articles 15 and 19.

6.75. The Danube is one of the most important natural resources of Hungary and its main water resource. It is crucial to many other States bordering it. One may recall the statement of this Court in the *Fisheries* case, which applies *mutatis mutandis* to the present dispute:

> "Both Parties have the obligation to keep under review the fishery resources in the disputed waters and to examine together, in the light of scientific and other available information, the measures required for the conservation and development, and equitable exploitation, of those resources, taking into account any international agreement in force between them."[56]

6.76. One of the most evident tools of cooperation is the duty to negotiate when difficulty appears in the management of a shared resource or in the implementation of common project. The general obligation of States to settle their disputes by negotiation has also been recognised by this Court, which noted that the obligation . . .

> "merely constitutes a special application of a principle which underlies all international relations, and which is moreover recognised in Article 33 of the Charter of the United Nations as one of the methods for peaceful settlement of international disputes."[57]

In the present case, the Hungarian Government repeatedly proposed to begin negotiations in order to reach an ecological guarantee agreement, without success.[58]

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56 *Fisheries case (Merits)* ICJ Rep 1974, p 200. See also p 205.

57 *North Sea Continental Shelf Cases* ICJ Rep 1969, p 6 at p 48.

58 See, e.g., *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 1 September 1989; Annexes, vol 4, annex 24; *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 30 November 1989, Annexes, vol 4, annex 30; *Aide Memoire* of the meeting between the Government Plenipotentiaries, Bratislava, 9 January 1991,

6.77. Other international jurisdictions have stressed several times the need to solve conflicts of interests by meaningful negotiation. The award in the *Lac Lanoux* arbitration states that:

> "les Etats ont aujourd'hui parfaitement conscience de l'importance des intérêts contradictoires, que met en cause l'utilisation industrielle des fleuves internationaux, et de la nécessité de les concilier les uns avec les autres par des concessions mutuelles. La seule voie pour aboutir à ces compromis d'intérêt est la conclusion d'accords, sur une base de plus en plus compréhensive. La pratique internationale reflète la conviction que les Etats doivent tendre à conclure de tels accords; il y aurait ainsi une obligation d'accepter de bonne foi tous les entretiens et les contacts qui doivent par une large confrontation d'intérêts et par une bonne volonté réciproque, les mettre dans les meilleures conditions pour conclure des accords. Cette indication sera retenue plus loin, lorsqu'il s'agira d'établir quelles obligations pèsent sur la France et l'Espagne en ce qui concerne les contacts et les entretiens antérieurs à la mise en oeuvre d'un projet tel que celui concernant le lac Lanoux."[59]

6.78. In the *Fisheries* case this Court stressed that negotiations must be conducted on the basis that each party must in good faith pay reasonable regard to the legal rights of the other and an equitable apportionment of the resources must be brought about.[60] It added that reasonable regard must be paid to conservation requirements pending the conclusion of the negotiation.[61] This requirement can be considered as having a general scope, since it flows from the principle of good faith which must govern negotiations.

6.79. By contrast, Czechoslovakia refused to negotiate except on the basis that the Gabcikovo barrage would be put into operation irrespective of the results of independent scientific studies.[62] It did not hesitate to

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Annexes, vol 4, annex 41; Proposals of the Hungarian Government, 22 April 1991, Annexes, vol 4, annex 49.

59 (1957) 12 UNRIAA 285 at p 308. An English translation of the award appears in the *ILC Ybk* 1974, vol II Pt 2, p 194.

60 ICJ Reports 1974, p 202.

61 Ibid, pp 202 - 3.

62 Letter from Slovak Prime Minister J Carnogursky to Mr F Mádl, Hungarian Minister Without Portfolio, 19 September 1991; Annexes, vol 4, annex 62.

prepare unilateral steps in this sense as early as 1990. On 27 July 1991 the Czech and Slovak Federal Republic authorised the filling of the upper water canal in violation of the Joint Contractual Plan, without informing the Joint Border Water Commission.[63] On 12 December 1991, the Czechoslovak Government passed a resolution on the basis of which the commencement of the operations of the power plant and the construction of Variant C was to be completed. On 8 January 1992, Mr Carnogursky wrote to the Hungarian Minister, Mr Mádl, that "we can only accept a solution which is aimed at the commencement of operations of the Gabcikovo Barrage".[64] Such statements were not only repeated but also were underlined by the acceleration of the construction of Variant C.[65] The Hungarian Government in vain requested the suspension of the construction work, which was a normal condition of the functioning of the proposed trilateral expert commission.

6.80. The pretence of negotiating while at the same time the object of the negotiations is destroyed by unilateral actions show a lack of good faith. In such circumstances no negotiated results are possible. As the Permanent Court said, the obligation that exists in international law is . . . " not only to enter into negotiations but also to pursue them as far as possible with a view to concluding agreements . . ."[66] As Judge Nagendra Singh commented in a dissenting opinion:

> "This does clearly imply that everything possible should be done not only to promote, but also to help to conclude successfully the process of negotiations once directed for the settlement of a dispute."[67]

6.81. In the present case, the Czechoslovak Government refused meaningful negotiations which could have reached an equitable solution of the dispute in the interest of both Parties.

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63 *Note Verbale* from the Hungarian Government to the Embassy of the Czech and Slovak Federal Republic, Budapest, 30 July 1991; Annexes, vol 4, annex 57.

64 See Annexes, vol 4, annex 72.

65 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 26 February 1992; Annexes, vol 4, annex 75. A draft agreement was annexed to this letter providing for the constitution of a joint expert committee.

66 *Railway Traffic Between Lithuania and Poland*, (1931) PCIJ Series A/B No 42,p 116, quoted by the Court in the *North Sea Continental Shelf Cases*, ICJ Rep 1969, at pp 47 - 48.

67 *Fisheries Case, (Merits)* ICJ Reports 1974 at p 214.

6.82. This chapter has demonstrated how, in implementing the Original Project from 1977 onward, Czechoslovakia showed very little concern about the protection of the natural environment of the region, despite its international obligations grounded both on treaty and customary law. Different treaty provisions, reflecting the actual evolution of general international law at the time, gave a precise and definite bearing to Czechoslovakia's international obligations of prevention and cooperation to protect the environment.

PART III

CHAPTER 7

THE DIVERSION OF THE DANUBE

SECTION A: THE EFFECTS OF THE DIVERSION

7.01. Beginning on 23 October 1992, and after working night and day for four days, the Danube was blocked at Cunovo and diverted into a by-pass canal constructed on the territory of the Czech and Slovak Federal Republic.[1]

7.02. The diversion had immediate harmful effects on the territory of Hungary, and its continued operation in causing further damage as well as imposing substantial risks of long-term damage to agriculture, sylviculture and the environment, including in particular the aquifer which underlies the region. The damage caused and threatened has been summarised in Chapter 5.[2]

7.03. This Chapter discusses the illegality of the diversion under both treaty law (Section B) and general international law (Section C), and demonstrates that there was no legal justification or excuse for it (Section D). Emphasis will be placed both on the illegality of the diversion as such and on the way in which it was carried out. The issue of the responsibility of Slovakia for the diversion will be discussed in Chapter 8.

SECTION B: THE ILLEGALITY OF THE DIVERSION UNDER THE APPLICABLE TREATIES

7.04. There are many treaties relevant to the illegality of the diversion. First is the 1977 Treaty itself, and the related Agreement of 6 May 1976 concerning the Joint Contractual Plan.[3] Second is the Boundary Waters Convention of 31 May 1976.[4] Third, there are other bilateral and multilateral conventions concerning such matters as international

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1 See above, para 3.186.

2 See above, paras 5.106 - 5.137.

3 Annexes, vol 3, annex 18.

4 Annexes, vol 3, annex 19.

navigation on the Danube, and especially the delineation of the territories of the two States and their borders.[5]

7.05. These three sets of agreements were breached in three principal ways. First, the elementary rule of cooperation laid down in the treaties was violated. This obligation is homologous with the general customary rule of cooperation binding on two States sharing the Danube as a natural resource. Second, there were breaches of specific treaty obligations, including protection of the natural environment, prevention of water pollution, maintenance of the Danube's water quality (including ground-water) and the protection of fishing interests. Finally, the unilateral diversion of the Danube transgressed Czechoslovakia's duties towards the Danube as a boundary river. Many of these obligations have been equally disregarded by Slovakia since 1 January 1993.

(1) OBLIGATION TO COOPERATE

7.06. This Memorial has already shown that a general obligation of cooperation exists in customary international law where the protection of a common environment or shared natural resource is concerned.[6] Pertinent treaty provisions embody this general obligation and obliged the two Parties to cooperate.

7.07. The 1977 Treaty incorporated this duty by setting up a general system of cooperation in the form of a "joint investment", a "joint venture" between the two Parties, whereby the Barrage System would be "a single and indivisible operational system" with collective management of the Danube.[7] The 1977 Treaty did not allow for unilateral operation of the Barrage System by either Party.

7.08. The 1976 Boundary Waters Convention plainly prohibits unilateral operation. It seeks to regulate "any water management activity performed on the boundary waters, which may bring about changes in the natural water conditions, such as, in particular: regulation of water courses, the construction of reservoirs and flood control dykes . . . the protection of surface and subsurface waters from pollution, hydroelectric development". Article 3 explicitly stated, under the heading "General Obligations", that:

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5 These boundary treaties are binding on Slovakia and Hungary, by way of an exception to the general rule against succession to bilateral treaties. See also below, para 10.111.

6 See above, paras 6.69 - 6.70.

7 See above, paras 4.10 - 4.11.

"The Contracting Parties do hereby undertake that they:

a) shall not carry out any water management activities without mutual agreement, which would adversely affect the jointly defined water conditions;

. . .

c) shall mutually inform each other on their long-term development plans of water management, mainly concerning the impact of water management activities on boundary waters;

d) shall engage in prior negotiations on the impacts of water management activities, which alter the water conditions [in the areas covered by the Convention] . . ."[8]

7.09. Article 7 specifies that "the competent authorities of the Contracting Parties shall mutually provide each other with the impact data necessary for technical planning". Article 11 imposes a special obligation to inform the other Party in case of extraordinary water pollution.

7.10. The 1976 Agreement concerning Cooperation and Mutual Assistance along the Czechoslovakian-Hungarian Border also contains obligations to inform. For example, Article 4 requires each state's border delegate: "e) to inform the border delegate of the other Contracting Party about operations performed near the border which might cause damage on the territory of the other country or might endanger the life, the corporeal integrity or health of the inhabitants..."[9]

7.11. Such treaty provisions clearly set out the procedures to be used by the Parties in their management of commonly shared waters: prior information, consultation, negotiations and joint agreement. Hungary has continually upheld its duty to consult and negotiate, especially from 1989 onward, as shown throughout this Memorial.[10]

7.12. Czechoslovakia did not comply with these obligations in its unwillingness to interrupt the works on Variant C pending a negotiated settlement, despite the invitations made by Hungary from 1989 onwards and by EC Commissioner Andriessen in 1992.[11] Czechoslovakia also

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8 See also Arts 1(1) & (4), 3, 10(1), 12(1).

9 Annexes, vol 3, annex 20.

10 See above, paras 3.78 - 3.185, 6.72 - 6.73, and below, paras 9.18 - 9.42.

11 See above, para 3.158.

persistently refused to communicate appropriate technical data on Variant C. A refusal to provide information is hardly an appropriate answer to reiterated invitations to negotiate, especially when these invitations were accompanied by successive Hungarian concessions, from the spring of 1989 through May 1992.[12]

7.13. This recalcitrant behaviour clearly contradicted both the spirit and specific provisions of the treaties referred to in paragraphs 7.07-7.10, each of them establishing explicit obligations of cooperation, more necessary even where a party faces unexpected difficulties in carrying out its obligations. The Parties had committed themselves to mutual information and effective negotiations.

7.14. The unilateral establishment of Variant C, as the sole substantial response to Hungary's repeated offers of negotiation, constituted a serious violation of Czechoslovakia's international commitments.

7.15. Here, one must recall the very significant differences between the Original Project and Variant C. The Original Project, as defined by the various bilateral treaties, included a set of dykes to hold the reservoir and a dam at Dunakiliti (in Hungary) that would divert the Danube towards the supply canal and Gabcikovo a hydroelectric station. By contrast, Variant C consisted of a new dam at Cunovo (in Slovakia), new dykes modifying the right bank of the reservoir, and an 11 km-long earth dam, following the left bank of the Danube with a 10 km displacement of the main navigable channel.[13]

7.16. The most striking differentiation is that Variant C limits its perimeter to Slovak territory whereas the Original Project was to remain under the joint control of Czechoslovakia and Hungary. Variant C thus excludes Hungary from any control of the Barrage System, with its potential for damaging Hungary's natural resources, environment and population.

(2) OBLIGATIONS TO PROTECT THE ENVIRONMENT

(a) Protection of the natural environment

7.17. Czechoslovakia claimed (and Slovakia now claims) that the 1977 Treaty was in force at the time of the diversion. Yet Variant C blatantly contradicted the provisions of the 1977 Treaty, both in its design and

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12 See above, paras 3.122, 3.144 and below, paras 9.18 - 9.42.

13 See above, para 1.17.

operation.[14] For example, Article 15 specified that the Parties shall ensure "that the quality of water in the Danube is not impaired", an expression covering both the waters in the main course of the river and ground-water connected with the river.[15] This required as a minimum the prohibition of pollution, and of creating a serious risk of pollution.

7.18. Article 19, requiring compliance with obligations for the protection of nature, particularly related to Appendix 2 to the 1976 Agreement on the Joint Contractual Plan. In laying down the "division of research work", Czechoslovakia was entrusted with carrying out "the detailed examination of the effect of the barrage on the environment".[16] Such a duty to establish the impact of the Original Project on the environment was not fulfilled by Czechoslovakia, and was equally ignored when deciding on the establishment of Variant C.

7.19. Article 20 of the 1977 Treaty, also included in chapter VII ("Protection of Nature"), explicitly required the "protection of fishing interests".

7.20. The actual and potential environmental damage caused by the construction and operation of Variant C, as well as its effects on public health, ground-water quality, surface water, soil, flora, fauna (especially fish) and the general ecological balance of the region are summarised in Chapter 5. Variant C was obviously quite inconsistent with these provisions of the 1977 Treaty.[17]

7.21. Turning to treaties which continued in force in October 1992, Czechoslovakia also breached several provisions of the Boundary Waters Convention of 1976. In particular, Article 11 requires that the State parties "make efforts to maintain the purity of the boundary waters". As demonstrated in Chapter 5, the establishment of Variant C, including the Cunovo dam and 11 km earth dam along the left-hand bank of the Danube, cannot be seen as an effort to maintain the purity of these waters.[18]

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14 See, above, paras 1.16 - 1.18.

15 See above, para 6.15. Cf also Art 5(5)(a)(5), 5(b)(13) which required the two Parties to restore the vegetation.

16 See above, para 6.31.

17 For more details see above, paras 5.106 - 5.137.

18 See above, paras 5.31 - 5.56 and 5.111 - 5.113.

(b) Maintenance of Water Projects

7.22. The general obligation to protect the natural environment should be considered in conjunction with the obligation in Article 6 of the Boundary Waters Convention, which provides that "the Contracting Parties . . . shall provide for the maintenance in good condition of water facilities and other equipment in place upon the boundary waters on their respective territories". The hasty and hazardous way in which Variant C was constructed hardly met the requirements of this article.[19]

(c) Water-Resource Management

7.23. The Czechoslovak (and now the Slovak) claim that the 1977 Treaty remained in force also contrasts with the act of abstracting most of the water in the stretch between Cunovo and Dunakiliti. Article 14 of the 1977 Treaty obliged the Parties to establish the water balance between the Barrage System and original navigational channel by mutual agreement in the Joint Contractual Plan. Only within the parameters of this water balance could a Party withdraw water from the Danube "without giving prior notice".

7.24. The original balance established in the Joint Contracting Plan could have been reviewed prior to the diversion had Czechoslovakia seriously entered into negotiations as requested by Hungary. However, the principle remains that any unilateral withdrawal of water from the Danube, especially in the extremes required by Variant C, was strictly contrary to the spirit and letter of the 1977 Treaty.

7.25. Turning to treaties which *were* in force in and after October 1992, the 1976 Boundary Waters Convention requires that the State Parties "shall maintain in good condition the beds of water courses, reservoirs and equipment located on boundary waters within their own territories and shall operate them in such a manner as to cause no damage to each other".

7.26. This last part of Article 3(1)(b) is of paramount interest because it demonstrates that, even before the conclusion of the 1977 Treaty, the two Parties recognised the binding force of the general customary rule prohibiting damage to the transboundary environment, which derives from the principle of harmless use of territory (*sic utere tuo ut alienum non laedas*), as embodied at that time in Principle 21 of the Stockholm Declaration.

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19 See above, para 5.134 - 5.137.

7.27. This treaty provision adapts and integrates this general customary rule into the special boundary regime established between Hungary and Czechoslovakia, to which Slovakia became a party as successor to a boundary agreement.[20] Slovakia cannot seriously argue that this provision and the general principle of harmless use of territory have been complied with, considering the risks and actual damage caused to the environment of both countries.

(d) Respect for and Protection of the Agreed Boundary Line

7.28. The unilateral diversion of the Danube also breached another group of treaty obligations relating to the delineation of the international boundary between the two states.

7.29. The respect by the two states of an internationally-agreed boundary line rests on strong and long-standing customary law, and is reflected in bilateral and multilateral treaties to which Czechoslovakia and Hungary were parties.

7.30. Although the 1977 Treaty was not a boundary treaty (since it was intended to establish the Parties' obligations with respect to a Barrage System which was separated from the boundary[21]) it nevertheless included a provision on the Determination of the Boundary Line of the State Frontier in the Barrage System. Article 22(1)(a) explicitly indicated that the border "shall remain unchanged", and recorded the definition of the borderline in the boundary agreements between the two States, as the "centre-line of the present main navigation channel of the river".

7.31. As Article 22 recognised, any change in the delineation of the border, even a minor change, had to be decided on an agreed basis. In addition, the Parties in 1977 specified precisely the extent of change that was permissible in the *character* of the Danube as a boundary river.[22] Czechoslovakia's actual behaviour with regard to Variant C was doubly inconsistent with the 1977 Treaty. First, its action on the border line was unilateral; second, Variant C shifted the main navigation route from the old bed of the Danube to a new channel, ten kilometres long, located

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20 For Slovakia's succession to the 1976 Convention see above, footnote to para 6.13.

21 See above, para 4.39.

22 Art 22(1) of the 1977 Treaty clearly distinguished between revisions in the line itself (which, though minor, were to be achieved by a separate agreement: Art 22(2)) and "changes in the character of the State frontier". See above, para 4.39.

exclusively on its territory. Czechoslovakia's unilateral action changed the *characters* of the border in a way which the 1977 Treaty certainly did not authorise.

7.32. The 1976 Boundary Waters Convention contains precise definitions relating to "The Protection of the State Border, its character, and the signs used for marking it".

7.33. For example, Article 4(1) states that the Parties "shall maintain in good condition the boundary waters, and the structures, facilities, and equipment located thereupon in order to protect permanently the state border".

7.34. Furthermore, Article 4(2) specifies that "the removal or displacement of boundary marks and other measuring marks serving for the determination and marking of the state border is forbidden during water management activities carried out on boundary waters without the prior approval of the competent authorities of the Contracting Parties. The boundary marks and the measuring marks shall be protected from being damaged during such activities".

7.35. Article 4(3) adds that:

> "For a water management activity, which would result in a change in the line or the character of the state border, a prior approval is needed pursuant to the laws and the regulations of both Contracting Parties."

7.36. Article 4 of the 1976 Convention makes perfectly clear that the signatories must keep the boundary waters in good condition and may not change the border line without prior agreement. Article 4(3) is clearly applicable in this respect, since there is no doubt that Variant C involved a "water management activity".

7.37. The statement in Article 22(1)(a) of the 1977 Treaty that "the position of that frontier shall be defined by the centre-line of the main navigation channel of the river" simply reflects the definition given by the Peace Treaty of Trianon, the Peace Treaty of Paris, and the 1956 Hungarian-Czechoslovak Treaty concerning the Regime of State Frontiers.

7.38. The Treaty of Trianon placed the frontier line as "le cours principal de navigation du Danube".[23] The Treaty of Paris,[24] as interpreted in the Supplementary Minutes No I to the Closing Minutes of the Meeting of the Hungarian-Czechoslovak Border Drafting Commission of 11 October 1948, described the border more precisely:

> "Along Border Section II, the original definition of the borderline extending through the Danube, as determined between 1922-1925, remains valid; that is, the border is defined by the thalweg of the river's main navigable bed at the lowest water level."[25]

7.39. Furthermore, Article 2(3) of the 1956 Treaty concerning the Regime of State Frontiers states that:

> "On sectors where it runs over water, the frontier line shall follow the middle of the bed of unnavigable rivers, canals or streams, or in the case of navigable rivers, the median line of the main navigable channel at the lowest navigable level".[26]

7.40. From 1920 onwards, these treaty provisions consistently identified the border line with *the main navigable channel.* The effect of the operation of Variant C has been precisely to substitute a new artificial main navigable channel for the Danube. Now this new navigable channel flows exclusively in Slovak territory, providing Slovakia with an additional means of pressure over the country downstream.

7.41. Finally, Czechoslovakia disregarded another multilateral treaty, if not literally, at least in spirit -- the Belgrade Convention on the Danube adopted in 1948.[27] The danger that the Danube could be diverted from its natural river-bed, not surprisingly, did not occur to the

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23 Treaty of Peace, Trianon, 4 June 1920, in *The Treaties of Peace 1919-1923* (New York, Carnegie Endowment for International Peace, 1924) vol 1, Art 27(4) ("the principal navigation line of the Danube"); Annexes, vol 3, annex 1.

24 Treaty of Peace with Hungary, Paris, 10 February 1947, Art 2; 41 UNTS 135; Annexes, vol.3, annex 2.

25 Under the Treaty of Paris, Art 3, the "thalweg" is the line following the deepest part of a river, channel, streambed or valley.

26 Czechoslovakia-Hungary, Treaty concerning the Regime of State Frontiers (with Final Protocol), Prague, 13 October 1956, 300 UNTS 150; Annexes, vol 3, annex 15.

27 Convention concerning the regime of navigation on the Danube, Belgrade, 18 August 1948, 33 UNTS 181; Annexes, vol 3, annex 4.

signatories. Thus, the Convention does not contain an explicit prohibition against unilateral diversion. However, the Convention's general spirit is one of friendly cooperation and mutual agreement, thereby excluding any unilateral initiative by a Party, especially where the matter is of great consequence.

7.42. This spirit of cooperation is, for instance, evidenced in Article 3, which deals with works required by unforeseen circumstances and carried out within the frontiers of one country. Even in such a situation, the Belgrade Convention explicitly requires that such an action may be carried out only after agreement between the riparian states.

7.43. In the establishment of Variant C, Czechoslovakia neglected its international obligations to cooperate with Hungary, as they derive from each and every treaty concluded with its riparian neighbour in regard to the utilisation of a shared natural resource, the Danube.

SECTION C: THE ILLEGALITY OF THE DIVERSION UNDER GENERAL INTERNATIONAL LAW

7.44. The diversion of the Danube water by Czechoslovakia also violated principles of general international law. The Czechoslovak Government did not respect the obligation not to cause damage to the environment of other States. It did not provide Hungary with timely and adequate information on its plan to proceed to this act, which was clearly harmful to the environment of its neighbour, and it did not accept meaningful consultations with it. It did not apply the guarantees flowing from its own environmental legislation to the impact which the diversion was to produce on Hungarian territory, and it did not observe the principle of equitable use of shared natural resources. Finally, it did not respect the principle of the permanent sovereignty of Hungary over one of its main natural resources.

(1) OBLIGATION NOT TO CAUSE DAMAGE TO THE ENVIRONMENT BEYOND ONES BORDER

7.45. One of the basic norms of international law was formulated in the context of environmental protection by Principle 21 of the 1972 Stockholm Conference's Declaration on the Human Environment. States have, in accordance with the UN Charter and the principles of international law, "the responsibility to ensure that activities within their

jurisdiction or control do not cause damage to the environment of other States . . ."[28]

7.46. Although the Stockholm Declaration is a non-binding text, this principle is rooted in decisions of international tribunals. It derives in part from the *Trail Smelter* arbitral award which affirmed that:

> "no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."[29]

7.47. The underlying principle was confirmed in a different context by this Court in the *Corfu Channel Case*, when it referred to...

> "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States."[30]

7.48. The *Lac Lanoux* arbitral decision also alluded to the problem of transfrontier pollution, although no water pollution was alleged there. The Tribunal said:

> "On aurait pu soutenir que les travaux auraient pour conséquence une pollution définitive des eaux du Carol, ou que les eaux restituées auraient une composition chimique ou une température, ou telle autre caractéristique pouvant porter préjudice aux intérêts espagnols. L'Espagne aurait alors pu prétendre qu'il était porté atteinte, contrairement à l'Acte additionnel, à ses droits. Ni le dossier, ni les débats de cette affaire ne portent la trace d'une telle allégation..."[31]

7.49. The Tribunal later indicated the consequences which would occur from such pollution:

> "...en admettant qu'il existe un principe interdisant à l'Etat d'amont d'altérer les eaux d'un fleuve dans des conditions de nature à nuire gravement à l'Etat d'aval, un tel principe ne trouve pas son application dans la présente espèce, puisqu'il a été admis par le Tribunal, à propos de la première question

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28 UN Doc A/Conf.48/14/Rev.1.

29 (1941) 3 UNRIAA 1938 at p 1965.

30 *Corfu Channel Case, (Merits)* ICJ Rep 1949, at p 22.

31 *Affaire du Lac Lanoux* (1957) 12 UNRIAA 281 at p 303.

examinée plus haut, que le projet français n'altère pas les eaux du Carol."[32]

7.50. Subsequent developments have confirmed Principle 21 as a rule of customary international law. In particular, it has been reaffirmed in various declarations adopted by the United Nations[33] and by other international organisations and conferences.[34] It is reflected in numerous international treaties.[35] One of these, the 1979 Geneva Convention on Long Range Transboundary Air Pollution reproduces Principle 21 of the Stockholm Declaration, stating that it "expresses the common conviction that States have on this matter".[36]

7.51. The Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 17 March 1992 specifies the scope of the general obligation not to cause damage to the environment of other States in this particular field:

"1. The Parties shall take all appropriate measures to prevent, control and reduce any transboundary impact.

2. The Parties shall, in particular, take all appropriate measures:

(a) To prevent, control and reduce pollution of waters causing or likely to cause transboundary impact;

(b) To ensure that transboundary waters are used with the aim of ecologically sound and rational water management, conservation of water resources and environmental protection;

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32 (1957) 12 UNRIAA 281 at p 308.

33 E.g., UN Charter of Economic Rights and Duties of States, 12 December 1974, UNGA Res 3281; World Charter for Nature, 28 October 1982, UNGA Res 37/7.

34 E.g., Preliminary Declaration of a Programme of Action of the European Communities in Respect to the Environment, *Official Journal of the European Communities* C 112/1, 20 December 1973; Final Act of the Helsinki Conference on Security and Cooperation in Europe, 1 August 1975, (1975) 14 ILM 1292; Declaration on Environment and Development, UN Conference on Environment and Development, Rio de Janeiro, June 1992, Principle 2, UN Doc A/Conf 151/5, p 2.

35 E.g., UN Convention on the Law of the Sea, Montego Bay, 10 December 1982, Art 194(2), UN Doc A/Conf 62/122 (1982); Convention on Biological Diversity, Rio de Janeiro, June 1992, Art 3, UNEP Bio.Div/CONF/L.2; Framework Convention on Climate Change, Rio de Janeiro, June 1992, preamble, UNGA Doc A/AC.237/18 (Part II)/Add 1.

36 (1979) 18 ILM 1442, Preamble. See also the Preamble to the Framework Convention on Climate Change, Rio de Janeiro, June 1992.

(c) To ensure that transboundary waters are used in a reasonable and equitable way, taking into particular account their transboundary character in the case of activities which cause or are likely to cause transboundary impact;

(d) To ensure conservation and, where necessary, restoration of ecosystems."[37]

7.52. The so-called Helsinki Rules on the Uses of the Waters of International Rivers stated as early as in 1966 that:

"(1) Consistent with the principle of equitable utilisation of the waters of an international drainage basin, a State

(a) must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State, and

(b) should take all reasonable measures to abate existing water pollution in an international drainage basin to such an extent that no substantial damage is caused in the territory of a co-basin State."[38]

7.53. Another scientific body, the Institut de Droit International, stressed the same principle in a Resolution adopted on 12 September 1979, linking it explicitly with the language of Principle 21 of the 1972 Stockholm Declaration :

"Article II. Dans l'exercice de leur droit souverain d'exploiter leurs propres ressources selon leur politique d'environnement et sans préjudice de leurs obligations conventionnelles, les Etats ont le devoir de faire en sorte que leurs activités ou celles exercées dans les limites de leur juridiction ou sous leur contrôle ne causent pas, au-delà de leurs frontières, de pollution aux eaux des fleuves et des lacs internationaux."[39]

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37 UN Doc E/ECE/1267; 31 ILM 1312 (1992).

38 International Law Association, *Report of the Fifty-Second Conference* (Helsinki, 1966) at p 484.

39 Institut de droit international, session d'Athènes, Résolution du 12 septembre 1979. See also Art III.

7.54. The same principles can be found in various Declarations and Decisions of the UN Economic Commission for Europe.[40]

7.55. The Draft Articles of the International Law Commission on the Law of the Non-Navigational Uses of International Watercourses summarise the state of international law in this regard in Article 7 (Obligation not to cause appreciable harm):

> "Watercourse States shall utilise an international watercourse in such a way as not to cause appreciable harm to other watercourse States."[41]

7.56. It is evident that the diversion of the Danube has caused, and risks causing, substantial environmental damage to Hungary. In the Szigetköz, the decrease of the underground water level and the change in the water regime has had severe effects. In the long term, a major water resource is threatened.[42] Due to the dynamic nature of underground water, the total extent of the damage may be manifest only in the future. However, the concept of pollution includes the risk of the deterioration of the environment by the introduction of polluting substances.[43] This means, in the present case, damage to the underground water, an essential element of the hydraulic system of the whole region.

(2) THE OBLIGATION OF PRIOR NOTIFICATION AND CONSULTATION

7.57. A State which plans to undertake or authorise activities capable of having significant effects on the environment of another State must inform the latter and should transmit to it pertinent information about the project. The natural complement to prior information on projects which could cause harmful effects to the environment of another State is the duty to consult with the latter State at its request. This obligation,

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40 ECE Declaration of Policy on Prevention and Control of Water Pollution, Including Transboundary Pollution (Decision B (XXXV), 1980, E/ECE/1084 ECE WATER/38); ECE Decision on the Cooperation in the Field of Transboundary Waters, 1986, reproduced in UN Doc ECE/ENVWA/2, p 28; ECE Decision on the Principles Related to the Cooperation in the Field of Transboundary Waters, ibidat p 32.

41 UN Doc A/46/405, 11 September 1991.

42 See above, paras 5.106 - 5.111 and 5.113 for a summary.

43 See above, para 6.16.

recognised in numerous international instruments,[44] is formulated for example in Principle 6 of the 1978 UNEP Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilisation of Natural Resources Shared by Two or More States:

> "It is necessary for every State sharing a natural resource with one or more other States:
>
> a) to notify in advance the other State or States of the pertinent details of plans to initiate, or make a change in, the conservation or utilisation of the resource which can reasonably be expected to affect significantly the environment in the territory of the other State or States, and
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> b) upon request of the other State or States, to enter into consultations concerning the above-mentioned plans; and
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> c) to provide, upon request to that effect by the other State or States, specific additional pertinent information concerning such plans; and

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44 UNGA Res 3139(XXVIII), 13 December 1973; UN Charter on Economic Rights and Duties of States, Art 3, General Assembly, Res 3281, 12 December 1974; OECD Resolutions on Principles concerning Transfrontier Pollution, C(74)224, 14 November 1974, on the Implementation of Equal Right of Access and Non-Discrimination in Relation to Transfrontier Pollution, C(77)28, 17 May, 1977, on Strengthening International Cooperation on Environmental Protection of Transfrontier Regions, C(78)77, 21 September 1978. The principle of information and consultation also appears in regional treaties:

in Europe: Geneva Convention on Long-Range Transboundary Air Pollution, 13 November 1979, Art 5, (1979) 18 ILM 1442;

in Asia: Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution, 24 April 1978, Art 11, 1140 UNTS 133; ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur, 9 July 1985, Art 20, *International Environmental Law, Multilateral Agreements* 985:51;

in Africa: African Convention on the Conservation of Nature and Natural Resources, Algiers, 15 September 1968, Art 14, *International Environmental Law, Multilateral Agreements*, 968:68. The Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, also provides for notification, exchange of information and consultation on activities which are likely significantly to affect adversely the biological diversity of other States (Art 14(1)(c)).

> d) if there has been no advance notification as envisaged in subparagraph (a) above, to enter into consultations about such plans upon request of the other State or States."[45]

7.58. The 1992 Rio de Janeiro Declaration on Environment and Development, proclaimed the same principle:

> "States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant transboundary environmental adverse effect and shall consult with those States at an early stage and in good faith".[46]

7.59. The Convention on Environmental Impact Assessment in a Transboundary Context was adopted on 26 March 1991 at Espoo, Finland, by 26 European States, including Hungary, as well as by the European Communities, Canada and the US. Drafted under the auspices of the UN Economic Commission for Europe, this instrument is a result of European cooperation in the field of environmental protection, rooted in the Final Act of the 1975 Helsinki Conference. It can be considered as expressing the legal standards applied by the legislation of many countries and by international practice. Although Czechoslovakia did not become a Contracting Party to the Espoo Convention, Federal Law No 17 of 5 December 1991 of the Czech and Slovak Federal Republic (which is still in force in the Slovak Republic) includes principles which correspond to those of the Espoo Convention. This law requires environmental impact assessments for activities extending beyond national borders. Annex 3 to the Environmental Act contains a list of 17 project types subject to international negotiations in respect of their environmental impact. The list includes dams and reservoirs with a height above foundation base of over 10 m, or a total volume of reservoir of over 10 million m3. Appendix 4 lists the required documentation for the assessment of such plans. These assessments must be reviewed by the authorities of the Republics as well as by the Federal Committee for the Environment. Evidently the obligation to inform other States of activities which potentially affect their environment was recognised by the Czech and Slovak Federal Government.

7.60. The Espoo Convention contains far-reaching provisions concerning the duty to notify potentially affected States of all the relevant information concerning activities which may affect their environment (Article 3) and to consult with them (Article 5). Appendix I

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45 UN Doc UNEP/IG 12/2 (19 May 1978).

46 Principle 19, UN Doc A/CONF.151/5.

of the Convention establishes a special procedure to decide on the necessity of an impact assessment and the notification and consultation which results from it. The concerned Parties must ensure that the public of the affected Party in the areas likely to be affected shall be informed of, and be provided with possibilities for making comments on, the proposed activity. Comments and objections shall be transmitted to the competent authority of the Party of origin (Article 8).

7.61. When the Czechoslovak Government proceeded with Variant C, it failed to comply with the obligation flowing from international law, as well as from its own legislation, to transmit detailed information foreseen by the law, let alone to consult with the Hungarian Government and affected Hungarian residents.[47]

7.62. The duty of information and consultation is contained in other international documents. For example, in the context of shared water resources, the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted on 17 March 1992 under the aegis of the UN Economic Commission for Europe, envisages prior information and consultation (Articles 9(2)(h), 10, 13, 16). It also insists that information "on the conditions of transboundary waters, measures taken or planned to be taken to prevent, control and reduce transboundary impact, and the effectiveness of those measures, is made available to the public".[48]

7.63. An important summary of the principles which should be applied in this field is contained in the Draft Articles on the Law of the Non-Navigational Uses of International Watercourses adopted on first reading by the International Law Commission on 11 September 1991. Part III (Planned Measures) describes the procedure to be applied. Watercourse States are required to "exchange information and consult each other on the possible effects of planned measures on the condition of an international watercourse" (Article 11); to provide timely notification of planned measures, accompanied by "available technical data and information in order to enable the notified States to evaluate the possible effects of the planned measures" (Article 12), to allow 6 months time for response (Article 13), and in the meantime to refrain from implementation of the planned measures without the consent of the

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47 Czechoslovak Federal Act on the Environment no 17/1992, Arts 25, 26, Annexes 1 - 4; Act No 244 of 15 April 1992, Art 13.

48 UN Doc E/ECE/1267, Art 16(1). 24 European States including Hungary, the EEC, Canada and US signed this treaty. The Czech and Slovak Federal Republic was not a signatory.

notified States (Article 14). If an objection is made, negotiations are required "with a view to arriving at an equitable resolution of the situation" (Article 17(1)), and the Project must be delayed for 6 months at the request of the affected State (Article 17(3)). Under Article 17(2):

> "2. The consultations and negotiations shall be conducted on the basis that each State must in good faith pay reasonable regard to the rights and legitimate interests of the other State."

7.64. When the Czechoslovak Government decided to order the execution of Variant C, the only notification it gave to the Hungarian Government was an announcement made by its representative during the Hungarian-Czech and Slovak Boundary Waters Commission's Danube Sub-Commission meeting in March 1991. According to this announcement, the work would begin on 2 April 1991.[49] On 24 July 1991, the Hungarian Minister in charge informed the Prime Minister of the Slovak Republic of the anxiety of the Hungarian public opinion and the Hungarian Government about the press reports that the Slovak Government had started preparatory works to divert the water from the Danube into another bed.[50] Even later, only summary information was given by the Czechoslovak delegate at a bilateral meeting held on 10 July 1991 and the consent of the Hungarian Government was not sought.[51] Until December 1993, no documents on Variant C including the relevant technical data were communicated to the Hungarian Government.

7.65. The unilateral decision of the Czech and Slovak Federal Republic and its execution without real information and consultation and without respecting minimum delays were contrary to generally accepted rules of international law. The Czech and Slovak Federal Government (a) failed to give detailed information to the Hungarian Government; (b) did not inform potentially affected residents on Hungarian territory of an action which produced a significant environmental impact; (c) in spite of the request of the Hungarian Government, did not enter into consultation concerning the project, which would have implied the suspension of all further action during the period of consultation.

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49 Letter from Mr M Király, Head of the Secretariat of Mr F Mádl, Hungarian Minister, to Mr I Lexa, Head of the Secretariat of the President of the Slovak Government, 25 March 1991; Annexes, vol 4, annex 46

50 Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to, Slovak Prime Minister J Carnogursky of 24 July 1991; Annexes, vol 4, annex 54.

51 *Note Verbale* of the Hungarian Government to the Czech and Slovak Embassy at Budapest, 30 July 1991; Annexes, vol 4, annex 57.

(3) THE PRINCIPLE OF NON-DISCRIMINATION.

7.66. According to Principle 13 of the UNEP Principles of Conduct in the field of the Environment for the Guidance of States in the Conservation and Harmonious Utilisation of Natural Resources Shared by Two or More States, States should take into account the potential adverse environmental effects arising out of the utilisation of shared resources "without discrimination as to whether the effects would occur within their jurisdiction or outside it".[52]

7.67. The consequence of Variant C and the diversion of the water of the Danube is that ecosystems of exceptional interest on the Hungarian side are and increasingly will be destroyed since they do not receive the necessary amount of water to remain viable. Such consequences were not taken into account by the Czechoslovak authorities.

7.68. This can be seen, for example, from the way in which the applicable Czechoslovak Federal legislation was applied. The Federal Act on the Environment, legally enforceable as of 16 January 1992,[53] provides for public information about environmental impacts (Articles 11-16), the prevention of environmental pollution (Article 17), environmental impact assessment and monitoring (Article 18), and prevention of damage and the risk of damage (Article 19). The Act entered into force after the decision to divert the Danube, but in accordance with its terms it should have been applied to the consequences of the construction, at least in order to mitigate the effects of the diversion. In fact, it was applied in a certain measure on Slovak territory, but the effects on Hungarian territory were not taken into account.

(4) THE PRINCIPLE OF EQUITABLE USE OF SHARED NATURAL RESOURCES

7.69. Since a relatively early stage of its work on non-navigational uses of international watercourses, the International Law Commission

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52 UNEP/IG.12/2. See also OECD Resolutions on Principles Concerning Transfrontier Pollution, 14 November 1974, Principle 4, C(74)224 and on the Implementation of a Regime of Equal Right of Access and Non-discrimination in Relation to Transfrontier Pollution, 17 May 1977, C(77)28. Cf the UN Convention on the Law of the Sea, Montego Bay, 10 December 1982, Art 227, UN Doc A/Conf 62/122 (1982).

53 Law No 17/1992; Ministry of the Environment of the Czech Republic, *Guide to the Environmental Laws and Regulations of the Czech Republic*, p 10.

established that such uses include all uses of the water of the watercourses, including especially diversion or abstraction of water for power generation facilities.[54] There has been no dissent from this view.

7.70. One of the principles governing the use of shared natural resources by two or more States is the rule of equitable use. Water is the archetype of the shared natural resource.[55] For an international watercourse, understood as a system of surface and underground waters,[56] this means that all the riparian States are entitled to a reasonable share of the uses and benefits of the waters. This requirement has both quantitative and qualitative implications.

7.71. The *quantity* of the Danube water which Hungary receives since the construction of Variant C has dramatically decreased. According to well established rules of international law, each of the riparian States is entitled to 50% of the water of this boundary river. Since the diversion, on average 80-85% of the water flows into the power canal and the remaining 15-20% is shared by Hungary and Slovakia. Instead of 50% of the Danube water, Hungary only receives 7-10%. Even prior to the beginning of the construction of the Barrage System, Czechoslovakia dredged vast amounts of gravel from the bed of the section of the Danube which is sited entirely on its territory. This unilateral action already had negative consequences on the level of the water of the Danube and had negative consequences on the Danube's hydraulic system in Hungary. The construction of Variant C aggravated the situation.

7.72. In addition, the *quality* of the shared water resource must not be impaired. States have the duty not to exceed their right to equitable utilisation by depriving other watercourse States of water which is fit for

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54 Second Report on the Law of the Non-navigational Uses of International Watercourses, by Mr S Schwebel, Special Rapporteur, UN Doc A/CN.4/332 and Add 1, Yearbook of the International Law Commission, 1980, vol II pt 1, pp 165 - 66.

55 Second Report on the Law of the Non-navigational Uses of International Watercourses, by Mr S Schwebel, Special Rapporteur, UN Doc A/CN.4/332 and Add 1, Yearbook of the International Law Commission, 1980, vol II pt 1, p 180 and for the developments on the concept of shared resources, pp 181-83.

56 Second Report on the Law of the Non-navigational Uses of International Watercourses, by Mr S Schwebel, Special Rapporteur, UN Doc A/CN.4/332 and Add 1, Yearbook of the International Law Commission, 1980, vol II pt 1, p 167; cf Art 2 of the Draft Articles on the Law of the Non-Navigational Uses of International Watercourses adopted by the International Law Commission on 11 September 1991, UN Doc A/46/45.

use: the water resource should not be polluted or its characteristics changed in such a way that other users cannot benefit from it. Again, the definition of pollution includes the risk of significant future pollution.

7.73. The obligations of riparian States to respect other riparian States' rights results from the principles formulated by different bodies on the basis of general international law. According to Article 10 of the Helsinki Rules:

> "(1) Consistent with the principle of equitable utilisation of the waters of an international drainage basin, a State
>
> (a) must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State..."[57]

7.74. The 1978 Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilisation of Natural Resources Shared by Two or More States contain similar rules.[58]

7.75. The Draft Articles adopted by the International Law Commission affirm categorically the obligation not to cause appreciable harm. Draft Article 7 provides:

> "Watercourse States shall utilise an international watercourse in such a way as not to cause appreciable harm to other watercourse States."

7.76. Article 2 of the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 17 March 1992 may also be recalled:

> "1. The Parties shall take all appropriate measures to prevent, control and reduce any transboundary impact.
>
> 2. The Parties shall, in particular, take all appropriate measures:
>
> (a) To prevent, control and reduce pollution of waters causing or likely to cause transboundary impact;

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57 International Law Association, *Report of the 52nd Conference* (Helsinki, 1966) p 484. See also Art XI (obligation of cessation and reparation).

58 See UN Doc UNEP/IG 12/2 (19 May 1978), Principles 1, 3.

(b) To ensure that transboundary waters are used with the aim of ecologically sound and rational water management, conservation of water resources and environmental protection;

(c) To ensure that transboundary waters are used in a reasonable and equitable way, taking into particular account their transboundary character, in the case of activities which cause or are likely to cause transboundary impact;

(d) To ensure conservation and, where necessary, restoration of ecosystems.

3. Measures for the prevention, control and reduction of water pollution shall be taken, where possible, at source."

7.77. These statements, which correspond to general international law rules, leave no doubt about the illegality of the diversion of the Danube.

7.78. As to the issue whether the purposes at which Variant C is aimed can justify the unilateral step taken by the Czechoslovak Government, two comments should be made.

7.79. The first results from the primacy of the "no appreciable harm" principle when compared to the principle of equitable use. According to Professor S McCaffrey, former Rapporteur of the International Law Commission, the...

"primacy of the 'no harm principle' means that the fundamental rights and obligations of States with regard to their uses of an international watercourse are more definite than they would be if governed in the first instance by the more flexible (and consequently less clear) rule of equitable utilisation."[59]

This is especially so when water pollution and consequent environmental damage are at stake.

7.80. A second answer results from the very nature of the damage caused by the diversion of the Danube. The Helsinki Rules list the relevant factors which must be taken into consideration in order to

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59 S McCaffrey, "The Law of International Watercourses: Some Recent Developments and Unanswered Questions" (1989) 17 Denver JIL & Policy 505 at p 510. Another author notes that the World Bank policy concerning projects on transboundary watercourses is based on a priority of the no-appreciable harm principle: D Goldberg, "Legal Aspects of World Bank Policy on Projects on International Waterways" (1991) 7 Water Resources Development 225 at p 226.

determine what is a reasonable and equitable share of waters of an international drainage basin. One of them is...

> "the degree to which the needs of a basin State may be satisfied without causing substantial injury to a co-basin State".[60]

7.81. There is no doubt that the diversion of the water of the Danube caused substantial injury to Hungary, the longer-term dimensions of which will manifest themselves only over a number of years. One of the major aspects of the problem is that the supply of a large part of the Hungarian population with drinking water is jeopardised. It must be recalled in this regard that, even if Article 10 of the Draft Articles of the International Law Commission states that no use of an international watercourse enjoys inherent priority over other uses, it also adds that in the event of a conflict between uses of an international watercourse the solution must be found with reference, *inter alia*, to the obligation embodied in draft Article 7 not to cause appreciable harm, and that special regard must be given to the requirements of vital human needs.

7.82. Since 1968 various international fora have stressed that the freshwater resources of mankind are in limited quantity. Their abundance is diminishing and their pollution is increasing. They must be conserved and managed.[61] This is particularly true for Central Europe and for Hungary, whose water resources are extremely limited. There is no sustainable development, and ultimately no human life, without fresh water in adequate quantity and quality.

(5) PERMANENT SOVEREIGNTY OVER NATURAL RESOURCES

7.83. Both the International Covenants on Economic, Social and Cultural Rights and on Civil and Political Rights proclaim in Article 1(2) that:

> "All peoples may, for their own ends, freely dispose of their natural wealth and resources without prejudice to any obligations arising out of international economic co-operation, based upon the principle of mutual benefit, and international

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60 Helsinki Rules, Art V(2)(k).

61 Council of Europe, European Water Charter, Committee of Ministers Resolution (67)10, adopted on 26 May 1967; UN Conference on Water, 1977, Mar del Plata Action Plan, UN Doc E/CONF.70/CBP/1; International Conference on Water and the Environment, Dublin, January 1992, Statement on Water and Sustainable Development; Rio de Janeiro Conference, Agenda 21, Chapter 18.

law. In no case may a people be deprived of its own means of subsistence."[62]

The UN General Assembly has many times affirmed the principle of permanent sovereignty of peoples over their natural resources.[63]

7.84. Although this principle has often been discussed in the context of foreign-owned property on the territory of a State, its scope is broader. In particular, the last sentence of the provisions of both Human Rights Covenant is categorical.

7.85. Hungary has two main natural resources: its soil and its water. Other natural resources which can be found on its territory are much less important. Utilisation of the soil very largely depends on the quantity and the quality of the water resources. At the same time, the internal renewable water resources of the country amount to only 591 m^3 per head per year, while water resources including river flows from other countries amount to 11,326 m^3. 94% of surface water originates outside the country. In this regard, Hungary is in a situation which can be compared to that of many African and Middle Eastern countries. It is the only European country to "face a serious marginal water scarcity situation, with major problems occurring in drought years".[64]

7.86. Thus everything which hampers the quantity or quality of the water in Hungary risks producing a major impact on the very basis of its life. One may recall the rights resulting from a situation of economic dependence and long-term reliance on rights to a natural resource, the legitimacy and the legal consequences of which have been recognised by this Court in the *Fisheries Jurisdiction Cases*.[65]

7.87. The diversion of the Danube in 1992 by a unilateral act of the Czechoslovak Government, even if it were in conformity with other rules of international law -- which, as this Chapter shows, it certainly was not -- is contrary to Hungary's right to have its permanent sovereignty on its basic natural resources respected. Nor, for the same reason, could the 1977 Treaty be interpreted as depriving Hungary of its sovereignty over one of its main natural resources.

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62 Adopted by UNGA Resolution 2200(XXI).

63 See, e.g., UN Charter on Economic Rights and Duties of States, Art 2(1), UNGA Resolution 3281, 12 December 1974.

64 FAO, *The State of Food and Agriculture*, Rome, 1993, p 236 - 238.

65 *Federal Republic of Germany v Iceland, (Merits)*, ICJ Rep 1974 at pp 199, 200, 205.

SECTION D: ABSENCE OF JUSTIFICATION

(1) COUNTERMEASURES

7.88. The unilateral diversion of the Danube by Czechoslovakia cannot be justified as a countermeasure, precluding the wrongfulness of a breach of international law. As shown earlier in this Memorial, the diversion constitutes a blatant violation of international law, and no circumstances exist that could have empowered Czechoslovakia to use measures which, by themselves, would be contrary to international law.

7.89. Two sets of reasons unequivocally preclude the application of countermeasures. First, the basic prerequisite for a countermeasure is absent because Hungary took no illicit action to which the unilateral diversion under Variant C could be seen as a legitimate reaction. Second, even if it were possible to characterise the unilateral diversion of a boundary river as a countermeasure, Czechoslovakia's actions do not accord with the well-established conditions for admitting countermeasures.

(a) Absence of Prior Illicit Act

7.90. "La première condition -- sine qua non -- du droit d'exercer des représailles est un motif fourni par un acte préalable, contraire au droit international."[66] This clear statement, taken from the leading case on countermeasures, the famous *Naulilaa Case*, has been continually repeated by courts, tribunals and other bodies.[67] It establishes that a State may take countermeasures only in reaction to a prior wrongful act, affecting that same state.

7.91. Czechoslovakia would first have to demonstrate that Variant C was a response to a wrongful act by Hungary in order to plead its justification as a countermeasure. But Hungary committed no wrongful act, as proved by events prior to the unilateral Czechoslovak decision. Moreover, Czechoslovakia's decision cannot have been the appropriate

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66 *Naulilaa Case* (1928) 2 UNRIAA 1013 at p 1027.

67 A general survey of the literature and jurisprudence devoted to this basic rule is to be found in the Reports on State Responsibility to the ILC by its successive special rapporteurs: Professor R Ago, ILC Ybk 1979, vol II, pt 1 p 13; W Riphagen, Fourth Report on State Responsibility, UN Doc A/CN.4/440, pp 18-19, Chapter II: "An International Wrongful Act as a Precondition", and G Arangio-Ruiz, Fourth Report, UN Doc A/CN.4/4444, p 2.

response to the cautious, provisional and partial suspension of works decided by Hungary during the spring of 1989.[68]

7.92. Since the 1977 Treaty contained no mechanism for its revision, the criterion for assessing the legality of the Hungarian conduct must be whether Hungary intended and clearly manifested its will to achieve an agreed solution based on good faith negotiations. This general rule stems from the "good faith" principle, as well as common sense and general customary international law. It acquires even more weight in the present case, for Article 27 of the 1977 Treaty refers precisely to revision by joint agreement, either among the government delegates or the Governments of the Contracting Parties, as the method of resolution of disputes about the Treaty.

7.93. The lawfulness of the Hungarian conduct will be demonstrated in Chapter 9 of this Memorial.[69] It is only necessary to note here that Hungary steadfastly intended to reach an agreed solution, as demonstrated by the diplomatic contacts that took place from May 1989 onward.[70]

7.94. For example, when adopting Resolution No 3125/1989 "on the suspension of the operations at Nagymaros", the Hungarian Government had no intention of presenting Czechoslovakia with a *fait accompli*. Rather, Hungary simply took selective interim measures over some of the works taking place under its authority, for period of a few months. These measures were limited in both scope and time. Provisional in character, they were aimed at avoiding any irreversible damage to drinking-water resources or the environment, while, at the same time, facilitating conditions for negotiating revisions of the 1977 Treaty. The Hungarian Government acted well within the framework of the 1977 Treaty, and in particular Article 27, and in the spirit of equality and cooperation with Czechoslovakia.[71] Thus when the Resolution was presented at the international level, the Hungarian initiative was simultaneously accompanied by a proposal for negotiations, personally

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68 See below paras 9.04 - 9.05.

69 See below paras 9.18 - 9.42.

70 See above paras 3.78 - 3.223.

71 This intention is further illustrated by the letter from the Hungarian Prime Minister to the then new Government in Prague, 10 January 1990. See Annexes, vol 4, annex 32.

addressed to the new Czechoslovak Prime Minister by his Hungarian colleague.[72]

7.95. Unfortunately, Czechoslovakia never agreed to a provisional suspension of works on Variant C, even when, in April 1992, it was established as a precondition by EC Commissioner Andriessen upon the request for mediation directed to the Commission of the European Communities. Mr Andriessen specifically requested that "each Government would not take any steps, while the Committee is at work, which would prejudice possible actions to be undertaken on the basis of the report's findings."[73] The Czechoslovak refusals were the very reason why this mediation committee was not established.

7.96. In the years after the suspension of works, Hungary undertook repeated efforts to arrange meaningful negotiations and an agreed solution. By contrast, Czechoslovakia continually stalled and had no other purpose than to continue the Gabcikovo works as rapidly as possible, in other words to reach a point of no return.[74] Thus, as conceived and carried out, always in conjunction with new offers of discussions aimed at achieving a common shared solution, this provisional suspension of work in 1989 is not contrary to any of Hungary's international obligations.

7.97. Hungary was always prepared to compensate for costs caused by the alteration of the Barrage System. It agreed on the principle of compensation and wanted it to be applied on a common, shared basis.

7.98. Czechoslovakia's decision to implement Variant C, taken at the latest in early 1991, while negotiations over compensation were continuing, cannot be considered as a reaction to prior illegal conduct by Hungary. Consequently, Czechoslovakia's decision to implement Variant C could not qualify as a countermeasure. Without any legal justification, Czechoslovakia's unilateral step of bringing Variant C into operation remains unlawful.

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72 See above, para 3.78.

73 Letter from Mr F Andriessen, Vice President of the EC Commission, to Mr G Jeszenszky, Hungarian Foreign Minister, 13 April 1992; Annexes, vol 4, annex 78.

74 See above, paras 3.78 - 3.185.

(b) Additional Legal Failings

7.99. But quite apart from this fundamental difficulty, the unilateral decision to divert would have additional legal failings as a countermeasure.

7.100. These failings appear when considering the procedures used to implement Variant C and are equally evident from its consequences.

7.101. First, Czechoslovakia sought to enforce its view of the dispute over the 1977 Treaty by threatening unilateral action on its own territory as early as August 1989. Moreover, Czechoslovakia refused to deliver appropriate information when requested by Hungary. Let us examine in more detail these two aspects of their conduct.

7.102. Czechoslovakia's decision to take unilateral steps was mentioned to the Hungarian Minister for Industry as early as 21-22 August 1989 by his colleague, the Czechoslovak Minister of Fuel and Energy.[75] This threat became even more apparent in a letter sent by Czechoslovak Prime Minister Adamec to Hungarian Prime Minister Németh, dated 31 August 1989. In this letter, he stressed that:

> "[We] will be forced to take such actions on the sovereign territory of the CSFR which will ensure the amount of water for the Gabcikovo Barrage according to the Treaty of 16 September 1977".[76]

7.103. At that time, Hungary had not taken any final decision to abandon the works for which it was responsible; rather, Hungary was desperately searching for a common agreement to revise the 1977 Treaty.

7.104. Czechoslovakia's threat to take unilateral steps constituted its only response to the Hungarian proposal to negotiate. But even if Czechoslovakia had agreed to enter into negotiations, the substance of its position would evidently have remained unchanged: the works must continue, the 1977 Treaty must be fulfilled, and there was no reason to suspend the works, even temporarily. Such a position amounted to a refusal of negotiations, and certainly of meaningful, negotiations.

7.105. Czechoslovakia's unilateral behaviour not only violated the principle of good faith which should inspire the application of any treaty, but also breached the general spirit with which Czechoslovakia and

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75 Annexes, vol 4, annex 21.

76 Annexes, vol 4, annex 23.

Hungary had adopted the 1977 Treaty, as well as the Boundary Waters Convention of 1976. Moreover, Czechoslovakia's behaviour contravened the specific provisions of Article 27 of the 1977 Treaty, which established negotiations for both ordinary cooperation (including revisions) *and* for the settlement of disputes.

7.106. Czechoslovakia's unilateral behaviour furthermore ignored that the two States had agreed, in Article 27 of the 1977 Treaty on an amicable settlement procedure, in case of disputes relating to the operation of the Barrage System.

7.107. Moreover, Hungary invoked other general dispute resolution procedures, such as those established by the CSCE.[77] Yet, in spite of the numerous meetings held from spring 1989 to spring 1992, the Czechoslovak position never budged, namely that works should never be interrupted, even for a brief period. This unwillingness to consider even a temporary suspension deprived the meetings of a major part of their usefulness.

7.108. Czechoslovakia was also unwilling to communicate the details of its unilateral plans. For example, in meetings of the Joint Operative Group, even as late as June 1991, Czechoslovakia still opposed Hungary's wish for precise information on the technical characteristics of Variant C, which was already being built.[78] Long afterwards, practically until December 1993, after commencement of the present proceedings, Hungary had still not been provided with descriptions of the elements composing Variant C.

7.109. Such a denial of information clearly contradicts Czechoslovakia's (and, later, Slovakia's) obligations, including *inter alia* Article 3 of the 1976 Boundary Waters Convention. Moreover, in the context of countermeasures, this denial of information seems to be inconsistent with the well-established practice according to which a "well governed state" should diligently provide the other state with a careful and detailed technical description of the countermeasure,[79] especially in a case such as this where the planning and implementation of the diversion took several years. Instead of appropriate communication of its intentions, Czechoslovakia resorted to threats of unilateral diversion, even though

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77 The Hungarian Government also tried to settle its dispute with Slovakia in the framework of the CSCE Mechanism for Consultation and Co-operation with regard to Emergency Situations. See above, para 3.183.

78 See above, footnote to para 3.194.

79 See UN Doc A/CN.4/444 (12 May 1992) p 40.

the safety of Hungarian people and the integrity of Hungarian territory were at stake.

7.110. Turning to the tangible consequences of Variant C, one must realise that the consequences have been, and will continue to be dramatically out of proportion to the Hungarian acts to which Czechoslovakia responded. As already noted, Hungary contemplated a commonly defined solution, entailing a revision of the Original Project and intended the solution to be sustainable and acceptable for both parties, not necessarily leading to termination of the whole project. In stark contrast, the consequences of Variant C are extremely harmful in both the short and long term.[80]

7.111. Even if Czechoslovakia's acts were capable of amounting to countermeasures, they contradict the well-established rule in the *Naulilaa Case* that:

> "Même si l'on admettait que le droit des gens n'exige pas que la représaille se mesure appproximativement à l'offense, on devrait certainement considérer comme excessives et partant illicites, des représailles hors de toute proportion avec l'acte qui les a motivées".[81]

7.112. This rule constitutes the core of the international law governing reprisals, as particularly recalled in the reports of the two Special Rapporteurs to the ILC on the second part of the Project on the Law of State Responsibility.[82] The principle of proportionality of countermeasures is one of the best-established rules of customary international practice.[83] It has been referred to so often that it is not necessary to recall it here in detail. Nevertheless, one must note that the Court itself had the opportunity, a few years ago, to reiterate its

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80 See above, paras 5.106 - 5.140.

81 (1928) 2 UNRIAA 1013 at p 1028.

82 Draft art 9(2) of Professor Riphagen (1984) and draft Art 13 of his successor, Professor Arangio-Ruiz (1992). The latter proposal was in substance adopted by the Drafting Committee in 1993.

83 Draft article 9(2) proposed by W Riphagen in his *Fifth Report* reads as follows: "The exercise of this right [of reprisals] by the injured State shall not, in its effects, be manifestly disproportionate to the seriousness of the internationally wrongful act committed." A survey of cases and authors recognizing the rule of proportionality is in Professor Arangio Ruiz's *Third Report*, UN Doc A/CN.4/440 (1991) pp 32 - 36.

importance in the *Case Concerning Military and Paramilitary Activities in and against Nicaragua.*[84]

7.113. The disproportionality of Czechoslovakia's actions is even more striking because there was no Hungarian wrongful act to which it responded. Further, the operation of Variant C has and will produce a very serious impact in the short, medium and long term, to the aquifer, ground-water, surface water, soil, and the entire environment balance of the Szigetköz region, as previously described in this Memorial.[85]

7.114. Another well-established set of rules governing countermeasures deals with the inherent limitations to the exercise of such measures in protecting fundamental human rights.[86] International institutions and conferences have stressed the common sense notion that there is no life without water.[87] The availability of a sufficient quantity and quality of water is a basic condition of life. Thus, a serious degradation of water resources must be an attack on the most fundamental human right -- the right to life itself -- which is certainly a peremptory norm of international law![88]

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84 ICJ Rep 1986, para 249.

85 See above, paras 5.106 - 5.137.

86 See in particular G Arangio-Ruiz, *Fourth Report*, UN Doc A/CN.4/444/Add.1 (25 May 1992), paras 78-83.

87 Council of Europe, European Water Charter, Committee of Ministers Resolution (67) 10, proclaimed on 6 May 1968, reproduced in UN Doc A/CN.4/274, *ILC Ybk* 1974 vol 2 p 342.

88 W Riphagen, *Fifth Report* (1984), draft Art 12(b); G Arangio-Ruiz, *Fourth Report*, UN Doc A/CN.4/444/Add.1, p.38, draft Art 14(c)(iii). The right to life should be, in this context, interpreted in relation to an emerging human right, which is "the right to a clean environment", proclaimed in the 1972 Declaration on the Human Environment, adopted at the United Nations Stockholm Conference on the Human Environment. It was reiterated in several international instruments, among which the 1989 European Charter of Environment and Health, adopted in Frankfurt, which proclaims that every citizen has the right to an environment which allows the highest possible state of health (World Health Organization, Regional Office for Europe, Copenhagen, ICP-RUD 113-1). Clauses concerning the protection of the environment can be found in the constitutions of almost 50 States. Practically no new constitution ignores the necessity to protect the environment. For a complete list, see (1990) 2 *Revue Universelle des Droits de l'homme*, 445, nn 1-2; see also E Brown-Weiss, *In Fairness to Future Generations* (1988) p 297ff.

7.115. Finally, it should be recalled that some of Czechoslovakia's breaches of international law are incompatible with the use of countermeasures. For example, as a result of the diversion, the internationally agreed character of the border line between the two countries has been unilaterally modified.[89] This blow to Hungary's territorial jurisdiction is contrary to the substantive rules limiting the use of countermeasures.[90]

7.116. Variant C also infringes Czechoslovakia's treaty obligations governing the international navigation on the Danube.[91] This violation of treaty obligations, again, is inconsistent with customary international law, as identified in ILC draft articles limiting the use of countermeasures,[92] because Czechoslovakia's actions also affect third countries which are entitled to use the Danube as an international waterway.

7.117. To summarise, the denial of meaningful negotiations, the lack of exhaustion of peaceful means to settle the dispute, the unwillingness to communicate technical details of its unilateral plans and, above all, the drastic disproportion of the benefits of Variant C to the major threat to the right to health, life and a decent environment of millions of people, as well as the loss of an irreplaceable wetland, all disqualify Variant C from being regarded as a lawful countermeasure.

7.118. Moreover, these same wrongful acts (with the exception of prior attempts to settle the dispute) would equally invalidate the legality of these decision if the acts were to be regarded as mere retorsions.

(2) NECESSITY

7.119. The core of Czechoslovakia's strategy, throughout the late 1980s and through the night-and-day construction of the Cunovo dam in 1992, has been to accelerate the building of the dam, while claiming that the Gabcikovo works had already reached the stage where it was impossible to stop them. Such an argument, formulated as a plea of necessity, has

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89 See above, paras 7.28 - 7.40.

90 G Arangio-Ruiz, *Fourth Report*, UN Doc A/CN4/444/ Add 1, p 38 (draft Art 14(c)(iii)).

91 See above, paras 4.40 - 4.47.

92 Draft Art 14; above, para 7.112.

always been misleading, especially since the decision to divert had been envisaged and prepared even before 1989, at least as early as 1982.[93]

7.120. The conditions for claiming necessity as a justification for actions contrary to international law are well-established.[94] They were very precisely summed up and clarified by the International Law Commission in the reports of Professor Roberto Ago, at the time when the ILC was working on the first part of the draft articles on State responsibility,[95] and are reflected in the Draft Articles of Part 1 as adopted on first reading.

7.121. As reflected in draft Article 33, a State may claim a necessity to act contrary to its international commitments, only in protection of an "essential interest". Here, Czechoslovakia actually acted *contrary* to its essential interests. Czechoslovakia's unilateral action created a long-standing threat to both Hungary's and its own drinking-water supplies and caused ecological damage to its own territory. These self-inflicted risks demonstrate that the national interests of Czechoslovakia were not in the direction of Variant C.

7.122. The unilateral diversion also threatens to undermine the fundamental human right to life for the populations concerned, on both sides of the frontier, and such a right is certainly a peremptory norm of international law. Now, one of the most generally admitted rules conditioning the plea of necessity is precisely that it cannot impair a peremptory norm.[96]

7.123. Czechoslovakia sought to have its cake and eat it, too. The situation of which Czechoslovakia was complaining had been for a large part created by its own conduct (i.e., its refusal to negotiate meaningfully

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93 The Vice-President of the Czechoslovak Planning Committee, Mr K. Ujhazy, announced in 1982 that Czechoslovakia was considering the possibility of the unilateral construction of the Gabcikovo Power plant. See Report of Mr P Havas on the Government Plenipotentiaries' negotiations held on 27 - 29 October and 2 - 3 November 1982; Annexes, vol 4, annex 160.

94 See also below, paras 10.06.ff.

95 Report of Professor R Ago, UN Doc A/CN.4/318 Add 5-7, *ILC Ybk* 1980, vol II, pt 1, p 14 ff; discussion of the draft articles by the Commission, 1613th Meeting, UN Doc A/CN.4/318/Add 5 and 6, A/CN.4/328 and Add 1-4, *ILC Ybk* 1980, vol I; *Report of the International Law Commission on the work of its thirty-second session*, p 49 para 31 in *ILC Ybk* 1980 vol II, pt 2.

96 Draft art 33(2)(a); see below, para 10.08.

for a commonly agreed solution). Such an occurrence equally prevents Slovakia now from using the argument of necessity in terms of the continued operation of the Project.

PART III

CHAPTER 8

SLOVAKIA'S INTERNATIONAL RESPONSIBILITY TOWARDS HUNGARY

8.01. Slovakia's responsibility towards Hungary depends on the attribution of Czechoslovakia's wrongful conduct in the implementation of the Original Project and of Variant C to Slovakia. This attribution will be addressed in Section A of this Chapter. Section B will examine Slovakia's consequential obligation to make reparations for damages produced by the wrongful conduct.

SECTION A: DAMAGE AND LOSS ATTRIBUTABLE TO SLOVAKIA'S CONDUCT

(1) ATTRIBUTION

8.02. The second preambular paragraph of the Special Agreement concluded between Slovakia and Hungary records that "the Slovak Republic is . . . the sole successor State [of Czechoslovakia] in respect of rights and obligations relating to the Gabcikovo-Nagymaros Project". As noted earlier in this Memorial,[1] this formulation draws a clear distinction between the 1977 Treaty and the Original Project, since Slovakia was never a party to the 1977 Treaty.

8.03. The first legal consequence is that Slovakia cannot be deemed responsible for breaches of treaty obligations attributable only to Czechoslovakia, which no longer exists. Nevertheless, Czechoslovakia's breaches of the 1977 Treaty, other bilateral treaties, various multilateral conventions and customary international law created a series of secondary obligations; namely, the obligation to repair the damage caused by the wrongful acts. These secondary obligations were neither extinguished by the termination of the 1977 Treaty nor by the disappearance of Czechoslovakia.

8.04. Slovakia continues to be responsible for these secondary obligations because Variant C continued to exist and to be operated after 1 January 1993. Indeed it was further developed under the control and responsibility of Slovakia and within its exclusive territorial jurisdiction. From the first day of its existence as a sovereign State, Slovakia uninterruptedly continued the operation of Variant C, as earlier

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1 See also the position of the Czech Republic, cited in para 2.07. above. See above, paras 6.01 - 6.10.

implemented by Czechoslovakia. From 1 January 1993, Slovakia's actions have effectively endorsed its international responsibility for Variant C.

8.05. The second preambular paragraph of the Special Agreement therefore simply reflects a known fact. It is an explicit way of delineating a legal relationship that was already in existence. In short, this preambular paragraph is nothing but a declaratory statement, showing that, from its beginning, Slovakia assumed the obligations, as operator of Variant C, to repair damage caused by present and prior breaches of international law. Further, Slovakia immediately accepted this heritage, first by its action, then by its statement in preambular paragraph 2 of the Special Agreement.

8.06. Slovakia is therefore responsible for damage and loss caused by Czechoslovakia in relation to the implementation of Variant C until the disappearance of Czechoslovakia on 31 December 1992. This responsibility extends to damage caused by any part of the material of the Original Project that was wrongfully converted or taken over for use in Variant C. From 1 January 1993 onwards, Slovakia is of course responsible, as a successor, for damage created by its own conduct.

(2) IDENTIFICATION

8.07. Identification here consists of three sets of elements. The first two are the identification of the pertinent date from which Czechoslovakia's responsibility (as subsequently endorsed by Slovakia) should be assessed and the wrongful acts committed after such date. The third element deals with the damages produced by the wrongful acts.

(a) Critical date

8.08. It is first necessary to determine the "critical date" from which Czechoslovakia should be held responsible, i.e., the date from which the Parties' conduct should be judged by the Court, in accordance with the Special Agreement upon which the Court's jurisdiction is based.[2] According to Article 2(1)(a) of the Special Agreement, the Court should assess the legality of conduct after May 1989, the date of Hungary's temporary suspension of works.

8.09. Although Article 2(1)(b) mentions November 1991 as the date from which Czechoslovakia proceeded to the "provisional solution" (i.e.,

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2 The term "critical date" here involves conduct following that date, not prior conduct, as is usually applicable in border disputes.

Variant C),[3] the Court will have to assess the lawfulness of Hungary's conduct in direct relation with the behaviour of Czechoslovakia and during the same period. Furthermore, it was in reaction to Hungary's proposal to renegotiate the 1977 Treaty that Czechoslovakia threatened to implement and operate the Gabcikovo Barrage System unilaterally on its own territory. The critical date should therefore be the first date mentioned in the Special Agreement (May 1989).[4]

8.10. The date from when *dies a quo* the wrongful behaviour of Czechoslovakia[5] should be assessed is necessarily contained between the critical date of 13 May 1989 and the termination of Czechoslovakia on 31 December 1992. The *dies a quo* should first be placed in the context of Czechoslovakia's previous wrongful acts and, secondly, revealed by its direct connection with the "provisional solution".

(b) Performance of wrongful acts over time

8.11. The demonstration of Czechoslovakia's numerous breaches of law has been accomplished in the previous two chapters. Here, one must establish the international responsibility for the wrongs by locating them after the critical date and *dies a quo*.

8.12. Czechoslovakia committed some of these wrongful acts soon after commencement of the 1977 Treaty and works on the Original Project. Although these failures originated before the critical date, they cumulatively and progressively contributed to endangering the natural environment and should be taken into account in the present proceedings. Not only will such an analysis assess the antecedents of actual responsibilities, but many of these acts simply continued after the critical date and should be considered as continuing breaches of law.

8.13. Although the legal ground which they infringe is basically the same when Czechoslovakia was effecting, one after the other, the Original Project and then Variant C, the breaches of the international conventional and customary obligations to which the successive performance of these two schemes gave rise should be carefully

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3 As explained in para 3.138 - 3.140, this may be the date at which Czechoslovakia actually began to construct Variant C, but the decision to do so was taken, and indeed officially admitted to Hungary, well before then.

4 Other factual considerations confirm that May 1989 should be considered as the date from which Czechoslovakia's responsibility should be judged. In particular the fundamental political and the economic changes in both countries began during 1989.

5 In relation to the Project in general and the "provisional solution" in particular, as mentioned in the second question asked of the Court in the Special Agreement.

distinguished. This is particularly the case because, as demonstrated in Chapter 7, the unilateral character of the decision to undertake and to operate Variant C introduced a radical element of novelty in comparison to the previous wrongful acts performed by Czechoslovakia.

8.14. We may distinguish between three successive periods, as far as Czechoslovakia's conduct is concerned: from the critical date (13 May 1989) until the actual commencement of construction of Variant C (November 1991); from November 1991 until 23 October 1992, date of the unilateral diversion; and finally, from 23 October 1992 until the termination of Czechoslovakia on 31 December 1992.

8.15. *13 May 1989 - November 1991:* During this first period, Czechoslovakia steadfastly refused to engage in fair and meaningful negotiations with Hungary. Hungary proposed negotiations as part of its notification of the temporary suspension of works at Nagymaros on 13 May 1989.[6] Other than the brief period during which the Czechoslovak Government showed some goodwill, by August 1989 Czechoslovakia formally threatened unilateral steps "securing the operation of the Gabcikovo Barrage" if Hungary did not proceed with preparations to divert the Danube and refused any overture to suspend work temporarily of pending negotiations.[7] In fact, these threats coincided with Czechoslovakia's commencement of final preparatory works for Variant C, which must have been conceived and designed much earlier.

8.16. The significance of the Czechoslovak refusal of August 1989 requires particular attention as it shows, more clearly than anything else since 13 May 1989, Czechoslovakia's inflexible refusal to accomplish anything other than the speedy implementation of the Gabcikovo Barrage. This hardening of Czechoslovakia's position constitutes the first step towards initiating a new series of wrongful acts, all connected to the decision to undertake Variant C, and the unilateral character of these acts is particularly irreconcilable with the obligation to undertake meaningful

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6 The *Aide Memoire* signed by the Government Plenipotentiaries on 26 June 1989 (see Annexes, vol 4, annex 17) clearly states that: "on 13 May 1989 the Hungarian [State] has informed the Czechoslovak [State] of the temporary suspension of works at Nagymaros". See above, para 3.82.

7 *Aide Memoire* of the negotiations between Mr G Czipper, Hungarian Deputy Minister for Industry, and Mr L Blazek, Czechoslovak Deputy Minister for Fuel and Energy, with the participation of the two Government Plenipotentiaries, signed by Mr T Laczai Szabo and Mr M Jaroslav, senior officials in the respective ministries, 21 - 22 August 1989; Annexes, vol 4, annex 21.

negotiations.[8] During this period Czechoslovakia was also unwilling to communicate the precise technical information on Variant C.[9]

8.17. This rejection of meaningful negotiations prolonged and confirmed Czechoslovakia's earlier breaches of law: failure to comply with its duty to cooperate;[10] refusal to undertake a systematic and meaningful environmental impact assessment of the Original Project; failure to provide technical information (through December 1993, no precise technical data had been provided to Hungary);[11] and the refusal to comply with the principle of prevention of damage to the environment (including the ground-water and the drinking-water) as established by several treaty provisions (especially Articles 15 and 19 of the 1977 Treaty) and general international law.[12]

8.18. *November 1991 until 23 October 1992*: This second period is characterised by two major breaches of Czechoslovakia's obligations. First, the decision to undertake work for the purpose of unilateral diversion of the Danube onto Czechoslovak territory.[13] Second, the

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8 As successively requested by the Hungarian Government, Commissioner Andriessen of the Commission of the European Communities and the authors of three different expert-studies established by independent non-governmental bodies: see INFORT, Budapest & Ecologia, Northampton, Massachusetts, USA, *Gabcikovo-Nagymaros Barrage Study, Program Options and Impacts* (May 1989); Annexes, vol 5, annex 6; *Stellungnahme des WWF zum Staufen-Project Gabcikovo-Nagymaros* (Rastatt, August 1989); Committee of Independent Specialists, *Expert Review Concerning the Ecological, Environmental, Technological, Economic, International and Legal Issues of the Gabcikovo-Nagymaros System* (Budapest, September 1989); Annexes, vol 5, annex 8. See also above para 6.78. In this respect, one cannot recognize negotiations as meaningful if one party destroys their objective by continuing the works, the damage threatened by which is precisely the aim of the talks.

9 See above, para 7.12.

10 See above, paras 7.06 - 7.14 (treaties), 6.69, 6.80 (general international law).

11 A very elementary description of Variant C was presented by the Trilateral Commission established under EC chairmanship. See *Report of the Working Group Independent Experts on Variant C of the Gabcikovo-Nagymaros Project*, 23 November 1992, pp 3 - 10; Annexes, vol 5, annex. 14 But this cannot be compared with the requirements established by general international law within the framework of the principle of information and consultation.

12 See above, paras 6.12 - 6.26, 6.57 - 6.68.

13 According to a Slovak document entitled *The Temporary solution on the Territory of the CSFR - Slovakia*, at p 1 "the governments of the CSFR and the Slovak Republic decided to *continue* the preparation of the temporary solution within the territory of the CSFR *in January 1991* (Emphasis added); Annexes, vol 4, annex 173.

decision to operate Variant C, despite every attempt by Hungary to prevent such a catastrophic event. Indeed the latter aggravated the former, as this illicit project could have been suspended and easily forsaken until the date of its final and concrete implementation. Special attention should equally be given to the hazardous manner by which the final closure operations were undertaken by the Czechoslovak authorities.[14]

8.19. The second period is also characterised by the continuation of prior wrongful acts, in particular the refusal of fair cooperation and meaningful negotiations with Hungary and the prevention of damage to the environment. During the same period, Czechoslovakia further violated the precautionary principle, which was gaining authority in international practice and the *opinio juris* of the international community.[15]

8.20. *23 October 1992 until 31 December 1992:* This third period is characterised by the direct and immediate consequences of the operation of Variant C. Moreover, practically none of the continuing breaches of international law disappeared during this final phase, which ended with the disappearance of Czechoslovakia as a sovereign State. Czechoslovakia's conduct during this period was characterised by a persistent refusal to provide Hungary with appropriate information about Variant C or to compromise at all in negotiations. Even the efforts made by the Commission of the European Communities, from October 1992, produced only a limited response on the part of Czechoslovakia, unaccompanied by any suspension of works on Variant C, which was being rapidly developed.

8.21. *From 1 January 1993 onwards,* Slovakia effectively endorsed Variant C, now exclusively on its territory. The new sovereign State maintained the breaches of international law that were previously attributable to Czechoslovakia; indeed it aggravated them by its brutal implementation and by its failure to comply with Article 4 of the Special Agreement. The Court, of course, has jurisdiction to assess Slovakia's wrongful acts in relation to Variant C through to the date of its judgment.[16]

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14 See above, para 3.182.

15 See above, paras 6.63 - 6.65.

16 See above, para 2.03.

(c) Damages

8.22. Every breach of the law committed by Czechoslovakia in implementing Variant C infringed Hungary's rights, as a partner or former partner to the Original Project. Such infringements constitute by themselves legal damage for which the Court should order reparation, having regard to their comprehensive adoption by Slovakia. This applies to wrongful acts committed by Czechoslovakia during each of the first two periods following the critical date.[17] The damage caused by the "provisional solution" comprises both legal and material damage, as Variant C has caused and will continue to cause significant and long-term degradation of the natural environment (including the ground water), as well as damage to the interests of the Hungarian and Slovak population in the area.

8.23. The issue of how to assess environmental damages is well known both at the international and the domestic level. The environment tends to be harmed incrementally over time and cumulatively by the negative interaction of the elements of incremental harm. These two elements, the time factor and the cumulative factor, often create difficulties in establishing a causal link between wrongful conduct and environmental damage.[18]

8.24. Several technical means have been used at the municipal level to adapt the legal instruments of the law of delicts to the characteristics of environmental damage. These adaptations may amplify the traditional definition of damage, channel responsibility for the damaging activity, or simplify the demonstration inherent in the causal relationship between a wrong and the resultant damage. By reversing the burden of the proof, other techniques establish strict liability on the operator of harmful activities, as provided by national or local laws or international treaties or conventions.[19]

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17 See above, paras 8.14 - 8.18.

18 See OECD, *Compensation for Pollution Damage* (Paris, 1981) p 217; D Magraw (ed), *International Law and Pollution* (Philadelphia, 1991); F Francioni & T Treves, *International Responsibility for Environmental Harm* (1991), particularly R Pisillo-Mazzeschi, "Forms of International Responsibility for Environmental Damage", ibid, pp 15 - 37.

19 See PM Dupuy, *La responsabilité internationale des Etats pour les dommages d'origine technologique et industrielle* (Paris, 1976); R Lummert, "Changes in Civil Liability Concepts", in M Bothe (ed), *Trends in Environmental Policy and Law* (Gland, 1980) p 237; PM Dupuy, "International Liability for Transfrontier Pollution" in Bothe, p 363.

8.25. As earlier shown in chapter 5 of this Memorial, the damages caused by Variant C are easily identified because Czechoslovakia undertook one direct operation, at a precise date, with deleterious effects some of which were manifest immediately afterwards.

8.26. The most striking feature of environmental damage, though, lies precisely in the time factor. Much of the damage will become manifest over a number of years, potentially even years after the Court has given its decision. This is particularly the case for degradation to the aquifer and ground-water, with inescapable consequences to the local drinking water,[20] as well as the ecological balance of the Szigetköz and other concerned areas.[21] Such a dramatic conclusion may be drawn from numerous independent international expert studies on the implementation of the Original Project or Variant C. The study by Equipe Cousteau even spoke of a "chemical time bomb"[22]. The potential for long-term irreparable damage is the primary reason why Hungary made such efforts to renegotiate the Original Project, and later to halt or reduce the impact of Variant C.

8.27. The international law of reparation as concerns the causal link between Variant C and the damage was already well-established by the time of Eagleton in 1932, when he stated:

> "All damage which can be traced back to an injurious act as the exclusive generating cause, by a connected, though not necessarily direct chain of causation should be integrally compensated".[23]

8.28. So long as there is a transitive link from cause to effect between different elements of the same channel of facts or phenomena, all such damage must be compensated. To echo the Tribunal in the *Case concerning British Assets in Spanish Morocco*, this is a case of "des dommages directs, quoique éloignés".[24]

8.29. Professor Arangio-Ruiz, the present Special Rapporteur to the International Law Commission on State Responsibility, also reached this conclusion, when considering the categories of damage to be

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20 See above, paras 5.30 - 5.56 and 5.11 - 5.113.

21 See above, paras 5.117 - 5.131.

22 Equipe Cousteau, *Final Report* (March 1993) p 174; Annexes, vol 5, annex 16.

23 C Eagleton, *The Responsibility of States in International Law* (New York, 1932) p 202.

24 (1923) 2 UNRIAA 615 at p 659.

compensated.[25] After expressing misgivings over the definitions of qualifying terms like "direct" or "indirect", he supports the converging opinion of the great majority of authors,[26] and calls for a "clear" and "continuous" causal link between the wrong and the damage to be compensated. The concepts of "normality" and "foreseeability", he claims, should also characterise the causal relationship between the damaging activity and the injury.[27]

8.30. International law thus requires that all damage caused to the natural environment, as well as to the interests of the Hungarian population, should be subject to reparation, provided that the damage is a consequence of the operation of Variant C.

8.31. It may be difficult to offer proof for all possible or potential damages. Indeed, the damming of a massive international river is precisely the type of hazardous situation that entails potential damage, the full extent of which cannot be demonstrated at this time. This is the core reason why the precautionary principle is gaining increasing authority in the legal concerns and practice of States.

8.32. Reliance on probabilities must therefore play a necessary part in the reparation process. The creation of potential risks by a State, which involve a threat to the future of entire populations across international borders, constitutes international damage and is likely to generate material consequences. These material consequences deserve adequate reparation, to be determined either by the Parties, in conformity with the Court's decision.

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25 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) para 34 - 44.

26 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) para 37ff. See in particular Salvioli, "La responsabilité des Etats et la fixation des dommages et intérêts par les tribunaux internationaux" (1929/III) 28 *Recueil des cours* 251; I Brownlie, *System of the Law of Nations, Part I. State Responsibility* (Oxford, 1983) p 226; B Bollecker-Stern, *Le préjudice dans la théorie de la responsabilité internationale* (Paris, 1973) pp 185 - 223; Personnaz, *La réparation du préjudice en droit international public* (Paris, 1938) p 136; Reitzer, *La réparation comme conséquence de l'acte illicite en droit international* (Paris, 1938) esp p 175; B Graefrath, "Responsibility and Damage Caused" (1984/II) 185 *Recueil des cours* 9 at p 95.

27 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) para 37.

SECTION B: SLOVAKIA'S OBLIGATION OF REPARATION

8.33. In addition to the specific environmental damage inflicted on Hungary, taken here *lato sensu*,[28] reparation should also follow the relevant rules of public international law governing the forms and content of the international responsibility of States.

8.34. For example, Article 21 of the Legal Principles for Environmental Protection and Sustainable Development drafted by the international experts group of the UN World Commission on Environment and Development (1987) provides that:

> "A State is responsible under international law for a breach of an obligation relating to the use of a natural resource or to the prevention or abatement of an environmental interference. In particular, it shall:
>
> (a) cease the international wrongful act;
>
> (b) as far as possible, re-establish the situation which would have existed if the international wrongful act had not taken place;
>
> (c) provide for compensation for the harm which results from the internationally wrongful act;
>
> (d) where appropriate, give satisfaction for the internationally wrongful act."[29]

8.35. The draft ILC articles on State Responsibility, as established by two successive Special Rapporteurs, portray similar obligations:[30] cessation of the wrongful act; restoration of the situation prevailing before the wrongdoing, and full reparation by every appropriate means, including satisfaction. Special Rapporteur G Arangio-Ruiz made an

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28 In this context, reparation should include not only the damage to the natural environment (including damage to the aquifer and ground water) but also damage of an economic, moral or even purely legal nature, which is directly connected with the illicit activity.

29 UN World Commission on Environment and Development, *Environmental Protection and Sustainable Development* (1987) p 127. See commentary by M Spinedi, "Les conséquences juridiques d'un fait internationalement illicite causant un dommage à l'environnement" in F Francioni & T Treves, *International Responsibility for Environmental Harm* (1991) 75.

30 See W Riphagen, *Preliminary Report*, *ILC Ybk* 1980 vol II pt 1, pp 110ff; *Second Report*, ibid, 1981 vol II pt 1, pp 85ff; *Sixth Report*, ibid, 1985 vol II pt 1, pp 9-10; G Arangio-Ruiz, *Preliminary Report*, UN Doc A/CN.4/416 & Add 1; *Second Report*, UN Doc A/CN.4/425 & Add 1.

additional suggestion, which was accepted by the ILC, namely the guaranteed non-repetition of the wrongful act that caused the damage.[31]

8.36. Slovakia's obligations should follow these rules of international law, as will be described in detail for each component of Slovakia's responsibility.

(1) CESSATION

8.37. The operation of Variant C is a typical example of a continuous wrongful act. By its very existence, development and persistency, day after day, month after month, Variant C creates new damage and additional risks, which accumulate to create greater threats to the populations concerned, as well as future generations. Hungary's long-standing goal has always been to obtain the nullification of the environmental risks posed by the Original Project by taking the initiative to propose negotiations or other peaceful settlement procedures.

8.38. The Court does not need to decide whether cessation should be a preliminary step in advance of the application of Slovakia's international responsibility towards Hungary, or whether cessation already constitutes the first element of such responsibility.[32] The important thing is that Slovakia cease the operation of Variant C, as the first result of the Court's decision. Without putting a definitive end to the operation of Variant C, there would be no logic in allocating reparation, since the damage would continue to grow and worsen.

(2) RESTORATION AND *RESTITUTIO IN INTEGRUM*

8.39. One of customary international law's best-established rules for state responsibility is that the responsible State should provide sufficient reparation to eliminate all damaging consequences produced by the wrongful act.[33] The situation that existed before the wrongful act was

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31 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) paras 146 - 61.

32 For this discussion see G Arangio-Ruiz, *Preliminary Report*, UN Doc A/CN.4/416, paras 29 - 52; B Graefrath, "Responsibility and Damage Caused" (1984/II) 185 *Recueil des cours* 9 at p 87.

33 See Riphagen, *Preliminary Report*, *ILC Ybk* 1980 vol II pt 1, pp 90ff; G Arangio-Ruiz, *Preliminary Report*, UN Doc A/CN.4/416, Add 1, paras 64 - 70. See also Graefrath, "Responsibility and Damage Caused" (1984/II) 185 *Recueil des cours* 9 at p 204; E Jimenez de Aréchaga, "International Responsibility" in M Sörensen (ed), *Manual of International Law* (1968) p 565; Alvarez de Eulate, "La restitutio in integrum en la practica internacional" (1973) 4 *Anuario Hispano Luso Americano de derecho internacional* pp 261ff; I Brownlie, *System of the Law of Nations, Part I. State Responsibility* (Oxford, 1983) p 222; K Nagy, "The Problem

committed should be re-established. This is the *restitutio in integrum* rule, also called restitution in kind, which is recognised as the most fundamental rule of reparation which was followed by the Permanent Court in the famous *Chorzow Factory Case*.[34]

8.40. In this case, *restitutio in integrum* has very specific implications: immediately after cessation of Variant C, the Danube should be returned to its natural course along the international frontier between Hungary and Slovakia (that is, the main navigable channel as defined by applicable treaties) and the Danube's waters should be restored to the quality situation applicable prior to the implementation of Variant C.

8.41. These steps will no doubt require some time and raise technical problems. According to Article 5(2) of the Special Agreement, the Parties would negotiate these modalities within six months after the Court's decision. Hungary is, of course, prepared to cooperate extensively with Slovakia to achieve the best technical and economic conditions for the Danube's restoration.

8.42. As far as restoring the flow of water in the Danube's main course, the London Agreement of October 1992, as negotiated and adopted between Hungary and Czechoslovakia, provides decisive guidance.

(3) COMPENSATION AND SATISFACTION

8.43. If *restitutio in integrum* is not possible, international law requires payment of compensation.[35] In this case, compensation as the sole reparation would be unsatisfactory because irreversible damage has already affected the natural environment with consequences that are difficult to evaluate. Indeed, by the end of these proceedings, the damages are likely to have increased to an unknown extent, with unexpected new consequences.

8.44. As detailed earlier in this Memorial, harmful phenomena are to be foreseen as concerns in particular the aquifer, and, subsequently,

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of Reparation in International Law", in *Questions of International Law* (1986) vol III, p 177; PM Dupuy, "Le fait générateur de la responsabilité internationale des Etats" (1984/III) 186 *Recueil des Cours* 92; M Spinedi, "Les conséquences juridiques d'un fait internationalement illicite causant un dommage à l'environnement" in F Francioni & T Treves, *International Responsibility for Environmental Harm* (London, 1991) p 93ff.

34 *Chorzow Factory Case* PCIJ Series A No 17, p 47.

35 See in particular G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) paras 20 - 105.

ground-waters, drinking water resources, soils, flora and fauna notably in the Szigetköz.[36]

8.45. Furthermore, the legal procedures ordinarily used for reparation, either at the international or municipal level, may be poorly adapted to the specificity of environmental damage, as has already been shown (see para 8.22).

8.46. Nevertheless, the costs of the measures to limit the existing damage, and restore the polluted areas, as well as the negative economic impact of Variant C in particular on agriculture, fisheries and forest exploitation as well as on recreational values and tourism should be estimated as exactly as possible and compensated.

8.47. In consideration of the time factor, it would be premature to embark now upon an evaluation of the various damage requiring compensation. This will be undertaken by Hungary at the latest possible stage of its pleadings.

8.48. Due to the difficulties of evaluating the costs of the environmental damage, the Court should determine, as precisely as possible, the categories of damage and the methodology and criteria for which compensation shall be established by both Parties and performed by Slovakia.

8.49. One aspect of indemnification deserves special attention. As rightly pointed out by Professor Arangio-Ruiz in his Second Report on the Law of State Responsibility, compensation should cover the "moral damage" caused to the individuals, nationals and agents of the injured country.[37] That principle was applied, for example, in the *Lusitania Case* of 1923.[38] Here, moral damage should include *pretium doloris*, which affects Hungarian nationals regarding the uncertain future of their health and livelihood, for themselves and future generations. Such a moral pressure and a source of stress and anxiety for millions of people, should be considered as part of reparation.

8.50. *Pretium doloris* should be carefully distinguished from the more classical moral damage suffered by Hungary as a sovereign State,

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36 See above, paras 5.106 - 5.140.

37 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989), para 7-12.

38 *Decisions of the Mixed Claims Commissions, United States and Germany* (1925) p 17.

as illustrated in the Second Report of Professor Arangio-Ruiz.[39] As a person of international law, Hungary is specifically affected by the Czechoslovak violations of the 1977 Treaty even if, as in the first two periods following the critical date (see paras 8.14 to 8.18), there may have been no material damage. To give another illustration of this type of damage, Slovakia's unilateral implementation of Variant C modified internationally established material elements for the border line; this specific infringement of Hungary's sovereign rights deserves appropriate reparation. Reparation for this type of damage is generally called "satisfaction". Satisfaction should be considered as an element in setting the financial compensation.[40]

(4) GUARANTEE OF NON-REPETITION

8.51. State responsibility for an international wrong should further require a guarantee of non-repetition of the illicit act.[41] There would be no sense, otherwise, in resolving the dispute if Slovakia could continue to create new threats, risks and damage in the future for the Republic of Hungary and its population.

8.52. Certain steps, in particular Slovakia's dismantling of its dam located at river kilometre 1851.7 would provide some guarantee. But, as demonstrated by the speedy construction and operation of Variant C, this is not enough. The Court should therefore provide a complementary guarantee of a legal nature, namely a decision, as part of its Judgment, to impose on Slovakia an obligation not to repeat such highly hazardous and damaging initiatives.

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39 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) paras 13 - 19.

40 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) paras 106-145; M Spinedi, "Les conséquences juridiques d'un fait internationalement illicite causant un dommage à l'environnement" in F Francioni & T Treves, *International Responsibility for Environmental Harm* (London, 1991) p 111.

41 G Arangio-Ruiz, *Second Report on State Responsibility*, UN Doc A/CN.4/425 (July 1989) para 185-88. As adopted by the ILC's Drafting Committee of the International Law Commission at the 45th session of the Commission, in 1992, Draft Article 10 *bis* of the Second Part of the Draft Articles on State Responsibility read as follows: "The injured State is entitled, where appropriate, to obtain from the State which has committed an internationally wrongful act assurances or guarantees of non-repetition of the wrongful act."

PART IV
THE LAWFULNESS OF HUNGARY'S CONDUCT

CHAPTER 9

THE SUSPENSION AND SUBSEQUENT ABANDONMENT OF WORKS

SECTION A: INTRODUCTION

9.01. Under Article 2(1) of the Special Agreement, the Court is requested to decide:

(a) whether the Republic of Hungary was entitled to suspend and subsequently abandon, in 1989, the works on the Nagymaros Project and on the part of the Gabcikovo Project for which the Treaty attributed responsibility to the Republic of Hungary...

9.02. In this Chapter it will be shown that Hungary acted lawfully in suspending and subsequently abandoning work on the Nagymaros Project, and subsequently in suspending and abandoning work on that part of the Gabcikovo Project for which it had responsibility.

9.03. Initially it is necessary to set out precisely the chain of events with respect to the suspension and abandonment of works, events that are summarised in a few words in the Special Agreement.

9.04. Hungary suspended work at Nagymaros on 13 May 1989, claiming that to construct the Barrage might cause irreparable environmental damage, including a serious risk to the drinking water supplies of Budapest.[1] At this stage Hungary sought negotiations with a view to clarification of the environmental and scientific position, and the modification of the Project to reduce or eliminate the dangers. However, if the concerns expressed by Hungary turned out to be justified, and if no acceptable solution could be found to them, it was clear that there could be no question of building the Nagymaros Barrage.

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1 See para 3.74; Government Resolution, No 3125/1989, 13 May 1989, Annexes, vol 4, annex 147.

9.05. After unsuccessful negotiations on a Hungarian proposal envisaging a number of options, including the continuation of the project with adequate ecological guarantees, the Hungarian Government on 20 July 1989 extended the suspension of works at Nagymaros until 31 October 1989. It also suspended certain works at Dunakiliti, relating to the planned diversion of the Danube through the Gabcikovo part of the Barrage System: that diversion had been due to take place in October 1989. On 1 September 1989, a Hungarian *Note Verbale* proposed further discussions on the future of Nagymaros.[2] Again on 30 November 1989 Hungary proposed modification of the Treaty, saying that the realization of the original treaty was impossible because of an "ecological state of emergency and . . . serious environmental damage . . . environmental catastrophe".[3] Negotiations failed to achieve any agreement, and on 10 January 1990, Hungary notified Czechoslovakia that it proposed to cancel the private contracts for construction at Nagymaros, and to enter into negotiations with the contractors for compensation. It noted that "the Hungarian Government's position remains unchanged with respect to the abandonment of the Nagymaros barrage system."[4] This can be said to mark the abandonment of the Nagymaros part of the Project, although a considerable amount of work continued to be done at the site after this date.

9.06. The position in relation to Gabcikovo was different. In July 1989, as noted in the preceding paragraph, Hungary suspended preparatory works at Dunakiliti. The Dunakiliti weir itself was already virtually complete by this stage. This suspension related to the filling of the Dunakiliti dam, to the collection of material and to other preparations for the actual diversion of the Danube. Both the filling of the dam and the diversion would, in Hungary's view, cause significant environmental harm, remedial provision for which had not been made.[5] The suspension

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2 *Note Verbale* from the Hungarian Ministry of Foreign Affairs, to the Embassy of the Czechoslovak Socialist Republic, 1 September 1989, Annexes, vol 4, annex 24.

3 *Note Verbale* from the Hungarian Ministry of Foreign Affairs, to the Embassy of the Czechoslovak Socialist Republic, 30 November 1989; Annexes, vol 4, annex 30.

4 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 10 January 1990; Annexes, vol 4, annex 32.

5 To that date, and in fact throughout the course of the dispute, the response of the Czechoslovakia (echoed later by the Slovak Republic) was not to suggest increases in the discharge regime but the building of underground weirs. See the letter from Mr J Martonyi, Hungarian State Secretary for Foreign Affairs, to Mr P Benavides,

did not affect the construction of the upstream section of the Barrage System as such, and Hungarian work on that section continued throughout 1989 and into 1990, despite increasing misgivings about the environmental and other impacts of the Project and its scientific and economic viability in the changing situation. In particular, Hungarian work continued to be carried out on Czechoslovak territory. On 16 April 1991, the Hungarian Parliament requested the Government, in the context of continued negotiations with the Czech and Slovak Federal Republic, to cease further State investment in the barrage system as a whole: that resolution characterised the situation as one of suspension of work.[6] The Government did not respond to the Parliamentary Resolution until 25 October 1991, when by Government Resolution 2009/1991 it called for an immediate halt on State investment in the Barrage System, effective 31 December 1991.[7] Hungarian work on the lower canal at Gabcikovo was concluded and the works handed over on 31 December 1991. Thus the formal decision to abandon work at Gabcikovo was taken in October 1991, and became effective at the end of 1991.[8]

9.07. Long before the suspension of work on the upstream section, there was reason to believe that planning for Variant C was well under way. On 21-22 August 1989, at a high-level ministerial meeting, it was disclosed that Czechoslovakia was considering the possibility of technical counter-measures.[9] At a contemporaneous meeting between delegations from the Hungarian Ministry of Industry and the Czechoslovak Ministry of Fuel and Energy, the Czech delegation

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EC Director for External Economic Relations, accepting the EC experts' recommendation for a temporary water management regime, 14 January 1994: Annexes, vol 4, annex 132.

6 Parliamentary Resolution 26/1991, 23 April 1991; Annexes, vol 4, annex 154. This Resolution was adopted by Parliament on 16 April and became effective upon publication on 23 April 1991.

7 Government Resolution 2009/1991, 25 October 1991; Annexes, vol 4, annex 155. This Resolution was adopted by Parliament on 16 April and became effective upon publication on 23 April 1991.

8 The last meeting of the Joint Operational Group which supervised work on the Project was held on 9 October 1991. The Group was not formally suspended until 3 March 1992.

9 Minutes of the meeting between the Hungarian Ministry for Industry, signed by Mr T. Láczai Szabó, and the Czechoslovak Ministry of Fuel and Energy, signed by Mr M Jaroslav, 21 - 22 August 1989; Annexes, vol 4, annex 21.

insisted on continued construction of both dams without modification, and stated that:

> "3. Otherwise, the Czechoslovak party will undertake measures that will ensure the operation of the Gabcikovo Hydro-electric Power Plant."[10]

In its *Note Verbale* of 31 August 1989, Hungary drew attention to the serious ecological and environmental consequences of these "technical counter-measures".[11] But thereafter the threat of unilateral action was never absent.[12] A later Slovak publication on the Project states that "the governments of the CSFR and the Slovak Republic decided to *continue* the preparation of the temporary solution within the territory of the CSFR in January 1991".[13] Having regard to the scope of those plans, the process of drawing them up and conducting the necessary investigations must have begun considerably earlier.[14] Press reports of work on Variant C led Hungary to raise the issue with the Slovak Government in March 1991.[15] There was no immediate reply to this query, despite the fact that on 29 March 1991 the Slovak construction company applied in writing to

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10 Minutes of the meeting between the Hungarian Ministry for Industry, signed by Mr T Láczai Szabó, and the Czechoslovak Ministry of Fuel and Energy, signed by Mr M Jaroslav, 21-22 August 1989; Annexes, vol 4, annex 21.

11 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 1 September 1989; Annexes, vol 4, annex 24.

12 See, e.g., the Czechoslovak position set out in Appendix 2 to the *Aide Memoire* of the meeting between Mr P Medgyessy, Hungarian Deputy Prime Minister, and Mr P Hrivnak, Czechoslovak Deputy Prime Minister, Bratislava, 9 September 1989; Annexes, vol 4, annex 25.

13 Vodohospodarska Vystaba sp Bratislava, "Gabcikovo-Nagymaros Project. The Temporary Solution on the Territory of the CSFR-Slovakia" (Bratislava, nd) at p. 1 (emphasis added); Annexes, vol 4, annex 173. Vodohospodarska vystaba sp Bratislava is the Slovakian State-owned company responsible for the construction of Variant C.

14 The plans of Variant C eventually disclosed by Slovakia in December 1993 (despite many earlier requests) are dated 1993 and are not copies of the original documents.

15 Letter from Mr M Király, Head of Secretariat of Mr F Mádl, Hungarian Minister Without Portfolio, to Mr I Lexa, Head of Secretariat, President of the Government of the Slovak Republic, 25 March 1991, referring to a Slovak statement that work on the so-called 'C' Variant (technical provisional solution) would begin on 2 April 1991; Annexes, vol 4, annex 46.

the Slovak Environmental Protection Committee for approval of the Project.[16] Mr Mádl, the Hungarian Minister Without Portfolio, raised the issue of Variant C again during joint negotiations held in Bratislava on 15 July 1991, and in a further letter of 24 July 1991.[17] It was only on 30 July 1991 that the Slovak Prime Minister formally admitted that Variant C was to proceed, expressing at the same time the hope that this decision would not disturb "Slovak-Hungarian relations".[18] This admission coincided with the unilateral filling of the power canal.[19]

9.08. To summarise, the position was that work at Nagymaros had been suspended in May 1989, and effectively cancelled by January 1990. By contrast, work at Gabcikovo (other than preparation for the actual diversion) was only suspended after reliable reports had reached Hungary that planning for Variant C was in an advanced stage and that a decision to proceed with it had already been taken. The Hungarian decision to cease state investments in the Barrage System as a whole finally became operative on 31 December 1991, more than a year after the Slovak Government reportedly authorised the construction of Variant C, and six months after those plans were formally admitted to Hungary.

9.09. Thus the initial focus so far as the suspension or abandonment of work is concerned must be on the Nagymaros section of the Project and on the temporary suspension of preparations for diversion at Dunakiliti. By the time work on Gabcikovo was abandoned in December 1991, planning for Variant C was well underway, and the original and "indivisible" scheme of the 1977 Treaty was in ruins.

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16 The date of the application is recited in the Note of the Slovak Environmental Committee of 25 June 1991 in which conditional approval was granted: Annexes, vol 4, annex 168.

17 Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to Slovak Prime Minister J Carnogursky, 24 July 1991; Annexes, vol 4, annex 54.

18 Letter from Slovak Prime Minister J Carnogursky to Hungarian Prime Minister Antall, 30 July 1991; Annexes, vol 4, annex 56.

19 Against which Hungary protested at Government Commissioner level on 29 July 1991; Letter from Mr G K Sámsondi, Hungarian Government Plenipotentiary, to Mr D Kocinger, Czechoslovak Government Plenipotentiary; and by *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czech and Slovak Federal Republic, 30 July 1991; Annexes, vol 4, annex 57. A protest directed to Slovak Prime Minister Carnogursky was made on 9 August 1991; Letter from Mr F Mádl, Hungarian Minister Without Portfolio, to Slovak Prime Minister J Carnogursky. Annexes, vol 4, annex 58.

SECTION B: THE POSITION IN 1989

9.10. The circumstances in which Hungary suspended work on the Nagymaros part of the Barrage System have been set out in Chapter 3. By 1989, the position in which the parties to the Treaty were placed can be summarised as follows.

9.11. Serious doubts had emerged about the safety of the Nagymaros Barrage, both in terms of physical design (including the impact of peak power production) and, more importantly, its environmental effects. These doubts have already been summarised in Chapters 3 and 5.[20] They were combined with major changes in the political and economic system in the region, which in turn led to significant reductions in demand for electric power and in the economics of power generation.

9.12. Despite attempts to resolve some of the scientific and environmental issues, and continuous assertions by proponents of the Project that any resulting problems could be "fixed" by technical means, professional and public disquiet remained, not just in Hungary but in both parts of Czechoslovakia, and internationally.[21]

9.13. There was thus a situation in which the further modification of the 1977 Treaty was necessary, in particular to ensure adequate environmental safeguards. Indeed, the termination of the project by mutual consent was a very real possibility, and might have proven to be the best means of escape from a project dating from an earlier and unhappy period in the history of the two countries. Such cancellation had already been suggested by responsible bodies and persons within both countries.[22]

9.14. Above all, from the Hungarian perspective, there were substantial and developing doubts about the threat to drinking water supplies, present and future, of the whole region. 60% of the water supplies of Budapest come from bank filtration works downstream of Nagymaros, in the region that would be affected by the Barrage.[23] Those works had already been quite seriously affected by the dredging required for

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20 See above, paras 3.63, 3.66, 5.30-5.105.

21 See above, paras 3.5 -3.59, 3.64, 3.70, 3.77.

22 See above, paras 3.62 (Hungarian Academy of Sciences), 3.77 (Slovak Union of Nature and Landscape Protectors).

23 See above, para 5.27, and 5.57 - 5.59.

Nagymaros. There was no prospect of alternative sources of supply of this magnitude. A Government cannot be required by a bilateral treaty to deprive the people of its major city of safe water supplies. On plausible scientific scenarios suggested by responsible bodies within and outside Hungary, a situation of necessity would arise.[24]

9.15. The situation can be seen, for example, from the *Gabcikovo-Nagymaros Barrage Project Study*, undertaken by a Study Team of 11 United States scientists. Their Report was issued in March 1989. Its express aim was to advise the Government on "mitigating measures to address environmental damages the project might cause", since at the time the Government had announced that it would proceed with the construction of the project. The Report recommended a number of mitigating steps, while making it clear that this "should, in no way, be interpreted as support for [the Project's] implementation".[25] What is significant for present purposes is that the Report, which was independent of the Government but which treated as given its decision to proceed, included in its mitigation strategies the recommendation that "Preparations for the Nagymaros barrage should be stopped until a complete assessment of its impacts and potential mitigating measures is undertaken".[26] This conclusion was reaffirmed in the related INFORT-Ecologia Study of May 1989, which concluded that "unresolved questions concerning the potential ecological and economic impacts of the BNB project require that *all construction be suspended during the period of decision-making on the fate of this project*".[27]

9.16. These doubts and difficulties had been repeatedly raised with Czechoslovakia, but without result.[28] On the contrary, notwithstanding a period (shortly after the installation of a new federal government in 1990) when a more flexible negotiating position appeared to be shown, the Czech and Slovak Federal Government's response was to continue to insist on the full implementation of the 1977 Treaty, including the

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24 C Reid & RD Yaro (eds), *Gabcikovo-Nagymaros Barrage Project Study* (March 1989); Annexes, vol 5, annex 5.

25 Ibid. at p 1.

26 Ibid. at p 25.

27 INFORT (Hungary)/Ecologia (USA), *Gabcikovo-Nagymaros Barrage Study. Program Options and Impacts. Interim Report* (May 1989) at p 17; Annexes, vol 5, annex 6 (emphasis in original).

28 See, e.g., above, paras 3.82, 3.93, 3.102, and 3.1.05.

Nagymaros sector, while at the same time issuing more or less veiled warnings about "technical countermeasures", i.e. unilateral diversion.

9.17. In a *Note Verbale* informing Czechoslovakia about the continued suspension, the Hungarian Government stated that this was to enable further examination and discussion relating to ecological risks, and that pending these further discussions "irreversible technical steps" should not be taken. The *Note Verbale* went on to say:

> "The Government of the Hungarian People's Republic hereby wishes to draw the attention of the Government of the Czechoslovak Socialist Republic to the fact that, in its opinion, both Hungary and Czechoslovakia are facing an ecological emergency. The actions of both Governments must be judged in the light of this fact. The Hungarian Party can see no explanation for the Czechoslovak Party's rigid refusal to discuss ecological guarantees and an optimum regime of operations for the project. The Czechoslovak Party would not even go as far as discussing any questions which might lead to the smallest deviation from the contents of the Treaty between the two countries on the Construction and Operation of the Gabcikovo-Nagymaros Dam System, despite the fact that, on the basis of the current scientific knowledge, strong objections have been raised against the claim that the project would represent no ecological threat. The Hungarian Party nevertheless hopes that the Czechoslovak Party will finally adopt a responsible attitude and take an active part in finding a solution acceptable to both sides . . .
>
> The Government of the Hungarian People's Republic hereby once more invites the Czechoslovak Government to give serious consideration to Hungarian proposals made in writing on 20 July 1989 in Budapest, and repeated on 3 August the same year, and urges the Czechoslovak Government to respond without delay to the said proposals on the merits. The Hungarian Party proposes that the planned next meeting between the Heads of the two Governments be preceded by expert meetings and then a consultation between the Deputy Prime Ministers of the two countries. The obligation of the two Governments to clarify this complex problem to their nations, and their responsibility to future generations, now demands of the two Governments a full

and appropriate reconciliation of their mutual and individual interests."[29]

There can be no doubt about either the good faith of the Hungarian Government in raising these issues, or the seriousness of the environmental concerns.

SECTION C: LEGAL BASIS FOR THE SUSPENSION AND SUBSEQUENT ABANDONMENT OF WORKS

(1) THE WORKS AT NAGYMAROS

9.18. The position at the time of suspension of the works at Nagymaros in July 1989 can thus be characterised as follows:

(1) Hungary did not deny that the 1977 Treaty remained in force. It continued to implement the Treaty in relation to the building of the Gabcikovo sector of the Project.

(2) The timetable laid down for work on the Project had never been treated as matter of strict legal obligation. In relation to a project of this complexity and size, to do so would have been quite unrealistic. Delays in implementation (which had been frequent, and not all due to Hungary) had been negotiated before and could be negotiated again, as necessary.

(3) Any problems caused by the delay could be compensated for, in one way or another as part of the continuing system of adjustment practiced by the parties, notwithstanding the apparently firm schedules agreed between them.

(4) The essential continuing obligation on the parties under the Treaty was to seek to resolve difficulties by negotiation in good faith, and this Hungary sought to do.

(5) But this was subject to the overriding issue of the physical and environmental safety of the project. In particular, if the view that there was a serious risk of substantial damage to the drinking water of the population and to a major water resource of Hungary

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29 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Ministry of Foreign Affairs, 1 September 1989; Annexes, vol 4, annex 24.

was justified, and if no technical or other modification of the scheme could be agreed on, a state of necessity would arise.

(6) In its report of 23 June 1989, the Hungarian Academy of Sciences confirmed that these risks were real.[30] International opinions to this effect had also been widely publicised.[31]

(7) Hungary continued to draw a distinction between the suspension and even the termination of works at Nagymaros and the continuation of the Treaty. It accepted that rights and obligations arising from the Treaty would have to be dealt with by negotiation, and that compensation would be payable both to private and public interests affected. In respect of private interests, it negotiated a substantial termination payment; in respect of the interests of the joint contracting party, it offered to pay appropriate compensation in an amount to be negotiated.[32] The Hungarian Parliament in its resolutions of 2 June 1989[33] and 31 October 1989[34] also accepted the need for a negotiated solution with the other contracting party.

9.19. In these circumstances, Hungary was justified in suspending work at Nagymaros pending resolution of its concerns. As is demonstrated in Chapter 10, international law allows a State to take action which is necessary to avoid irreversible harm to an essential interest of that State or of its people, or to the environment. The necessity of such action is a circumstance precluding wrongfulness.[35] Moreover the principle applies in cases where the otherwise wrongful

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30 Annexes, vol 5, annex 7.

31 See above, paras 3.57 - 3.59 and 3.64.

32 See above, paras 3.96, 3.103, 3.110, 3.126.

33 Parliamentary Resolution 9/1989 (VI.13), 2 June 1989; Annexes, vol 4, annex 148.

34 Parliamentary Resolution 24/1989 (XI.10), 31 October 1989; Annexes, vol 4, annex 151.

35 See below, para 10.08. This right does not extend to a use of force contrary to the United Nations Charter, or otherwise to action that would violate a norm of *jus cogens* or cause similar damage to an equally essential interest of the other State. As is demonstrated in Chapter 10, none of these limitations applied here. *A fortiori*, they did not apply to a mere *suspension* of works.

action is taken under or with respect to a treaty:[36] there is no disjunction between the law of state responsibility and obligations arising under treaties.

9.20. The legal basis of and limitations on a claim of necessity are also analysed in Chapter 10, where it is demonstrated that the conditions for such a legal claim had been met.[37]

9.21. If a State has a right, or may in all likelihood have a right, to take action on the basis of necessity to avoid irreparable harm to an essential interest, it must be entitled to postpone taking any steps that would (in the absence of a state of necessity) be required to be taken, while it negotiates with the other State concerned on ways of avoiding the state of necessity. A State entitled to take the greater step may first take a lesser step, reserving its rights for the future.

9.22. In the context of the Nagymaros Barrage, the step that would have irrevocably produced serious harm would, presumably, have been the completion and putting into operation of the Barrage. Only when the Barrage was complete and had been filled with water would the various significant harmful consequences have begun to occur. But if at an earlier stage it became very likely that these consequences were involved, it must have been legitimate and reasonable to suspend work immediately, notwithstanding that individual items of that work would not, treated in isolation, cause the harm in question. The point is that such items are not to be treated in isolation. The conduct that was suspended was the conduct of building the Barrage ("the works on the Nagymaros Project"), a structure which it was feared would cause defined, serious and potentially irreversible consequences. That the form of that suspension related to a certain stage in the construction, and to some among a large number of individual acts requiring to be performed to construct the Barrage, is not to the point, since these acts were being performed not in themselves but for the purpose of the construction and operation of the Barrage as a whole. International law does not require a State in a situation of necessity to construct useless and all-but-complete structures, if it is excused from putting into operation the completed structures. There is no point in building *part* of a dam.

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36 Thus the ILC Draft Articles on State Responsibility, Part 1, like the Draft Articles as a whole, applies to any obligation whether arising under a treaty or under general international law.

37 See below, paras 10.17 - 10.40.

9.23. For these reasons, once it became clear that future work on the Nagymaros Barrage was subject to the most serious doubts referred to in paragraphs 9.11-9.15 above, it was lawful for Hungary immediately to suspend construction and to seek forthwith to resolve the difficulties. The same principle of necessity that would justify termination of the Treaty justified investigation and negotiation with a view to determining whether the Nagymaros Barrage should be built, or whether in the light of any agreed modifications construction could proceed.

9.24. Thereafter it was a matter for the parties in good faith to negotiate with a view to resolving the difficulties, if possible, or if not, to adjusting the Project plans, and eventually the 1977 Treaty itself, accordingly. The fact that work was merely suspended indicated the possibility of resumption if the difficulties could be resolved. If the difficulties *were* resolved, any basis for relying on necessity would disappear. Incidental losses to Czechoslovakia in terms of any delay could be compensated for by adjustments in the building program or in the allocation of power output, as had happened in the past. Alternatively, financial compensation could be provided for, as successive Hungarian proposals recognised.[38]

9.25. In these circumstances, both parties were obliged to negotiate in good faith, but neither was obliged to accept the judgment of the other as to the existence or not of the state of necessity. In particular, since the initial problem related to the Nagymaros sector of the Barrage System, which was located wholly in Hungarian territory, and since the concerns about safety and environment impact related wholly to the environment and health of the Hungarian population, the Republic of Hungary was not obliged to accept the assertion of Czechoslovakia that no vital interest would be affected. If no agreement could be reached by negotiation under Article 27 of the Treaty, the dispute over whether there was a state of necessity would have to be resolved by the means referred to in Article 33 of the Charter of the United Nations. No doubt a State could not, in good faith, assert the existence or probable existence of a state of necessity but refuse all suggestions as to ways of resolving a dispute over whether such a state of necessity existed. But this was never Hungary's position: it repeatedly sought ways of resolving the issue, including by reference to binding arbitration or to this Court.[39]

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38 See above, paras 3.96, 3.103, 3.110, 3.126.

39 See, e.g., *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 1 September 1989, Annexes, vol 4, annex 24. (inclusion in negotiations of "international scientific organisations into

9.26. There were advantages to both parties in the suspension of works. Opportunity was provided for negotiation, exchange of information, public consultation and of detailed argument as to the respective position of the parties, and for adjustment of the Project or of the Treaty itself. In the serious circumstances prevailing in 1989, suspension of works was a proportionate response to the situation. Equally, however, it was a temporary and provisional response, and did not determine the long-term consequences for either party arising from the situation.

9.27. The Czechoslovak response to the suspension of works at Nagymaros was outlined in Chapter 3.[40] To summarise, rather than seeking to resolve the issue by negotiation and possible modification of the Project, Czechoslovakia insisted on continuation of the Barrage System without modification. This can be seen from the letter of Czechoslovak Prime Minister Adamec, of 31 August 1989 in which he stated:

> "Following an examination of all sides of all the variants included in your recommendation [*sc* of 20 July 1989] by the responsible Czechoslovak authorities, and by scientific, technical, economic and other institutions, I am forced to repeat that the Government of the Czechoslovak Socialist Republic continues to insist that construction of the Gabcikovo-Nagymaros Barrage System proceeds as per the Treaty [of 1977]... and other related treaty documents."[41]

In the period between 20 July 1989 and the sending of this letter on 31 August 1989 (a period including the traditional summer vacation), it is

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the joint scientific and expert work"); Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister L Adamec, 4 October 1989; Annexes, vol 4, annex 27. (inspection of guarantees by international scientific organs); Draft Treaty attached to *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 30 November 1989; Annexes, vol 4, annex 30., Art 3 (reference of "unsettled questions... to an international arbitral tribunal or to the International Court of Justice"). As far as is known, this was the first occasion since 1945 that an Eastern or Central European country *proposed* the submission of a specific dispute to the Court.

40 See above, paras 3.87 - 3.91.

41 Annexes, vol 4, annex 23. Prime Minister Adamec's letter contained a further intimation of Variant C ("we will be forced to take such actions on the sovereign territory of the CSFR as are necessary to ensure the amount of water guaranteed the Gabcikovo Barrage by the Convention of September 16, 1977").

not conceivable that "all sides of all the variants" could have been examined "by the responsible Czechoslovak authorities, and by scientific, technical, economic and other institutions".[42] The letter was simply a flat rejection of Hungary's legitimate concerns.

9.28. At no stage in the subsequent diplomatic and inter-governmental correspondence between the parties did Czechoslovakia address specifically or in detail the Hungarian concerns relating to the Nagymaros sector of the Project. For example, the Slovak scientific study established in 1989 and funded by the PHARE program focused exclusively on the Gabcikovo barrage and on its impact on Slovakia.[43] This was representative: virtually all the subsequent emphasis was on the dispute over the (shared) water resources of the Szigetköz/Zitny Ostrov. The crucial sector downstream of the proposed Nagymaros barrage, a purely Hungarian resource, was ignored in the Czechoslovak responses, although attention was drawn in repeated Hungarian statements to the vital nature of this water resource. Concerns about the effects of peak power operation in the sector upstream of Nagymaros also went unanswered. Czechoslovak authorities rarely referred to Nagymaros specifically, but simply insisted that the entire Project be constructed as provided for in the 1977 Treaty. This attitude remained unchanged until the diversion of the Danube as part of Variant C in October 1992.[44]

9.29. Under these circumstances, it is submitted that the Hungarian authorities acted reasonably in abandoning work at Nagymaros, while retaining the framework of the 1977 Treaty in order to resolve issues of rights and obligations arising from the Project. No evidence was produced by Czechoslovakia to show that the fears in relation to drinking water supplies of Budapest were unfounded. To secure these supplies was an essential governmental responsibility of Hungary, unshared with

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42 A point made by Hungarian Prime Minister Németh in his letter to Czechoslovak Prime Minister Adamec on 4 October 1989. Annexes, vol 4, annex 27.

43 For details of the Project see above, para 3.113. Referring to the project in the context of an account of the ground water quality problems of the region, the leader of the project, Professor Mucha and a collaborator commented that "[t]he problems are extraordinarily complex, interdisciplinary in their basis, unique from the expert point of view and of extreme importance *for the whole of Slovakia*". See I Mucha & E Paulikova, "Ground Water Quality in the Danubian Lowland Downwards from Bratislava" ((1991) 1(5) *European Water Pollution Control* 13 at p.16 (emphasis added). For the article see Annexes, vol 5, annex 11.

44 See e.g. above, paras 3.82, 3.85, 3.89, 3.93, 3.102.

any other State. Previous experience had demonstrated that a lowering of bed levels in the stretch of river from Nagymaros to Budapest had produced at least a 10% decline in water capacity of the bank-filtered wells, and had also led to the closure of certain wells due to pollution.[45] The scientific reports annexed to this Memorial, contemporary and subsequent, bear out the reasonableness of the concerns felt by the Hungarian Government.[46]

(2) THE WORKS AT DUNAKILITI

9.30. Although Hungary's concerns about drinking water supplies downstream of Nagymaros were particularly strong, these were not the only unresolved problems raised by the Project. So far as the upstream Gabcikovo sector was concerned, two issues were raised. The first related to the water resources of the Szigetköz aquifer, which contained a major untapped source of supply, the most significant in the country.[47] The second related to the environment of the Szigetköz region, which was likely to be significantly harmed (in effect, destroyed) by the discharge regime provided for in the 1977 Treaty, even as subsequently amended.[48] In the latter case the impact would be felt immediately after the diversion, and serious doubts had been expressed as to the technical solutions envisaged for them.[49]

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45 See para 5.59.

46 The scientific reports may be found in the Annexes in volume 5.

47 See para 5.30-5.59.

48 See para 5.60-5.105.

49 For example, waste water treatment upstream of both dams was an essential matter, but neither Czechoslovakia nor Hungary had the resources for this purpose. Indeed Czechoslovakia had recently announced that it had no money for sewage treatment: see C Reid & RD Yaro (eds), *Gabcikovo-Nagymaros Barrage Project Study* (March 1989), 9; Annexes, vol 5, annex 5. The lack of concern for environmental harm is evident, for example, from the Joint Contractual Plan, Summary Description, 1977, Annexes, vol 3, annex 24. After stating that "the abandoned river bed" of the old Danube would "only get the water superior to the capacity of the diversion channel" (para 7.7, and for references to "the abandoned riverbed" see, e.g., para 3.3.1), the Plan went on to state that the inevitable water shortage in the mid-Szigetköz "can be compensated with irrigation to be constructed within the framework of national investments", and that any problems of lack of water during the vegetation period could be resolved by letting 200 m^3/s into the old Danube bed (ibid, para 7.7). As is now known, 200 m^3/s is not even close to being adequate as a minimum discharge: the Joint Contractual Plan proposed it as a maximum *during the growing*

9.31. Accordingly, when Hungary announced the extension of the suspension of works at Nagymaros, it also suspended work at Dunakiliti preparatory to the diversion of the Danube. As noted already, this suspension was of a more minor character, since the Dunakiliti weir itself was essentially complete.[50] The Hungarian *Note Verbale* of 1 September 1989, summarising a Heads of Government meeting of 20 July 1989, stated that:

> "during the time of suspension, further investigations of the ecological risks entailed by the project shall take place and that during this period no irreversible technical measures shall be taken. This is the reason why preparatory work conducted on the territory of Hungary and related to the relocation of the Danube's bed at the Dunakiliti Dam was also to be included in the range of activities to be suspended."[51]

The *Note Verbale* added that:

> "The suspension of preparatory operations for the closure of the Danube bed at Dunakiliti by the Hungarian Party in itself neither interferes with the realisation of the conception of the Gabcikovo-Nagymaros Dam nor with the construction of the Gabcikovo Barrage. The suspension unquestionably delays the commencement of operation of the first hydro-electric generators but it must be taken into consideration that this period of suspension is the last possibility for the two Parties to confront thoroughly and for all times the joint work with the requirements of environmental protection. . . ."[52]

9.32. The Czechoslovak response was entirely negative. For example at negotiations held at Deputy Prime Minister level in Bratislava in September 1989, the Czechoslovak position contained the following elements: (a) a rejection of any possibility of change in requirements of the 1977 Treaty; (b) an offer by Czechoslovakia to divert the Danube at Dunakiliti at Hungarian expense; (c) the threat to implement Variant C

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season. As to the upper Szigetköz, the Plan suggested that "bottom sills" (i.e. underwater weirs) could be constructed "in case of need" (ibid).

50 See above, para 9.05.

51 *Note Verbale* from Hungary to Czechoslovakia, 1 September 1989; Annexes, vol 4, annex 24.

52 Ibid.

"in the interest of both nations"; (d) "the supply of the Moson section of the Danube and of the old bed of the Danube with the proper amount of water corresponding to the contractual documents", in other words, a refusal to change the discharge regime in any way at all.[53]

9.33. This attitude contrasts with that expressed by Prime Minister Németh on 4 October 1989:

> "I would like to emphasise that the Hungarian Government used international environmental law as its starting point, which requires that in the event that environmental dangers are perceived, states have the right and obligation to suspend work in the interest of avoiding undesirable ecological effects and to commence negotiations. The Hungarian Party considers these measures, to the best of its belief, to be entirely lawful... We consider the execution of experiments on nature having uncertain effects to be extraordinarily risky."[54]

9.34. The Hungarian position with respect to the upstream sector was further expressed in a *Note Verbale* of 3 November 1989. Having referred to the "ecological state of emergency" inherent in the construction of Nagymaros and the operation of the Barrage system in peak-power mode, the *Note Verbale* went on to deal with the Gabcikovo sector:

> "The Hungarian Party considers it necessary to conclude an inter-governmental agreement in order to minimise the environmental risks present in the normal operation mode of the Dunakiliti-Hrusovo Reservoir and the Gabcikovo hydroelectric power plant and to provide for a system of guarantees, which include the defence of water quality, technical operational maintenance, and ecology, relating to the Dunakiliti-Hrusovo Reservoir, the Gabcikovo hydroelectric power plant, the power canal, and the river section of the Danube as far as Nagymaros.
>
> The precondition of filling up the Dunakiliti-Hrusovo Reservoir is the conclusion of the inter-governmental agreement. In case of a Czechoslovak statement of intention about the conclusion

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53 *Aide Memoire* of the meeting between Mr P Medgyessy, Hungarian Deputy Prime Minister, and Mr P Hrivnak, Czechoslovak Deputy Prime Minister, 9 September 1989, Appendix 2; Annexes, vol 4, annex 25.

54 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister L Adamec, 4 October 1989; Annexes, vol 4, annex 27.

> of the inter-governmental agreement, the preparatory work of the riverbed diversion at the [Dunakiliti] Reservoir can be continued."[55]

9.35. This was followed by a further *Note Verbale* of 30 November 1989 to which was attached a Draft Treaty. The Treaty took into account "the actual state of advancement of the Gabcikovo Dam", and amended the 1977 Treaty *inter alia* to provide for a mutual account "for the costs, expenditures, expenses and damages resulted or resulting from the amendment of the Treaty". If no agreement could be reached on "the unsettled questions in connection with the construction and operation of the [Gabcikovo] Dam including the disputes resulting from the necessary steps taken in favour of protecting the natural environment", these could be submitted to binding arbitration.[56]

9.36. In the absence of any Czechoslovak response to the *Notes Verbales* of 3 and 30 November 1989, Hungarian Prime Minister Németh on 10 January 1990 wrote, referring to the "so-called technical substitute solution" which would if implemented become a "source of tension" between the parties, and proposed that the newly-installed Czechoslovak Government should agree to...

> "a joint Czechoslovak-Hungarian scientific study, with the involvement of international scientific organisations, [to] examine the complex ecological effects of the Dunakiliti-Hrusovo Reservoir, the Gabcikovo hydro-electric plant and the power channel, along with the assessment of the present environmental situation and the recording thereof, and that we make the commencement of operation of the reservoir and Gabcikovo hydro-electric plant dependent on the results thereof. On the basis of the results... we would decide upon an amendment of the inter-state treaty or the conclusion of a new treaty."[57]

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55 *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 3 November 1989; Annexes, vol 4, annex 29.

56 Draft Treaty transmitted with a *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Czechoslovak Socialist Republic, 30 November 1989, Art 2(c), 3(1), (3); Annexes, vol 4, annex 30.

57 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 10 January 1990; Annexes, vol 4, annex 32.

Prime Minister Calfa's reply, while supporting "the immediate renewal of bilateral negotiations which would lead to joint conduct concerning the putting into operation of the Gabcikovo Barrage during the year of 1991" avoided the issue of the "technical substitute solution".[58] In fact there was a delay of nearly six months before a series of meetings of Government Plenipotentiaries. These were held, apparently, without preconditions on either side.[59] But they had reached a standstill by the end of the year.[60]

9.37. As already demonstrated, in August 1989, just a few months after the suspension, there had been clear indications of action being taken with a view to the unilateral diversion of the Danube and the construction of Variant C.[61] This created an entirely new situation, and was the subject of vigorous protests on the part of Hungary as soon as the Czechoslovak plans were revealed.[62] While proposing various forms of compensation for the abandonment of works,[63] Hungary refused to take part in any authoritative study to settle the future of the Gabcikovo project unless work on Variant C was first halted, while no indication of willingness on the part of either Czechoslovakia or the Slovak Government to suspend this work pending a resolution of the issue was ever given prior to May 1992.[64]

9.38. The position of the Czechoslovak Government at this time can be seen from several exchanges which took place in July 1991, the same month in which it was formally admitted to Hungary that work would proceed on Variant C. On 11 July 1991, Slovak Prime Minister Carnogursky conceded that "[t]he material presented by the Hungarian

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58 Letter from Czechoslovak Prime Minister M Calfa to Hungarian Prime Minister M Németh, 15 February 1990; Annexes, vol 4, annex 33.

59 See, e.g., Minutes of the meeting between the Government Plenipotentiaries held in Budapest, 17-18 October 1990; Annexes, vol 4, annex 37.

60 See above, paras 3.113 - 3.114.

61 See above, para 9.06.

62 See above, paras 3.140 - 3.142.

63 See *Aide Memoire* regarding the meeting of the Government Plenipotentiaries, 9 January 1991, para 4 ;Annexes, vol 4, annex 41; Letter from Mr G Sámsondi, Hungarian Plenipotentiary, to Mr D Kocinger, Czechoslovak Plenipotentiary, 15 February 1991, Attachment; Annexes, vol 4, annex 45; Hungarian Draft Treaty, 22 April 1991; Annexes, vol 4, annex 48-50.

64 See above, para 3.162.

party regarding the construction of the Gabcikovo hydroelectric plant would undeniably lead to its position of rejection", but went on to argue that the Hungarian fears were in fact unjustified.[65] But at Joint Negotiations held in Bratislava on 15 July 1991, the Slovak Prime Minister insisted on the commencement of operations of the Gabcikovo plant, on the basis that the working out of ecological risks "may be viewed during the operation of the barrage", and "additional technological solutions" (such as filtering of all drinking water) could be adopted as required.[66] This was another version of the "experiments... on nature" condemned by Prime Minister Németh on 4 October 1989.[67] At the same time Prime Minister Carnogursky refused to delay construction of Variant C.[68]

9.39. The damage actually caused to Hungary by the diversion of the Danube in October 1992 has been outlined in Chapter 5.[69] Similar damage to the Szigetköz region would have been caused by the diversion of the Danube at Dunakiliti itself, in the absence of a greatly modified discharge regime and other precautions. The risks attached to the Dunakiliti dam and the Gabcikovo barrage have also been analysed in Chapter 5.[70] The extent of both risk and harm is further analysed in the scientific reports annexed to this Memorial.[71] Having regard both to the

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65 Position of the Czechoslovak Governmental Delegation, signed by Slovak Prime Minister J Carnogursky, 11 July 1991; Annexes, vol 4, annex 52. The same letter acknowledged that "the quality of the subterranean water [sc of the Zitny Ostrov] is unsuitable for the purposes of drawing drinking water from the upper water layer of the water supply of Zitny Ostrov. The degradation of water quality can be, at present, measured to a depth of 50 meters, alongside the fact that this was not caused by the Gabcikovo Hydroelectric Plant". This statement was not calculated to reassure the Hungarian side about its concerns as to the Szigetköz aquifer.

66 Report of Mr F Mádl, Hungarian Minister Without Portfolio, to the Hungarian Government regarding meetings held with Slovak Prime Minister J Carnogursky in Bratislava, 15 July 1991; Annexes, vol 4, annex 53.

67 See above para 9.33.

68 Report of Mr F Mádl, Hungarian Minister Without Portfolio, to the Hungarian Government regarding meetings held with Slovak Prime Minister J Carnogursky in Bratislava, 15 July 1991; Annexes, vol 4, annex 53.

69 See para 5.106-5.140.

70 See para 5.30-5.105.

71 The scientific reports may be found in volume 5 of the Annexes.

long-term risks and the immediate harm to the environment which diversion in accordance with the 1977 Treaty would have caused, and for the same reasons as those set out in paras 9.17.-9.24 above, Hungary was justified in suspending work at Dunakiliti and in seeking satisfactory safeguards against such risk and harm.

(3) THE WORKS AT GABCIKOVO

9.40. Such safeguards were never agreed on, and by mid-1991 Czechoslovakia was adamant in refusing to suspend work on Variant C to allow an agreed solution to emerge either from negotiations or from reference to third party experts. Thus the larger scale winding-down of Hungarian works at Gabcikovo, and their final abandonment at the end of 1991 was an integral part of the overall dispute which led Hungary to terminate the 1977 Treaty in May 1992.

9.41. The history of the dispute to that point was aptly described by Prime Minister Antall in a letter to the Czechoslovak Prime Minister Calfa on 19 December 1991:

> "Subsequent to the decisions regarding the suspension, the Hungarian party searched for a solution via negotiations. The Prime Ministerial meeting in 1989 attests to that. At the same time, in the summer of 1989 joint efforts were made to clarify the problems.
>
> The transitions taking place in our countries offered an opportunity for the joint resolution of the serious problems inherited from the dictatorial system of the past and for the conclusion of a responsible and humane decision, keeping in mind the interests of present and future generations. Our governments began negotiations in April of 1991.
>
> The plenipotentiaries met first in Budapest, then in Bratislava in July and once again in Budapest in December.
>
> The delegations emphasised on every occasion that they consider the issue of the Gabcikovo-Nagymaros Barrage System to be primarily a professional-scientific problem. The Parliamentary Committees of the two countries having responsibility for environmental-ecological issues agreed with this in their joint statements and urged the earliest joint disclosure of these problems.
>
> In accordance with this, during the negotiations in December of 1991, both parties considered the determination of the mandate

of the committee which examines the professional questions to be their most important assignment. The delegations previously put their proposals regarding this into writing and jointly produced an agreement. From this point of view, the meeting in December could have concluded with results.

At the same time the Hungarian delegation requested that, during the examination by the professional committee, the Czech and Slovak party refrain from work which is inconsistent with the Interstate Treaty of 1977 and which (in contravention of International Law) aims at a unilateral decision. This rational minimum requirement (which aids the equanimity of the joint research) was not taken into consideration by the Czech and Slovak delegation. However, it promised to notify the Czech and Slovak Government of the request. In light of this, the Hungarian Party offered another ten days for the deliberation of this situation.

Jan Carnogursky, the Prime Minister of the Slovak Republic, in a letter dated 18 December 1991 to Ferenc Mádl, the director of the Hungarian delegation, announced that the Czech and Slovak party could only accept a solution which supports the putting into operation of the Gabcikovo Barrage and for this purpose continues the building of the Gabcikovo-Nagymaros Barrage. This also includes construction which deviates from the Joint Contractual Plan. The Hungarian Party has yet to receive information with regard to the results and aims of this construction.

With regard to the works carried out unilaterally and illegally on the territory of the Czech and Slovak Republic, I regret to state that there is less and less of a chance to set up the planned Joint Expert Committee and to reach a well-founded mutual decision. It would be rational to establish the Joint Expert Committee only if both Parties undertook to take into account the conclusions of the experts in the future. Thus [the Parties] should be open to the conclusions of the experts, instead of putting improper pressure upon them by accelerating the work and implying the irreversibility of the construction.

Dear Mr Prime Minister!

I am hopeful that the representatives of the Government and the Parliament of the Czech and Slovak Republic, having regard to their historic responsibility, will find an opportunity to take the above reasonable points of view into consideration. If this

> expectation proves to be futile, the Government of the Republic of Hungary would be compelled to review the consequences of the discontinuation of negotiations, the fate of the 1977 Interstate Treaty and the necessary counter-measures."[72]

9.42. To summarise, while prepared at all stages to refer the dispute to an independent third party, and to pay reasonable compensation for work done under the 1977 Treaty, Hungary refused to negotiate under the threat of unilateral action that would cause immediate and serious harm to its territory. Thereafter the dispute about possible modification of the 1977 Treaty to allow work to proceed at Gabcikovo became subsumed in a more basic dispute about the very continuation of the Barrage System as a whole, given the combination of radically changed circumstances and the continuing threat of unilateral action on the part of Czechoslovakia. This question is accordingly taken up in Chapter 10 in the context of the termination of the 1977 Treaty.

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72 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 19 December 1991, Annexes, vol 4, annex 70.

PART IV

CHAPTER 10

THE TERMINATION OF THE 1977 TREATY

10.01. Under Article 2(1) of the Special Agreement, the Court is requested to decide:

(c) what are the legal effects of the notification, on 19 May 1992, of the termination of the Treaty by the Republic of Hungary.

In addition the Court is requested, by Article 2(2) to determine "the legal consequences, including the rights and obligations for the Parties, arising from its Judgment" on this question. As has already been pointed out,[1] the Court cannot determine the legal consequences for the parties in terms of their future conduct in relation to the Project (i.e. the legal consequences as at the date of the Court's judgment) without determining whether the Treaty is in force as between the Republic of Hungary and the Slovak Republic, notwithstanding Hungary's notification of termination, the subsequent unilateral diversion of the Danube, the disappearance of the Czech and Slovak Federal Republic, and the subsequent operation by the Slovak Republic of Variant C.

10.02. Thus in order to determine the matters referred to in Article 2(1)(c) and (2), the Court will need to answer two distinct questions:

(1) Was the Hungarian notice of termination lawful and effective to terminate the Treaty?

(2) If not, did the Treaty cease to be in force by reason of events subsequent to 19 May 1992?

These questions will be dealt with in this Chapter. Chapter 11 will deal with the legal consequences for the parties of the answers to these questions.

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1 See above, para 2.03.

10.03. The Hungarian Declaration of 16 May 1992[2] recited the factual and scientific position at the time and relied on the following grounds for termination:

(1) the necessity to modify the treaty to minimise ecological consequences (Declaration, para 12), combined with the refusal of Czechoslovakia even to consider such modifications, which together produced a situation of *necessity* within the meaning of Article 33 of the ILC Draft Articles on State Responsibility (Declaration, Part I, para 12, 15, 19, 20, 21; Part III, para 1);

(2) *impossibility of performance* (Declaration, Part III, para 2);

(3) *fundamental change of circumstances* (Declaration, Preamble; Part III, para 3);

(4) *material breach*, taking the form of failure by Czechoslovakia to carry out environmental impact studies as required by the Joint Agreed Plan of 6 May 1976, as well as provisions of the 1977 Treaty relating to nature and water quality (Declaration, Part I, para 1; Part III, para 4)

(5) *further material breach* of the 1977 Treaty by Czechoslovakia, in particular through the planned construction of "the so-called provisional solution" (Variant C) (Declaration, Part I, para 20, 22, 23, 24; Part III, para 4-5);

(6) *subsequently imposed requirements of international law* in relation to protection of the environment, precluding performance of the 1977 Treaty (Declaration, Part I, para 4; Part III, para 6). This is relevant to other grounds listed above (in particular Grounds 1-3) but was listed also as a separate ground, in reliance on the maxim *lex posterior derogat legi priori, lex specialis derogat legi generali* (Declaration, Part III, para 6).

10.04. These grounds were clearly expressed to be cumulative in their effect. To the extent that any one of these grounds is justified, it justifies the action of Hungary in terminating the Treaty of 1977, independently of the effect of any of the others. Moreover, it is open to Hungary, having made the essential basis of its action clear beyond question in its Declaration of 16 May 1992, to supplement and clarify those grounds.

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2 Annexes, vol 4, annex 82.

This will be done in the following sections of this Chapter, which deal with the grounds for termination in the same order as in the Declaration of 16 May 1992. This Chapter will then consider two further matters: first, the appropriateness of the procedure followed by Hungary in terminating the 1977 Treaty, and second, what the legal position now is on the hypothesis that the 1977 Treaty may have survived Hungary's Declaration of Termination.

10.05. To summarise, the arguments in this Chapter are to the following effect. Hungary acted lawfully in terminating the 1977 Treaty, for the reasons referred to in the Hungarian Declaration of 16 May 1992 and further particularised here. But even if this were not so, the Treaty was terminated either by its repudiation by Czechoslovakia in October 1992, or by the disappearance of Czechoslovakia on 31 December 1992, in circumstances in which no new State succeeded to the former Czechoslovakia as a party to the 1977 Treaty.

SECTION A: STATE OF NECESSITY

10.06. In modern international law, a plea of necessity should only be admitted on a narrow and strictly defined basis.[3] Pleas of necessity should be extremely limited because "necessity" allows a sovereign state to commit what would otherwise be an unlawful act, while avoiding international responsibility.

10.07. The International Law Commission completed a systematic survey of state practice, jurisprudence and doctrine concerning pleas of necessity and reached the conclusion that "the imperative need for compliance with the law must not be allowed to result in situations characterised so aptly by the *maxim summum jus summa injuria*".[4] The ILC insisted that the conditions underlying a plea of necessity must be clearly identified.

10.08. The ILC Report thus stated that "the most appropriate way of determining [necessity] was to indicate that an essential interest of the State must be involved", and added that "the extent to which a given

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3 See above, paras 7.120 - 7. 122.

4 Report of Professor R Ago, UN Doc A/CN.4/318/Add 5-7, ILC Ybk 1980, vol II, pt 1, pp 14ff. For discussion of the draft articles by the Commission, see 1613th Meeting, UN Doc A/CN.4/318/Add.5 & 6, A/CN.4/328 & Add 1-4; ILC *Ybk* 1980, vol I, *Report of the International Law Commission on the Work of its 32nd Session*, p 49, para 31; ILC Ybk 1980 vol II, pt 2.

interest is 'essential' naturally depends on the circumstances in which the State is placed in different specific situations".[5] The Report further indicated that:

> "the danger to what proves in the circumstances to be a genuinely 'essential' interest of the State, must have been extremely grave, that it must have been a threat to the interest at the actual time, and that the adoption by that state of conduct not in conformity with an international obligation binding it to another State must definitely have been its only means of warding off the extremely grave and imminent peril which it apprehended".[6]

As revised after discussion, draft article 33 adopted by the ILC reads as follows:

"*State of necessity*

1. A state of necessity may not be invoked by a State as a ground for precluding the wrongfulness of an act of that State not in conformity with an international obligation of the State unless:

(a) the act was the only means of safeguarding an essential interest of the State against a grave and imminent peril; and

(b) the act did not seriously impair an essential interest of the State towards which the obligation existed.

2. In any case, a state of necessity may not be invoked by a State as a ground for precluding wrongfulness:

(a) if the international obligation with which the act of the State is not in conformity arises out of a peremptory norm of general international law; or

(b) if the international obligation with which the act of the State is not in conformity is laid down by a treaty which, explicitly or implicitly, excludes the possibility of invoking the state of necessity with respect to that obligation; or

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5 *Report of the International Law Commission on the Work of its 32nd Session*, p 49, para 31.

6 Ibid, p 49, para 32.

(c) if the State in question has contributed to the occurrence of the state of necessity."

10.09. Hungary perfectly understands the strict limits of customary international law in allowing pleas of necessity, and nevertheless contends that under the explicit circumstances of this case, it was necessary for Hungary to terminate the 1977 Treaty, as it did by the Declaration of 19 May 1992. Considering Czechoslovakia's inflexibility in opposing Hungary's every overture for amendment of the 1977 Treaty, and observing that the threats placed on the health and vital interests of the populations concerned in a region characterised by its exceptional environmental value (particularly the Szigetköz region), the Government of Hungary had no other choice than to terminate the 1977 Treaty unilaterally.

10.10. The determinant criterion for authorising a plea of necessity, as indicated above, is the "essential" character of the interest involved. In assessing the pertinent State practice, the International Law Commission found that:

> "particularly relevant are those cases where the 'essential interest' of the State [was] threatened by a 'grave and imminent danger' and safeguardable only through the adoption of conduct which in principle was prohibited by an international obligation was to ensure the survival of the fauna or vegetation of certain areas on land or at sea, to maintain the normal use of those areas or, more generally, to ensure the ecological balance of a region".[7]

10.11. In this respect, the Commission found, unsurprisingly, that "most statements of position proposing to preclude on that basis the wrongfulness of conduct not in conformity with an international obligation will be found to be contemporary ones". Nevertheless, much older precedents could equally be relied on.

10.12. For example, over 100 years ago, in 1893, the Russian Government sealed off the Russian coast. As recollected by the Commission's Report:

> "in view of the alarming increase in sealing activity by British and United States fishermen near Russian territorial waters, and

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7 *Report of the International Law Commission on the work of its thirty-second session*, p 49, para 14.

> in view of the imminent opening of the hunting season, the Russian Government, in order to avert the danger of extermination of the seals, issued a decree prohibiting sealing in an area that was contiguous to its coast but was at the time indisputably part of the high seas and therefore outside Russian jurisdiction".[8]

10.13. The justification made by the Russian Minister for Foreign Affairs, and accepted by the British Government, was grounded on the "absolute necessity of immediate provisional measures" in view of the imminence of the hunting season. His statement was accompanied by proposals to negotiate with the United Kingdom, and achieve a peaceful and permanent settlement of the question. An agreement with the British Government was concluded in May 1893.[9]

10.14. The *Russian Fur Seals Case* is particularly interesting, not only because it occurred eight decades before the modern international law of the sea,[10] but also because it prophetically points to the necessity of revising the classical scope of competence of sovereign states to safeguard and protect natural resources in the interests of both the coastal state and the international community. This revision of classical sovereignty has certainly become one of the striking features of modern international environmental law, both in maritime areas and in other contexts.

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8 *Report of the International Law Commission on the work of its thirty-second session*, p 49, para 31.

9 JB Moore, *History and Digest of the International Arbitrations to which the United States has been a Party* (Washington, US Government Printing Office, 1898) vol I, p 826.

10 This Court had shown the way in the *Icelandic Fisheries Cases (United Kingdom v Iceland; Federal Republic of Germany v Iceland)* ICJ Reports 1974, p 3 and p 175, when assessing the preferential rights of the coastal state for protecting coastal fisheries on which it depends. Not much later, the Third Conference on the Law of the Sea recognized the same tendency in Article 222 of the Informal Composite Negotiating Text drawn up by the President of the conference, as pointed out in the above mentioned report of Professor R Ago on the state of necessity, after having referred to the *Torrey Canyon Case* (ILC Rep 1980 vol II, pt 1, pp 26-27, para 33). The same preoccupations gave rise to several provisions in the United Nations Convention of the Law of the Sea adopted at Montego Bay (1982), by recognizing special rights to the coastal state for preserving the natural resources and the maritime environment in the Exclusive Economic Zone, as laid down in particular in arts 61 (Part V) and 208 (Part XII).

10.15. More specifically, as noted by the International Law Commission's commentary, this precedent also "brings out several of the conditions that must in any case be fulfilled before one can even consider whether a situation of 'necessity' justifies action by a State which is not in conformity with an international obligation".[11]

10.16. These conditions include: (1) the absolutely exceptional nature of the alleged situation; (2) the imminent character of the danger threatening a major interest of the State, and (3) the impossibility of averting such a danger by other means.

(1) "ESSENTIAL" CHARACTER OF THE INTERESTS INVOLVED

10.17. Hungary's essential interests may be assessed on two grounds, each of them being sufficient for justifying a plea of necessity.

10.18. The operation of the Barrage System planned by the 1977 Treaty, and Variant C as later unilaterally implemented poses a major economic and environmental threat to the population. First, severe damage to Hungarian agriculture and sylviculture in the region could be anticipated as a result of the operation of the Barrage System and threatened the survival of these rural populations.

10.19. Further severe damage was foreseen as a consequence of the severe pollution of surface and subsurface waters that provide the drinking water for millions of people, on either side of the boundary. This hazard had been consistently put forward by Hungary in the course of discussions with Czechoslovakia in the period preceding termination of the 1977 Treaty.[12]

10.20. The Szigetköz gravel aquifer, for example, is the largest source of high quality ground water in Central Europe. It contains over 12 km^3 of water, 5 km^3 of which is on Hungarian territory. Thus, as stated at a Hungarian-Czechoslovak Expert Conference on ecology, hydrology,

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11 ILC Ybk 1980 vol II pt 2, p 39, para (14). See also *Great Venezuelan Railroad Case* Ven Arb 1903, p 632); *The Wimbledon* PCIJ Ser A No 1 at p 37 (Judges Huber and Anzilotti, dissenting); *Oscar Chinn Case* (1934) PCIJ Ser A/B No 63 at p 113 (Judge Anzilotti); *Compagnie Générale de l'Orenoque*, Ralston's Rep 1905, p 244 at p 360; *Martini Case*, Ven Arb 1903 p 819 at p 843.

12 See, e.g., the substance of the Hungarian position during the succession of meetings between the two inter-Governmental delegations which took place from April 1991; see above, paras 3.125 - 3.137, 3.144 - 3.145.

geology, seismology, pedology and agricultural production held on 17-19 July 1989: "It is of vital interest to keep undisturbed water supply from the Danube terrace concerned. This is the water supply of 3 million (or, in the long run, 5 million) people in Hungary and 5 million people in Czechoslovakia".[13]

10.21. As established earlier in this Memorial, the operation of the Barrage System planned by the 1977 Treaty, and equally that under Variant C, pose a serious threat to this ground water resource, with a high probability of risking the quality of the drinking water.[14] This fact has been reinforced by reliable experts, both Hungarian and international.[15] If a plea of necessity was recognised as legally correct a hundred years ago to defend the life of thousands of fur seals, the same plea is equally legitimate today to defend the lives of millions of human beings.

10.22. Hungary's second essential interest is maintaining its natural environment. As shown earlier in this Memorial,[16] the principal ecological impact of the implementation of the 1977 Treaty or Variant C was to decrease the water discharge in the Danube's main channel, which feeds the water system of the entire Szigetköz region. The unavoidable results of these risky plans include a decrease of water velocity, infiltration and modifications in levels of ground water, deterioration of the aquifer, intensive sedimentation, periodical formation of dead water, creation of swamped areas and, finally, the substantial risk of eutrophication.

10.23. Referring again to draft Article 33 of the first ILC Report on State Responsibility, the condition put forward under paragraph 1 as to the "essentiality" of the interest seems abundantly met, for the protection of public health, welfare and the environment.

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13 See Declaration of the Hungarian Government, 25 May 1992, p 7; Annexes, vol 4, annex 82. The Declaration was made on 16 May 1992, handed over to the Embassy of the Czech and Slovak Federal Republic on 19 May 1992, and entered into force on 25 May 1992. Hereinafter, it will be referred to as the Declaration of the Hungarian Government, 16 May 1992.

14 See above, paras 5.30 - 5.59 and 5.106 - 5.113.

15 See above, para 5.10 and accompanying note; paras 5.30 - 5.59 and 5.106 - 5.113; see also Appendix 3 and Annexes, vol 5, annexes 16, 17, and 20.

16 See above paras 5.52, 5.54, 5.111 - 5.113.

10.24. In relation to the consideration of vital necessity, a State must protect the life and livelihood of its population. This traditional rule of public international law should also be interpreted to include the "right to environment" as provided by numerous texts assessing the relevant *opinio juris*.[17]

10.25. With regard to the consideration of (environmental) necessity, the term "environment" should include the safeguarding of the ecological balance of one of Hungary's most attractive and delicate regions, as well as the protection of unique landscapes, with a high tourism value. The extent of environmental necessity goes further and also concerns the protection of the Danube as a natural resource, commonly shared by Hungary and other riparian states.

(2) THE IMMINENT NATURE OF THE PERIL

10.26. As for the second condition required by customary international law and draft article 33, the imminent nature of the peril was equally satisfied in the present case.

10.27. As most regrettably proven by events taking place after commencement of the operations of Variant C, immediate and very substantial damage was sustained, quite apart from the substantial risk of medium and long-term detrimental effects, especially to ground water, drinking water, forests, fisheries, agriculture, landscape, and the recreational values of one of the most prestigious regions of the Danube, situated principally on Hungarian territory.[18] This applies to the Szigetköz region, which contains particularly delicate species of fauna and flora, of both ecological and economic importance.

10.28. Considering the detrimental impact on ground water and drinking water, the operation of Variant C and the implementation of the Original Project cannot be separated. After all, the works to implement Variant C threatened to turn into actuality the environmental risks that, for years, Hungary had been trying to avoid by proposing the opening of meaningful negotiations.

10.29. Moreover, Variant C was liable to create similar damage to that threatened by the operation of the Original Project.

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17 See below, para 10.38.

18 See above, paras 5.106 - 5.137.

10.30. The proximity of the danger became manifest from the beginning of 1992, since Czechoslovakia persistently refused to consider any postponement in the construction schedule. As long as possible, Hungary had been trying to leave the way open for achieving an agreed settlement. It made as many concessions as possible, without achieving any actual change in the Czechoslovak position. In contrast, Czechoslovakia showed its intransigence by deciding to implement Variant C.[19]

10.31. When Hungary decided to terminate the 1977 Treaty in May 1992, the peril was manifestly imminent because, by letter dated 23 April 1992, the Czechoslovak Prime Minister had set October 31 as the date for the unilateral diversion of the Danube. Hungary had to act as quickly as possible to show its resolve in contesting the unilateral diversion. The only legal possibility was to terminate the 1977 Treaty.[20]

(3) THE UNAVOIDABLE CHARACTER OF THE HUNGARIAN DECISION

10.32. As for the third condition required by customary international law, the unavoidable character of the decision, Hungary had been providing its counterpart with relevant data on the immediate and long-term detrimental consequences of the 1977 Treaty. The data became more precise and extensive over the years. Moreover, Hungary did not wait until the termination of the 1977 Treaty before declaring the situation to have created a state of necessity: from 1989 onwards it constantly urged proper ways for avoiding risks to drinking water reserves and the environment.[21]

10.33. In return, Hungary only obtained superficial discussions, while Czechoslovakia accelerated construction on the Barrage System. Finally, the decision to operate Variant C, in breach of many treaty obligations between the parties, convinced Hungary that there was no hope of finding a sustainable solution through revision of the 1977 Treaty.

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19 See above, paras 3.78 - 3.186.

20 See the text of the Declaration of the Government of the Republic of Hungary on the Termination of the Treaty Concluded Between the People's Republic of Hungary and the Socialist Republic of Czechoslovakia, 19 May 1992; Annexes, vol 4, annex 82.

21 See the *Note Verbale* from the Hungarian Ministry of Foreign Affairs, to the Embassy of the Czechoslovak Socialist Republic, 1 September 1989; Annexes, vol 4, annex 24.

10.34. Due to the absolute intransigence of the position taken by Czechoslovakia, the only solution left open to Hungary to avoid extensive future damage was twofold: on the one hand, termination of the 1977 Treaty, and, on the other, the commencement of any available steps for a judicial procedure aimed at peacefully settling the dispute. The termination of the 1977 Treaty was the last possible legal reaction to Czechoslovakia's illegitimate and persistent refusal of meaningful negotiations, which was only underscored by Czechoslovakia's perseverance with Variant C in spite of Hungary's urgent invitations to discontinue work, as highly damaging and incompatible with the 1977 Treaty.

(4) OTHER CONDITIONS

10.35. As for the other conditions laid down in draft article 33 (2)(a), (b) and (c), it cannot be argued that they are not satisfied, since the 1977 Treaty neither embodied a peremptory norm of general international law nor contained any provision which excluded the possibility of invoking a state of necessity.

10.36. Finally, Hungary did not contribute to the occurrence of the state of necessity, since it had earlier taken specific steps, such as the suspension of the works at Nagymaros, to prevent threats to the ecology, the economy and, above all, to the public health of the populations concerned.

10.37. Furthermore, it should be noted that, far from impairing Czechoslovakia's essential interests (to use the language of the ILC's draft article 33(1)(b)), Hungary consistently notified Czechoslovakia of the risks to the ecology of the region and the health of the riparian populations on both sides of the river. As noted earlier, the drinking water supplies of the population in Slovakia were endangered by the Barrage System, in spite of Hungarian and international warnings.[22]

10.38. The failure of the planners of the Original Project to consider the detrimental impact on the drinking water resources and the environment led Hungary to assert repeatedly the rights of people on both sides of the border, including the rights of future generations. This point was regularly stressed in diplomatic notes addressed by Hungary to

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22 See above, paras 5.30 - 5.59.

Czechoslovakia.[23] This emerging human right to the environment can be defined as the right of each generation to benefit from and develop its natural and cultural patrimony in such a manner so that it can be passed on to future generations in no worse condition than it was received.[24]

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23 See, e.g., the *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Czechoslovak Embassy, 1 September 1989; Annexes, vol 4, annex 24, and the letters sent on 10 January 1990 by Prime Minister M Németh of Hungary, to Czechoslovak Prime Minister M Calfa; Annexes, vol 4, annex 32; and on 6 December 1991 by Mr S Keresztes, Minister of Environmental Protection, and by Mr F Mádl, Minister Without Portfolio, to Mr J Vavrousek, Minister of Environmental Protection of the Czech and Slovak Republic; Annexes, vol 4, annex 68.

24 This requires the conservation and, as appropriate, the enhancement of the quality and of the diversity of this heritage and, specifically,. the conservation of the diversity and quality of biological resources, of renewable resources such as forests, water and the soil all of which form an integrated system. It requires the avoidance of actions with harmful and irreversible consequences for the natural and cultural heritage. One of the first formulations of this newly arriving rule was already to be found in the Stockholm Declaration on Human Environment (1972) which lays down in its very first Principle that: "Man... bears a solemn responsibility to protect and improve the environment for present and future generations". According to Principle 3 of the Rio de Janeiro Declaration on Environment and Development, "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" (UN Doc A/CONF.151/5). Reiterations of the same rule can also be read in the following conventions: Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 3 March 1973, 993 UNTS 243; Convention on the Conservation of Nature in the South Pacific, Apia, 12 June 1976, UNEP, *Selected Multilateral Treaties in the Field of the Environment* (1983), p 463; Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, Geneva, 18 May 1977, (1977) 16 ILM 88; Kuwait Regional Convention for Cooperation in the Protection of the Marine Environment from Pollution, 24 April 1978, (1978) 17 ILM 511; Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 23 June 1979, (1980) 19 ILM 15; Convention on the Conservation of European Wildlife and Natural Habitat, Bern, 19 September 1979, European Treaty Series, No 104; Convention for the Protection and Development of the Marine Environment of the Wilder Caribbean Region, Cartagena de Indias, 24 March 1983, (1983) 22 ILM 227; ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur, 9 July 1985, (1985) 15 *Environmental Policy and Law* 64; Convention on the Transboundary Effects of Industrial Accidents, Helsinki, 17 March 1992, UN Doc E/ECE/1268. Particularly significant is Art 3(1) of the UN Framework Convention on Climate Change, Rio de Janeiro, June 1992: "The Parties should protect the climate system for the benefit of present and future generations of humankind ..." UN Doc A/AC.237/18 (Part II)(Add 1). This

10.39. Considering the present state of international law for the protection of the environment, a "well-governed state" has a duty of diligence to avoid immediate and major risks to the health and livelihood of its present and future generations. This preoccupation has, very explicitly, inspired Hungary when terminating the 1977 Treaty in a state of necessity.

10.40. Consistent with other recent achievements in modern environmental international law, Hungary has always considered the Danube as a natural resource, which, although being partly national, is also shared with the other riparian states (including Slovakia). The termination of the 1977 Treaty, because it is inspired by the purpose of protecting the environment as a whole in the concerned region, is coherent with this long standing position.

SECTION B: IMPOSSIBILITY OF PERFORMANCE

10.41. The second ground on which Hungary relied in its Declaration of 16 May 1992 as a basis for the termination of the 1977 Treaty was that of impossibility of performance.[25] The Declaration relied on the principle "*ad impossibilia nemo tenatur maxima*" (sometimes also rendered as "*lex non cogit ad impossibiliam*"), and stated that Hungary could not "be obliged to fulfil a practically impossible task, namely to construct a barrage system on its own territory that would cause irreparable environmental damages".[26] In that context it cited the *Russian Indemnity Case*.[27]

10.42. In the *Russian Indemnity Case*, the Ottoman Empire relied on *force majeure* as a ground for its non-payment of money due to Russia

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convention is the follow-up of several UN General Assembly Resolutions, the most important of which concerns the Protection of Global Climate Change for Present and Future Generations of Mankind, GA Res 43/53, 6 December 1988, UN Doc A/Res/43/53. In the Convention on Biological Diversity (Rio de Janeiro, June 1992), now in force, the Contracting Parties state their determination "to conserve and sustainably use biological diversity for the benefit of present and future generations" (preamble, last paragraph): UNEP/Bio.Div/CONF/L.2.

25 See above, para 10.03.

26 Declaration of Termination, Part III, para 2, 16 May 1992; Annexes, vol 4, annex 82.

27 (1912) 11 UNRIAA 421.

under a treaty. The *force majeure* took the form of most extreme financial difficulties, associated with internal turmoil and conflict requiring international intervention in the financial affairs of the Ottoman Empire, the suspension of payments by its central bank, etc. It was, it argued, not required to pay monetary interest on the unpaid amounts during the period of these extreme difficulties.

10.43. The Permanent Court accepted the plea of *force majeure* in principle. It said:

> "*L'exception de la force majeure* . . . est opposable en droit international public aussi bien qu'en droit privé; le droit international doit s'adapter aux nécessités politiques. Le Gouvernement Impérial Russe admet expressément . . . que l'obligation pour un Etat d'exécuter les traités peut fléchir 'si l'existence même de l'Etat vient à être en danger, si l'observation du devoir international est . . . *self-destructive*."[28]

It held however that during the period in question the Ottoman Empire had been able to borrow at favourable rates quite large amounts of money, and that it could have afforded the payment required by the treaty.

10.44. The Permanent Court's award did not rely on *force majeure* in the narrow sense of the term used in Draft Article 31 of the International Law Commission's Draft Articles on State Responsibility. There *force majeure* is restricted to "an irresistible force or... an unforeseen external event... which made it materially impossible for the State to act in conformity with that obligation". The present case did not involve material impossibility, in the sense that the Barrage system could physically have been built. If large-scale water pollution had been caused, the water could have been physically treated by processes of purification (however expensive and impractical), or the aquifers could have been abandoned as a water resource. In the last resort, water could have been imported. As to the Szigetköz, it does not *need* to exist as a wetland. Environmental degradation is always a *physical* possibility. Wildly uneconomic projects can still be paid for.

10.45. But there is no reason to treat Draft Article 31 as reflecting or limiting the broader doctrine of impossibility on which the Tribunal in the *Russian Indemnity Case* relied. This can be seen from an

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28 (1912)11 UNRIAA 421 at p 443 (emphasis in original).

examination of the doctrine of supervening impossibility of performance in the law of treaties, as reflected, for example, in Article 61 of the Vienna Convention on the Law of Treaties.[29]

10.46. Article 61 provides as follows:

> "1. A party may invoke the impossibility of performing a treaty as a ground for terminating or withdrawing from it if the impossibility results from the permanent disappearance or destruction of an object indispensable for the execution of the treaty. If the impossibility is temporary, it may be invoked only as a ground for suspending the operation of the treaty.
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> 2. Impossibility of performance may not be invoked by a party as a ground for terminating, withdrawing from or suspending the operation of a treaty if the impossibility is the result of a breach by that party either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty."

10.47. At the time the parties negotiated, signed and ratified the 1977 Treaty, the Vienna Convention had not entered into force, nor were Hungary and Czechoslovakia then parties to it.[30] Since the Convention only applies to treaties "which are concluded by States after the entry into force of the... Convention with regard to such States" (Article 4), the matter is accordingly governed by general international law. As the Court has observed in the related context of fundamental change of circumstances, dealt with in Article 62, the Convention "may in many respects be considered as a codification of existing customary law..."[31] The Convention is accordingly a guide to the content of general international law, but the Court's studied language ("in many respects") suggests a need for caution, and in each case it will be necessary to consider whether the Convention requirements precisely reflect the general international law position.

10.48. Under Article 61 there are two conditions for invoking impossibility: (1) there must have been a permanent disappearance or

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29 1155 UNTS 315.

30 Hungary acceded to the Vienna Convention on 19 June 1987; Czechoslovakia on 29 July 1987.

31 *Fisheries Jurisdiction Cases (Jurisdiction), (UK v Iceland)* ICJ Rep 1973 p 3 at p 18; *(Federal Republic of Germany v Iceland)* ICJ Rep 1973 p 49 at p 63.

destruction of an object indispensable for the execution of the treaty, and (2) the disappearance or destruction must not have been the result of a wrongful act by the invoking State. These requirements will be dealt with in turn.

(1) DISAPPEARANCE OF AN OBJECT INDISPENSABLE FOR THE EXECUTION OF THE TREATY

10.49. Article 61 is not limited to cases of physical destruction or disappearance of tangible objects, although this may be the primary situation envisaged. The International Law Commission in its commentary listed a number of such cases, but without suggesting that its list was exhaustive of the categories of impossibility.[32] For example it is sometimes said that the disappearance of a State party to a bilateral treaty (in situations where no other State succeeds to the treaty) is an example of impossibility of performance.[33] Yet a State is not an "object" in the sense of a thing, and the disappearance of a State and the non-succession of another are not simple automatic events, the occurrence of which can be determined without the application of legal criteria or the interpretation of the treaty in question. As the Commission pointed out, impossibility of performance tends to overlap with fundamental change of circumstances, and extends to cases where "a legal situation which was the *raison d'être* of the rights and obligations contained in the treaty" disappears.[34]

10.50. Thus Article 61 extends also to cases where the object or purpose of the treaty has become impossible of performance, i.e., to cases where the express purposes of the treaty manifestly can no longer be carried out. The criterion of *physical* destruction as the only basis for impossibility is both inadequate and insufficient. The criterion is inadequate because impossibility is a circumstance, not the automatic result of the destruction of an object, however essential. For example in certain cases the treaty in question might be interpreted as requiring the

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32 ILC Ybk 1963 vol II, pp 206-7.

33 See Waldock, ILC Ybk 1963 vol II, pp 77-79; I Brownlie, *Principles of Public International Law* (4th edn, Oxford, Clarendon Press, 1990) p 619 n83; Nguyen Quoc Dinh, P Dallier & A Pellet, *Droit International Public* (4th edn, LGDJ, 1992) p 303. Cf the ILC's observations in its final Commentary, ILC Ybk 1966 vol II, p 256 para (6).

34 ILC Ybk 1963 vol II, p 206. It gave as an example treaties connected with the operation of the capitulations system.

destroyed object to be reconstructed (e.g., a series of boundary pillars under a demarcation agreement). The criterion is insufficient because there are other cases of impossibility which give rise to equal problems of performance and which should equally be governed by the rule.

10.51. In the present case, the object of the 1977 Treaty was essentially twofold: (1) a Barrage System functioning safely on the territory of the States concerned, i.e., one which did not cause "irreparable environmental damage" to the State; (2) an object of joint management between the parties, a "joint investment" operating to their mutual benefit, not an engine of discord and destruction. As a result of subsequent environmental awareness and understanding, it had become clear that the first object -- an environmentally safe Barrage System -- could not be achieved.[35] As a result of the whole chain of events which eventually led to the implementation of Variant C, the object of a mutually beneficial joint investment had become impossible to perform. Taken together, these developments gave rise to a situation of impossibility within the meaning of Article 61 of the Vienna Convention or its customary law equivalent.

10.52. An analogy might be found in a treaty to construct and operate a large nuclear power plant using technology subsequently discovered to be unsafe. International law would not require the States parties to build the plant -- or to continue to operate it -- in those circumstances, because an object of the treaty indispensable for its implementation would have been a safe nuclear plant, and this object would have disappeared. Similarly if two States agreed to cooperate in the exploitation of a certain fishery using specified technology, and it emerged that the fishery would become unsustainable if so operated, the principle of impossibility would apply, and *at a stage prior to the elimination of the fishery.* In this respect the notion of impossibility contains a precautionary element. No doubt if the technology could be modified to render the plant safe or the fishery sustainable the impossibility might be temporary.[36] But whether the modification was sufficient would be a scientific and technical question, to which the precautionary principle would apply.[37] There are some risks that international law does not require a State to take.

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35 For an analysis of the risk and damage entailed by the construction of the Barrage System see above, paras 5.30 - 5.105 and the scientific reports referred to in the Appendices, and Annexes.

36 *Cf* Vienna Convention, Art 61(1), second sentence.

37 See above, para 6.55.

10.53. It might be argued that the example of the unsafe nuclear reactor or the unsustainable fishery is equally covered by error, fundamental change of circumstances or necessity. The latter two grounds are dealt with elsewhere in this Chapter, and were of course relied on as parallel grounds justifying the termination of the Treaty. As to error, if the Court were to hold that the appropriate rubric in situations where new scientific knowledge or understanding renders a project unsafe, dangerous or unsustainable is error rather than impossibility, then Hungary should be equally entitled to rely on error. Although a State is required to state the substantial grounds of its action in terminating a treaty, it should not be prejudiced if it characterises its action by reference to one rather than another possible label, especially where the labels overlap. International law is not a system of fixed formulas.[38] As to the substantive requirements of error,[39] it was assumed by the parties in 1977 that the Barrage System could be operated economically, in partnership and without substantial damage to drinking water supplies or on the environment generally. That assumption must have been an essential basis of the consent to be bound by the 1977 Treaty. The present understanding of scientific and hydrological risks has developed significantly since 1977, and the economic circumstances changed during the 1980s in a way that was quite unpredictable. Thus the circumstances of 1977 were not such as to put the parties on notice of possible error.

(2) The Disappearance was not the Result of a Breach of the International Obligations of Hungary

10.54. Article 61(2) requires, in the case of impossibility of performance, that the impossibility should not have been the result of a breach by the party relying on the impossibility "either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty".

10.55. The disqualifying phrase in Article 61(2) only operates where it can be said that the substantial cause of the impossibility is the wrongful act of one of the States party to the treaty. The purpose of that phrase is to prevent a State relying on its own wrongful act as a justification for terminating an otherwise valid treaty. That purpose has no application where the essential or substantial cause of the impossibility is separate

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38 Cf *Appeal relating to the Jurisdiction of the ICAO Council (India v Pakistan)* ICJ Rep 1972 p 46 at p 63.

39 Vienna Convention on the Law of Treaties, 1155 UNTS 315 Art 48.

from any wrongful act which may be imputable to the State relying on impossibility. The impossibility must be "*the* result" in the sense of a *causa sine qua non*, not an ancillary or incidental factor. Article 61 envisages a single circumstance of impossibility, and a party should not be disqualified from relying on a genuine impossibility of performance unless its own wrongful act was the dominant or substantial cause of the impossibility.[40]

10.56. Thus in the present case, even if (as Hungary contends[41]) the construction of Variant C was a breach of the 1977 Treaty and of other international obligations owed by Czechoslovakia to Hungary, that would not disqualify Czechoslovakia from relying on the situation of impossibility produced by the factors referred to in para 10.47. Looked at overall, it is not the case that "the impossibility is *the* result of a breach" by either party of the 1977 Treaty or of any other international obligation. The risks of environmental harm were inherent in the very conception of the Barrage System, and this remains the case even though those risks were exacerbated by the unwillingness of Czechoslovakia to agree to modifications to the 1977 Treaty which would have mitigated them.

10.57. In any event, for the reasons given in Chapter 9 and in this Chapter, that impossibility is certainly not the result of any wrongful act of Hungary vis-à-vis Czechoslovakia.

10.58. For these reasons, Hungary was entitled to rely on impossibility of performance as a ground for termination of the 1977 Treaty.

SECTION C: FUNDAMENTAL CHANGE OF CIRCUMSTANCES

10.59. The third ground on which Hungary relied in its Declaration of 16 May 1992 as a basis for the termination of the 1977 Treaty was that of fundamental change of circumstances (*rebus sic stantibus*).[42]

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40 Compare Draft Article 31 of Part 1 of the Draft Articles on State Responsibility, which does not apply where the invoking State "*has contributed* to the occurrence of the situation of material impossibility" (emphasis added).

41 See above, paras 7.04 - 7.40.

42 See above, para 10.03.

10.60. In order to substantiate this ground for the termination of the 1977 Treaty, it is proposed first to summarise the rule of fundamental change of circumstances in general international law, and secondly to demonstrate that the various changes that had occurred by 1992 were sufficient to entitle Hungary to terminate the 1977 Treaty on that ground.

(1) FUNDAMENTAL CHANGE OF CIRCUMSTANCES AS A GROUND FOR THE TERMINATION OF TREATIES

10.61. The Court observed in the *Fisheries Jurisdiction Cases (Jurisdiction)* that Article 62 "may in many respects be considered as a codification of existing customary law on the subject of the termination of a treaty relationship on account of change of circumstances".[43] It is convenient therefore to start with Article 62, which provides as follows:

> "1. A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty unless:
>
> (a) the existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and
>
> (b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty.
>
> 2. A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty:
>
> (a) if the treaty establishes a boundary; or
>
> (b) if the fundamental change is the result of a breach by the party invoking it either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty.
>
> 3. If, under the foregoing paragraphs, a party may invoke a fundamental change of circumstances as a ground for terminating or withdrawing from a treaty it may also invoke the change as a ground for suspending the operation of a treaty."

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43 *Fisheries Jurisdiction Cases (Jurisdiction), (UK v Iceland)* ICJ Rep 1973 p 3 at p 18; *(Federal Republic of Germany v Iceland)* ICJ Rep 1973 p 49 at p 63.

10.62. The Court has been fully prepared to apply Article 62, or rather its customary law equivalent,[44] in appropriate cases. It is true that in the *Free Zones Case*, the Court rejected a French argument based upon fundamental change of circumstances.[45] But it did so by reference to the facts of that case, facts which were very different from the present. First, France relied essentially on a single circumstance as the basis for its right of termination: viz, that the Canton of Geneva was in 1815 a free trade area, so that the free zone on the French side of the border had the effect of creating a single economic unit.[46] The Court denied that the absence of customs duties at Geneva was the ground for the creation of the Zones, and pointed out also that there were in fact customs duties at Geneva at the time, so that the French claim of a free trade zone as the basis for its concession failed *in limine*.[47]

10.63. Secondly, the Court stressed the importance of the Congress of Vienna of 1815, in which the original stipulation was contained: a mere difference in degree in the amount of Genevan or Swiss customs duties "would have been much too precarious to constitute the basis of a part of the European settlement after the Napoleonic wars".[48]

10.64. Thirdly, the Court pointed out that France had never, over a period of more than 60 years, treated the existence of a Genevan free zone as essential, or even relevant, to the maintenance of its own free trade regime. The Genevan system of low customs had been abolished in 1849, and yet subsequently France had extended its free trade zone.[49]

10.65. It should be noted that Article 435 of the Treaty of Versailles of 1919 expressly dealt with the problem, providing that it should be solved by agreement rather than unilateral action. According to Article 435, it was "for France and Switzerland to come to an agreement together with a view to settling between themselves the status of these territories". Article 435 could thus be construed as excluding unilateral action.

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44 The Court has not had to deal with a case of treaty validity or termination in circumstances where the Vienna Convention was directly applicable.

45 PCIJ Ser A/B No 46 (1932).

46 PCIJ Ser A/B No 46, pp 156, 158.

47 PCIJ Ser A/B No 46, p 156.

48 PCIJ Ser A/B No 46, p 157.

49 PCIJ Ser A/B No 46, p. 157.

10.66. In the case concerning *Right of Passage over Indian Territory*,[50] India argued that the treaty rights claimed by Portugal had come to an end as a result of a fundamental change of circumstances. The Court rather artificially avoided dealing with the point,[51] but appeared to concede that India could rely on the fundamental change of circumstances argument for the future. It said that its decision would...

> "leave open the arguments of India regarding the subsequent lapse of the right of passage and of the correlative obligations. It is in connection with what may have to be decided, not as to the past, but as to the present and the future, that these arguments may, if such questions arise, be taken into consideration."[52]

As commentators have pointed out, the Court's judgment left open the possibility of reliance on fundamental change of circumstances in a situation where India itself had arguably caused, or at least significantly contributed to, the change, although in circumstances where the Court held India was not in breach of any international obligation.[53]

10.67. In the *Fisheries Jurisdiction Cases*,[54] the Court accepted that a change which was such as to "imperil the existence or vital development of one of the parties" would constitute a fundamental change of circumstances for the purposes of Article 62. It said:

> "37. One of the basic requirements embodied in that Article is that the change of circumstances must have been a fundamental one. In this respect the Government of Iceland has, with regard to developments in fishing techniques, referred . . . to the increased exploitation of the fishery resources in the seas surrounding Iceland and to the danger of still further exploitation because of an increase in the catching capacity of fishing fleets. The Icelandic statements recall the exceptional

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50 ICJ Rep 1960 p 6.

51 As President Klaestad observed: id, p 47. Two judges specifically upheld the argument based on fundamental change of circumstances: Judge Armand-Ugon at p 87; and Judge Moreno Quintana at p 93.

52 Ibid, p 29.

53 See, e.g., H Thirlway, "The Law and Procedure of the International Court of Justice 1960-1989. Part Four" (1992) 63 *BYIL* 1 at p 77.

54 *Fisheries Jurisdiction Cases (Jurisdiction), (UK v Iceland)* ICJ Rep 1973 p 3; *(Federal Republic of Germany v Iceland)* ICJ Rep 1973 p 49.

dependence of that country on its fishing for its existence and economic development...

38. The invocation by Iceland of its 'vital interests', which were not made the subject of an express reservation to the acceptance of the jurisdictional obligation under the 1961 Exchange of Notes, must be interpreted, in the context of the assertion of changed circumstances, as an indication by Iceland of the reason why it regards as fundamental the changes which in its view have taken place in previously existing fishing techniques. This interpretation would correspond to the traditional view that the changes of circumstances which must be regarded as fundamental or vital are those which imperil the existence or vital development of one of the parties."[55]

10.68. The essential reason why the Court refused to apply the doctrine in that case was that the obligation in question was one relating to peaceful settlement of disputes, and that the burden and benefit of that provision was unchanged:

"43. Moreover, in order that a change of circumstances may give rise to a ground for invoking the termination of a treaty it is also necessary that it should have resulted in a radical transformation of the extent of the obligations still to be performed. The change must have increased the burden of the obligations to be executed to the extent of rendering the performance something essentially different from that originally undertaken. In respect of the obligation with which the Court is here concerned, this condition is wholly unsatisfied; the change of circumstances alleged by Iceland cannot be said to have transformed radically the extent of the jurisdictional obligation which is imposed in the 1961 Exchange of Notes. The compromissory clause enabled either of the parties to submit to the Court any dispute between them relating to an extension of Icelandic fisheries jurisdiction in the waters above its continental shelf beyond the 12-mile limit. The present dispute is exactly of the character anticipated in the compromissory clause of the Exchange of Notes. Not only has the jurisdictional obligation not been radically transformed in its extent; it has remained precisely what it was in 1961."[56]

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55 ICJ Rep 1973 at pp 18-19 (*UK v Iceland*), pp 63-64 (*FRG v Iceland*).

56 ICJ Rep 1973 at p 21 (*UK v Iceland*), p 65 (*FRG v Iceland*). Judge Fitzmaurice in his separate opinion suggested that a jurisdictional obligation might be terminable

The obligation to submit disputes to peaceful settlement, for example under Article 36(1) or (2) of the Statute of the Court, is no more onerous because the substantive law may have changed: the Court's function is to apply that law, and indeed in the *Fisheries Jurisdiction Case (Merits)*, it took into account Icelandic interests in its treatment of the law.[57]

10.69. Thus the Court left open the possibility of reliance on fundamental change of circumstances if the treaty had not merely provided for judicial settlement of disputes but had prevented Iceland from relying on future changes in the law of fisheries jurisdiction which were to its benefit. As Thirlway has commented:

> "If the Exchange of Notes had prevented [Iceland] from extending the fishery zone, there would, it seems, have been a case for invoking fundamental change of circumstances, even though both the changes in the law of the sea and those in fishery techniques might have been regarded as foreseeable; what the Court rightly pointed out was that the mere obligation to submit any such extension of fisheries jurisdiction to judicial vetting was not the same as forbidding such extension."[58]

It is submitted that this interpretation of the decision is correct, and that -- as the Court itself confirmed[59] -- a change in the law may itself be a circumstance, or one of the circumstances, allowing a State to invoke fundamental change of circumstances in terminating a treaty.

10.70. To summarise, in particular, the Court's jurisprudence, State practice and doctrine support the following conclusions with regard to this right of termination:

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for fundamental change of circumstances "if the character of the International Court itself had changed in the meantime so that it was no longer the entity the Parties had in mind": Ibid, p 33 n16 (*UK v Iceland*), p 77 n16 (*FRG v Iceland*). A rather similar position was referred to by Judge Schwebel (dissenting) in the *Case concerning Military and Paramilitary Activities in and against Nicaragua (Preliminary Objections)* ICJ Rep 1984 p 392 at pp 620 - 21 as "a substantial argument".

57 *Fisheries Jurisdiction Cases (Merits), (UK v Iceland)* ICJ Rep 1974 p 3; *(Federal Republic of Germany v Iceland)* ICJ Rep 1974 p 175.

58 H Thirlway, "The Law and Procedure of the International Court of Justice 1960-1989. Part Four" (1992) 63 *BYIL* 1 at p 81.

59 ICJ Rep 1973 at p 17 (*UK v Iceland*), p 61 (*FRG v Iceland*).

(1) It is not necessary to identify one single factor as *the* basis for a fundamental change of circumstances. Such a change can be cumulative, and result from the concurrence of a number of factors, provided that the circumstances taken as a whole were essential to the agreement to be bound.[60]

(2) The Permanent Court in the *Free Zones Case* used language which suggested that a particular matter could only be a "circumstance" for this purpose if it was "in view of and because of the existence of a particular state of facts" that the treaty was originally concluded.[61] But this does not mean that the circumstance has to be the motive or expressed rationale for the treaty. It is sufficient that the matter was an essential assumption or basis for concluding the treaty -- in the words of the Vienna Convention, a "basis of the consent of the parties to be bound". In determining whether this was so, the Court can have regard to the *travaux* of the treaty, to the events surrounding its conclusion and to the subsequent conduct of the parties.[62] The terms of the treaty are relevant but not decisive.

(3) A major multilateral treaty intended to lay the foundations for a world or regional order is relatively impervious to termination on grounds of fundamental change of circumstances.[63] By contrast there is no such special constraint with respect to ordinary bilateral treaties.

(4) A change in the law can constitute or contribute to a fundamental change of circumstances.[64]

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60 It was essentially on the basis of this cumulative change of circumstances that a United Nations Secretariat Study concluded that the inter-war minorities treaties had terminated: see UN Doc E/CN.4/367 (1950); JB Kelly, "National Minorities in International Law" (1973) 3 *Denver J of Int L & Policy* 253 at p 265. This conclusion was generally accepted.

61 PCIJ Ser A/B No 46 (1932), p 156.

62 In the *Free Zones Case* the Permanent Court referred to each of these elements -- the *travaux* (at p 156), surrounding circumstances, such as the state of Genevan customs duties in 1815 (ibid) and subsequent conduct (French conduct after 1849 (at p 157).

63 *Free Zones Case*, above, para 10.63.

64 *Fisheries Jurisdiction Case*, above, para 10.69.

(5) The state of mind or knowledge of the parties can be a circumstance for this purpose, as much as a state of "objective" fact. For example if two States agreed to build a dam on the basis that it was safe to do so, and a seismic fault was subsequently discovered which made it unsafe, this could constitute a fundamental change of circumstances. But in that case, no fact (external to the state of mind of the parties) would have changed, merely the parties' knowledge or understanding of the facts.[65]

(6) By the same token the existence of a *degree of risk* can be a circumstance for this purpose. As far as the safety of a dam is concerned, a seismic fault is a risk, which may or may not materialise during the lifetime of the dam. To take another example, if the parties agree to a certain level of exploitation of a resource in the belief that that level of exploitation is sustainable, but subsequently discover that the agreed level risks endangering the survival of the resource, a fundamental change of circumstances may have occurred.

(7) There is a correlation between the degree of risk and the magnitude of potential harm. A substantial increase in the risk of a slight amount of harm may not be sufficient to qualify as a fundamental change. By contrast a perceptible increase in risk of great damage may well be fundamental.

(8) A State may invoke fundamental change of circumstances even though its own conduct has contributed to or even caused the change in circumstances, provided that that conduct was not itself unlawful vis-à-vis another party to the treaty and that it was not the cause (in the sense of the essential or substantial cause) of the change in circumstances.[66]

(9) A State may invoke a change of circumstances, notwithstanding that some change of that kind may have been foreseen at the time

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65 On the relationship between different grounds of termination of treaties see also above para 10.50.

66 *Right of Passage Case*, above, para 10.66. Cf IM Sinclair, *The Vienna Convention on the Law of Treaties* (Manchester UP, Manchester, 1973) p 107. On the requirement of "cause" for this purpose see below, para 10.80.

of conclusion of the treaty, if the magnitude of the change was not foreseen and is fundamental in the relevant sense.[67]

(10) The requirement in Article 62 that the change must "radically... transform the extent of obligations still to be performed under the treaty" refers to radical change in the strict sense of change which goes to the root or basis of the treaty. The reference to "extent" is not merely quantitative; it includes transformations in the *consequences* which follow from performance. In the words of the Court in the *Fisheries Jurisdiction* cases, the change "must have increased the burden of the obligations to be executed to the extent of rendering the performance something essentially different from that originally undertaken".[68] Provided that the change does indeed do this, and meets the other requirements of Article 62 or, as in the present case, of general international law, there is no requirement that the change should have been extraordinary or of a singular character. By the same token, a fundamental change in the "burden of the obligations" may be sufficient: it is not necessary that the physical character of the obligation (i.e., the actual step to be performed) should have changed. Indeed this will rarely be the case.

(11) For the reasons given by the Court in the *Fisheries Jurisdiction Cases*, and referred to in the Hungarian Declaration, the words "transform the extent of the obligation still to be performed" in Art 62(1)(b) should be interpreted to include transformations in the *burden* or *impact* of the acts to be performed. So interpreted, Art 62(1)(b) corresponds to general international law. If it were interpreted so as to limit the doctrine to cases where the required conduct itself had changed, it would not reflect the international law requirement.

(12) Although the Court in the *Fisheries Jurisdiction Cases* did not need to state comprehensively what amounted to a fundamental change, it did refer with apparent approval to "the traditional view that the changes of circumstances which must be regarded as fundamental or vital are those which imperil the existence or vital

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67 H Thirlway, "The Law and Procedure of the International Court of Justice 1960-1989. Part Four" (1992) 63 *BYIL* 1 at pp 80 - 81.

68 ICJ Rep 1973 at p 21 (*UK v Iceland*), p 65 (*FRG v Iceland*); see also above, para 10.68.

development of one of the parties".[69] Compared with the old and discredited "vital interests" doctrine, the fundamental change of circumstances rule requires an objective determination of the conditions for its invocation. As the *travaux* of Article 62 make clear,[70] it is for the Court to determine whether those conditions have been met. Nonetheless the rule exists to allow States to adjust their treaty relations in cases where, without essential fault on their part, what they have become obliged to do in the new circumstances is "something essentially different from that originally undertaken".

(2) THE RELEVANCE OF THE CONDUCT OF THE PARTIES

10.71. In determining whether a State in a given case is entitled to terminate a bilateral treaty for fundamental change of circumstances, it is relevant to consider the response of the other party to the situation. This is especially the case in relation to the exploitation of natural resources extending beyond the boundaries of a single State.[71] For example, if a State party to a treaty agrees to consider legitimate concerns raised by the other party as to some change in the circumstances of performance, it may be possible to adjust the treaty relations in such a way as to avoid or limit the incidence of new and onerous obligations. In the light of such adjustments, it may no longer be the case that the extent of obligation still to be performed is radically transformed. The position will be quite different if a State party refuses to consider modifications or measures which meet the concern that has been raised. *A fortiori* if the other State, far from seeking to deal with the concern, itself takes measures which are destructive of cooperation, or are even premature or unjustified countermeasures. Although the principle of good faith is not a substitute for the rules of treaty law, it is relevant to assess the conduct of the parties in the light of that principle.

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69 ICJ Rep 1973 at p 19 (*UK v Iceland*), p 64 (*FRG v Iceland*).

70 See Sir H Waldock, Second Report on the Law of Treaties, UN Doc A/CN.4/156 & Add 1-3 (1963) para 18; *Report of the Commission to the General Assembly 1963*, ILC Ybk 1963 vol II

71 As Judge Jessup pointed out in his separate opinion in the *North Sea Continental Shelf Cases* ICJ Rep 1969 p 6 at p 83, "the principle of international cooperation in the exploitation of a natural resource is well established in other international practice", referring to the Helsinki Rules.

(3) FUNDAMENTAL CHANGE OF CIRCUMSTANCES IN THE PRESENT CASE

10.72. Turning to the application of these considerations in the present case, it is submitted that Hungary was justified, in 1992, in invoking change of circumstances as a ground for terminating the 1977 Treaty. It is necessary to consider (a) the extent and onerousness of the substantive changes that occurred, (b) whether they were the result of a breach of obligation on the part of Hungary, and (c) whether any special procedural requirements applied.

(a) Substantive elements

10.73. The expressed purposes of the 1977 Treaty were analysed in Chapter 4. To recapitulate, the 1977 Treaty was designed as and expressed to be:

(1) a vehicle for "socialist integration" through COMECON (preambular paragraph 2);

(2) "a single and indivisible operational system", combining both upstream and downstream elements in a system of peak power production (Article 1(1));

(3) "a joint investment", i.e., one which was economically beneficial (Article 1(1); also preambular paragraph 1);

(4) a framework treaty, requiring revision in the light of "research, exploration and planning operations" (Article 5(3), (4)); (5)), and

(5) a treaty consistent with environmental protection (Article 5(5)(a)(5), 5(5)(b)(13), 15, 19).

10.74. By contrast, by early 1992 (40 years after the idea of the Barrage System was conceived), the position was as follows:

(1) The idea of "socialist integration" had vanished, and COMECON itself had been dissolved.[72] The Soviet Union, having failed to make available the equipment promised in connection with the

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72 See Protocol dissolving COMECON (CMEA, 46th Session of Council), Budapest, 28 June 1991).

Project on the "soft-loan" terms applicable within COMECON,[73] eventually moved in another direction. For example it changed to world market pricing for its oil in 1990. Both Hungary and Czechoslovakia were moving to free-market economies, subject to the full pressure of international energy markets. The Project itself had become not a force for integration but the single most serious source of conflict between the Treaty Parties.

(2) The "single and indivisible operational system" had dissolved, with the barrage at Nagymaros suspended as a result of serious (and unrebutted[74]) concerns about environmental impact, the barrage at Gabcikovo being constructed as a unilateral scheme uncontemplated by and outside the scope of the 1977 Treaty, and all thought of peak-power production gone.

(3) The "joint investment" had turned out, in the words of Prime Minister Németh, to be a "gigantic investment fiasco".[75] In the period since the 1977 Treaty (*a fortiori*, since the actual design of the Project) there had been a substantial deterioration in the economic terms of the project. New technologies (e.g. for gas turbine power generation) were available, which could produce power at considerably lower cost.[76] Both countries were in a period of economic transition and were suffering economic hardships. Moreover the basis for any economic calculation was changing by reason of the emergence of the parties gradually during the years before 1989, then suddenly, into a free market system. In that system, the cost of inputs would have to be calculated and paid for, to a large extent, in hard currencies.[77] The

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73 See above, para 3.39.

74 See above, para 9.25.

75 Letter from Hungarian Prime Minister M Németh to Czechoslovak Prime Minister M Calfa, 6 March 1990; Annexes, vol 4, annex 35.

76 As Hungary noted in its Proposals as to the joint resolution of questions of energy resulting from the abandonment of the Gabcikovo Nagymaros Hydroelectric Plant System, Budapest, 22 April 1991; Annexes, vol 4, annex 50.

77 The progress of this transformation can be seen in a series of treaties concluded between Hungary and Czechoslovakia, as follows:

* Agreement on Application of Stamp Duty related to rates of Exchange of National Currencies for Non-Commercial Payments of 28 December 1974 (amended by further Agreement of 16 May 1985);

distortions of a centrally-planned economy, conducted within the framework of an artificially installed and maintained trading bloc within Eastern Europe, would have no place. All of the assumptions -- scientific, economic, environmental, political -- on which the 1977 Treaty was based were in question. This is hardly surprising since the assumptions of a whole economic and political system were directly and fundamentally challenged.

(4) The framework treaty, requiring revision in the light of "research, exploration and planning operations" had become, according to Czechoslovakia, an immutable norm.[78]

(5) The treaty consistent with environmental protection had become, according to Hungary, a prescription for environmental disaster, in that it required Hungary to run unacceptable risks with the actual drinking water supply of its major city and with its major drinking water reserve, and to accept the environmental degradation, amounting to destruction, of a major wetland area.[79]

10.75. In particular the Nagymaros Barrage was essential to the Original Project, which was, as demonstrated in Chapter 4, conceived as "a single and indivisible operational system of works".[80] In concept, in operation and in terms of any possibility of an economic return from this "joint investment", the Nagymaros Barrage was a key element. Without it, peak power production would not be possible, and a principal economic advantage of the Original Project would disappear. The serious and sustained doubts as to the environmental and other risks associated with the Nagymaros Barrage cast into doubt the viability of

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* Agreement on the Amendment of the Coefficient of the Conversion of Non-Commercial Payments into Commercial Roubles, 16 May 1985;

* Protocol 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

* Agreement on Mutual Trade and Payments, Budapest, 1 December 1990.

Formally, the change can be dated therefore to 1 January 1991, although some of its effects would have occurred after that date.

78 For the persistent Czechoslovak refusal to countenance any revision to the 1977 Treaty after 1989 see above, paras 3.78 - 3.186.

79 See above, paras 5.30 - 5.105.

80 1977 Treaty, Art 1; see above, para 4.10.

the System as a whole. Having regard to the terms of the Preamble and Article 1 of the 1977 Treaty it was inevitable that they should do so.

10.76. The gross underestimation of the environmental effects of the dam system, the insufficiency of environmental impact assessments, faulty knowledge of certain fundamental data, the massive deterioration in the economic viability of the project -- all these circumstances were accompanied by changes in international environmental law, and equally importantly in international environmental awareness. These changes,[81] increased the onus on a responsible government to consider the long-term implications of its actions in terms of the safety of the population, the security of vital water resources and the long-term viability and cost-effectiveness of its energy policy. As a developing democracy, seeking to comply with international standards of accountability in this respect,[82] the Republic of Hungary had no choice but to reconsider the Project, especially in its scientific, environmental and energy-related aspects. At some stages in the subsequent negotiations, there was a similar responsiveness on the Czechoslovak side, but overall the tone of the reply made by Prime Minister Adamec on 31 August 1989 was maintained,[83] and eventually an unprecedented and destructive unilateral diversion of the Danube was embarked on.

10.77. This was the trigger for the Hungarian action terminating the Treaty, in the sense that it was the essential reason why Hungary took that step rather than continuing to negotiate with Czechoslovakia on an agreed termination or modification of the Treaty. As Prime Minister Antall's letter of 19 December 1991[84] makes clear, it was the repeated refusal of Czechoslovakia to suspend work on Variant C that was the trigger for Hungarian action. But having decided to act, Hungary was entitled to invoke all grounds for termination of the 1977 Treaty then

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81 See above, para 5.30 - 5.105.

82 As reflected in Art 21 of the Universal Declaration of Human Rights and Art 25 of the International Covenant on Civil and Political Rights of 1966. Czechoslovakia abstained in the vote on the Universal Declaration (UN Doc A/811, 10 December 1948); Hungary was not then a Member of the UN. Hungary ratified the Covenant on 17 January 1974; Czechoslovakia did so on 23 December 1975. Free elections complying with Art 25 of the Covenant were thereafter held in Hungary for the first time in March 1990, in Czechoslovakia for the first time in June 1990. See para 3.109.

83 See above, para 9.24.

84 See above, para 9.34.

available to it under international law. Prominent amongst these was fundamental change of circumstances, in relation to the changes detailed in paragraphs 10.74.-10.76. above. Taken individually and collectively these changes were of fundamental significance, they had not been foreseen by the parties, they constituted an essential basis of their consent to be bound and they fundamentally affected the burden of continued performance in the relevant sense.[85]

(b) The change of circumstances was not the result of a breach of international obligations by Hungary

10.78. Article 62(2) provides that a fundamental change of circumstances may not be invoked as a ground for terminating a treaty...

> "(a) if the treaty establishes a boundary; or
>
> (b) if the fundamental change is the result of a breach by the party invoking it either of an obligation under the treaty or of any other international obligation owed to any other party to the treaty."

10.79. For the reasons explained in paragraph 4.39 above, the 1977 Treaty was not a treaty which established a boundary.

10.80. Article 62(2)(b) imposes the same condition with respect to fundamental change of circumstances as Article 61(2) does with respect to impossibility of performance and for the same reason -- that a party should not be entitled to rely on its own wrongful act. As the ILC Commentary states, this is "simply an application of the general principle of law that a party cannot take advantage of its own wrong".[86] By contrast no such condition is imposed on termination for breach. A party may terminate a treaty for material breach under Article 60 even though it is itself in breach. The same interpretation should be given to both Article 61(2) and Article 62(2)(b). For the reasons given in paragraph 10.55 above, Article 62(2)(b) only applies where it can be said that the sole or substantial cause of the change of circumstances is the wrongful act of the State invoking that change.

10.81. The cumulative effect of the five circumstances outlined in paragraphs 10.74-10.76 above was not the fault of any State, even if

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85 See above, para 10.70, point (10).

86 See ILC Ybk 1966/II, p 260 para (12), citing the *Chorzów Factory Case* PCIJ Ser A No 9 (1927) at p 31.

individual elements might have been. The changes in the political and economic life of the region were not the result of anyone's "fault", but of long-term societal developments. Changed attitudes to environmental management resulted both from an increased scientific understanding and a preparedness to learn the lessons of earlier "experiments with nature" that had caused, and threatened to cause, serious environmental harm. This was particularly the case in Eastern Europe, with what Dr Vavrousek has described as its "appalling toll of environmental destruction and the cruel arrogance of huge dams and inappropriate industrial projects".[87]

10.82. Thus in the present case, the combination of circumstances referred to in paragraphs 10.74-10.76 was not either individually or collectively the result of a breach of the international obligations of Hungary to Czechoslovakia.

(c) Procedural elements

10.83. It is sometimes suggested that fundamental change of circumstances is not as such a ground for the termination of treaties but merely a ground that a State may invoke for the revision of a treaty by consensual means. At an earlier stage of the development of international law, the general problem of revision of treaties was much debated,[88] and the law of treaty termination was also still uncertain and unsettled.[89] On the contrary the present position is clear. Both the jurisprudence[90] and the doctrine[91] support the view that fundamental

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87 J Vavrousek, "Institutions for Environmental Security" in G Prins (ed), *Threats without Enemies* (Earthscan Publications, London, 1993) 87-108 at p 88. For an illustration of changing attitudes see e.g. SV Vinogradov, "International Environmental Security: The Concept and Its Implementation" in A Carty & G Danilenko (eds), *Perestroika and International Law* (Edinburgh UP, Edinburgh, 1990) 196.

88 Cf League of Nations Covenant, Art 19.

89 Hence the reticence of the Permanent Court on the question in the *Free Zones Case*: above, para 10.61.

90 *Fisheries Jurisdiction Cases* ICJ Rep 1973 p 18 (*UK v Iceland*), p 63 (*FRG v Iceland*) ("a ground for invoking the termination or suspension of the treaty").

91 E.g. G Haraszti, "Treaties and Fundamental Change of Circumstances" (1975/III) 146 *Receuil des cours* 1 at p 86; A Tóth, "The Doctrine of *Rebus Sic Stantibus* in International Law" (1974) *Juridical Review* 147 at pp 168-9, 265, 273; H Thirlway,

change of circumstances is one of the specific grounds of treaty termination, subject to the same extent as the other grounds to procedural requirements such as notification, but not subject to any special regime of its own. In other words, it is not merely a basis for seeking revision of a treaty from the other party. The reason is quite clear. The parties to a treaty may revise or amend it at any time and for any reason.[92] If there has been a fundamental change of circumstances, a party which has not through its own wrongful conduct caused those changes has the *right* to terminate or withdraw from the treaty, subject to compliance with due procedures, and that right cannot be negated by the refusal of the other party to countenance any change.

10.84. This is the position confirmed by the Vienna Convention, which treats fundamental change of circumstances in the same way as all other grounds of termination,[93] and which establishes common procedures for all of them in Articles 65-68. The question of the appropriate procedures for termination is discussed below, in the context of all of the grounds relied on by Hungary.[94]

(4) CONCLUSION

10.85. For these reasons, Hungary was entitled to invoke fundamental change of circumstances as a ground for terminating the 1977 Treaty.

"The Law and Procedure of the International Court of Justice 1960-1989. Part Four" (1992) 63 *BYIL* 1 at p 90.

92 Cf Vienna Convention, Art 39, 54. The Convention only deals with the modalities of revision for multilateral treaties (Art 40, 41), since only they present any difficulties.

93 The various verbal formulations in the Vienna Convention of grounds for termination or withdrawal by a party are to the same effect: thus Art 56 ("not subject to denunciation or withdrawal unless..."); Art 60 ("entitles the other [party] to invoke the breach as a ground for terminating the treaty"); Art 61 ("may invoke... as a ground for terminating... if..."); Art 62 ("may not be invoked as a ground for terminating... unless..."); Art 63 ("does not affect... except in so far as..."). Only in two cases does a treaty terminate by operation of law: Art 59 ("shall be considered as terminated if..."); Art 64 ("becomes void and terminates").

94 See below, paras 10.103 - 10.106.

SECTION D: BREACH OF THE TREATIES OF 1976 AND 1977, IN PARTICULAR THROUGH THE CONSTRUCTION OF VARIANT C

10.86. In addition, Hungary relied on material breach by Czechoslovakia in its Declaration of 16 May 1992 as a basis for the termination of the 1977 Treaty. This breach took several different forms: breach of the environmental obligations under the Joint Contractual Plan of 1976 and the Treaty of 1977, and in particular breach of the 1977 Treaty through the construction and implementation of the so-called "provisional solution", otherwise known as Variant C.[95]

10.87. Article 60 of the Vienna Convention deals with the right to terminate a treaty on account of its breach by another State party. It reads, in relevant part, as follows:

> 1. A material breach of a bilateral treaty by one of the parties entitles the other to invoke the breach as a ground for terminating the treaty or suspending its operation in whole or in part...
>
> 3. A material breach of a treaty, for the purposes of this article, consists in:
>
> (a) a repudiation of the treaty not sanctioned by the present Convention; or
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> (b) the violation of a provision essential to the accomplishment of the object or purpose of the treaty.

The Court stated in the *Namibia Opinion* that these rules "may in many respects be considered as a codification of existing customary law on the subject".[96]

10.88. In Chapter 6 it has been shown that Czechoslovakia was and remained in breach of the obligations in relation to water quality and the protection of the environment arising under Articles 15 and 19 of the Treaty.[97] This breach was of an "anticipatory" kind: it took the form of a failure to adjust the plans for the construction of the Barrage System, especially in relation to the upstream sector, so as to ensure that water

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95 See above, para 10.03.

96 ICJ Rep 1971 p 17 at p 47 (para 95).

97 See above, paras 6.13 - 6.26.

quality would not be impaired and that the environment ("nature") would be protected. As anticipatory breaches they were of a continuing character: they would have continued (unless remedied) to the point of implementation of the Barrage System. Although the protection of the environment was not the main purpose of the original drafters, nonetheless provisions *were* inserted in the 1977 Treaty to protect water quality and to ensure nature preservation. The provisions of the Joint Contractual Plan may have been inadequate in this regard, but the Plan was intended only to be the "means" of the fulfilment of the obligations spelt out in Articles 15 and 19. Those articles must be taken to have meant what they said, in which case their violation cannot be dismissed as something which was not "essential to the accomplishment of the object or purpose of the treaty".

10.89. As demonstrated in Chapter 7, the decision to plan and construct Variant C was itself a serious breach of the 1977 Treaty, a clear example of the "repudiation of the treaty" referred to in Article 60(3)(a) of the Vienna Convention.[98]

10.90. Accordingly Hungary had the right to invoke these breaches as grounds for termination of the Treaty, once it became clear that Czechoslovakia would neither suspend the construction of Variant C nor amend the 1977 Treaty so as to institute adequate environmental safeguards.

SECTION E: CONFLICT WITH SUBSEQUENT OBLIGATIONS UNDER GENERAL INTERNATIONAL LAW

10.91. The sixth ground on which Hungary relied in its Declaration of 16 May 1992 as a basis for the termination of the 1977 Treaty was that *subsequently imposed requirements of international law* in relation to protection of the environment precluded performance of the Treaty.[99]

10.92. As already noted, this is relevant to other grounds listed above. In particular the developments in international environmental law were an important part of the background to the fundamental change of circumstances that occurred prior to 1992.[100]

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98 See above, paras 7.04 - 7.43.

99 See above, para 10.03.

100 See above, para 10.64.

10.93. But the problem of subsequent obligations under general international law was also relied on by Hungary as a separate ground for termination. In particular, reference was made to the maxim *lex posterior derogat legi priori, lex specialis derogat legi generali* (Declaration of 16 May 1992, Part III, para 6) and to a number of important instruments including the Stockholm Declaration of 1972.

10.94. As has been demonstrated in Chapter 6,[101] the position under general international law, as it had developed since 1977, was as follows. The obligation enunciated in Stockholm Principle 21 not to cause substantial damage to the territory of another State, or to areas beyond national jurisdiction, had over time become a rule of international law. But States had come to accept that the primary consideration was that of *prevention* of substantial harm. Issues of liability for harm already caused could arise, but the central concern was to prevent foreseeable harm arising. Moreover, in the context of resources of significance to the people of a region extending beyond a single State, these obligations were obligations *erga omnes*. In extreme cases, the International Law Commission had recognised that they could amount to an international crime.[102]

10.95. Even assuming that the parties could by treaty exclude performance of general international law obligations subsequently arising -- which, since they were *erga omnes* obligations, is by no means clear -- the 1977 Treaty manifested no intention to do so. The obligations in Articles 15 and 19 could be interpreted in a way which was consistent with the developments in general international law referred to in paragraph 10.94. Having regard to the *erga omnes* status of those obligations, it was right to interpret them in that way.

10.96. If Czechoslovakia was obliged under general international law not to carry out activities on its territory that would cause serious or substantial harm to Hungary, then Hungary was entitled to take action to remove any pretext for such conduct. Hungary's termination was forced by the other party's refusal to suspend work on Variant C. Hungary's

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101 See above, paras 6.57 - 6.67.

102 See ILC Draft Articles on State Responsibility, Part 1, Art 19(3)(d), and see further G Arangio-Ruiz, *Fifth Report on State Responsibility* (UN Doc A/CN.4/453 & Add 1-3, 1993).

conduct was a necessary and proportionate response to this refusal, as has already been demonstrated.[103]

SECTION F: THE PROCEDURE ADOPTED BY HUNGARY IN TERMINATING THE 1977 TREATY

10.97. Finally, it is necessary to consider whether procedurally, the appropriate steps to rely on the various grounds for termination of a treaty have been taken. A treaty that has been breached, or which is subject to impossibility of performance or to fundamental changes of circumstances does not terminate automatically or by operation of law. It is necessary for a State party to invoke the relevant ground of termination, as Hungary did by its Declaration of 16 May 1992.

10.98. Articles 65-67 of the Vienna Convention lay down a procedure to be followed in invoking a ground for termination. Although these provisions are not declaratory of general international law, they provide a guide to the requirements of due form and good faith in the conduct of treaty relations. Also relevant is the conduct of the other State when confronted with legitimate concerns as to change that have arisen with respect to a treaty.

10.99. Articles 65-67 require the State concerned (1) to notify the other party of its claim and of its intention to terminate or suspend the treaty; (2) except in cases of special urgency, not to proceed to do so before three months have elapsed; (3) in case the other party objects to termination, to seek to resolve the dispute through the means indicated in Article 33 of the United Nations Charter; (4) to notify the other State of the termination by a written instrument signed by the Head of State, Head of Government, Minister for Foreign Affairs or some other person duly authorised to do so.

10.100. In late 1991 and early 1992, Hungary gave a series of warnings that unless work on Variant C was suspended it would be forced to consider termination of the 1977 Treaty. It did so, for example, in the letter of Prime Minister Antall on 19 December 1991.[104] As Prime Minister Antall made clear, the case was one of urgency. Work was proceeding incessantly on Variant C, and Czechoslovakia claimed that it had a *treaty* right to construct the diversion -- a right which Hungary

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103 See above, paras 9.18 - 9.42.

104 Letter from Hungarian Prime Minister J Antall to Czechoslovak Prime Minister M Calfa, 19 December 1991; Annexes, vol 4, annex 70; see above, para 9.34.

vigorously disputed. Under these circumstances and given that the disagreements between the parties were well-known, three months notice was not required by international law. But Hungary was reluctant to take this final step, and more than 5 months elapsed before the delivery of the Declaration of 16 May 1992, signed by the Prime Minister and duly communicated through the diplomatic channel to the other party.

10.101. Hungary had shown itself at all times willing to negotiate both on modifications to the Treaty to meet its environmental concerns as to the upstream sector and over compensation by way of an account for work done which would be wasted.[105] It offered, both before and after 16 May 1992, to refer the dispute to third party settlement, including before this Court. It had negotiated in good faith, and would have continued to negotiate on the basis of the 1977 Treaty if work on Variant C had been suspended.

10.102. Under these circumstances, Hungary not merely complied with the requirements of good faith under general international law in the context of treaty termination It also complied with the more specific and more onerous requirements of the Vienna Convention.

SECTION G: REPUDIATION OF THE TREATY THROUGH THE IMPLEMENTATION AND OPERATION OF VARIANT C

10.103. It was pointed out in paragraph 10.89 above that the decision to plan and construct Variant C was a serious breach of the 1977 Treaty, a clear example of the "repudiation of the treaty" referred to in Article 60(3)(a) of the Vienna Convention.[106] *A fortiori* -- if the Treaty of 1977 had then been in force -- the implementation of Variant C in October 1992 would have been a most serious breach of the Treaty, especially of Article 19. The damage done to the environment of the Szigetköz by Variant C was outlined in Chapter 5 and is documented in the Annexes and Appendices.[107]

10.104. Thus even on the hypothesis that the 1977 Treaty survived termination by Hungary on 19 May 1992, the implementation of Variant C amounted to a repudiation by Czechoslovakia of the Treaty -- as clear

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105 See above, para 3.126.

106 See above, paras 7.04 - 7.40.

107 See above, paras 5.106 - 5.137. See also Appendices 1, 2, and 3 and Annexes, vol 5, various annexes.

a repudiation as one could imagine. It may well be that the decision actually to carry out the final phase of the diversion was made unilaterally by Slovak officials answerable to the Slovak Republic, by then actively preparing for its formal independence.[108] But as explained in Chapter 8, international responsibility for the acts of the Slovak Republic was still vested in the Czech and Slovak Federal Republic, which did not cease to exist until the end of the year and which retained throughout its monopoly over the conduct of foreign affairs. Thus the diversion which commenced on 23 October 1992 was imputable to Czechoslovakia, and amounted to a clear repudiation of the 1977 Treaty, which that State still claimed to be in force.

10.105. If a State has once terminated a treaty and continues to maintain that the treaty is not in force, it is not required by international law to continue to produce notices of termination when confronted with subsequent breaches or repudiations of the treaty by the other party. From its point of view there can be no point in the repetition of completed formulas. It can simply regard the conduct of the other party as confirmatory of its view that the treaty is at an end, leaving the assessment of that conduct to the rules of general international law which, of course, continue to govern the relations between the parties.

10.106. Thus Hungary is entitled to treat the implementation of Variant C in October 1992 as confirming its view that the 1977 Treaty had been terminated, at the latest, by that date.

SECTION H: TERMINATION OF THE TREATY THROUGH THE DISAPPEARANCE OF ONE OF THE PARTIES

10.107. Even if -- contrary to the arguments presented in this Chapter -- the 1977 Treaty remained in force despite Hungary's termination of it and the unilateral implementation of Variant C, it ceased to be in force as a treaty on the disappearance of Czechoslovakia on 31 December 1992.

10.108. A bilateral treaty cannot survive the disappearance of one of the parties to it, unless another State succeeds to that party either by operation of the law of State succession or by express agreement between that State and the surviving party. As is recorded in para 6.05 above, the Czech Republic has expressly declined to become a party by

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108 See above, para 3.186.

succession to the 1977 Treaty.[109] Although the Slovak Republic has sought Hungarian agreement to its succession to the 1977 Treaty, no such agreement has been given.[110] Nor is any such agreement given in the Special Agreement between Hungary and the Slovak Republic. As pointed out in paras 6.01 - 6.06 above, the preamble to the Special Agreement refers to the Slovak Republic as "one of the two successor States of the Czech and Slovak Federal Republic and the sole successor State in respect of rights and obligations relating to the Gabcikovo-Nagymaros Project". This did not amount to an agreement by Hungary - even a contingent agreement - that the Slovak Republic had succeeded to the 1977 Treaty. Hungary's position with respect to the 1977 Treaty was well-known: that Treaty had been terminated in May 1992, and no issue of agreement to succession to it would have been entertained.

10.109. It is for this reason, in particular, that the Special Agreement distinguishes between the 1977 Treaty as such, which is referred to in the first preambular paragraph, and the Gabcikovo-Nagymaros Project, which is referred to in the second preambular paragraph. Having regard to this express distinction, the second preambular paragraph cannot be construed as an agreement by Hungary to Slovak's contingent succession to the 1977 Treaty. It is certainly not an express agreement, and under the circumstances such an agreement is not to be implied. Moreover, if such an agreement had been intended, it would have been contained in a substantive provision of the Special Agreement and not in a preambular paragraph.

10.110. Of course the Court has jurisdiction, under Article 2(2) of the Special Agreement, to determine *whether* the 1977 Treaty is still in force. It is necessary to determine that question in order to decide what are the rights and duties of the parties arising from the Court's judgment on the questions enumerated in Article 2(1). The point is only that the Court must determine whether the 1977 Treaty expired on 31 December 1992 (on the assumption that it remained in force until that time) *by applying the law of State succession*. The issue is not determined one way or the other by the Special Agreement.

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109 *Note Verbale* from the Czech Republic to the EC Commission, 3 March 1993; Annexes, vol 4, annex 117.

110 See *Note Verbale* from the Hungarian Embassy to the Slovak Ministry of Foreign Affairs, 23 December 1992, Annexes, vol. 4, annex 110. and below, paras 10.118 - 10.119.

boundary in negotiations for the 1977 Treaty, but these changes were not accepted by Czechoslovakia.[111] Nor did the 1977 Treaty create "obligations and rights... relating to the regime of a boundary" within the meaning of Article 11 of the Vienna Convention on State Succession with respect to Treaties of 22 August 1978.[112] The proposal that the boundary between Czechoslovakia and Hungary should be changed to follow the line of the Gabcikovo canal and works was never accepted, and the 1977 Treaty left the actual boundary between the two States unaffected.[113] There is accordingly no basis for arguing that the Slovak Republic succeeded to the 1977 Treaty under the rules of general international law relating to boundary treaties.

10.112. In respect of bilateral treaties (other than boundary treaties), there is no rule of international law which provides for automatic succession if part of a State separates, or if a predecessor State dissolves and several successor States emerge in its place. Whether there is a succession to bilateral treaties in such cases depends essentially on agreement between the successor State and the other party to the treaty. In the present case there has been no such agreement.

10.113. This is the rule stated, for example, in *Restatement Third. The Foreign Relations Law of the United States*, section 210(3):

> "When part of a state becomes a new state, the new state does not succeed to the international agreements to which the predecessor state was party, unless, expressly or by implication, it accepts such agreements and the other party or parties thereto agree or acquiesce."[114]

10.114. Along similar lines, the Arbitration Commission established by the International Conference on the Former Yugoslavia (the Badinter Commission) referred in its Opinion No 11 to...

> "the few well-established principles of international law applicable to State succession. The fundamental rule is that

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111 See above, paras 3.25, 3.32, 3.37.

112 UN Doc A/CONF.80/31, 22 August 1978, reprinted in (1978) 17 ILM 1488.

113 See above, paras 3.32, 3.37, 4.39, 7.30, - 7.31.

114 American Law Institute, *Restatement of the Law Third, The Foreign Relations Law of the United States* (American Law Institute Publishers, St Paul, 1987) vol 1, p 108. For commentary see ibid., pp 100, 113.

States must achieve an equitable result by negotiation and agreement."[115]

The Commission went on to point out that agreements as to succession between two successor States could not bind third States without their agreement.[116]

10.115. It is true that a rule of automatic succession to all treaties is provided for in Article 34 of the Vienna Convention on State Succession with respect to Treaties. Article 34 provides as follows:

"1. When a part or parts of the territory of a State separate to form one or more States, whether or not the predecessor State continues to exist:

(a) any treaty in force at the date of the succession of States in respect of the entire territory of the predecessor State continues in force in respect of each successor State so formed;

(b) any treaty in force at the date of the succession of States in respect only of that part of the territory of the predecessor State which has become a successor State continues in force in respect of that successor State alone.

2. Paragraph 1 does not apply if:

(a) the States concerned otherwise agree; or

(b) it appears from the treaty or is otherwise established that the application of the treaty in respect of the successor State would be incompatible with the object and purpose of the treaty or would radically change the conditions of its operation."

10.116. The Vienna Convention on State Succession is not in force. As at 31 December 1992, it had been signed by 19 States and ratified by only 12. Czechoslovakia signed it in 1979 but never ratified it. Hungary has neither signed nor ratified it. Since 1 January 1993, neither the Czech Republic nor the Slovak Republic has acceded to the Convention. Not only is the Convention itself widely regarded as legislative in character and not as a statement of existing general international law, but

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115 Opinion No 11, Paris, 16 July 1993, reprinted in (1993) 32 ILM at p 1590. See also Opinion No 13, Paris, 16 July 1993, para 1.

116 Ibid.

there is little or no support for Article 34 as being declaratory of general international law.[117]

10.117. The provisions of the Convention dealing with separation of part of a State (now Articles 34 and 35) went through an extensive evolution within the International Law Commission and at the two sessions of the Vienna Conference.[118] The end product did not reflect any consensus as to the state of general international law, and was rather more influenced by concerns at possible secession of parts of independent States. Nor have these provisions been consistently applied in the practice of the various States that have emerged in Eastern Europe and the former Soviet Union since 1989, especially so far as bilateral treaties are concerned. In the case of bilateral treaties, succession has been negotiated between the successor States and other parties on a case-by-case basis. On the other hand there has been a higher level of succession to multilateral treaties, due to the general interest in continuity of multilateral obligations and the importance of securing continued adherence to human rights and other universal standards. Thus the member States of the European Communities have insisted, as a condition for the recognition of the Republics of former Yugoslavia and the Soviet Union which have emerged as new States, that they should express their specific commitment to be bound by existing boundaries, and by general principles relating to human rights and the rule of law, but have limited themselves to requiring that those States "settle by agreement, including where appropriate by recourse to arbitration, all questions concerning State succession and regional disputes".[119] The

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117 RY Jennings & A Watts (eds), *Oppenheim's International Law* (9th edn, Longmans, London, 1992) vol 1, 236 observe that "State practice has been, however, insufficiently uniform to provide evidence of clear rules of international law". See also I Brownlie, *Principles of Public International Law* (4th edn, Oxford, Clarendon Press, 1990) pp 668-70; R Mullerson, "The Continuity and Succession of States, by reference to the Former USSR and Yugoslavia" (1993) 42 *ICLQ* 473 at p 488.

118 For an account of the changes see J Crawford, "The Contribution of Professor DP O'Connell to the Discipline of International Law" (1980) 51 *BYIL* 1 at pp 34-44, and for commentary see I Sinclair, "Some Reflections on the Vienna Convention on Succession of States in respect of Treaties" in Hakapää (ed), *Essays in Honour of Erik Castrèn* (1979) 156 at p 175.

119 European Political Cooperation, Extraordinary Ministerial Meeting, Brussels, 16 December 1991, "Declaration of the 'Guidelines on the Recognition of New States in Eastern Europe and in the Soviet Union".

practice of the Council of Europe has also been inconsistent with any theory of automatic succession.[120]

10.118. On 18 December 1992 the newly-established Ministry of Foreign Affairs of the Slovak Republic addressed a *Note Verbale* to the Hungarian Embassy in Prague, which stated, in part:

> "In accordance with, and to the extent as determined by, the existing norms of international law, the Slovak Republic in its capacity of one of the successor States of the Czech and Slovak Federal Republic, considers itself bound, with effect from January 1, 1993, by all bilateral and multilateral treaties to which until this time one of the parties was the Czech and Slovak Federal Republic."[121]

In announcing in reply its willingness to establish immediate diplomatic relations with the Slovak Republic, Hungary stated that it was...

> "ready to enter, within the shortest possible time, into negotiations with the Government of the Slovak Republic on questions relating to state succession in respect of treaties."[122]

10.119. Subsequently the parties exchanged lists of bilateral treaties which they were prepared to see continue in force as between themselves. The two lists are not identical, and do not include all treaties which were in force between Hungary and the former Czechoslovakia. The *Note Verbale* accompanying the Slovak list stated that the Ministry of Foreign Affairs was...

> "ready to hold negotiations on the questions of the Slovak Republic's state succession to bilateral international conventions and agreements which were concluded between the Czech and Slovak Federal Republic and the Republic of Hungary."[123]

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120 See, e.g., Council of Europe, Committee of Ministers, "Memorandum on Council of Europe Practice with regard to State Succession in the Matter of Treaties", Strasbourg, 12 January 1994 (Misc (94) 6), para 10; Annexes, vol 4, annex 178.

121 *Note Verbale* from the Czechoslovak Ministry of Foreign Affairs to the Hungarian Ministry of Foreign Affairs, 18 December 1992; Annexes, vol 4, annex 109.

122 *Note Verbale* from the Hungarian Embassy to the Slovak Ministry of Foreign Affairs, 23 December 1992; Annexes, vol 4, annex 110.

123 *Note Verbale* from Slovak Ministry of Foreign Affairs, to the Embassy of the Republic of Hungary, 15 November 1993; Annexes, vol 4, annex 128.

The attached list incorporates recommendations from the relevant Slovak Ministry recommending whether the particular treaty should be maintained in force. Against some treaties is noted a proposal to maintain the treaty in force; against others a proposal to maintain it temporarily in force until agreement can be reached on amendment or replacement;[124] against still others it is proposed to rescind the agreement. Thus the practice of the Slovak Republic itself is inconsistent with the concept of automatic succession to bilateral treaties contained in Article 34 of the 1978 Convention. In fact negotiations between the parties on issues of succession to treaties are proceeding.

10.120. Even if the law of treaty succession embodies a *presumption* that treaties remain in force after the emergence of a new State, this could only apply to treaties which would be workable in the new circumstances, and in the case of bilateral treaties it must be a matter for agreement between the parties whether this will be so.[125] In the present case the 1977 Treaty had been suspended and then terminated by Hungary for clearly articulated and cogent reasons well before the succession of States. It had been violated by Czechoslovakia prior to the termination, and repudiated by it subsequently through the unilateral imposition of Variant C, causing substantial damage to Hungary. Immediately prior to the succession neither Hungary nor Czechoslovakia were complying with the 1977 Treaty, and since the succession neither Hungary nor the Slovak Republic has done so. The function of the law of State succession is to assist the parties to treaties and their successors to maintain valid and operative treaties in force so as to facilitate cooperation between them. It is not its function to resuscitate inoperative treaties which were previously a source of dispute between

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124 This is true, e.g., for the Boundary Waters Convention of 31 May 1976 (Item 51 on the Slovak List) which is to be maintained "for the time being, until an amended agreement is concluded".

125 Cf DP O'Connell, "Reflections on the State Succession Convention" (1979) 39 *Zeitschrift für Ausländisches öffentliches Recht und Völkerrecht* 725 at p 743. The United States has applied such a presumption in relation to "multilateral agreements of general application to all states", and "bilateral agreements that establish rules of general application concerning certain relations", but has also accepted that "given the unsettled nature of the governing legal rules and the diversity of agreements in question... the only way to establish clearly what agreements would remain in force... would be an explicit, case-by-case review of outstanding agreements..." See ED Williamson & JE Osborn, "A US Perspective on Treaty Succession and Related Issues in the Wake of the Breakup of the USSR and Yugoslavia" (1993) 33 *Virginia JIL* 261 at pp 265 - 67.

the original parties and which, if succession to them was to be required by international law, would continue to be a source of conflict and disagreement. Its function is to facilitate cooperation, not to exacerbate conflict. This is why the emphasis in State succession to bilateral treaties (other than boundary treaties and treaties relating to the regime of a boundary) is on the mutual consent of the parties. In the circumstances any presumption of succession is plainly rebutted.

PART IV

CHAPTER 11

LEGAL CONSEQUENCES OF THE TERMINATION OF THE 1977 TREATY

11.01. Under Article 2(2) of the Special Agreement, the Court is requested to determine "the legal consequences, including the rights and obligations for the Parties, arising from its Judgment" on the three questions identified in Article 2(1). The legal consequences of the suspension of works by Hungary in 1989 (Article 2(1)(a)) were discussed in Chapter 9. The legal consequences of Czechoslovakia's (and subsequently Slovakia's) operation of Variant C were discussed in Chapter 8. This Chapter discusses the legal consequences for the parties of the termination of the 1977 Treaty, the matter referred to in Article 2(1)(c) of the Special Agreement, within the overall remedial context of the case.

SECTION A: CONSEQUENCES FOR THE PARTIES OF THE TERMINATION OF THE 1977 TREATY

11.02. In international law things done in compliance with a treaty are lawful as between the parties to the treaty. On the other hand, when the treaty is terminated, the future conduct of the parties in relation to the subject of the treaty is governed once again by general international law which, in any event, acts as an irreducible framework law underlying the treaty.[1]

11.03. This position is reflected in Article 70 of the Vienna Convention on the Law of Treaties, which deals with the consequences of the termination of a treaty. So far as bilateral treaties are concerned, it states:

> "1. Unless the treaty otherwise provides or the parties otherwise agree, the termination of a treaty under its provisions or in accordance with the present Convention:

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1 Cf *Nicaragua Case (Merits)* ICJ Rep 1986 p 14.

(a) releases the parties from any obligation further to perform the treaty;

(b) does not affect any right, obligation or legal situation of the parties created through the execution of the treaty prior to its termination."

11.04. Thus the primary consequence of the termination of the 1977 Treaty was that it released the parties from the obligation to complete or to operate the Gabcikovo-Nagymaros Barrage System. As from 25 May 1992, the obligations of Hungary and the Czech and Slovak Federal Republic in relation to the Danube reverted to those which apply under general international law. At no stage during the dispute did Czechoslovakia assert that it had the right to divert the Danube, or to alter the main navigational channel, or drastically to alter the flow of water in the main bed of the river, independently of the existence of the 1977 Treaty. The 1977 Treaty, having terminated such permissions lapsed, with the consequences discussed in Chapter 7.[2]

11.05. But Article 70 also contemplates that any "rights, obligations or legal situations" of the parties that existed or may have existed at the time of the termination of the Treaty will not be affected. In the present case, these rights or potential rights fall into three classes:

(a) accrued rights of either party relating to breaches of the 1977 Treaty by the other party;

(b) claims of a financial character which could be made under the 1977 Treaty in relation to work done on the Project;

(c) property rights in relation to the different installations which were part of the Project.

Something will be said as to each of these categories, before turning to consider the overall remedial position the Court will have to face, in the light of Article 5 of the Special Agreement.

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2 See above, paras 7.44 - 7.87.

(1) ACCRUED RIGHTS RELATING TO ANY BREACH OF THE TREATY

11.06. Under international law, there is in general no rule of succession to international responsibility.[3] In the absence of a treaty provision, a successor State is not liable for the wrongful conduct of its predecessor.[4] On the other hand this general rule is subject to a number of qualifications. First, if a successor State claims rights or titles which belonged to the predecessor State, it may be required to assume any corresponding obligations, and cannot be in a better position with respect to the right or title claimed than its predecessor. Secondly, a new State is responsible if it has adopted and made its own a wrongful act or situation existing at the date of independence, or if it has failed to comply with international law requirements with respect to the prevention or cessation of the wrongful act or situation after independence.[5]

11.07. Applying these principles to the present situation, the following conclusions apply:

(1) As pointed out in paragraph 2.08 and 6.07, the Court has the competence to decide whether either party to the 1977 Treaty was in breach of that Treaty, to the extent necessary to determine any

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3 See, e.g., *Robert E Brown Case* (1923) 2 ILR 66; *Hawaiian Claims* (1925) 20 AJIL 381; *Lighthouses Arbitration between France and Greece, Claim No 12a* (1956) 23 ILR 106. See also *Oppenheim's International Law* (9th edn, Longman, 1992, ed RY Jennings & AD Watts) vol 1, pp 218, 222; I Brownlie, *Principles of Public International Law* (Clarendon Press, Oxford, 1990) pp 666-67; Nguyen Quoc Dinh, P Dallier & A Pellet, *Droit International Public* (4th edn, LGDJ, Paris, 1992) p 524.

4 This has nothing to do with the controversial issue of the application of the doctrine of continuous nationality in situations where the *claimant* State is a successor State. Cf *Panavezys-Saldutiskis Railway Co Case* PCIJ Ser A/B No 76 (1939) at pp 32-35 (Judge van Eysinga, dissenting), or with the continuation of private law claims between entities which continue to exist as such under the relevant legal system.

5 *Lighthouses Arbitration between France and Greece, Claim No 11 & 4* (1956) 23 ILR 81 at p 90, where the Permanent Court of Arbitration noted that: "far from doing anything to check or prevent its shipping company from lending itself to these illegal transactions, Greece, on the contrary, kept in force and thus sanctioned the illegal practice under its own direct responsibility after the acquisition of territorial sovereignty... It cannot be doubted that in acting in this way Greece undertook a responsibility of its own for the period subsequent to the acquisition of sovereignty..."

of the issues specified in Article 2 of the Special Agreement. Thus the Court must determine whether the 1977 Treaty was terminated for any of the reasons set out in Chapter 10. These issues have been dealt with earlier in this Memorial.

(2) When the Slovak Republic became independent on 1 January 1993, it inherited the *situation* created by the illegal diversion of the Danube, and the continuing damage and risk of damage being suffered by Hungary as a result. The 1977 Treaty was by now no longer in force. Far from taking prompt steps to restore the Danube to its original course and to mitigate the damage in the meantime, the Slovak Republic maintained the position unchanged. This clearly constituted an adoption of the wrongful conduct of Czechoslovakia with respect to Variant C as a whole, with all the legal consequences that flow from that adoption.

(3) The wrongful conduct of Slovakia in this respect is aggravated, in fact and in law, by reason of its failure so far to comply with the obligation to institute a temporary water management regime under Article 4 of the Special Agreement. It has so far failed to agree on minimal requirements for a temporary water management regime, as recommended by the European Commission's experts.[6]

(2) CLAIMS UNDER THE 1977 TREATY IN RELATION TO WORK DONE ON THE PROJECT

11.08. The 1977 Treaty envisaged that there would be a sharing of costs relating to the construction of the Project. Article 5(6) of the 1977 Treaty provided:

> "6. The apportionment of labour and supplies under the joint investment as provided in paragraph 5 shall be evaluated by the Contracting Parties in monetary terms in the joint contractual plan. The valuation of the labour and supplies shall not affect the apportionment of the works (labour) specified in paragraph 5; however, any amount due for settlement may not exceed 2.5 per cent of the budgetary value of the work and deliveries to be carried out by the Contracting Parties in accordance with paragraph 5. The settlement of any difference as aforesaid shall also take the form of labour and supplies. The costs of carrying out the joint investment shall be specified in the joint

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6 See above, paras 2.09 - 2.12, 3.208 - 3.223.

> contractual plan on the basis of the mutually agreed budgetary figures and shall be expressed in the Hungarian forint and the Czechoslovak korun at the annual rate of exchange in effect on 1 January 1975."

11.09. Hungary always accepted that the termination of the 1977 Treaty would require an account of work properly done in accordance with its terms, and a settlement of that account as between the parties. This had nothing to do with any issue of State responsibility on the part of Hungary, but was a consequence of the regime of the 1977 Treaty while it remained in force and unimpaired. The account would of course not have extended to any work done to give effect to Variant C, which, as demonstrated in Chapter 7, constituted a breach of the 1977 Treaty. Nor would it have extended in any circumstances to work done after 25 May 1992, the date of termination of the 1977 Treaty, other than necessary restoration work.

11.10. The right to an account, as contemplated in the 1977 Treaty, was no doubt a "legal situation of the parties created through the execution of the treaty prior to its termination".[7] It was not a domestic legal right under the law of either party, but a bilateral consequence on the international level of Article 5 of the 1977 Treaty. Thus it was not, and is not, a "legal situation" in the sense of a vested treaty right *of Slovakia*. Slovakia was never a party to the 1977 Treaty and has acted quite contrary to its terms, despite claiming that it continues in force, since 1 January 1993.

11.11. Hungary has no information about the internal arrangements within the Czech and Slovak Federal Republic in relation to the financing of the Barrage System, or for that matter of Variant C; nor does it know on what basis any continuing financial obligations relating to the Project or to Variant C were divided on the dissolution of the Czech and Slovak Federal Republic. In the first instance it is a matter for the Slovak Republic to substantiate any claims it may make, both as a matter of fact and law. Hungary will return to the issue at the stage of the Counter-Memorial.

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7 Vienna Convention of the Law of Treaties, 1155 UNTS 315, Art 70.

(3) PROPERTY RIGHTS ACQUIRED PURSUANT TO THE 1977 TREATY

11.12. The 1977 Treaty was an international treaty which provided the framework for a joint investment effected within the territory of the two Parties. The material results of the joint investment gave rise to property rights under the relevant national legal system. This was regulated by Article 8 of the 1977 Treaty, which provided as follows:

> "Ownership of works carried out under the joint investment
>
> 1. Among the works of the System of Locks carried out as joint investment, the following shall be jointly owned by the Contracting Parties in equal measure:
>
> (a) the Dunakiliti dam (article 1, paragraph 2(b));
>
> (b) the by-pass canal (article 1, paragraph 2 (c));
>
> (c) the Gabcikovo series of locks (article 1, paragraph 2 (d));
>
> (d) the Nagymaros series of locks (article 1, paragraph 3 (b));
>
> 2. On the basis of the joint ownership, the Contracting Parties shall have the rights and obligations arising from the relevant provisions of this Treaty.
>
> 3. Ownership of the other works of the System of Locks carried out as joint investment shall vest in the Contracting Party in whose territory they were constructed."[8]

11.13. In the aftermath of the termination of the 1977 Treaty, the situation of the property rights created under Article 8 needs to be resolved. No difficulty arises with respect to the "other works" referred to in Article 8(3). Those works on Hungarian territory continue to belong to Hungary; those works on Czechoslovak territory would no doubt have passed to the Slovak Republic under the arrangements for the distribution of assets between the Czech and Slovak Republics on the dissolution of the predecessor State.

11.14. The position with respect to "the Nagymaros series of locks" referred to in Article 8(1)(d) is also clear. That installation was never built. What remains at Nagymaros is a coffer dam, a temporary structure erected to allow for the construction of the Nagymaros system of locks

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8 Under Art 26(1)(b) each party was responsible for the maintenance and repair of jointly-owned plant in its territory.

itself. It formed part of the "preparatory construction stage" at Nagymaros, within the meaning of Article 21 of the 1977 Treaty, and was not part of the "System of Locks" itself. In a *Note Verbale* of 13 July 1993, the Slovak Republic asserted joint ownership over the coffer dam pursuant to Article 8 of the 1977 Treaty.[9] That claim was without substance, since the coffer dam is covered by Article 8(3) and not by Article 8(1)(d).[10]

11.15. Thus the only joint property issues arise with respect to the other three installations covered by Article 8(1) of the Treaty, viz the Dunakiliti dam, the by-pass canal and the Gabcikovo series of locks. Hungary assumes that under the arrangements for distribution of property as between the constituent republics of the former Czech and Slovak Federal Republic, the joint property interest under Article 8, which would have continued after the termination of the 1977 Treaty, would have passed to the Slovak Republic. This assumption is consistent with preambular paragraph 2 of the 1977 Treaty, and with the rules of State succession with respect to public or state property.[11]

11.16. But although these three installations were subject in principle to the regime of joint ownership under Article 8 of the 1977 Treaty, there is the difficulty that the Gabcikovo series of locks and the by-pass canal were converted for use as part of Variant C. In other words, the Czech and Slovak Federal Republic and subsequently the Slovak Republic used a jointly-owned installation for the purpose of the unlawful diversion, causing thereby substantial damage to Hungary and the risk of even more substantial damage in the future. It is a matter to be determined between the parties or, in the absence of agreement, by the Court under Article 5(3) of the Special Agreement, what the disposition of any jointly-owned installations should be.

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9 *Note Verbale* from the Slovak Ministry of Foreign Affairs to the Embassy of the Republic of Hungary, Bratislava, 13 July 1993; Annexes, vol 4, annex 121.

10 As the Hungarian Republic pointed out in reply: see *Note Verbale* from the Hungarian Ministry of Foreign Affairs to the Embassy of the Slovak Republic, Budapest, 25 November 1993; Annexes, vol 4, annex 129.

11 Cf *Peter Pázmány University Case* PCIJ Ser A/B No 61 at p 237; Vienna Convention on Succession of States with respect to State Property, Archives and Debts, 8 April 1983, (1983) 22 ILM 306, Art 8.

SECTION B: THE OVERALL REMEDIAL CONTEXT

11.17. The various claims, rights and legal situations referred to in Section A do not exhaust the matters which have to be taken into account in any settlement of the dispute. In addition it is necessary to have regard to:

(a) the damages done to Hungary as a result of the breaches of international law committed by the Czech and Slovak Federal Republic prior to 31 December 1992;

(b) the damages done to Hungary by conduct attributable to the Slovak Republic, including the operation of Variant C;

(c) the breach by Slovakia of the Article 4 of the Special Agreement.

As noted in paragraphs 11.06-11.07 above, the matters referred to in paragraph (a) were not as such imputable to the Slovak Republic, which was not a party to the 1977 Treaty and did not exist as an international legal person at the relevant time. By contrast, the whole process of the implementation and operation of Variant C is attributable to the Slovak Republic, having regard to its conduct in affirming and extending Variant C since its independence. The breach of Article 4 of the Special Agreement is, of course, also imputable to the Slovak Republic.

11.18. The remedial position as between the parties is evidently a complex one. Many legal issues are in dispute between the parties, and they implicate a variety of scientific and technical issues. Hungary has given indications of the extent of damages it has suffered, in particular from the implementation of Variant C and from the lack of an adequate discharge regime notwithstanding the commitment undertaken in Article 4 of the Special Agreement. But in the nature of things these indications are preliminary and tentative. There would be no point in seeking to quantify damages in circumstances where much of the damage relates to future events which can *still* be affected by the conduct of the parties.

SECTION C: SUMMARY OF CONCLUSIONS

11.19. The Republic of Hungary respectfully requests the Court first to determine the answers to each of the three questions specified in Article 2(1) of the Special Agreement. For the reasons given in this Memorial, the answers to those questions should be as follows:

(a) that the Republic of Hungary was entitled to suspend and subsequently abandon the works on the Nagymaros Project and on the part of the Gabcikovo Project for which the Treaty attributed responsibility to the Republic of Hungary;[12]

(b) that the Czech and Slovak Federal Republic was not entitled to proceed to the "provisional solution" (damming up of the Danube at river kilometre 1851.7 on Czechoslovak territory and resulting consequences on water and navigation course);[13]

(c) that by its Declaration of 19 May 1992, Hungary validly terminated the Treaty on the Construction and Operation of the Gabcikovo-Nagymaros Barrage System of 16 September 1977.[14]

11.20. In addition the Court should deal with any other disputed issue which has to be resolved in order to determine what the legal consequence are for the parties to the proceedings, i.e. what are the rights and obligations for the parties at the date of and arising from the Court's judgment. In accordance with the arguments presented in this Memorial, these legal consequences fall under five headings. In particular, the Court is asked to determine:

(1) that the 1977 Treaty has never been in force between the Republic of Hungary and the Slovak Republic;[15]

(2) that the Slovak Republic bears responsibility to Hungary for maintaining in operation the "provisional solution";[16]

(3) that the Slovak Republic is internationally responsible for the damage and loss suffered by the Republic of Hungary and by its nationals as a result of the operation of the "provisional solution";[17]

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12 See above, paras 9.18 - 9.29.

13 See above, paras 7.01 - 7.123.

14 See above, paras 10. 01 - 10.102.

15 See above, paras 10.01 - 10.102, 10.103 - 10.120.

16 See above, paras 8.02 - 8.32.

17 See above, paras 8.02 - 8.32.

(4) that the Slovak Republic is under an obligation to make reparation in respect of such damage and loss;[18]

(5) that the Slovak Republic is also under the following obligations:

(a) to return the waters of the Danube to their course;

(b) to restore the Danube to the situation it was in prior to the putting into effect of the provisional solution; and

(c) to provide appropriate guarantees against the repetition of the damage and loss suffered by the Republic of Hungary and by its nationals.[19]

But for the reasons stated in paragraph 11.18, the quantification of any damages or losses and the modalities of implementation of the Court's judgment should be left to be determined by the Court, if necessary, at a further stage of the proceedings, as contemplated by Article 5 of the Special Agreement.

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18 See above, paras 8.33 - 8.51.

19 See above, paras 8.52 - 8.53.

SUBMISSIONS

On the basis of the evidence and legal argument presented in this Memorial, the Republic of Hungary

Requests the Court to adjudge and declare

First, that the Republic of Hungary was entitled to suspend and subsequently abandon the works on the Nagymaros Project and on the part of the Gabcikovo Project for which the Treaty attributed responsibility to the Republic of Hungary;

Second, that the Czech and Slovak Federal Republic was not entitled to proceed to the "provisional solution" (damming up of the Danube at river kilometre 1851.7 on Czechoslovak territory and resulting consequences on water and navigation course);

Third, that by its Declaration of 19 May 1992, Hungary validly terminated the Treaty on the Construction and Operation of the Gabcikovo-Nagymaros Barrage System of 16 September 1977;

Requests the Court to adjudge and declare further

that the legal consequences of these findings and of the evidence and the arguments presented to the Court are as follows:

(1) that the Treaty of 16 September 1977 has never been in force between the Republic of Hungary and the Slovak Republic;

(2) that the Slovak Republic bears responsibility to the Republic of Hungary for maintaining in operation the "provisional solution" referred to above;

(3) that the Slovak Republic is internationally responsible for the damage and loss suffered by the Republic of Hungary and by its nationals as a result of the "provisional solution";

(4) that the Slovak Republic is under an obligation to make reparation in respect of such damage and loss, the amount of such reparation, if it cannot be agreed by the Parties within six months of the date of the Judgment of the Court, to be determined by the Court;

(5) that the Slovak Republic is under the following obligations:

(a) to return the waters of the Danube to their course along the international frontier between the Republic of Hungary and the Slovak Republic, that is to say the main navigable channel as defined by applicable treaties;

(b) to restore the Danube to the situation it was in prior to the putting into effect of the provisional solution; and

(c) to provide appropriate guarantees against the repetition of the damage and loss suffered by the Republic of Hungary and by its nationals.

(*Signed*) János MARTONYI

Agent for the Government of the Republic of Hungary

5 April 1994

GLOSSARY

Aquifer: Permeable underground water-bearing formation capable of yielding exploitable quantities of water.

Alluvium: The sedimentary deposits resulting from the action of rivers.

Asl: Above (Adriatic) sea level

Barrage System: Barrier across a river provided with a series of gates or other control mechanisms (see **Lock** below) to control the water-surface level upstream, to regulate the flow or to divert water supplies into a canal. In this Memorial, **Barrage System** includes the entire system of reservoir and locks at either Gabcikovo or Nagymaros.

Biotope: An ecological term to designate an area in which all the fauna and flora are uniformly adapted to the environment in which they occur.

Canal : Man-made open channel, usually of regular cross-section shape.
By-Pass Canal: Canal built to divert flows from a point upstream of a region to a point downstream.
Head-Race Canal: Canal that brings water to a water wheel or turbine.
Tail-Race Canal: Canal that conducts water away from a water wheel or turbine.

Dam: Barrier constructed across a valley or riverbed for impounding water or creating a reservoir.
Coffer Dam: A watertight enclosure from which water is pumped to expose the bottom of a body of water and permit construction (eg, a turbine), hence Nagymaros coffer dam

	is the temporary structure at Nagymaros to enable the construction of the Nagymaros barrage.
Dyke:	An artificial embankment constructed to prevent flooding.
Eutrophic:	The state of a water body when it has an excess of plant nutrients.
Flood Plain:	Nearly level land along a stream flooded only when the streamflow exceeds the water carrying capacity of the channel.
Hardpan:	A hard impervious layer within the soil resulting from the cementation of relatively insoluble materials and the leaching of soluble materials.
Leaching:	The process by which waters in percolating downwards through a soil remove humus in solution, soluble bases and sesquioxides from the upper horizon.
Lock:	A canal enclosure (singular) with gates at each end used in raising or lowering boats as they pass from level to level (eg, in a Barrage System).
Original Project:	The Barrage Project as described in the 1977 Treaty and the Joint Contractual Plan, which includes work at Nagymaros, Dunakiliti and Gabcikovo. **Nagymaros Sector:** Section of the Original Project concerning the Nagymaros barrage system and hydroelectric plant. **Gabcikovo Sector:** Section of the Original Project concerning the Gabcikovo barrage system and the hydroelectric plant, including the Dunkiliti Dam **Dunakiliti Dam:** Section of the Original Project concerning the dam and reservoir at Dunakiliti.
Reservoir:	Body of water, either natural or man-made, used for storage, regulation and control of water resources.

Riprap: A term referring to large fragments of broken rock tipped along a bank or shoreline to protect against erosion.

Riverbed: Lowest part of a river valley shaped by the flow of water and along which most of the sediment and runoff moves in interflood periods.

Spillway: Structure over which excess flood waters flow.

Variant C: Unilateral Czechoslovak plan involving the Cunovo dam and reservoir, with water flowing through the Gabcikovo Sector.

Water: The liquid that descends from the clouds as rain, forms streams, lakes and seas and is a combination of two parts hydrogen and one part oxygen.
Groundwater: Subsurface water occupying the saturated zone.
Headwater: Stream from the source of a river.
Surface Water: Water that flows over or is stored on the ground surface.
Subsurface Water: Water that flows under the ground surface and often passes through large interstices, such as caves or caverns.

Weir: Overflow structure that may be used for controlling the upstream water level, for measuring discharge or for both. Compare with **Dam**, which is usually the barrier across the river, which may or may not include a **Weir**.

APPENDICES

Appendix 1 F Mészáros, L Ronkay & A Volnits, *The Nature Protection Aspects of the Gabcikovo-Nagymaros Project*, Budapest, 2 October 1993.

Appendix 2 A Vida, *Ichthyological Aspects of the Gabcikovo-Nagymaros Project*, Budapest, October 1993.

Appendix 3 P Liebe, *Environmental - Ecological Effects of the Gabcikovo-Nagymaros Project Subsurface Waters* Budapest, February 1994.

APPENDIX 1

THE NATURE PROTECTION ASPECTS OF THE GABCIKOVO-NAGYMAROS PROJECT

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October 1993

SECTION I. NATURAL VALUES AFFECTED BY THE CONSTRUCTION OF THE GABCIKOVO-NAGYMAROS PROJECT

It is a well-known fact that the natural values of a given landscape are not restricted to the living components alone, but include inanimate formations of nature. In this study, we shall examine the flora and fauna of the area affected by the diversion of the Danube, and also discuss their conservation value.

The affected area may be divided into three major sections: the Szigetköz, the Danube Valley (from the Szigetköz downstream to the Danube-Bend) and the Danube-Bend (including the northern part of Szentendré Island. The botanical assessment of these three sections was based on a uniformly distributed sampling, the zoological on less evenly distributed collecting efforts. While the fauna and flora of the Szigetköz is fairly well-known, the fauna of the Danube Valley is practically unexplored, as is the zoological assessment of the Danube-Bend, since this began only a year ago in 1992. We would like to emphasise though that, except for the Szigetköz, research is not exclusively focused on the dam's effect on the fauna and flora, but is aimed to clearly show the present state of flora and fauna in Hungary.

The detailed environmental impact assessment of the flora and fauna of the Szigetköz is of paramount importance, since this region was the most highly affected by human activity arising from the bilateral treaty between Hungary and Czechoslovakia, and by continued Slovak works after the termination of the treaty by Hungary.

(1) General characterisation of the flora and fauna of the Szigetköz (its state prior to the diversion)

The Szigetköz is a unique section of the Danube valley, since a braided branch-system on a similar alluvial cone neither exists upstream nor downstream. In a relatively small area, this branch-system accommodates a wide range and an amazing diversity of habitats. Considering the size of the Szigetköz, the flora and fauna are remarkably rich.

The greatest value of the Szigetköz is the landscape itself, which was created by the Danube, with unique geomorphological and hydrological formations and natural values, both botanical and zoological. Because of extensive river regulations and the agricultural use of all available land, the area covered by riparian woodlands elsewhere in Europe is continuously and drastically decreasing, with alterations to their natural state and biological degradation. In contrast, significant stands of soft

and hard wood riparian forest remain intact in the Szigetköz. Therefore, these riparian forests, and nearby bordering areas with their fauna, are natural values of European significance.

Owing to its special geological, geomorphological, climate and water-regime features, the Szigetköz has unique fauna.. The waters arriving from the Alps constantly carry plant seeds and other reproductive components, which occasionally get stuck in the slow side branches, and when other ecological circumstances are favourable (for example, cool, moist temperatures), may eventually settle in the Szigetköz. The near-natural, lowland-type forest stands owe their uniqueness to the dealpine and montane beech forest elements (for example, the following species: *Selaginella helvetica, Achillea ptarmica, Lilium bulbiferum, Gentianella ciliata, G. austriaca, Carex alba, Parnassia palustris*). Although a majority of these plant associations are not rare, the species composition is peculiar. For example, the diversity of orchid species is remarkable (23 species). In the maintenance of botanical diversity, the immigration of species and the repeated inundation are essential. Both of these were previously ensured by vast flow of the Danube into the side branch system during floods.

As a consequence of the decreased flow of the Danube, the Szigetköz has received significantly less water, resulting in a drastic decrease in the size of the wetland habitat (moors, fenwoods, marshes). Therefore, the remaining patches of these habitats with their exceptionally rich biota should be strictly protected. At higher elevations, in certain localities, the original steppe vegetation is still prevailing.

These conclusions hold true for the fauna, too. As a general rule the fauna of the great Central-European river basins are very similar, regardless of their exact geographical location. However, the fauna of the Szigetköz is unique from that of any other river basin because of its special geographical situation. Since the fauna of the Szigetköz is enriched with particular species assemblages, its species composition is unequalled (for example, East-Alpean, Atlantic, lower-montane, and steppe species - beetles: *Leptura maculicornis, Acanthocinus aedilis, A. griseus*; lepidopterans: *Aricia artaxerxes, Scopula umbelaria, Acasis viretata, Perizoma sagittata*; fishes: *Cottus gobio Hucho hucho*; mammals: *Microtomus oeconomus*).

Thus, not only the highly valuable rare species, but also the species combination and composition of the Szigetköz are unique.

The high species diversity of the flora and fauna is indicated by the fact that 30-50% of the species of the Hungarian fauna may be found in the Szigetköz, and in the case of some taxa an even higher proportion may

be established. These species were recorded on the 9000 hectares of the Nature Reserve. The high number of species may be explained by the presence of a large quantity of mosaic-like patches of habitat over a relatively small area. In these patches, many of the main habitat types may be found: submontane river, connected and isolated side branches, canals, moorlands, marshes, hard and soft wood riparian forests, *Convallario-Quercetum, Salicetum triandrae-purpureae* associations, relict *Carpino-Quercetum* associations, fens and remnant patches of forested steppe vegetation.

The estimated number of protected plant species is 64, and animal species is approximately 300.

(2) THE FLORA AND PLANT ASSOCIATIONS

(a) Vascular Plants

According to botanical surveys undertaken over the last three years, the number of plant species between the Moson-Danube and the main stream of the Danube in the Szigetköz area is approximately 820. Considering the relatively small area and the high percentage of land cultivated or otherwise affected by forest management, this number is quite high (there are only 2150 species of vascular plants in Hungary). According to botanical literature, the number of species could be as high as 870, since several species were not found during botanical surveys and might have disappeared during the past decades (e.g., *Sellaginella helvetica, Daphne cneorum, Carlina acaulis, Centaurea arenaria, Salvia aethiopis*). Vascular plants are either somewhat rare or not always present in the flora; in other cases, their exact place of occurrence cannot be defined.

(b) Plant Associations

Approximately 25% of the 26 000 hectares of the Szigetköz is covered by near natural or semicultivated associations, such as forests, poplar and willow stands, aquatic plant associations, marshes, and pastures. Although poplar and willow stands are originally cultivated plantations, they are nevertheless regarded as near natural associations because they accommodate floodplain and montane elements.

According to recent botanical assessments, several floodplain associations live in the Szigetköz in a natural or near-natural state. 67 associations have already been found in this area, and the number is expected to rise. From the point of view of nature protection, 17% of these associations are highly valuable, including relicts (2 associations and those demanding protection (10 associations); 46% are valuable, including near-natural (25 associations and pioneer (6 associations); 9%

of these associations are disturbance tolerant and 6 are categorised as less degraded. 27%, however, are highly disturbed weed associations, with degradation of 18, which is the direct outcome of intense agricultural disturbance.

(c) Vascular (Flowering) Plant Species and Plant Associations of the Water Bodies and Aquatic Habitats of the Danube

(1) The Flora

The vascular flora of aquatic and marshland habitats is rich. Except for some rarities, all characteristic species of floodplains are present in the Szigetköz area. Characteristic aquatic and protected species:

Elodea canadensis, Groenlandia densa (Upper-Szigetköz), *Callitriche cophocarpa, Ceratophyllum demersum, Hippuris vulgaris, Hottonia palustris* (Lower-Szigetköz), *Hydrocharis morsus-ranae, Lemna minor, Myriophyllum spicatum, M. verticillatum, Najas minor* (Middle- and Lower-Szigetköz), *Nuphar luteum, Nymphaea alba, Nymphoides peltata, Pedicularis palustris* (Middle- and Lower-Szigetköz), *Polygonum amphibium* (Lower-Szigetköz), *Potamogeton acutifolius, P. compressus* (Atlantic species, that occur only in the Szigetköz in Hungary), *P. crispus, P. gramineus* (Lower-Szigetköz), *P. lucens, P. natans* (Upper-Szigetköz), *P. nodosus* (Upper-Szigetköz), *P. panormitanus* (Lower-Szigetköz), *P. pectinatus, P. perfoliatus, P. tricoides* (Lower-Szigetköz), *Ranunculus baudotii* (Lower-Szigetköz), *R. circinnatus* (Upper-Szigetköz), *R. fluitans* (in Hungary appears only in the Upper-Szigetköz), *R. petiveri, R. radians* (Middle-Szigetköz), *R. rionii* (Lower-Szigetköz), *R. trichophyllus, Salvinia natans, Stratiotes aloidens, Utricularia australis* (Lower-Szigetköz), *U. minor* (Upper-Szigetköz), *U. vulgaris* (Middle-Szigetköz), *Vallisneria spiralis* (Upper-Szigetköz). Further marshland vegetation elements and protected species: *Epipactis palustris, Iris pseudacorus, Dactylorrhiza incarnata.*

(2) The Plant Associations

Widespread aquatic and marshland associations, which are classified as relicts or deserving protection:

Lemno-Spirodeletum, Salvini-Spirodeletum, Lemno-Utricularietum, Hydrochari-Stratiotetum (Upper-Szigetköz), *Batrachietum fluitantis* (which is only found only in the Upper-Szigetköz), *Hottonietum palustris* (Lower-Szigetköz), *Elodeetum canadensis, Myriophyllo-Potamogetonetum, Potamogetono perfoliati-Batrachietum circinnati* (Upper-Szigetköz), *Potamogetonetum lucentis, P. natantis, Nymphaeetum albo-luteae, Nymphoidetum peltatae, Scirpo-*

Phragmitetum austro-orientale, Sparganietum erecti, Glycerietum maximae, Rorippo-Oenanthetum, Sparganio-Glycerietum fluitantis, Caricetum elatae, Carici-Menyanthetum, Carici-Typhoidetum, Caricetum acutiformis ripariae, Caricetum vulpinae, Eleochari-Caricetum bohemicae (pioneer associations), *Calamagrosti-Salicetum cinereae, Dryopteridi-Alnetum* (willow relicts and alder marsh vegetation).

(d) Vascular Plant Species and Plant Associations of the Szigetköz Floodplain

(1) The Flora

Species of the Szigetköz listed in the European Red Data Book: *Actaea spicata, Cerastium arvense, Erysimum odoratum;*

Seriously endangered or strictly protected species: *Ophrys apifera, O. insectifera* (these two are rare in both Hungary and the Upper-Szigetköz);

Protected species include all of the further 21 species of the Orchidaceae family: *Anacamptis pyramidalis, Cephalanthera damasonium, C. longifolia, C. rubra, Epipactis atrorubens, E. helleborine, E. microphylla, E. palustris, Orchis coriophora, O. laxiflora* subsp. *palustris, O. militaris, O. morio, O. purpurea, O. ustulata, Dactylorrhiza incarnata, D. maculata, Neottia nidus-avis, Gymnadenia conopaea, Listera ovata, Platanthera bifolia;*

Other protected species, including some montane elements: *Ophioglossum vulgatum, Dryopteris carthusiana, D. dilatata, Thelypteris palustris, Adonis vernalis, Anemone sylvestris, Clematis integrifolia, Parnassia palustris, Astragalus exscapus, Lathyrus pannonicus, Dictamnus albus, Vitis sylvestris, Gentiana cruciata, G. pneumonanthe, Gentianella ciliata, G. austriaca, Aster amellus, Inula oculus-christi, Jurinea mollis, Pyrola rotundifolia, Dianthus superbus, Primula elatior, Hemerocallis lilio-asphodelus, Lilium bulbiferum* (this species occurs in the Szigetköz plain only at low elevations, where its richest population in Hungary may be found), *Scilla vindobonensis, Leucojum aestivum, Iris pseudacorus, I. pumila, I. sibirica, I. spuria, Eriophorum angustifolium, E. latifolium, Stipa borysthenica, S. pennata;*

The *Fagetalia* species are also characteristic of the Szigetköz area: *Euphorbia amygdaloides, Majanthemum bifolium, Carex pilosa, C. alba, Gallium odoratum, Viola sylvatica, Allium ursinum, Arum orientale*, and a montane element: *Pyrola rotundifolia;*

In the marshland meadows, important species include: *Sanguisorba officinalis, Sesleria uliginosa* (rare species), with the following representative endemics: *Molinia hungarica, M. arundinacea, Allium angulosum.* In the meadows and hayfield rare species include: *Achillea ptarmica, Gallium boreale.* In the fall *Colchicum autumnale* occurs in masses. Steppe elements include: *Anemone sylvestris, Festuca rupicola, Peucedanum alsaticum, Tunica saxifraga.*

The above-listed species show the diversity of the rich floodplain flora and indicate the importance of the primary and original state of the Szigetköz.

(2) The Plant Associations

There are near natural associations of forests near the villages of Magyaróvár, Feketeerdő, Halászi, Dunakiliti, Rajka and Hédervár, and *Molinietalia, Molinion* and *Arrhenatheretalium* communities are found in the Upper- and Middle-Szigetköz. The near natural or relict associations requiring protection include:

Salicetum triandrae-purpureae, Salicetum albae-fragilis, Fraxino pannonicae-Ulmetum (in several stands, for example at Dunasziget, with the co-dominant species *Alnus incana*), *Querco robori-Carpinetum* (its only stand in the Szigetköz is found near Halászi in the Derék forest. The species composition of this beautiful relict forest has not changed since 1930, and similar forests are only found in Hungary on the Great Hungarian Plain), *Festuco-Quercetum roboris* (at Püski, with fragments also present in the Kimlei forest). *Deschampsietum caespitosae croato-pannonicum, Alopecuretum pratensis, Agrostetum albae, Cirsio cani-Festucetum pratensis, Agrostio-Typhoidetum, Trisetetum flavescentis, Carici flavae-Eriophoretum, Succiso-Molinietum* (Lower-Szigetköz), *Arrhenatheretum elatioris* et subass. *festucetosum rubrae, Brometum tectorum, Astragalo-Festucetum rupicolae, Potentillo-Festucetum pseudovinae.*

The relicts of bogs and associations of alder and willow, which deserve protection, are of great importance because they are the last remnants of the original marshland.. The *Phragmitetum* and *Glycerietum moxinae* associations cover the largest area. There are smaller fragments of *Nymphoidetum, Hottonietum,* and fragments of *Caricetum elotae* and *Seslerietum uliginosae.* Relict and protected species also occur in these associations. The high number of natural associations is a characteristic of the Szigetköz, and this mosaicity is a crucial element of the landscape. Other important elements include willow stands, *Fraxino-pannonicae-Ulmetum* riparian forests, and *Potametea-, Phragmitetea-, Molinio--*

Juncetea communities. It is worth mentioning that the only occurrence of *Ranunculaetum fluitans* association is in the Szigetköz. The preservation of these remnant patches is essential for the conservation of the region's original biota because these patches could serve as the starting point for reconstructing the original state of the Szigetköz. The plant associations of the meadows and pastures fortunately indicate a lower level of disturbance. Several hundred years of agricultural use undoubtedly facilitated the invasion of weed associations.

(3) THE FAUNA OF THE SZIGETKÖZ

The description of the Szigetköz fauna is more difficult than that of the flora, because animals are not as constant and as clearly distinguishable as plant associations and vegetation types. While a botanical data record (the occurrence of a certain species) shows that any given species (or individual plant) is a member of a specific association (belt, zone), a zoological reference only shows that a given animal was spotted at a particular place, and may or may not be a member of that community. Furthermore, there is no characteristic group of animals in the Szigetköz, in contrast to the vascular (flowering) plants that characterise the plant community. Therefore, the fauna of the Szigetköz is described here according to large taxonomical units.

(a) Molluscs (Mollusca)

116 Mollusca species were collected from 74 localities (this constitutes 48% of all Hungarian Mollusca fauna). On the basis of detailed studies, we concluded that the number of species is very high and that the Szigetköz is of paramount importance in the preservation of Mollusca species. Several species occurred only in limited localities. The patchiness of the Szigetöz might explain this phenomenon, and these patches are important reservoirs in some cases. The occurrence of an additional 13 species is possible, and these may be introduced or rheophilous species. Specimens of *Paladilhia oshanove* were not found in the upper reaches of the Danube, although intensive research was carried out in Germany and Austria. This ground-dwelling snail has gills and lives in the ground water of the alluvial fan. It is probably an endemic species of the Szigetköz. As the *Paladilhia* species are real stygobiont organisms, they may live in holes with moving ground-water. The other molluscs are grouped according to their habitats.

Rheophilous species live in fast-flowing waterbodies, with strong current:

Gastropoda: *Theodoxus (Theodoxus) transversalis, Theodoxus (Theodoxus) danubialis, Viviparus (Viviparus) acerosus, Potamopyrgus*

jenkinsi, Lithoglyphus naticoides, Fagotia (Microcolpia) acicularis, Fagotia (Fagotia) esperi, Ancylus fluviatilis; Bivalvia: *Unio pictorum, Unio crassus, Anodonta (Anodonta) cygnea, Pseudanodonta complanata, Dreissena polymorpha, Sphaerium (Sphaeriastrum) rivicola, Pisidium amnicum, Pisidium henslowanum, Pisidium supinum.*

Species in slowly-flowing waterbodies, including those living in canals, ponds, dead branches:

Gastropoda: *Viviparus (Viviparus) contectus, Valvata (Valvata) cristata, Valvata (Cincinna) piscinalis, Valvata (Cincinna) pulchella, Bithynia (Bythinia) tentaculata, Bithynia (Bythinia) leachi, Acroloxus lacustris, Lymnaea (Lymnaea) stagnalis, Lymnaea (Galba) truncatula, Lymnaea, (Radix) auricularia, Lymnaea (Radix) peregra, Physa fontinalis, Physella (Constatella) acuta, Planorbarius corneus, Planorbis planorbis, Planorbis carinatus, Anisus vortex, Anisus vorticulus, Bathyomphalus contortus, Gyraulus (Gyraulus) albus, Gyraulus (Torquis) laevis, Gyraulus (Lamorbis) riparius, Gyraulus (Armiger) crista, Hippeutis complanatus;* Bivalvia: *Sphaerium (Sphaerium) corneum, Sphaerium (Musculium) lacustre,Pisidium milium, Pisidium nitidum, Pisidium obtusale, Pisidium subtruncatum.*

Species capable of living in marshes and water accumulating in pits:

Gastropoda: *Lymnaea (Stagnicola) palustris, Aplexa hypnorum, Anisus spirorbis, Segmentina nitida and* Bivalvia: *Pisidium casertanum, Pisidium personatum.*

Gastropoda species characteristic of *Carex* vegetation and wet meadows:

Carychiumminimum, Cochlicopa nitens, Vertigo (Vertilla) angustior, Vallonia (Vallonia) enniensis, Succinea (Succinella) oblonga, Oxyloma elegans, Nesovitrea hammonis, Deroceras (Deroceras) laeve, Perforatella rubiginosa.

Snails characteristic of moist meadows and shaded places:

Cochlicopa lubrica, Vertigo (Vertigo) pygmaea, Pupilla (Pupilla) muscorum.

Species occurring in dry grasslands or along roads:

Cochlicopa lubricella, Truncatellina cylindrica, Granaria frumentum, Vallonia (Vallonia) pulchella, Helicella (Helicella) obvia, Helicopsis (Helicopsis) striata, Monacha (Monacha) cartusiana, Cepaea vindobonensis.

Snail species characteristic of marshlands, riparian forest:

Carychium tridentatum, Vertigo (Vertigo) antivertigo, Vertigo (Vertigo) moulinsiana, Succinea (Succinea) putris; Macrogastra (Macrogastra) ventricosa, Arion (Mesarion) subfuscus, Semilimax semilimax, Zonitoides (Zonitoides) nitidus, Vitrea (Crystallus) crystallina, Aegopinella nitens, Euconulus (Euconulus) fulvus, Trichia (Trichia) striolata, Trichia (Trichia) hispida, Helicigona (Arianta) arbustorum, Cepaea hortensis.

Snails living in moist forests:

Columella edentula, Acanthinula aculeata, Clausilia (Clausilia) pumila, Balea (Alinda) biplicata, Punctum (Punctum) pygmaeum, Discus (Discus) rotundatus, Discus (Discus) perspectivus, Bradybaena (Bradybaena) fruticum, Perforatella (Monachoides) umbrosa, Trichia (Trichia) unidentata.

Snails living in dry deciduous forests:

Vallonia (Vallonia) costata, Chondrula (Chondrula) tridens, Cochlodina (Cochlodina) laminata, Vitrina (Vitrina) pellucida, Aegopinella minor, Limax (Limax) cinereoniger, Perforatella (Monachoides) incarnata, Euomphalia (Euomphalia) strigella, Helix (Helix) pomatia.

Snails characteristic of the human environment or living on cultivated land:

Cecilioides (Cecilioides) acicula, Arion (Arion) lusitanicus, Oxychilus (Oxychilus) draparnaudi, Tandonia budapestensis, Limax (Limax) maximus, Deroceras (Agriolimax) reticulatum, Eobania vermiculata.

(b) Crustacea

Hungary has a total of 150 crustacean species (90 Cladocera, 60 Copepoda), 96 of which are present in the Szigetköz (64 Cladocera, 32 Copepoda) The Szigetköz is extremely rich in species, for several reasons. First of all, the fact that the Danube meets a plain creates a high diversity of aquatic habitats. The fauna of the main-branch, side-branches, dead arms, canals and stagnant water bodies is further affected by the dynamics of the water regime and by flooding. This pattern is demonstrated by material collected from the side-branch system at Ásványráró in 1991. Desiccating shallow water bodies are characterised by *Daphnia magna* and *Moina brachiata*. Samples collected near lake Öntés contain these species, as well as Chydoridae species, which are usually present in the vegetation of the littoral zone. *Daphnia cucullata*, widespread in larger stagnant water bodies, was also found in these samples. *Eurytemora velox* were also found, the first record of this

species in Hungary. In 1992 this species was the most widespread crustacean in the Szigetköz, and it has colonised several water-types.

We can conclude that the Szigetköz is a very species-rich in Crustaceans.

(c) Dragonflies (Odonata)

Forty-five species of Odonata were found in the Szigetköz (adults of 42 and larvae of 32 species were collected). This is more than half of the Hungarian Odonata fauna. The high species diversity is partly maintained by the slow flowing of the Danube in the Szigetköz, which transports and accumulates sediment, as well as the well-developed side branch system. The larvae of dragonflies breathe dissolved oxygen from the water, and water quality is therefore an important factor for their survival. There are three areas in the Szigetköz that are of paramount importance for maintaining Odonata: the Moson-Danube, Gazfi the Holt-Danube (Sérfenyősziget-Cikolasziget) and the Novák-csatorna (Halászi, Püski).

The Moson-Danube is a meandering Danube branch, which preserved its original state fairly well. Because of its different size of sediment, several habitat types have developed. These habitats, as well as the bog patches occurring in the riparian forest, offer excellent conditions for Odonata. Species living here include: the *Stylurus flaviceps* (protected by the Bern Convention), *Aeshna cyanea* and *Sympetrum danae*.

The Gazfi Holt-Danube, and the Novák-csatorna branching from it, are the only localities where *Epitheca bimaculata* may be found in the Hungarian Little Plain. The population of *Aeshna grandis* is remarkably strong here.

The Novák-csatorna is the richest in Odonata species of the Szigetköz water bodies -- 23 species were found. The most valuable species include *Somatochlora flavomaculata, Aeshna grandis* and *Anax parthenope*.

(d) Aquatic and semiaquatic bugs (Heteroptera)

Data on 27 species were obtained. Although Heteroptera species were absent in fast-flowing river sections and lakes formed in gravel excavations, aquatic Heteroptera are rich in other localities. Interestingly, semiaquatic species are not as diverse.

Species characteristic of waterbodies partly covered by vegetation were dominant in the samples. The wide range of water and habitat types in the Szigetköz accommodate diverse species of aquatic and surface-dwelling heteropterans, comparable to that of Lake Balaton. The populations are limited by natural changes of the water-regime. Four

species (*Hydrometra gracilentum, Micronecta griseola, Hesperocorixa sahlbergi* and *Sigara fossarum*) are interesting from a faunistical point of view,.and the latter species was recorded in Hungary for the first time.

(e) Net-winged ('Neuropteroidea')

42 species of Neuroptera, one third of all Hungarian Neuroptera, were collected at 35 localities in the Szigetköz. In addition to the characteristic species of lower montane areas, several westerly and north-westerly distributed European species were found in the Szigetköz. *Coniopteryx aspoecki* and three other Neuroptera species developing in water along the banks of the Moson-Danube (*Sialis morio, S. nigripes* and *Sisyra terminalis*) are of high natural value.

The Házi forest is the most natural stand of the hard wood riparian forests covering higher elevations of the floodplain. The natural state of this forest is indicated by the fact that 7 of the 100 characteristic Neuropterans were recorded here. Four neuropteroid species living in the forest deserve protection, including *Nineta carinthiaca.*

(f) Beetles (Coleoptera)

Based on our knowledge of the Coleoptera of the Carpathian Basin, the estimated number of beetles of the Szigetköz is 2000. One third of these has already been recorded. We have provided below a list of 44 species characteristic of the areas deserving protection. The species may be grouped as (i) protected species; (ii) endangered species, which should be protected; (iii) rare, faunistically important species (characteristic of Hungarian habitats); and (iv)extremely rare species in Hungary (recorded only in the Szigetköz), the survival of their populations is uncertain:

Calosoma auropunctatum (Herbst, 1784) - protected, endangered species.

Calosoma reticulatum (Fabricius, 1787) - protected species, also listed in the Red Data Book.

Carabus coriaceus coriaceus (Linnaeus, 1758) - protected species.

Carabus hungaricus hungaricus (Fabricius, 1792) - protected species, highly endangered.

Carabus germarii exasperatus (Duftschmid, 1812) - protected species.

Carabus granulatus granulatus (Linnaeus, 1758) - protected species.

Carabus cancellatus cancellatus (Illiger, 1798) - protected species.

Carabus ulrichii ulrichii (Germar, 1824) - protected species.

Carabus scheidleri baderlei (Mandl, 1965) - endangered subspecies, its protection is recommended; in Hungary it is found only in the Szigetköz.

Cychrus caraboides (Linnaeus, 1758) - protected species.

Nebria livida (Linnaeus, 1758) - rare montane species, in Hungary it occurs only along the Danube and Rába rivers; its protection is recommended.

Trechus obtusus (Erichson, 1837) - rare species, occurring sporadically in the western part of Hungary.

Bembidion fasciolatum (Duftschmid, 1812) - rare montane species, in Hungary it occurs only in the Szigetköz and along the Rába river.

Bembidion modestum (Fabricius, 1801) - sporadically occurring montane species.

Perileptus areolatus (Creutzer, 1799) - rare, endangered species, occurring along good water quality rivers and clear lakes, and dwelling on saturated gravel surrounding fresh lakes.

Abax parallelepipedus (Piller et Mitterpacher, 1783) - characteristic, abundant montane species, occurring only in the Szigetköz on plain localities of low elevation.

Rantus consputus (Sturm, 1834) - a characteristic species of rivers of continental steppe or forest habitats.

Gaurodytes subtilis (Erichson, 1837) - characteristic species of cooler, moist, montane habitats.

Hydroporus rufifrons (Duftschmid, 1805) - in Hungary it occurs only in the Szigetköz.

Gyrinulus minutus (Fabricius, 1798) - one of the three known Hungarian localities of this species is in the Szigetköz.

Orectochilus villosus (O. F. Müller, 1776) - living in fast-flowing cool, clear waterbodies, in larger streams and rivers.

Bledius pallipes (Gravenhorst, 1802) - there are only two known localities of this species in Hungary, one of them in the Szigetköz.

Dicerca alni (Fischer, 1823) - its occurrence is sporadic in Hungary.

Lucanus cervus cervus (Linnaeus, 1758) - protected species.

Dorcus parallelipipedus (Linnaeus, 1758) - protected species.

Odonteus armiger (Scopoli, 1772) - a widespread but rare species in the forested areas of Hungary; its protection is recommended.

Potosia aeruginosa (Drury, 1770) - protected species.

Osmoderma eremita (Scopoli, 1763) - protected species, highly endangered; throughout Europe it occurs sporadically only in old willow stands along rivers.

Megopis scabricornis (Scopoli, 1763) - protected species.

Rhamnusium bicolor (Schrank, 1781) - protected and endangered species.

Lamia textor (Linnaeus, 1758) - endangered but not yet protected species; its protection is recommended.

Obrium brunneum (Fabricius, 1792), *Leptura maculicornis* (De Geer, 1775), *Leptura rubra* (Linnaeus, 1758), *Leptura sanguinolenta* (Linnaeus, 1761), *Monochamus galloprovincialis pistor* (Germar, 1818), *Acanthocinus aedilis* (Linnaeus, 1758), *Acanthocinus griseus* (Fabricius, 1792) - are characteristic species of montane deciduous and pine forests; in the Szigetköz they live in the *Pinus silvestris* plantations.

Obrium bicolor Kraatz, 1862 - reaching the north-western border of its area in Hungary, it is abundant in the hard wood riparian forests of the Szigetköz.

Nathrius brevipennis (Mulsant, 1839) - occurs sporadically in Hungary.

Aromia moschata (Linnaeus, 1758) - characteristic of willow stands; deserves protection.

Calamobius filum (Rossi, 1790) - protected species.

Timarcha tenebricosa moravica (Bechyné, 1949) - occurs sporadically on the plains, foothills and lower montane areas.

Sermylassa halensis (Linnaeus, 1758) - occurs in a limited number of localities in Hungary.

(g) Caddis flies (Trichoptera)

64 species have been confirmed. Considering the plain character of the Szigetköz, this is a very high number. For example, on the Great Hungarian Plain, only 92 species have been recorded. The 64 species comprises some 30% of Hungarian Trichoptera (of a total of 202).

The following species are of great faunistical importance:

Ceraclea nigronervosa - a new species of the Hungarian fauna, it was recorded for the first time in 1992 in the Szigetköz; *Rhyacophila dorsalis; Agapetus laniger; Oxyethira flavicornis; Hydroptila forcipata; Polycentropus irroratus; Cyrnus trimaculatus; Lype phaeopa;*

Brachycentrus subnubilus - the populations of these species were established only in the Szigetköz; *Limnephilus elegans* - rare throughout the whole of Europe, and its occurrence in the Szigetköz is important both from faunistical and ecological points of view; *Halesus radiatus; Lepidostoma hirtum; Athripsodes albifrons.*

The high species diversity of Trichoptera in the Szigetköz is maintained by the relatively clear water of the Danube and its side branch system, as well as the current conditions, chemical characteristics and quality of the sediment.

(h) Lepidoptera

1124 species of Lepidoptera were identified (663 macrolepidoptera and 461 microlepidoptera). On the basis of the available knowledge, the expected number of species is probably around 1300, which is approximately 30% of Hungarian Lepidoptera.

The distribution of species within the main taxonomical units of lepidopterans, especially the ration of species richness of Noctuidae and Geometridae, is similar to that of the lower montane forests. Namely, there is no significant difference from the ratio found in the whole Hungarian fauna (5:3).

Although the Lepidoptera of the Szigetköz is similar to the fauna of other Central-European river basins, the relatively higher diversity and greater number of species are directly influenced by the presence of scattered patches of *Alnus* stands, (otherwise typical of Atlantic or lower montane areas), as well as by the mosaicity and humidity of habitats.

The Lepidoptera species composition of riparian forests in Central and Southwest Europe are not exclusively determined by exact geographical location, and are generally fairly poor in species. The difference in species assemblages is not predominantly affected by the diversity of the tree canopy layer, but by the richness of the herb layer. Intense forest management or flooding can almost completely destroy the herb layer and hence facilitate the invasion of certain weed species (*Impatiens, Solidago* spp.), which eventually become dominant in the affected associations. This process leads to a decrease in diversity, as the invading weed associations are usually uniform.

Although these tendencies generally hold true in the Szigetköz, the area is nevertheless unique because of certain characteristic features:- its sub-Atlantic climate, and the effects of the nearby Alps. Several Lepidoptera species that live here are usually absent from, or rare in, other riparian forests. These faunal elements are characteristic species of closed montane mixed forest stands, Atlantic-plain or lower-montane alder

associations, or fens and moist stream basins. In the Szigetköz they may be found in the remnant forests of higher elevation, or in the small uncultivated forest mosaics of the floodplain. Consequently, their populations are often fragmented and isolated.

The dry, sandy patches of grassland covering the higher localities of the Szigetköz are important landscape elements, since they conserve several characteristic species of the steppe forest vegetation, although these patches are becoming increasingly disturbed.

(i) Oribatida

176 species of Oribatids were collected in the Szigetköz, which is an exceptionally high number compared to other nature reserves and national parks of Hungary. For example, 109 species of Oribatids have been found in the Hortobágy National Park, 195 in the Kiskunság National Park, 103 in the Barcs Nature Reserve and 164 in the Bátorliget Nature Reserves.

The composition of Oribatids can be characterised by chronological categorisation and ecological grouping. The size of these groups is also important.

1. Wide-spread species (48%):

   cosmopolitan (10 species), holarctic (40 species) and palearctic (34 species) for a total of 84 species (48%)

2. Species groups with smaller areas:

   European (24 species), Central-European (18 species), West-North-European (6 species), South-Western Central European (24 species), Mediterranean (12 species) and Hungarian Endemic (5 species)

3. Unidentifiable species: 3

Total of 92 species (52%)

According to previous surveys, wide-spread Oribatid species are dominant elsewhere in Hungary, even in such particular places as the Bátorliget Nature Reserves (60-40%). In contrast, high numbers of Atlantic, Atlanto-Mediterranean, and even boreo-alpine faunal elements were found in the Szigetköz.

Highly valuable faunal elements of the Szigetköz: we have listed below the most important species of the area (occurring exclusively in the Szigetköz, demanding strict protection, or indicating the uniqueness and sensitivity of the area).

Brachychthonius bimaculatus (Willmann, 1936); *Brachychthonius impressus* (Moritz, 1976); *Brachychochthonius hungaricus* (Balogh, 1943); *Brachychochthonius suecicus* (Forsslund, 1947); *Neobrachychthonius magnus* (Moritz, 1976); *Synchthonius elegans* (Forsslund, 1956); *Atropacarus* sp. n. (new species); *Steganacarus brevipilus* (Berlese, 1923); *Mesoplophora pulchra* (Sellnick, 1928); *Ctenobelba pectinigera* (Berlese, 1908); *Dorycranosus* sp. n. (probably a new species); *Furcoribula furcillata* (Nordenskiöld, 1901); *Machuella* cf. *ventrisetosa* (Hammer, 1966); *Medioppia hygrophila* (Mahunka, 1987); *Multioppia glabra* (Mihelcic, 1955); *Oxyoppioides decipiens* (Paoli, 1908); *Autogneta longilamellata* (Michael, 1885); *Conchogneta dalecarlica* (Forsslund, 1947); *Hydrozetes parisiensis* (Grandjean, 1948); *Suctobelbella carcharodon* (Moritz, 1966); *Suctobelbella messneri* (Moritz, 1971); *Suctobelbella palustris* (Forsslund, 1953); *Oribatula pannonica* (Willmann, 1949); *Zetomimus furcatus* (Pearce & Wharburton, 1906); *Punctoribates hexagonus* (Berlese, 1908); *Eupelops curtipilus* Berlese (1916).

One of the most important results of our research is that some special Oribatids (*Suctobelbella messneri, S. charcarodon*), living in the floodplain or the moss layer covering fallen or rotten stumps or under their bark, can tolerate the repeating water cover. From the samples collected in certain localities (Kisbodak, Dunasziget) new species of the Hungarian fauna, or extremely rare species were collected. These habitats are undoubtedly of great importance in maintaining the Oribatid diversity of the Szigetköz. It is highly probable that these species will be the first to disappear from the floodplain in the course of the desiccation process.

From a soil-zoological point of view, one of the most interesting and valuable areas of the Szigetköz, indeed of all Hungarian habitats is the Derék Forest. The Central-European forest fauna here are enriched with Atlanto-Mediterranean and boreo-alpine species. The highest species diversity of Oribatids in Hungary has been recorded here, in a relatively small area.

(j) Fishes (Pisces)

Since a separate detailed study of the fish fauna and their natural value has been prepared, we will not discuss this topic here.

(k) Amphibia

Eleven species of amphibians were recorded in the Szigetköz (*Triturus vulgaris, Triturus cristatus, Bombina bombina, Pelobates fuscus, Bufo*

bufo, Bufo viridis, Hyla arborea, Rana arvalis wolterstorffi, Rana lessonae, Rana ridibunda, Rana esculenta).

The amphibians occurring in the Szigetköz can be divided into two major groups. The first group consists of species living permanently in the water, while members of the second require water only temporarily. The amphibian populations of the floodplain are directly controlled through their reproductive biology by the quantity and temporal distribution of water. The repeated lack of a high or medium water levels in spring will severely endanger Amphibian populations in the long term. Present hybridisation conditions and changes in water regime facilitate the spread of *Rana esculenta*. Similarly, the size of *Rana lessonae* habitats will obviously shrink.

(l) Birds (Aves)

206 species of birds were recorded in the Szigetköz, that is 57% of the Hungarian ornithofauna. 166 species are protected, of which 134 nest here. The high number of species is maintained by the mosaicity and habitat diversity of the Szigetköz, while the density of the species is increased by the dense shrub layer and the edge effect.

The species-composition of the Szigetköz is similar to that of lower montane forests, but with a higher density (150-200%). The presence and co-occurrence of diverse habitat types allows the breeding of several strictly protected species (*Ciconia ciconia, Haliaetus albicila*).

Montane faunal influence is indicated by the nesting of *Parus montanus*. The strong breeding populations of *Prunella modularis* and *Hyppolais icterina* are also worth mentioning. With regard to species richness and diversity, the Szigetköz is the most valuable floodplain in Hungary.

This area is of vital importance as an overwintering ground for wildfowl. In fact, this area is one of the largest overwintering areas in Europe. Some 10-14 thousand individuals of various duck species have overwintered here in previous years. Maximum numbers were recorded in January. The main channel and the side branches provide feeding sites of different qualities and flow speeds. High numbers of the European-wide white-tailed eagle (*Haliateus albicilla*) winter here regularly. Either because of their exceptionally high abundance (e.g., mallards *Anas platyrhynchos*) or because of their international conservation value as a threatened species, the following bird species should be mentioned (the estimated number of overwintering individuals is shown in parentheses):

Mallard - *Anas platyrhynchos*: (6000-7000)

Goldeneye - *Bucephala clangula*:	(ca. 3000)
Pochard - *Aythya ferina*:	(ca. 1000)
Tufted Duck - *Aythya fuligula*:	(500-1000)
Goosander - *Mergus merganser*:	(200-250)
Smew - *Mergus albellus*:	(ca. 400)
White-tailed Eagle - *Haliaetus albicilla*:	(ca. 15)
Kingfisher - *Alcedo athis:*	(500-1000)

The inclusion of the Szigetköz into the Ramsar Convention, as an important overwintering area for aquatic birds, is in progress. Similarly, the acceptance of this area into the IBA (Important Bird Areas) Project is on its way. Owing to the drop in water level, the food supply of waterfowl will probably decrease, and wintering grounds will shrink or might even disappear. This rich variety of wintering bird fauna is seriously threatened.

(m) Mammals (Mammalia)

The ice-age relict *Microtus oeconomus* is a very valuable species. It is found in almost every larger reed bed of the Szigetköz, and at certain places it is a dominant species. As the areas outside the dykes dry up, this species will probably disappear entirely.

SECTION II. THE EFFECTS OF VERSION C ON THE BIOTA OF THE SZIGETKÖZ

The effects of the diversion of the Danube can be demonstrated by discussing the already detectable (a), and the predictable long-term effects and damages (b).

(a) Damages Already Detectable

The immediate impact mainly affected aquatic organisms, in some cases disastrously. It is also clear that the effect on terrestrial fauna will be perceptible during the next vegetation period, since most of the invertebrates were already preparing for wintering, and, their activity was lower at the time of the diversion (October).

(b) Predictable Long-Term Effects: Damages and Changes

The natural values of the Szigetköz are maintained by the Danube River. As a consequence of the geographical and climatic characteristics of the Szigetköz, it is the westernmost fragment of the zonal forest-steppe vegetation in the Carpathian Basin. If water supplementation is not carried out, the following changes in the fauna are likely to occur.

As a consequence of the diversion, the Upper- and Lower-Szigetköz will change in character. The boundary between the two areas will probably run at around the Bagamér side-branch system, where there are already signs of impounding.

In the Upper-Szigetköz, the radical change of the water discharge will transform plant associations, and will also seriously affect the fauna. If the surface- and ground-water level are stabilised at the present level, the most valuable and characteristic botanical and zoological feature of the Szigetköz will be lost: that is, the mosaicity of the landscape, and the presence of a high diversity and a wide range of habitats in a relatively small area.

The diversity of aquatic habitats in the floodplain, and outside the dykes will either vanish, or shrink to a critical point. Therefore, the aquatic flora and fauna, and several affected terrestrial organisms may become extinct or emigrate to other locations. The size of the populations will considerably decrease. In the long-term, biological diversity will decrease, although species diversity (in weeds) might even increase initially. We list some examples hereunder.

During the summer of 1993 rapid weed invasion with high productivity occurred in the desiccated side branch system. Great quantities and high species diversities of weed associations were recorded. The following species were found:

Chenopodium rubrum, Polygonum mite, Artemisia annua, Sonchus asper, Plantago lanceolata, Urtica dioica, Rorippa sylvestris, R. islandica, R. amphibia, Chenopodium striatum, Aster tradescenti, Bidens tripartitus, Gnaphalium uliginosum, Polygonum persicaria, Lythrum salicaria, Potentilla supina, Polygonum lapathifolium, Juncus bufonius, Rumex conglomeratus, R. sanguineus, Matricaria inodora, Bromus tectorum, Senecio vulgaris, Solidago gigantea.

After two or three similar years, the original aquatic, marshland and fen vegetation will be severely damaged. The floodplain forests cannot even endure that long and will probably be destroyed more quickly.

The desiccated gravel beds and shore lines of the Öreg Danube have become xerotherm habitats (like a desert), where great numbers of xerophilous beetle species have recently been found (*Amara fulva, Amara similata, Anthicus schmidtii, Colotes hampei, Coccinella undecimpunctata*), for the first time in the shore habitats of the Szigetköz.

In the stagnant waterbodies of the side branches, zooplankton stocks of a very high density emerged (for example, in the Sziget-Danube 6073-

28368 individuals pro 20 litres). This amount of rotatorians and planktonic crustaceans is usually found in polytrophic waterbodies.

The flora and fauna preserving capacity of terrestrial mosaic patches is strongly correlated with their size and shape. As a consequence of the decrease in the ground water level, and its stabilisation at a significantly lower level, these mosaics will be lost or will struggle on even smaller areas, under significantly worse conditions, especially on the floodplain and localities near the Öreg Danube. The development of hard wood riparian forests should take place. The possibilities of ground water uptake will be both spatially and temporarily the determining factors in the development of the new biota. In this respect, localities close together may vary widely.

Outside the dykes, the spread and dominance of zonal forest steppe vegetation is expected. Their species composition will be greatly affected by the spreading capacity of the species living in the small fragments of present steppe patches. Perhaps the only localities where quick change will not take place are the alluvial forests standing along the Moson Danube. Ecologically planned water-regime regulation of the Moson Danube and the canals outside the dykes might slow down the desiccation process.

The expected degradation will first destroy the herb species -- the most valuable botanical elements are within this group! Moreover, the species richness of phytophagous fauna is basically determined by the heterogeneity of the herb layer.

The mesophilization triggered by desiccation will facilitate the spread of ubiquitous species, at the expense of stenoecious species. This process will probably initially increase the number of species, but the duration of the increase cannot be predicted. Thereafter a sharp decline in diversity will occur, as a consequence of the disappearance of the biota of the wet habitats.

The effects on the biota of the Lower-Szigetköz cannot be easily assessed. It is very probable that the value - at least the nature protection value - of this area will be more respected. This section will be less desiccated, and, therefore, the expected changes will be less pronounced or not take place at all. The Bagamér branch system deserves special attention, since these branches still carry water. There is no information on the hydraulic and hydrological processes going on in these waterbodies, but we suspect that several parameters have changed since the diversion of the Danube. There is no chance that this branch system will substitute for the damaged or vanished branch systems of the Upper-Szigetköz.

In the Szigetköz, an enhancement of the multi-directional migration process is expected. It is impossible to predict on the basis of our biological knowledge which species groups will be able to establish their populations under the conditions to come.

SECTION III: CONDITIONS OF CONSERVATION AND REHABILITATION OF THE EXISTING HABITATS

Under present circumstances or even with a minor water supplementation system, the characteristic habitat mosaicity, sustaining the diversity and natural values of the Szigetköz, cannot be preserved. Under the conditions prior to the diversion, nature protection and landscape reconstruction-rehabilitation were mainly aimed at enlarging the area of mosaic-like patches, and at creating larger zonal habitats.

Our advice concerning the rehabilitation and preservation of habitats is immediate and straight forward: the recreation of the ecological factors sustaining the original natural environment. These factors were controlled originally by the Danube itself. Therefore, the highest possible volume should be fed - without storing in the reservoir - into the Old Danube. But this issue is not really a biological one, but a political and technical problem.

It is, nevertheless, possible to attempt to preserve some aquatic habitats. The price of this effort would be exceptionally high. Since the basic ecological rules predict the opposite, we must bear in mind that in a considerably changed environment the long-term preservation of the biological values of these isolated small areas is almost hopeless.

SECTION IV: THE FAUNA AND FLORA OF THE MIDDLE SECTION OF THE PLANNED RIVER BARRAGE SYSTEM (FROM GYŐR TO THE DANUBE BEND)

The particular part of the barrage system that would have fundamentally affected the ecological conditions of this river section was not constructed. Considering aspects of nature protection, this river section contains the least natural values, and most of the few found here are not located directly along the shoreline of the river. The research carried out in this area is far from complete, limited to small areas and few taxa. Since 1987, botanical monitoring has only been carried out at two localities (Tát - *Molinietalia* community, Almásneszmély - riparian forest) within this river section.

SECTION V: NATURAL VALUES OF THE DANUBE BEND

The landscape could itself be the target of nature protection, and valuable landscapes should be considered in their entirety when making

conservation efforts. The beautiful Danube Bend is an exceptionally valuable region in both the geomorphological and aesthetic sense. A geological process lasting several millions of years was needed for the Danube to cut through the volcanic hills to form a deep and picturesque gorge. The outcome of this long and natural process is one of the most beautiful landscapes of Europe. Recent years of human interference have caused the most drastic landscape damage here, in the construction of the turbine pit for the planned power point at Nagymaros.

The World Conservation Strategy defines wetland and aquatic habitats and temperate deciduous forests as ecosystems demanding the strictest protection. The latter ecosystems are found today in the Pannonian and Kamchatkan biogeographical region. The Pannonian region is part of Hungary and of former Yugoslavia. The protection of aquatic habitats and wetlands - in Hungary several small regions belong to these categories - is of paramount importance in Europe.

It is impossible to predict the indirect effects of the filling up of the planned reservoir at Nagymaros on biota not directly located on the shoreline. Nevertheless, we are certain that such an interference in a river valley bordered with steep mountain sides will considerably affect the micro- and meso-climate and, hence, damage the vulnerable and sensitive members of the biota, especially those suffering from the effects of previous anthropogenic environmental damage. The most vulnerable vegetation components are the *Quercetum-petraeae cerris* associations located on the slopes facing the Danube; *Chrysanthemo (corymbosi)-Luzulo -Quercetum* communities of the steep localities; and the *Corno-Quercetum poetosum pannonicae* and *Ceraso (mahaleb)-Quercetum pubescentis* plant associations. The *Festucion rupicolae* vegetation of the south part of the Börzsöny mountains might also be endangered. Also endangered is the small, though valuable in species composition and fragments of loess steppe vegetation.

The original plant associations along the rivers in the Danube and Ipoly basin - i.e., natural soft and hard wood riparian forests - were already severely damaged by the regulation of the Ipoly river, and the advanced work on the barrage system at Nagymaros. Only the willow and poplar associations survived. The remnant patches of alluvial hard wood riparian forest (oak, ash and elm trees) are still thriving on the small islands, peninsulas, and protected sections of the shore, but even these stands would be directly endangered by damming below or above the barrage. Among the relatively more abundant wet habitats, soft wood riparian forests (poplar and willow), *Salicetum triandrae-purpureae*, *Molinietalia*, *Arrhenatheretalia*, and *Nanocyperion* associations would be endangered and perhaps destroyed.

The long-term effects endanger the *Agropyro-Kochietum* and grass associations on the high banks of the Danube between Vác and Göd, and the *Molinion* communities at Göd and Sződliget. Moreover, the fate of extremely valuable grass (*Festucion vaginatae*) associations, which are essentially similar to those found in the Great Hungarian Plain, the sand-covered patches and sand dunes near the shore of the Szentendré Island is uncertain. The future of the specific habitats located north of the planned dam is also doubtful. At present, this area is characterised by a high degree of mosaicity, wetland associations (*Phalaroidetum, Agrosteum albae, Magnocaricion, Phragmitetum,* in the dead arms *Hydrocharition, Salicetum albae-fragilis, Salicetum cinereae, Carici elongatae-Alnetum, Nymphaetum albo-luteae*) and dry habitat patches (*Festucion vaginatae)* that may be present near each other. This shore line zonation is determined by the ground water table, and the planned reservoir will change the prevailing ground water conditions. The *Fraxino pannonicae-Alnetum* and *Carici elongatae-Alnetum* habitat patches along the Ipoly river, which are located farther away from the Nagymaros work site, are of outstanding value and demand strict protection. As a consequence of the last regulation of the Ipoly river, these habitats were severely damaged and are presently in a critical state. Any further disturbance might entirely wipe out the biota of these wetlands.

It is very likely that the micro- and meso-climatic changes arising from the planned construction of the Nagymaros reservoir will transform these plant associations and consequently affect the fauna living there. Before these slow-acting changes, the direct impact of the construction and damming will heavily damage the biota. The fauna of the wet habitats (marshlands, fens, shoreline) are especially endangered by direct effects, while the animal communities of the dry-warm sand, loess-wall, and slope-steppe localities will be mainly affected by indirect effects. Consequently, the future of the irreplaceable fauna elements of this region is doubtful.

The populations of protected (or strictly protected) animals inhabiting the area - some of which are included in the Red Data Book - were already severely affected by the construction of the round-dam at Nagymaros, because their habitats disappeared, or were constantly disturbed by human beings. The habitat of the biggest aquatic mammal, living in Hungary, the otter (*Lutra lutra)*, was almost completely destroyed around Nagymaros. Some otters migrated upstream into the Ipoly river and might still be found in the mountains, but the former population focus was clearly located on the Danube.

With regard to birds, the aquatic birds and waders should be mentioned, of which most rest on the Danube during migration, or overwinter there. Both near the waterbodies and some distance away several bird species build nests: Mallard (*Anas platyrhynchos*), Little Grebe (*Tachybaptes ruficollis*) and Moorhen (*Gallinula chloropus*). The endangered and rare Black Stork (*Ciconia nigra*) nests in the riparian forests of the floodplain. The Little Ringed Plover (*Charadrius dubius*) nests along the Danube. During migration, many birds rest or find shelter here during the winter, including the Great White Egret (*Casmerodius* albus), the Spoonbill (*Platalea leucorodia*), eleven species of ducks, the Lesser White-fronted Goose (*Anser erythropus*), the White-fronted Goose (*Anser albifrons*), the Red-throated Diver (*Gavia stellata*) and the Black-throated Diver (*Gavia arctica*). The larger water surface created by the damming will enhance the virtual spread of the aquatic fauna (the spread of the non-sensitive aquatic species such as swans (*Cygnus* spp.) might be expected), but the valuable sensitive species may disappear because they require not only a substantial food supply, but a peaceful habitat. The construction of the river barrage and the power station - and the concomitant disturbance - would probably scare away the following species of winter guests : Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*), Spotted eagle (*Aquila clanga*), White-tailed Eagle (*Haliaetus albicilla*) and Osprey (*Pandion haliaetus*), as well as several strictly protected species that nest on the steep cliffs facing the Danube: Raven (*Corvus corax*) and Saker (*Falco cherrug*), since these species are extremely sensitive to disturbance. The construction of the reservoir would surely cause their disappearance.

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APPENDIX 2

ICHTHYOLOGICAL ASPECTS OF THE GABCIKOVO-NAGYMAROS PROJECT

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SECTION I: INTRODUCTION

The water bodies of the Szigetköz have special significance when analyzing the ichthyological effects caused by the Gabcikovo Barrage, since these water bodies have shown the most dramatic changes so far and are expected to suffer from the greatest long-term effects. For this reason, the ichthyological analysis of the area must be discussed with reference to changes in the water.

The examined changes are presented in three chronological periods. The first "initial" period pertains to the conditions prior to the diversion of the Danube in October 1992. Although construction work in the area during this initial period, such as the work on the Dunakiliti reservoir, already had had certain effects on fish-fauna, such effects were much less important than the changes following the diversion. The diversion resulted mainly in diminishing the size of the floodplain habitats, along with it the total stock of fish. The second period describes changes that occurred following the diversion (between October 1992 and the conclusion of this study in October 1993). The discussion of the third period, i.e., following the conclusion of this study, gives predictable short-and long-term changes, for all individual water types based on the prior data and observations.

SECTION II: SITUATION BEFORE DIVERTING THE DANUBE

(Ichthyological values of the influenced area)

The ichthyofauna of the Szigetköz is highly valuable because of the presence of unusual species, as well as because of its special species composition and combinations. According to investigations undertaken before the diversion, the six main water types of the Szigetköz sustained 65 fish species. This species diversity is outstanding for both Hungary and Europe, as a whole. The number of species in the small floodplain and main stream system is unique among similar European water bodies (i.e., those with only fresh-water fauna). In addition, 80% of native Hungarian fish species can be found in the Szigetköz. These two characteristics should be sufficient for demanding international protection to the area as one of the most important ichthyofaunistic "paradises" in Europe.

Ratio of endangered species on the European level:	22% (n=14)
Ratio of rare species on the European level:	22% (n=14)
Ratio of vulnerable species on the European level:	43% (n=22)

The major reason for the richness and diversity of species (high species diversity) is the "cramming" (mosaic-like occurrence) of numerous habitats in a comparatively small area.

The water bodies of the Szigetköz can be classified into six main ecological categories:

- main stream,
- inundated branch system of the floodplain,
- wetlands and disconnected backwaters,
- irrigation and water-supply canals of the flood free area,
- gravel-pit ponds,
- Moson-Danube

A complete species list and the frequency of species in the water types of the Szigetköz as well as the international qualification of the species are summarised in the tables of the Appendix.

(1) MAIN STREAM

The main stream of the Szigetköz belongs to the submontane of the Danube river and its character species developed accordingly. The slope gradient (40 cm/km) and the velocity (2.5 m/s) of the Szigetköz main stream are unique in Hungary and provide a habitat for several rare rheophilous species, such as *Pararutilus frissi meidingeri, Gobio kessleri, Zingel streber, and Gymnocephalus schraetzer.*

The population of *Hucho hucho* in the Szigetköz is an outstanding ichthyofaunistical value because this species lives in Hungary. Elsewhere, its population must be maintained by artificial breeding and fry reintroduction. Formerly, this species could be found in other areas of the Danube.

For the 25 years preceding the diversion, populations of *Cottus gobio* were abundant in the main stream of the Szigetköz, but were not reported elsewhere in Hungary.

The character species, *Barbus barbus and Chondrostoma nasus* with prealpine elements, including *Cottus gobio, Huco hucho* and *Salmo trutta m. fario,* occur in considerable numbers. Several rare fauna elements may also be found in the Szigetköz, including migratory Ponto-Caspian species, which seldom occur in Hungary, as well as voucher specimens found exclusively in Szigetköz: including *Caspialosa kessleri pontica, Coregonus albula* and *Coregonus lavaretus.* The other species of the community are also primarily Ponto-Caspian.

The unique quality, slope gradient and velocity of the main stream makes it readily understandable, why on this 60 km long tract such a great number of fish species (n=57) were found before the diversion of the Danube.

(2) FLOODPLAIN

River regulation, flood control, navigation, and agricultural and sylvicultural utilisation of the land drastically reduced the territories of alluvial floodplains all over Europe. In Hungary, however, floodplains of considerable size remained intact in the area of the Szigetköz and Gemenc, which together with their fish fauna represented natural values of European-wide significance.

A characteristic feature of floodplain branch systems is high habitat diversity. Side-arms of the river provide spawning sites for both native fish species and migratory species arriving from great distances, such as *Vimba vimba*. The high habitat diversity accounts for the high species diversity (n=52).

Notable fish species in the floodplain include:

- *Cyprinus carpio m. hungaricus*
- *Cobitis aurata*
- *Pelecus cultratus*
- *Gymnocephalus baloni*

A special water type of the flushed floodplain branches are permanent inner lakes. These inner lakes have fauna similar to the backwaters of a flood-free area. Due to seasonal water level fluctuations these lakes temporarily connect with the side-arms and provide reproduction, fry development areas, as well as feeding sites for floodplain species in addition to the basic fauna. The most important inner lake is Öntés Lake lying in the Ásvány branch system.

(3) WETLANDS AND DISCONNECTED BACKWATERS

The backwaters of the flood free area became isolated from the floodplain during former water regulations. These backwaters included marshes, moors and isolated water bodies. The specific physico-chemical parameters of the water are tolerated only by a few species. Due to the disappearance of similar water types elsewhere in Europe, most of these species have become endangered. For example, a highly valuable species in these habitats is *Umbra krameri*, indigenous in the Carpathian Basin and recorded in the Hungarian Red Data Book. Its most significant population in the world is found in the Szigetköz. Other species in these habitats include *Misgurnus fossilis, Carassius carassius*

(the dominant species), Proterorhinus marmoratus and *Tinca tinca. Leucaspius delineatus* is a rare, protected fauna element that is abundant in some parts of Zátony-Danube. In the backwaters of the flood-free area 23, species were recorded during sample collections before the diversion.

(4) IRRIGATION AND WATER-SUPPLY CANALS OF THE FLOOD FREE AREA

Between 1896 and 1900 a drainage system was constructed in the Szigetköz which, is now part of nearly 300 km long canal system. Although existing river beds are also used in this drainage system, the majority of the canals have regulated straight banks. Ichthyologically interesting areas could only develop at points with diverse habitats (e.g., bridges, trees fallen into the water, meanders and wider parts with thick water vegetation). The outstanding, protected and endangered fish species of the canals include *Gobio albipinnatus* and *Umbra krameri*, the latter being very scarce in this water type. The total number of fish species here is 27.

(5) PONDS OF GRAVEL PITS

Because the subsoil in the Szigetköz is gravel, man had dug out gravel for many years prior to the diversion. The high groundwater levels of the Szigetköz then gave rise to lakes in these abandoned pits, scattered throughout the Szigetköz.

The fish fauna of these ponds is the result of artificial introduction. Only a small portion of these communities, usually cyprinids, originates from natural colonization. Since their fauna does not considerably differ from other ponds managed by angler associations, they will not be discussed in detail.

(6) MOSON-DANUBE

The Moson-Danube also had a flushed character, similar to other Danube branches, with both strong currents and stagnant water bodies. Migratory fish species move according to water fluctuations. The ichthyofauna of the Moson-Danube can be divided into upper, intermediate and lower stretches. At the upper reach of the Moson-Danube, which receives water solely through a dyke of the main stream, the largest *Gasterosteus aculeatus* population in Hungary can be found. Two rare cyprinids, *Pararutilus frisii meidingeri* and *Rutilus pigus virgo* should also occur at the mouth of the Moson-Danube.

Rivers flowing into the intermediate part (Rába, Rábca and Lajta rivers) have a great impact on the ichthyofauna of the Moson-Danube. Owing to the influence of the Rába river, a large population of *Cobitis aurata may be* found near Győr. This species turned up only on one occasion in

other locations of Szigetköz (in the Ásvány branch system near the Árvai-dam in 1991). Near the delta of the Rába and Lajta rivers, two rare zingel species (*Zingel zingel, Z. streber*) were recorded.

The hydrodynamic conditions and the fauna composition of the lower reach of the Moson-Danube also have certain connections to the above mentioned rivers, but here the influence of the Main-Danube is considerable; For example, A*cipenser ruthenus*, which is characteristic of the lower tracts of the main stream may be found in the lower reach.

Although the habitat diversity of the Moson-Danube is lower than that of the main stream-floodplain system, the number of species is similar (n=54) because of the external effects mentioned above.

Comparative ichthyofaunistic analysis of the Szigetköz water types (Vida 1993)

(Species categories - see Lelek 1987)

Sub-montane zones, all water types		
	Szigetköz	Rába
Total n^{o} of fish species	65	53
Protected in Hungary	20(31%)	13(25%)
Threatened species	47(82%)	36(68%)
Endangered species	14(22%)	7(13%)
Bern Convention App.II	1	-
Bern Convention App.III	30(46%)	22(42%)
Corine Biotopes Manual	21(32%)	15(28%)

SECTION III: CHANGES RESULTING FROM THE DIVERSION OF THE DANUBE

(From October 1992 to October 1993)

(1) MAIN STREAM

Following diversion, the main stream became divided into three distinct sections, based on the hydrodynamic conditions and fish fauna types: the upper reach (from Rajka to the end of the Ásvány branch system), the intermediate reach (from the end of the Ásvány branch system to the

inflow of the artificial canal) and the lower reach (from the inflow of the artificial canal to the mouth of the Moson-Danube).

The continued interconnection of the various water types could have guaranteed the conservation of the ichthyofaunistic values found in the upper part. However, the diversion almost entirely disconnected the main stream from the floodplain whose diversity is important for the survival of many main-stream species. Thus on the upper reach of the main stream, daily and seasonal migration between the two areas became impossible. This fact will lead to a population decline and probable decrease in species diversity in the long term in this section of the main stream. The majority of main-stream fish species spawned and developed as fry in the branches, with the exception of the following rheophilous and stenoecious species that spawned in the main channel: *Zingel zingel*, *Z. streber*, *Gymnocephalus sreatzer*, *Hucho hucho*, *Salmo trutta m. fario*, *S. gairdneri*, *Gobio kessleri* and *Cottus gobio*. Streamflow and channel depth decreased considerably in the upper reach resulting in a reduced carrying capacity. The narrowed main stream lost most of its contacts with the tidal zone, the littoral part of which was indispensable for many species.

Cottus gobio living in the littoral zones is a characteristic alpine prealpine element in the fish fauna of the main stream. Although the international significance of this population is small since it is widespread at the Salmonoid levels of Europe, over the last 25 years, its only recorded occurrence in Hungary was in the Szigetköz. Today, a serious population loss is taking place in the upper Szigetköz tract of the main stream, where its habitats have significantly lessened.

Specimens of *Cottus gobio* were not found at all in the middle reach of the main stream. The inflow from the diversion canal created a submerged section in the middle reach. Consequently, the middle reach entirely lost its submontane character, as well as significant populations of characteristic submontane species (the majority of the fish migrated out of the territory). The main stream near the Bagaméri branches also became a problem area for fish species. During sampling after the diversion, the following common main-stream species could not be found (n=14):

- *Abramis ballerus*
- *Gobio albipinnatus*
- *G. kessleri*
- *Leuciscus leuciscus*
- *Pelecus cultratus*

- *Rutilus pigus virgo*
- *Vimba vimba*
- *Cobitis taenia*
- *Lota lota*
- *Cottus gobio*
- *Gymnocephalus baloni*
- *G. schraetzer*
- *Zingel zingel*
- *Z. streber*

Less common species were not found in samples from this tract either, but their absence perhaps could be due to sampling errors. However, the species listed above should have been found during any of the three sampling periods if their frequency had remained unchanged. Thus, not only the total stock of fish, but the number of species also decreased. These decreases were likely caused by the disappearance of the main stream's submontane character and the subsequent migration of rheophilous species fauna. Compared to other main stream tracts, changes in the fish fauna are the most relevant in the middle stretch. At this moment, the impact of the Gabcikovo barrage on the migratory species cannot be predicted. Nevertheless, the temporary water supply of the branches on the Hungarian side upstream of this area is connected to the main stream and thus the lack of water in the main stream may hinder the reproductional migration of main stream species.

At the tract downstream of the power canal, considerable impact was observed over a one year period. Potential ichthyofaunistic changes caused by the inflow of stored water cannot be predicted at present.

Thus, the upper and submerged tracts underwent negative changes compared to the initial stage before diversion. The reaches downstream of the returning diversion canal did not show considerable ichthyofaunistic changes over a one year period.

(2) FLOODPLAIN

As a result of the diversion, the branches lost most of their water. Consequently, the branches now lack even the most elementary conditions for typical side-arm fish fauna, including *Esox lucius*, *Cyprinus carpio*, *Scardinius erythrophthalmus* and *Tinca tinca*. Body conditions necessary for hibernation became critical for several species, as their intensive feeding became impossible at the time of the diversion in October. In the main stream, they could not find enough food. Many

fish perished or disappeared, (estimated at 3 to 5 times the annual fish catch or) 150-450,000 kg, accounting for several millions of individuals.

Species that had already started hibernation, got stuck in a few remaining water bodies and eventually died due to the continued habitat loss. Although the inundation of late November filled up the branches with water, it was not sufficient to change the situation. Some of the individual fish resettled in the side-arms, but when the flood was over, their habitats again disappeared. The water level in the water bodies of the floodplain decreased to the groundwater level and then followed its fall. During the first months after the diversion the majority of the isolated residual water bodies froze to the bottom several times. Thus, the hibernating fish could not survive the winter. In several tracts of the Ásvány branches thousands of fish were found frozen in the fragmented ice cover. As the conditions for fish hibernating under the ice in deeper areas was not sufficient, the future of the survivors is uncertain.

The diversion also separated the upper and the lower sections of the Szigetköz floodplain. Water levels in the upper branches were critically low before water supplementation had started. The former large and continuous water surfaces were divided into several small water bodies, which hindered migration, and the feeding grounds and spawning sites also became inaccessible. The populations of the rheophilous species decreased to a greater extent than the others. On the basis of collected samples, it can be assumed that the number of predators older than three years was reduced to one-tenth of their level in previous years. The quantity of the two-year old fry decreased by 20-30%.

Because of the absence of an icy flood in late winter and the green (late-spring) flood, exceptionally few main stream species reached side-arm spawning sites.

Due to temporary water supplementation, several migrating, rheophilous species reappeared in the affected parts of the floodplain. The majority of these fishes presumably returned from the main stream to the branches through the connected side arms and reappeared throughout the upper floodplain.

Such recorded species are:

- *Barbus barbus*
- *Chondrostoma nasus*
- *Vimba vimba*
- *Leuciscus leuciscus.*

Nevertheless, the number of non-migrating, rheophilous species diminished in comparison to the initial stage. For example, *Gymnocephalus baloni* used to be abundant in the floodplain. There was an average of 40 specimens on a 50 m long riprapped littoral area of high velocity in 1989, as opposed to only 1 individual on every 100-120 metres in 1993.

The Bagaméri side-arm system is a less endangered floodplain area. In springtime, the reproduction of several cyprinids (e.g., *Abramis brama*, *Chondrostoma nasus* and *Vimba vimba*) was observed. Changes in water conditions are less striking here. Owing to the main channel, migrating rheophilous species may be found in the lower section of this water body and the ratio of non-migrating rheophilous species is similar to the initial stage. Although submerging also affects this area, ichthyofaunistic changes have not yet be observed.

(3) DISCONNECTED BACKWATERS

The water disappeared from practically everywhere in the backwaters of the flood free area. The remaining short tracts were so shallow that birds and other piscivores have considerably thinned the fish populations.

After the water supplementation of the Zátony-Danube *Umbra krameri* could not be found among the characteristic species (see Chapter II). The disappearance of this population is a serious loss in the genetic value of the species. In Austria, where not even a single specimen has been captured for fifty years, it has become a symbol of nature conservation. In the Lipót Holt-Danube, its estimated density was 3-10 individuals per square metre in 1992.

In addition, the water supplementation of the Zátony-Danube caused the backwaters with stagnant water and marshes to become, in many parts, "canals" with a current velocity of 40-80 cm/s. Gravity water intake from the Moson-Danube caused its fish fauna to appear in the Zátony-Danube. Consequently, the number of fish species increased, but only *Misgurnus fossilis* remained dominant from the members of the "initial" fish fauna. This seemingly positive effect was likely caused by the colonisation of the euroecious, competitor species that supersede the original fauna. *Lepomis gibbosus* appeared in large numbers, a fish-egg consuming, aggressive territorial species that had already suppressed the indigenous elements in several water bodies.

Among the rare, protected elements of the original fauna, the population of *Leucaspius delineatus* in the Zátony-Danube critically decreased. In the last few months it could be found solely at the edge of a dyke (an area with stagnant water) though formerly, it was abundant in several parts of the Zátony-Danube. Instead, *Alburnus alburnus* became

abundant, a species with broader ecological tolerance, a typical pioneer of newly formed gravel ponds.

The Lipót Holt-Danube, which had had prominent ichthyiofaunistic values, dried out completely after the diversion. All its fish fauna perished. Water supplementation withdrawn from the main stream could not save the original fish fauna. The physical, chemical and biological parameters of the water did not enable the resettlement (natural or artificial) of this fauna of European value. During sampling two pioneer species (*Carassius auratus*, *Alburnus alburnus*) and a one-year old specimen of *Cyprinus carpio* were collected, the latter presumably of local introduction. Species of the original fish fauna did not occur at all.

(4) IRRIGATION CANALS OF THE FLOOD FREE AREA

Diversion brought about a significant drop in the water level of the canals, their flow was reduced or became stagnant. Consequently, the status of rheophilous species became critical. As the effects of the diversion are delayed through exclusive contacts with ground water, the ultimate results became evident only a few months later. The previously dominant species in these canals, suffered a significant population decrease:

- *Gobio gobio*
- *Gobio albipinnatus*
- *Leuciscus leuciscus*
- *Cobitis taenia*
- *Noemacheilus barbatulus*

The increasing dominance of *Lepomis gibbosus* and *Rhodeus sericeus amarus* over more valuable fauna elements is striking.

(5) MOSON-DANUBE

From among the water bodies of the Szigetköz, only the Moson-Danube has not greatly suffered, since the inflowing rivers from the Hungarian side (Lajta, Rábca and, Rába rivers) have alleviated the effects of the diversion. The evaluation of data collected last year does not show any significant changes.

CONCLUSION

The majority of endangered species cannot be reproduced, because their artificial breeding is not ensured. Sufficient information enabling large-scale breeding is available only for economically important fish species. Our knowledge regarding the natural history, reproduction and behaviour of these rare endangered species is scanty.

SECTION IV: LONG TERM EFFECTS OF THE DIVERSION

(Tendencies, prospects, problems)

(1) MAIN STREAM

The river regime of the main section of the Danube is of alpine character. In the event that the "alpine rhythm" seasonal water level fluctuation is not sustained in the floodplain main stream system, the spawning, fry development and hibernation of main stream fish species becomes questionable, because they are based on cyclical hydrologic conditions. The hibernation, spawning, feeding and fry development sites do not overlap, and isolated, mosaic-like water bodies are not convenient for these species. Migratory species living in other tracts of the Danube formerly spawned in the side branches of the Szigetköz. Thus a decrease in spawning sites will affect the fish fauna of the Danube downstream from the Szigetköz area.

An outstanding element of the Szigetköz main stream was the *Hucho hucho* population. The occurrence of this species was aided by the strong current, high concentration of dissolved oxygen, low water temperature and suitable nutrients The simultaneous presence of these factors in the main stream has become quite improbable, and thus, the survival of this species in Szigetköz is very unlikely.

There are several other Prealpine elements in the Szigetköz main channel of the Danube which are sensitive to fluctuations of even one or two degrees in the water temperature. The lower streamflow of the upper reach, the decreased current velocity of the intermediate reach and the re-entering of stored water into the lower section will result in an increased water temperature for all reaches in summer. The future of Prealpine elements is largely dependent on the resulting water temperature.

(2) FLOODPLAIN

Among the water types of the Szigetköz, the floodplain is the most complex system. Therefore, an evaluation of ongoing change is the most difficult. Upper- and Lower-Szigetköz will be divided more characteristically. Their border will presumably be the point where the submerging effect of the Danube will spread (at the Bagamér side-arm system).

Temporary water supplementation can at best alleviate the detrimental effects of the diversion. However, the isolation of the main stream-floodplain system has decreased habitat diversity. The regular flushing of the floodplain was primarily responsible for the great variety of habitats and the stabilisation of the water regime will lead to a loss in habitat diversity. In the event that the fluctuating hydrodynamics of the floodplain change, reproductional and ontogenetic cycles adapted to

alpine hydrodynamic conditions may severely suffer. These potential changes will lead to a decrease in species diversity in the long term.

(3) DISCONNECTED BACKWATERS

The fish fauna of these areas was most probably completely destroyed after the diversion. With the exception of the Lipót Holt-Danube, temporary water supplementation comes from the Moson-Danube, and the immigrating and recolonizing species will originate from that area. The stabilisation of the elements in the new community depends on the water supplementation levels of the new habitats. At present water velocities, the resettlement of the original community cannot be expected. Rather, the dominance of euroecious species is likely to result and will result in the natural devaluation of the area. Before the establishment of a stabilised, stationary community, however, the overdominance of certain species can be expected, as was observed in similar, newly colonised systems.

(4) IRRIGATION CANALS OF THE FLOOD FREE AREA

At present, it is difficult to predict the future development of fish fauna in the irrigation canals, because temporary water supplementation may considerably modify the situation. A situation similar to the Zátony-Danube would be favourable for the canals.

(5) MOSON-DANUBE

Due to the inflowing rivers mentioned above, little change occurred to the fish fauna of the Moson-Danube. The ability of this area to conserve various species may become significant later with regard to the ichthyofauna of the whole Szigetköz.

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APPENDIX

I Globally threatened fish species in the water types of Szigetköz. (Source: Anton Lelek: Threatened fishes of Europe. 1987, AULA-Verlag)

Table 1
Distribution of Fish in the Szigetköz as compared to neighbouring water bodies, their nature conservation status and representation in our collection

Table 1/1

Species	DISTRIBUTION														C	P	Th	Be rn Co nv.		Cor. B.M.
	S z					H			Sl			A			R	Sz	H		II.	III.	
	1	2	3	4	5	1	2	3	1	2	3	1	2	3							
Petromyzontidae																				
Eudontomyzon mariae (Berg, 1931)	1	?	?	-	1	0-2	+	+	+	+	-	-	-	-	2			V		•	•
Acipenseridae																				
Acipenser ruthenus Linnaeus, 1758	1	1	-	-	1	0-2	+	?	+	+	-	1	-	-	1			E		•	
Clupeidae																				
Caspialosa kessleri pontica (Eichwald, 1838)	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Anguillidae																				
Anguilla anguilla (Linnaeus, 1758)	1	1	-	-	1	0-3	+	+	+	+	-	1	1	1	1			I-V			
Esocidae																				
Esox lucius Linnaeus, 1758	1	2	2	2	2	0-3	+	+	+	+	+	2	2	2	2			I-V			
Umbridae																				
Umbra krameri Walbaum, 1792	-	?	1	2	-	0-2	-	-	+	?	-	-	-	-	-			V-E	•		
Coregonidae																				
Coregonus albula Linnaeus, 1758	•	-	-	-	-	•	•	-	-	-	-	-	-	-	-			E		•	•
Coregonus lavaretus Linnaeus, 1758	•	-	-	-	-	•	•	-	?	+	-	-	-	-	-			E		•	•
Thymallidae																				
Thymallus thymallus (Linnaeus, 1758)	?	-	-	-	-	•	-	-	?	?	-	-	-	-	-			V		•	•
Salmonidae																				
Salmo trutta m. fario Linnaeus, 1758	1	1	-	-	-	0-3	•	+	+	?	-	-	-	-	1			V			
Salmo gairdneri Richardson, 1833	1	-	-	-	-	0-3	•	+	+	+	-	-	-	-	1						
Hucho h. hucho Linnaeus, 1758	1	-	-	-	-	0-1	-	-	+	-	-	1	-	-	-			E		•	•
Cyprinidae																				
Cyprinus carpio Linnaeus, 1758	1	2	1	1	2	0-3	+	+	+	+	+	1	2	2	2			V-E			
Cyprinus carpio m. hungaricus (Heckel, 1843)	1	1	-	-	?	0-1	+	?							1						•
Abramis brama (Linnaeus, 1758)	2	2	-	-	2	0-3	+	+	+	+	+	3	3	3	2						
Abramis ballerus (Linnaeus, 1758)	1	2	-	-	1	0-2	+	+	+	+	+	2	3	3	1			V		•	•
Abramis sapa (Linnaeus, 1758)	1	1	-	-	1	0-2	+	+	+	+	-	1	2	2	1			R-V		•	•
Alburnus alburnus (Linnaeus, 1758)	3	3	1	1	3	0-3	+	+	+	+	+	3	3	3	3			I			
Alburnoides bipunctatus (Bloch, 1782)	1	-	-	-	1	0-3	-	+	+	+	-	-	1	-	3			V-E		•	•
Aspius aspius (Linnaeus, 1758)	2	2	-	-	1	0-2	+	+	+	+	+	2	2	-	2			V-E		•	•
Barbus barbus (Linnaeus, 1758)	3	2	-	-	2	0-3	+	+	+	+	-	3	1	-	3			V			
Blicca bjoerkna (Linnaeus, 1758)	3	3	2	-	3	0-3	+	+	+	+	+	3	3	3	3			I			
Carassius carassius (Linnaeus, 1758)	-	1	1	2	1	0-3	+	+	+	+	+	-	-	1	1			R-V			
Carassius auratus (Linnaeus, 1758)	2	3	1	1	3	0-3	+	+	+	+	?	2	1	1	2			I			
Chalcalburnus chalcoides mento (Agassiz, 1832)	?	-	-	-	1	0-1	•	-	-	-	-	-	-	-	-			V-E		•	•
Chondrostoma nasus (Linnaeus, 1758)	3	2	-	-	2	0-3	+	+	+	+	+	3	3	-	3			I-V		•	
Ctenopharyngodon idella (Valenciennes, 1844)	1	1	1	1	2	0-2	+	-	+	+	+	-	1	1	1						
Gobio albipinnatus Lukasch, 1933	2	2	3	-	2	0-3	+	+	+	+	-	3	1	-	3			R		•	
Gobio gobio (Linnaeus, 1758)	2	2	3	1	2	0-3	+	+	+	+	+	1	-	-	3			I-R			
Gobio kessleri Dybowski, 1862	1	1	-	-	1	0-3	+	+	+	+	-	1	-	-	2			R-V		•	
Hypophthalmichthys molitrix (Valenciennes, 1844)	1	2	-	-	1	0-2	+	+	+	?	-	-	1	-	1						
Hypophthalmichthys nobilis (Richardson, 1845)	1	2	-	-	1	0-2	+	+	+	+	-	-	1	-	1						
Leucaspius delineatus (Heckel, 1843)	-	1	?	2	-	0-3	?	+	+	+	+	-	-	2	1			R-V		•	
Leuciscus cephalus (Linnaeus, 1758)	3	3	3	1	3	0-3	+	+	+	+	+	3	2	1	3						
Leuciscus idus (Linnaeus, 1758)	1	2	1	1	2	0-3	+	+	+	+	+	2	1	-	1			V-E			•

Table 1/2

Species	DISTRIBUTION															C	P	Th	Bern Conv.	Cor. BM.
	Sz					H			Sl			A			R	Sz	H		II.	III.	
	1	2	3	4	5	1	2	3	1	2	3	1	2	3						
Leuciscus leuciscus (Linnaeus, 1758)	2	2	1	-	1	0-3	+	+	+	+	+	2	1	-	2			I-V		
Pelecus cultratus (Linnaeus, 1758)	1	1	-	-	1	0-3	+	*	+	+	+	1	1	-	1			I-R		*	
Phoxinus phoxinus (Linnaeus, 1758)	1	-		-	1	0-3	*	+	+	-	-	-	-	-	1			V			
Pseudorasbora parva (Temminck et Schlegel, 1842)	1	1	1	1	1	1	3	+	+	+	?	-	-	-	2						
Rhodeus sericeus amarus (Bloch, 1782)	2	2	3	1	2	0-3	+	+	+	+	+	-	1	3	2			R-V		*	*
Rutilus rutilus (Linnaeus, 1758)	3	3	3	2	3	1	3	+	+	+	+	2	3	3	2						
Rutilus pigus virgo (Heckel, 1852)	1	1	-	-	1	0-1	+	+	+	+	-	1	-	-	?			R		*	*
Pararutilus frisii meidingeri (Heckel, 1852)	?	-	-	-	1	0-?	-	-	+	-	-	-	-	-	-			R-E		*	*
Scardinius erythrophthalmus (Linnaeus, 1758)	-	1	1	2	2	0-3	+	+	+	+	+	-	1	3	1			V			
Tinca tinca (Linnaeus, 1758)	1	1	1	2	2	0-3	+	+	+	+	+	-	1	2	1			I			
Vimba vimba (Linnaeus, 1758)	2	2	-	-	1	0-3	+	+	+	+	-	1	1	-	1			I-E		*	
Cobitidae																					
Cobitis taenia Linnaeus, 1758	1	2	3	1	2	0-3	+	+	+	+	+	-	1	1	2			R		*	
Cobitis aurata (Filippi, 1865)	?	1	-	-	1	0-2	+	+	+	+	-	-	-	-	2			R-V		*	
Misgurnus fossilis (Linnaeus, 1758)	-	1	2	2	1	0-3	+	+	+	+	+	-	-	-	1			R-V		*	*
Noemacheilus barbatulus (Linnaeus, 1758)	2	2	2	1	2	1	3	+	+	+	-	-	-	-	2			R-V			
Ictaluridae																					
Ictalurus nebulosus (Le Sueur, 1819)	-	1	1	-	2	0-3	+	+	+	+	+	-	-	-	1						
Siluridae																					
Silurus glanis Linnaeus, 1758	1	1	-	-	1	0-2	+	+	+	+	+	1	1	1	2			R-V		*	*
Gadidae																					
Lota lota (Linnaeus, 1758)	2	2	-	-	1	0-2	+	+	+	+	+	1	1	-	2			R-I			*
Gasterosteidae																					
Gasterosteus aculeatus Linnaeus, 1758	-	-	-	?	3	0-1	+	-	?	+	-	1	-	-	-			I-R-V			
Cottidae																					
Cottus gobio Linnaeus, 1758	3	1	-	-	-	0-?	?	-	+	+	-	2	1	-	-			V			
Centrarchidae																					
Lepomis gibbosus (Linnaeus, 1758)	-	1	2	2	2	0-3	+	+	+	+	+	-	-	3	1						
Percidae																					
Perca fluviatilis Linnaeus, 1758	2	3	2	2	3	1	3	+	+	+	+	2	2	3	2						
Gymnocephalus baloni Holcik et Hensel, 1974	2	3	-	-	-	0-2	+	?	+	+	-	1	1	-	-			V		*	
Gymnocephalus cernuus (Linnaeus, 1758)	2	2	-	-	1	0-3	+	+	?	+	+	1	2	2	1			I			
Gymnocephalus schraetzer (Linnaeus, 1758)	2	1	-	-	1	0-2	+	+	+	+	-	1	1	-	2			E		*	*
Stizostedion lucioperca (Linnaeus, 1758)	2	2	-	-	2	0-3	+	+	+	+	+	2	2	2	2			I-V			
Stizostedion volgense (Gmelin, 1788)	1	2	-	-	1	0-3	+	+	+	+	+	1	1	-	1			I-V		*	
Zingel zingel (Linnaeus, 1758)	1	-	-	-	1	0-2	+	+	+	?	-	1	-	-	2			E		*	*
Zingel streber (Linnaeus, 1758)	1	-	-	-	1	0-2	+	+	+	+	-	1	-	-	2			E		*	*
Gobiidae																					
Proterorhinus marmoratus (Pallas, 1811)	2	3	3	2	3	1	3	+	+	+	+	1	2	3	-			V		*	

Legend:

Sz = Szigetköz; 1 = main channel, 2 = side-arms, 3 = irrigation canals, 4 - disconnected backwaters, 5 = Moson-Danube;
H = Hungary: 1 = other parts of the country, 2 = Danube River, 3 = catchment area of the Danube in the Szigetköz;
Sl = Slovak Danube reach (after Holcik *et al.* 1981): 1 = main channel, 2 = side-arm systems, 3 = biotopes outside the floodplain;
A = Austrian Danube reach between Vienna and the Slovak border (after Scheimer & Spindler 1989): 1 = main channel, 2 = connected backwaters, 3 = disconnected backwaters;
R = Submontane zone of the Hungarian section of the Rába River;
C = collected in the Szigetköz (1983-93);
P = protected by law in Hungary,
Th = threatened in Europe (after Lelek 1987);
Bern Conv. II = included in Bern Convention, Appendix II;
Bern Conv. III = included in Bern Conv, Appendix III;
Cor. BM = included in Corine Biotopes Manual issued by the Commission of the European Communities;
Symbols: - = absent, + = unspecified, ? = assumed occurrence, * = random occurrence, 1 = rare, 2 = common, 3 = abundant

APPENDIX 3

ENVIRONMENTAL-ECOLOGICAL EFFECTS OF THE GABCIKOVO-NAGYMAROS PROJECT

SUBSURFACE WATERS

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Environmental/ecological effects of the Bős-Nagymaros hydropower project

SUBSURFACE WATERS

1. Introduction

1.1 On the effects of river barrage systems on subsurface waters;-general considerations

Construction and operation of river dams alter water levels, the hydrological regime, sediment movement and, in many cases, water quality. All of these affect those neighbouring subsurface waters which are hydraulically interconnected with the channel flow. These ground waters are mainly found in the alluvial gravel deposits of the rivers. In some situations the ground water is recharged from the river, while in others the rivers drain the shallow aquifers. In particular cases recharge and discharge conditions alternate, varying as a function of the water stage in the channel. In rare specific cases the river is interconnected not only with the ground waters of its own alluvial cone, but also with those of other geologically older formations. In such situations the rivers generally drain the ground water that flows in the older geological formations.

Effects of river barrages on the ground waters of the adjacent area include: alterations of the ground water table and hydraulic heads, changes of the velocity and direction of groundwater flow, modification of the conditions of recharge and discharge and changes of the quality of ground water.

Eventually, ground water table rises in the vicinity of impounded river reaches will occur due to increased recharge from the river. However this effect can be substantially reduced if the deposition of fine sediment particles onto the channel bed results in clogging (colmatation), thus reducing the permeability of the channel bed. Under such circumstances the quality of water recharged from the river might deteriorate, as a function of the chemical composition of the deposited material. Ground water level rise might be sufficiently high in the initial phase when the effect of colmatation is still negligible, that seepage canals (catch drains) must be constructed in order to drain excess seepage waters. However, with the increasing deposition of finer silty particles the rate of recharge of the ground water could be reduced by orders of magnitude. This

process might result in substantially reduced exfiltration (groundwater recharge) which in turn could reverse the former rise of the groundwater table, causing groundwater subsidence.

One of the crucial issues of the effects of river barrage systems and river impoundments on subsurface waters is related to the quality and quantity of sediments depositing onto the channel bed due to the reduced flow velocities. The theoretical principles of sediment scour and deposition are relatively well founded, although in practice estimates of sediment behaviour are subject to high levels of uncertainity. However, the combined case of sediment deposition coupled with ex- and infiltration from/into the channel does not even have an agreed theoretical basis. Relationships of sediment movement do not, generally, consider the changes of the rate of infiltration into the channel as affected by the joint effects of scouring and deposition, although it is well known that in the case of intensive water abstraction from bank-wells, the deposition of particles and the clogging (colmatation) of the channel bed can occur even when high flow velocities would have been expected to prevent this process.

In the nineteen-sixties investigations were carried out at the Water Resources Research Centre VITUKI with respect to the questions of channel bed clogging (colmatation) (Starosolszky, 1965, 1966). In these studies colmatation was considered a favourable effect, hindering seepage, and it was found that this process takes place under conditions characteristic of the Danube's sediment properties.

In the case of bank-filtered water abstraction schemes the fluctuation of river water levels is generally sufficiently high that some infiltration into the river occurs from time-to-time. This can have an effect similar to the wash-back or flush-back process which is applied in the case of man-made slow filters used in water and waste water treatment processes. If this process does not occur in the bank-filtered water abstraction systems problems might arise even in cases when the river flow velocity is considered high enough to prevent deposition. Consequently, if river training measures result in the elimination of this two-way flow pattern, the continuously flow towards the ground water from the river can result in the clogging of the channel bed thus causing deterioration of the hydraulic relationship between the ground water and the river flow regimes.

In places where ground water is hydraulically connected to the river, loss of head of ground waters will occur in areas adjacent to the river channels downstream of the dams and in the case of power canal type

arrangement also in the river reaches of reduced flow and water level. Recharge of ground water could cease or even the flow direction reverse along river reaches where the river had formerly been feeding ground waters. In river reaches where the river had been draining ground waters the rate of flow towards the channel might be substantially increased. Along river sections and arms of reduced flow and water stage the above effects might successfully be counteracted by river training methods which reestablish or maintain previous water levels (e.g the construction of bottom dikes). These methods, however, can not be applied successfully in cases where the reduced flow is associated with the deposition of fine particle sediments, which clog the channel bed. This situation is likely to be especially serious at locations where the river had originally fed the groundwater resources. In such river reaches reduced flow velocities might also be associated with the deterioration of water quality of the river and of the pore water of the deposited sediment. Ground water subsidence can, in principle, be counteracted by the construction of infiltration (recharge) canals and basins. Nevertheless, in practice, this solution can give rise to a range of other problems as is clearly shown by the relevant literature. These include water quality deterioration due to colmatation.

The greatest problems related to the effects of river dams on subsurface water resources are likely to be associated with bank-filtered drinking water abstraction schemes and with the changes of the ground water table, with the changes of the water of shallow groundwaters, and with the associated water quality problems. (Figure 1.)

Along the impounded river reaches, some effects might be positive, since increased recharge from the river reduces the chance of ground water abstraction by wells from the usually more polluted off-river background zones. In periods of low river flow, when background water of worse quality might have been abstracted previously, improved quality of the abstracted water could result. However, negative effects can be expected in terms of the water quality of the impoundments, where deposited silt can induce undesirable changes. Chemically reductive conditions might develop, resulting in the dissolution of iron and manganese and in the increase of ammonium concentrations. Hydrogen sulphide and methane problems might arise and micropollutants could be mobilized under reductive conditions. The situation can be further worsened if dredging disturbs the bottom deposits.

The above problems can also occur in cases where impoundment does not actually increase water levels but maintains the original river water stages at reduced flow rates.

In the case of lowered water stages, along the downstream reaches, the water yielding capacity of bank-wells might be adversely affected as a function of the extent of lowering of water levels. This might be further aggravated by channel bed erosion along the downstream reaches, which could further decrease water stage, especially under mean- and low flow conditions.

Effects on the shallow ground water table and on the water balance of the phreatic aquifer are especially important from the viewpoints of nature conservation, forestry and agriculture, that is from the viewpoint of the water available for vegetation and the ecosystem as a whole. In this context, a sinking ground water table can create the most problematic situation, especially in cases when the vegetation relies, due to the lack of sufficient local precipitation, on the supply of moisture from the ground water resources. In cases where capillary rise does not reach the top soil, the location of the groundwater table becomes irrelevant from this point of view. Excessive rise of the groundwater table can also be problematic, resulting in more soil moisture than desirable and in excess water inundations. Both positive and negative effects on the soil water budget can adversely affect the salinity of the soil, sometimes to harmful extent.

Many literature examples can be cited to illustrate the observed occurrence of such adverse effects. For example:

In Switzerland the oxygen content of water abstracted from a bank-filtered zone adjacent to the reservoir of a hydropower station of the River Limmat was decreased to zero, resulting in the appearance of iron and manganese in the abstracted water. The reservoir is the recipient of the waste waters of Zürich. (Märki, 1961)

Black, typically anaerobic, silt of high organic matter and iron content was deposited on the bottom of the reservoir of the hydropower station of Verboi on the River Rhone, resulting in the appearance of high iron and manganese concentrations in the subsurface water (Märki, 1961).

At a reservoir of the River Aaare the oxygen content of the river dropped to appr. 4.0 mg/l and the water abstracted from bank-filtered drinking water resources became chemically aggressive with high iron and manganese content (Schmassmann, 1959).

In spite of having the humus removed from the filter zone rapid deterioration of the quality of well water was observed at the river barrage Ybbs-Persenburg. After one year substantial concentrations of iron and manganese were detected along with increased oxygen consumption and ammonium content and the presence of hydrogen sulfide. Bacterium counts had dramatically increased leading to severe operational problems for the water works (Weber, 1981).

In the case of the Abwinden-Asten hydropower station of the Austrian Danube reach rapid deterioration of the quality of water produced by the radial bank-wells of the waterworks was observed after the filling of the reservoir. Manganese appeared within a year followed one year later by ammonium and dissolved iron (Frischrez, 1986).

In the Altenwörth reservoir (Danube, Austria) -where 4 million m^3 silt has been deposited over 6 years and the thickness of the sediment layer has reached 6 m- the increased transparency of the water and richer nutrient supply resulted in a 20% increase of biological activity and reduction of oxygen saturation in July to 63% (Hary and Nachtnebel, 1989). In the reservoir deposition of sediment particles of moderate organic matter content in the vicinity of the river dam resulted in anaerobic conditions and the concentrations of ammonium, dissolved iron and manganese in the groundwater increased. In respect to deposited toxic heavy metals the present conditions are of no appreciable hazard (Colley, 1988).

1.2 Affected zones along the Hungarian side of the river

The Danube reach affected by the Bős-Nagymaros hydropower scheme stretches between Rajka (the border station) and Budapest. Downstream of Budapest the effects are either negligible or indirect. (Figure 2.)

Flow in the river reach of concern is hydraulically connected to the adjacent ground waters along the full length of the reach.

Following a course downstream, the first affected area is the **Szigetköz**, the area between the Danube and the Mosoni-Danube. However, the affected area extends beyond the Mosoni Danube to the area between the River Lajta and the Mosoni-Danube, to the area south of the River Lajta and to the area of Hanság as far as the main canal of Hanság. This area has to be subdivided into three parts both with respect to the original conditions and to the effects of the river barrage scheme:

- In the Upper Szigetköz as far as the River Lajta and to the SW from this line the groundwater table has generally not reached the fine upper soil layer (which is missing at many locations), and the effects of the hydropower scheme can be mostly characterized in terms

of the rise of the groundwater table;

- In the Middle Szigetköz the relationship between the groundwater table and the top soil is varying and the effects of the hydropower scheme can be characterized by groundwater table subsidence.

- In the Lower Szigetköz, downstream of Szap where the tailwater canal rejoins the River Danube, the groundwater table has generally reached the topsoil and the river barrage system or the diversion of Danube did not alter this situation.

The next river reach further downstream is the one spanning between Gönyü and Nagymaros. Along this reach, where at present hardly any effects of the hydropower scheme can be felt, due to the halting of the construction of the Nagymaros dam, the alluvial gravel deposits of the river are of lesser thickness with discontinuities. Between Dunaalmás and Esztergom, the Danube is hydraulically interconnected with the karstic water reservoir of the Dunántúli Középhegység (Middle Mountain Ranges of Transdanubia), a situation that will be discussed below in more detail.

Downstream of Nagymaros, where no impoundment had been contemplated, the effects of the hydropower scheme must be investigated from the view point of the bank-filtered drinking water resources of the Island of Szentendre, as affected by the tailwaters of the Nagymaros dam. Since this latter has not been constructed no observed effects of the hydropower scheme can be mentioned in this context.

1.3 Potential effects of various phases of the construction of the Bős-Nagymaros Hydropower Scheme BNV.

Preparatory investigations aimed at supporting the elaboration of the plans of the hydropower scheme had already been carried out in the nineteen-fifties, mainly in the research centre VITUKI.

Before the elaboration of the Mutually Agreed Plan KET the following studies were made in the field of subsurface waters:

- Prediction of groundwater level subsidence in the Szigetköz (Honti, 1953; Vargay, 1964; Csománé, 1965);

- Hydraulic scale-model studies of seepage (catch-drain) systems of the Szigetköz (Varrók, 1965, 1966);

- Laboratory analysis of colmatation (clogging of the channel bed) (Starosolszky, 1966);

- Investigations into the strengthening of dikes in the Szigetköz (Szilvássy, 1970);

- Investigation of the water budget of the topsoil in the Szigetköz (Major, 1976);

- Investigations of the groundwater basins of Komárom (Varrók, 1966), Esztergom and Pilismarót (Vargay, 1964);

- Investigation of the problems of bank-filtered drinking water resources, caused by silt deposition (Bulkai, 1976).

- Investigations into channel changes and sediment movement did not include questions related to groundwater recharge, but provided information for research into this subject (Csoma, 1966, 1967)

In this period VIZITERV carried out the following investigations:

- Effects on the Waterworks of Győr (VIZITERV, 1976);
- Effects of the channel dredging downstream of Nagymaros (Aujeszky, 1966; VIZITERV, 1976)

The original plans of the river barrage system were included in the Mutually Agreed Plan "KET" (VIZITERV-HYDROCONSULT). These plan considered the effects of the project on the groundwater with respect to the following aspects only:

- In the Upper Szigetköz an increase of the ground water table elevation was foreseen due to the effect of the Dunakiliti reservoir. Counter measures were contemplated in the form of catch drain canals.

- In the Middle Szigetköz, where a flow of 50 - 200 m^3/s was to be maintained in the old channel, ground water

table subsidence of several meters magnitude was foreseen. Irrigation was planned to alleviate the adverse effects of this subsidence. The construction of bottom-dikes in the abandoned Danube channel was also contemplated along with the additional supply of water to the floodplain and to the protected side of the flood levee. However,specific plans for this latter solution had not yet been elaborated at that time.

- The plans did not consider at that time the problems of diminishing water recharge into the valuable potential subsurface drinking water resource of the gravel formations of the Szigetköz. An earlier study (1976) by the responsible planning agency VIZITERV did not consider the effects of the river barrage project on the operation of the waterworks in the vicinity of Győr to be harmful.

- For the impounded Danube reach between Szap and Nagymaros the Mutually Agreed Plan KET considered the increased exfiltration from the River Danube, only from the view point of preventing excess water inundation.

- Loss of capacity of the wells of the Island of Szentendre, abstracting water from the bank-filtered resources, was foreseen by KET, due to the effects of the planned dredging operations along the tailwater reach of the Nagymaros dam.

On the basis of the above considerations it can be stated that the KET did not deal with the effects on subsurface water resources to a satisfactory extent, in spite of the fact that the importance and location of the already utilized and potentially utilizable bank-filtered drinking water resources was well known even at that time. Although the need for relevant investigations and remedial measures had been briefly mentioned, these were to be considered later among the national tasks.

In the period 1977-89 several studies dealt with the above mentioned problems:

The following investigations were carried out at the Water Resources Research Centre VITUKI:

- Groundwater level changes of the Szigetköz were forecast by a two-dimensional numerical computer model assuming quasi-steady flow conditions and by taking local seepage resistance into consideration too (Székely, 1977);

- An analogue model was used for studying the effectiveness of the Dunakiliti seepage canal (catch-drain) and of the infiltration (recharge) system (Varrók, 1978; Újfaludy, 1979; Haszpra, 1979, 1983; Újfaludy, 1984). Nevertheless the problems related to channel clogging, maintenance-type dredging and water quality were only mentioned and not evaluated, and anisotropy was only considered by estimated values. However infiltration field experiments were also carried out (Újfaludy, 1985)

- Investigations of the water quality conditions of waterworks relying on bank-filtered drinking water resources (László, 1981). Estimation of the expected quality of Danube water was dealt with in several studies (Hock, 1985; László et al., 1987);

- The relationship between the river and the karstic reservoir system was studied for the vicinity of Dunaalmás and Esztergom (Lorberer, 1987-1989)

- Effects of the hydropower scheme on subsurface waters (Szabóné, 1985).

- Research related to the topsoil in the Szigetköz (Hutyán, 1985; Vargay, 1985), and to channel changes and sediment movement (Rákóczi, 1985, 1986, 1988; Bognár, 1987-89; Kornisné, 1986; Laczay, 1987-89) also provided information for the understanding of the problems of subsurface waters.

- This was the period when researchers (Újfaludy, 1988) started to consider subsurface water quality problems of

and surveyed the agricultural and other local sources of pollution in the Szigetköz (VGI, 1988)

The Hydraulic Design Company VIZITERV also carried out several investigations related to bank-filtered water resources in 1978 and 1984. The problems of channel bed clogging (colmatation) were mentioned, but "fine" dredging was considered an efficient tool in solving these problems.

- In 1981 a study by VIZITERV, related to the regulation of the ground water table, had been dealing primarily with the relationship between ground water, agricultural production, floodplain forests, nature- and landscape protection, and flood defence. Ground water regulation (recharge) was proposed by making use of the water (50 m^3/s) delivered by the catch-drain canals that surround the upper reservoir with the help of seepage (infiltration) canals to be constructed in the floodplain and in the protected side of the flood levee. However this study did not deal with the problems of colmatation (clogging of the bottom of infiltration canals) and neither with the potential related water quality problems. The potential value of the water resource of the gravel formations of the Szigetköz, as a drinking water resource, was not considered either.

- The Budapest University of Technology also started to study subjects related to seepage hydraulics in this period (BME, 1988).

- Attention had been drawn to the potentially harmful effects of the Hydropower project on subsurface waters, starting in 1983, first of all by M. Erdélyi, with special respect to the Szigetköz area and to the Dunántúli Középhegység (Middle Mountain Ranges of Transdanubia). These studies were, however, professional publications only, being independent of the official reports. Some of the more important statements of these studies will be referred to below:

  In 1979 a publication by Erdélyi pointed out, with respect to the effects of the hydropower scheme on the

Szigetköz, that: ".As the result of the contemplated construction works the connection between the main channel and the gravel formations will be weakened and that of the side river-arms will be practically terminated. This 32 km long reach of the main channel is the most important recharge section for the ground water resources of the thick gravel basin of Győr. Today ground water resources are being refreshed in the down-gradient direction until the area of Hanság. As a result of the contemplated construction project the recharge into the groundwater storage basin will be substantially reduced, narrowing down the zone receiving recharge substantially too.

The ground water table will fall over a substantial area. Many plant cultures might be degraded or can be maintained by irrigation only. Due to intensified irrigation leaching of pollutants such as fertilizers might be expected to increase, since the vast coarse-particle basin of the Kisalföld is without any natural protection, and has neutral hydraulic head conditions. The highest danger is associated with nitrate leaching and downward penetration.

With the decrease of natural seepage flow velocities, deterioration of water quality might be also expected. This qualitative deterioration might be further aggravated, independently of the effects of the hydropower project, by the leaching of fertilizers, pesticides and other pollutants originating from household sewage and large-scale animal husbandry".

"It is likely that the largest subsurface drinking water resource of the nation is found in the gravels of the Kisalföld basin. A resource of similar value is found in the southern Tisza river depression only. The coarse-particle formations of the Győr Basin have a total volume of 21.8 km^3, 95% of which is gravel and rough sand. Calculating with 25% porosity the volume of water stored there amounts to 5.43 km^3.

In 1983 Mr. Erdélyi has again urged investigations into the identification of problems related the hydropower scheme:

"The concept of the Bős (Gabcikovo)-Nagymaros river barrage project is more than 30 years old. During these three decades many changes have occurred in terms of both the natural environment and the national economy. It is timely to investigate whether the original concept should be revised whether it is outdated or not and if so to what extent? Are the priorities of the objectives the same as originally se, namely: navigation, power generation, which were only then followed by the triple interrelated objective of agriculture, water supply and environmental protection?"

He considered the role of the contemplated complementary water supply scheme to the side river arms a positive one:

"Water supply (to the side arms) of increased rate and longer duration would be the most valuable for the refreshment and cleaning of ground water resources if by regulating the side arms they had also served for recharging the ground waters. In this way the channel surface that had been available before the river regulation for recharge could be reestablished, offering the largest possible surface for recharging during the shortest time large volumes of water into the gravel".

- In 1983 the Hungarian Academy of Sciences had been dealing with the scientifically disputed issues of the hydropower project BNV. It drew attention to the urgency of investigation of issues related to the hazards of pollution of the River Danube and to those threatening the drinking water supply of Budapest, which relies predominantly on bank-filtered drinking water resources. Preparation of an appropriate environmental impact assessment was proposed.

- In 1985 VIZITERV prepared a document on "the Environmental Impact Assessment of the Gabcikovó-Nagymaros Hydropower Scheme". The impacts on subsurface water resources were investigated from the point of view of the Szigetköz area, the Szap-Nagymaros Danube reach and of the karstic storage reservoir of the Dunántúli Középhegység. The need to protect both utilized and potentially utilizable subsurface drinking water resources was also mentioned in this material. The document underlines the problems existing along the Danube reach of concern, discussing the conditions prior to the establishment of the hydropower project. The potentially harmful effects of the hydropower scheme on subsurface water resources are considered, in this material, were to be either negligible or easily eliminated. Positive effects have also been mentioned as follows: The increase of the Danube water level was considered as a phenomenon counteracting colmatation. Groundwater levels were to be regulated later, -to an extent which would be better than the previous conditions-, by artificial drainage and infiltration systems.
With respect to the quality of surface water recharging subsurface waters, to channel bed alteration and in this context to the qualitative and quantitative conditions of

water discharge into the ground water bearing formations the impact assessment did not go into sufficient detail (among other aspects it did not consider the partial results of the Kisalföld Research Programme of the Hungarian State Geological Institute, which were available at that time). The investigation into the impacts of ground water level changes on agriculture and forestry can be considered a well founded one.

- In the framework of an exclusive round-table conference the Hungarian Academy of Sciences made a statement, in 1985, on the content of the above mentioned impact assessment. With respect to subsurface waters the following statements were made:

  = the water yielding capacity of the bank-wells of the area surrounding the Nagymaros reservoir will decrease due to the effects of silt deposition. It must be counteracted by regular dredging,
  = unified environmental monitoring network should be established in order to be able to quantify the changes expected.

  It was also of relevance to subsurface waters that the document considered the possibility of inundating the floodplain forests of the Szigetköz. Another issue of relevance was the consideration of an improvement of the water quality of the River Danube and the reduction of pollution loads, prior to the construction of the dams.

- A report of the Hungarian Academy of Sciences to the Council of Ministers, in 1988, considered already the possibilities and consequences of not building the Nagymaros dam. Among the reasons the risks of pollution of bank-filtered groundwater resources, the loss of potential bank-filtered water abstraction capacities are mentioned.

- In the period following the preparation of the impact assessment study many such investigations were carried out, the results of which should have been available well before making the Mutually Agreed Plan KET (such as

studies on surface water quality, sediment transport, supplementary water conveyance into the side-arms of Szigetköz, subsurface drinking water resources and the situation of karstic waters). In 1989 there were several questions still open, due to inadequately coordinated research in various fields and to the lack of a unified systems approach. Recognizing this a large research project to model all of the above mentioned processes, including subsurface flow and transport, had been initiated with the main tasks to be undertaken by the research centre VITUKI in close cooperation with, and supervision (and also financial support) by IIASA (the International Institute for Applied Systems Analysis, Laxenburg, Austria) (Szöllősi-Nagy et al. 1989). Although the project was launched by the Hungarian party with a major effort, resulting in a preparatory study of seven volumes, which reviewed all former research results of the related fields, this large-scale project was never completed, due to reasons beyond the control of the research institutions involved. In the 3rd volume of the above mentioned preparatory report (Szöllősi-Nagy, Székely and Újfaludy, 1989) the following considerations, related to the quality of subsurface waters of the Szigetköz, were made:

"Even if we make the unrealistically optimistic assumptions that

- = the water quality of the reservoir will not be worse than that of the River Danube now, and that
- = the recharge rates of the artificial infiltration system will not be reduced by channel clogging (colmatation), and that
- = the quality of water recharged will not be worse than that of the Danube water now, and that
- = the use of agricultural chemicals and the extent of pollution by communal wastes will not significantly deviate from the present circumstances, and that
- = the reservoir will not operate in peaking mode,

even then we must take substantial changes of the present groundwater quality conditions into consideration. Namely, upon the effect of the operation of the hydropower scheme the groundwater flow will be substantially altered; flow pathways and their length will be altered"

"The only chances of improving the groundwater quality are

= the securing of more rational use of agricultural chemicals and
= the removal or reduction of communal pollution loads"

The authors further stated that

= The effects of the planned drainage system will be favourable along the Danube reach between Győr and Nagymaros;
= the impoundment will have some favourable effects on the bank-filtered drinking water resources: "the safety of water supply will be increased from the quantitative point of view" and "contamination from the polluted background zone will be reduced, since the ration of groundwater flow from the background towards the bank-wells will be decreasing". Nevertheless bottom deposits of rather uncertain thickness, particle size and chemical composition will "increase the clogging of the channel on one hand", and "can deteriorate the quality of water produced by the wells"

= In the case of the karstic ground water reservoir in the vicinity of Esztergom the "additional exfiltration from the Danube" will be increased, by the year 2000, by 30%" and "the deterioration of karstic water quality must be taken into account at certain locations";

= Along the Danube reach downstream of

> Nagymaros one must, in any case, consider substantial changes of the quantity and composition of sediments, which ,-along with further changes of water quality of the River Danube-, might further modify the quality of water of the bank-wells"

Due to the above mentioned reasons, and associated with political changes, the Government of Hungary suspended the Nagymaros construction project in May 1989 and ordered the acceleration of additional special studies (in the fields of biology, hydrology, sewage treatment, seismology and environmental protection) along with the estimation and evaluation of the risks involved. In August 1989 the Government Commissioner of the BNV project had decision support material prepared. Following this an independent expert committee prepared a report for the Council of Ministers (September, 1989) in which the expected harmful effects on subsurface waters played a decisive role: hazards to existing water works (relying on bank-filtered drinking water resources), to the potential water resource of the gravel formations of the Szigetköz (mainly from the view point of qualitative deterioration), to the ecosystem as a whole and to the ground water regime were emphasized. Nevertheless, the document did not prove, in terms of detailed research results, the magnitude or probability of the mentioned potential hazards and damages. It mentioned, that risk analyses carried out up to that time could not be considered as to be of sufficient detail or scientific basis, since monitoring data were not available for all relevant issues (while there were possibly too many observation stations of near surface ground water established). With respect to subsurface waters it is of significance that the Committee did not consider the damming of the river an acceptable solution, owing to the lack of appropriate waste water treatment. Due to the expected environmental hazards and risks the committee suggested that the optimum decision was to terminate all construction works of the BNV project once for all. The committee also suggested that the channel-closure of the Dunakiliti-Körtvélyes reservoir be suspended until an appropriate ecological

guarantee was obtained and until the optimum operating rule of the Bős hydropower station was defined. This issue also has relevance to the question of subsurface waters.

- Investigations related to problems of subsurface waters were also continued in 1989 (László and Páczayné, 1989; Motyovszky, 1989; Lorberer and Csepregi, 1989; Bognár, 1989; Laczkó, 1989)

- In 1990 the Bechtel Consulting agency of San Francisco considered "the general methods aimed at the prevention of the effects of harmful changes of the subsurface flow regime" appropriate ones and made proposals for local modifications on the basis of more detailed monitoring data.

- In 1990 Erdélyi raised again the question of the relationship between the river barrage system and the subsurface waters. He stated that after having the Bős hydropower station constructed, the following situation will be encountered:

"Recharge of ground water will be almost completely terminated. The Danube section, disconnected from the main river by the power canal, will lose its groundwater regulating function, which will be taken over by the side-arm system only"

He foresaw some problems related to the contemplated artificial ground water recharge system:

"The self-purification capacity of Danube will decrease, although it is of substantial significance from the point of view of drinking water supply on the downstream side (also for Budapest)

The potential for utilizing appr. 1 million m^3 drinking water resource along the Danube reach of the Szigetköz, will be lost."

"Seepage water from the Dunakiliti reservoir of 35-40 m^3/s, to be utilized by the artificial recharge (infiltration) system, will not cause any favourable changes, since most of this water will be gravitationally conveyed by the gravel after the considered loss of hydraulic head.

Channels of the side-arm system will mostly form the elements of this ground water recharge scheme. It is questionable whether or not this system will be able to

maintain the contemplated recharge rate, whether the clogging of the channel beds would occur at the smaller slope and flow velocity conditions, after having the side arm channels regulated, and whether or not flow intrusion from the polluted background zones would cause the quality of the ground water resource to deteriorate?"

- In 1991 the study on "the probable effects of the Nagymaros dam on the microbiological and biochemical dynamics and water quality of Danube" (Szabó I.M., 1991) raised many disputes. This issue also relates to subsurface waters. In discussions several experts (Várady, 1991; Csanády, 1991; Császár, 1991) and other authors (Várady and Tevanné, 1991) judged these anxieties to be exaggerated, but the dispute made decision makers even more uncertain.

- After the government decision mentioned above, problems of subsurface water resources have also been discussed at international Czech-Slovak-Hungarian negotiations. Solution to these problems were to be found by the joint expert committees (Intergovernmental negotiations on the 2nd of December, 1991). Subsequent intergovernmental negotiations and correspondence were inefficient in finding solutions, the Czech-Slovakian partner did not halt the construction works and wanted to carry out the contemplated investigations on the hazards involved during the period of construction and operation, with the support of the EC. In this period the Slovak party launched large-scale investigations, supported by PHARE, related to the modelling of subsurface waters. The Danish Hydraulic Institute DHI assumed a significant role in these studies (its expert participated from EC's part in the subsequent negotiations). The results of these investigations, to be completed by 1995, have already proved the potential risks of damage to subsurface waters if the original plans of the hydropower scheme were implemented; in order to protect the waterworks of Somorja (Somorin) additional measures had to be taken to change flow pattern of the reservoir.

- Between 1989 and the summer of 1992 there were no investigations of appropriate detail into the problems related to the hydropower scheme and neither were joint projects carried out. However there were some

achievements in three fields:

- Further plans were made to find appropriate solution for the artificial recharge (infiltration) system (ÉDUVIZIG, 1989-92) although they have not been finished; the questions of colmatation (channel bed clogging) that might be expected upon prolonged recharge through the channel bed of the side arms still remains still open, along with those related to water quality deterioration;

- Under a contract with Hungarian Academy of Sciences, detailed investigations were carried out into the state of the environment in the Szigetköz and the ecological requirements. Investigations of subsurface waters were part of this project (MÁFI 1991; Somlyódy et al. 1992). These investigations considered conditions without the existence of the river barrage scheme and were expanded only after October 1992, after the diversion of Danube, to include conditions affected by the river project. Preliminary results of these investigations have influenced the subsequent decisions related to the river barrage project. In 1992 an ad hoc committee of the Hungarian Academy of Sciences prepared a Statement on the ecological risks of the Bős Hydropower Scheme, taking research results of 1991 into consideration. Statements from this study, with relevance to subsurface waters, are cited below:

  "Due to the special hydrogeological conditions of the Szigetköz harmful substances, getting into the ground water, will in the course of time, during a few decades, completely pollute the subsurface water resource. Furthermore contemplated dredging of accumulated silt will not only deteriorate the quality of surface waters, but by completely removing the filter layer it will open the way for the intrusion of micropollutants and microbes into the ground water too."

  "The artificial recharge system aimed at the

counteraction of groundwater subsidence along the abandoned Danube channel downstream of the Dunakiliti dam will also cause, due to the inflowing raw water and also of the state of the side-arm channels which are prone to colmatation, the qualitative and quantitative deterioration of the full water resource stored there."

"In order to be able to save the function of the channel bed with respect to organic matter decomposition and filtering the present dynamics of Danube should be preserved. Without this one can not ensure simultaneously appropriate oxygen supply, favourable self purification properties of the Danube and regular renewal of the channel surface which acts as a filter layer"

"Along the Danube reach in the vicinity of Budapest there were several possibilities for investigating the effects of various river training and industrial gravel dredging operations on the conditions of drinking water production, as the country's largest bank filtered drinking water resources are found in this region".

"According to the results of chemical, bacteriological and hydrobiological investigations the water quality (of bank-wells) was non-objectionable in periods preceding the onset of dredging operations. During and after dredging, algae, iron, sulphur bacteria, coli bacteria, streptococcus and Pseudo-monas pollution incidents were frequently detected."

"In areas with groundwater table subsidence the mineralization of plant residues is accelerated, the organic material content of the soil is decreased, the soil structure deteriorates and the danger of leaching plant nutrients from the soil is increasing. The capillary water supply to the root zone will be terminated in places, due to ground water table lowering, from the fine cover layer to the underlying gravel formations. As a consequence of this the yield of cultivated plants and the safety of crop production will be substantially decreased, the drought sensitivity of the area is increasing, the supply of water to the forests will also change and the presently interconnected floodplain communities will be split into independent patches; the organic matter production of plant communities will be decreasing."

"In places where groundwater levels are rising anaerobic processes become dominant, the danger of excess water inundation is increasing in areas with poor natural drainage conditions"

- The Committee of Water Management Sciences of the Hungarian Academy of Sciences (March-April, 1992) took a contradictory standpoint to that of the ad hoc Committee, also in the field of subsurface waters. The "Opinion" on the Statement of the ad hoc Committee of MTA (March, 1992) refers to the impounded Danube arm, the Soroksári Danube arm, as an example not verifying the above raised anxieties (actually here the conditions of bank-filtration are much more unfavourable, in terms of both quality and quantity, than in the Szigetköz or at the Island of Szentendre). Discussing bottom deposits and damages to the filter zones the study states that:

"Potential damages to the bank-filtered water production can be avoided by continuously "fine"-dredging the bottom silt or by gravel dredging concentrated at certain locations of the reservoir"

The same is repeated in relation to the planned artificial water supply and recharge system:

"If channel bed clogging affects recharge into the groundwater to undesirable extent, the clogged layer can be removed by dredging"

The opinion of the Committee for Water Management Sciences of the Hungarian Academy of Sciences, formulated in April 1992 in relation to the Bős Hydropower station and to "Alternative C" assigns less significance to the water resource of the gravel complex of the Szigetköz:

"In this area less than 1% of the population of the country receives water supply from these resources. The National Water Management Master Plan did not make any proposal for the long term utilization of this water resource, since exhausting of the Nation's drinking water resources is not expectable. The geographical location of the area renders, as a matter of course, the conveyance of water via water mains over long distances uneconomical".

> The above quotation proves that there were substantial uncertainities in judging the long term significance of these water resources.

In May 1992 the Government of the Republic of Hungary issued a statement on the termination of the contract of 1977. Parts of this statement relevant to subsurface waters include the following:

- The most significant drinking water resources of both Hungary and Slovakia can be found along the Danube reaches affected by the Bős-Nagymaros project. Almost 45% of Hungary's total drinking water production originates from the bank-filtered drinking water resources affected by the Bős-Nagymaros Hydropower Scheme. Budapest has been supplied with drinking water for more than a century from these resources and similarly Pozsony (Bratislava) relies on the same type of drinking water resources. Most of the natural filtration processes take place in the upper few cm of the channel bed. Consequently it is a question of crucial importance to secure conditions which preserve the original state of this biologically active layer which provides physical-chemical filtration as well.

- The quality and quantity of water stored in the alluvial gravel cone of several hundred meters thickness of the Csallóköz-Szigetköz area are also determined by the filtration properties of the Danube channel bed. Human interventions associated with the river barrage scheme have not yet affected this continuously recharged water resource. Therefore approximately 40 km and 70 km long river reaches are available respectively in Slovakia and Hungary as drinking water reserves for later utilization, as was indicated by the results of detailed water quality and hydrogeochemical surveys. These potential resources represent for Hungary a drinking water production reserve of approximately 1 million m^3/day (being of the same order of magnitude as the present rate of drinking water supply of Budapest), and it could provide 2 million m^3/d water supply, on a continuous basis, for Slovakia. Upon the effects of the Dunakiliti reservoir substantial changes will occur in these resources. The most significant problem will be associated with the deposition of contaminated silt which results in anaerobic conditions and in the dissolution of iron and manganese, as well as in the infiltration of certain toxic substances. The bottom sludge will create, at the same time, permanent hazard of infection by viruses.

In relation to the effects of the Dunakiliti dam the text of the Statement is the same as that of the ad hoc Committee of the Hungarian Academy of Sciences. With respect to the lack of investigation results it states, that;

> "The extent of pollution of the groundwater resource of the Szigetköz can be but roughly estimated due to the lack of detailed long term hydrological and water quality investigations in the past.

It is to be noted that the above outlined opinion of Hungarian researchers are identical with those of the Slovak experts, as expressed in their final report of February 1990. Very similar conclusions, in respect to the lack of investigations, have been drawn by the Canadian firm Hydroquebec, which was invited by the Slovak Government for consultation in the fall of 1990.

Just before and after the diversion of the Danube in 1992 investigations were accelerated but they focussed mainly on the changes caused by the river diversion. Due to the relatively short duration of these investigations they can not be considered complete, although their results would be very much needed for supporting the tripartite negotiations that have been launched in the meantime (in preparing this document, which will form part of the records of the court case of Hague, increased difficulties were faced, since areas outside the Szigetköz have not been lately dealt with at a level similar to that of the Szigetköz studies)."

1.4 Development of the monitoring system of subsurface waters

In accordance with the proposals for environmental impact assessment VIZITERV prepared, in 1985, a plan for the environmental monitoring system, which, with respect to subsurface waters, meant the operation of the existing groundwater level and quality observation system of wells and the expansion of the network (VIZITERV, 1986; Mantuano, 1988)

In the nineteen-fifties approximately 200 observation wells were in operation along the Danube reach of concern, most of which formed part of the national hydrographic network. In the period 1980-86 additional wells were established in the Szigetköz and later downstream of Gönyü. Some 600 wells were drilled and this proved later to be more than was needed. In 1991 more than 100 wells were excluded from the network and subsequently the number of wells used has further decreased. Evaluations were prepared by VIZITERV also in 1987-88, dealing also with the quality and quantity of subsurface waters. Evaluation of the period of 1986-1992 (KGI, 1993) was made on the basis of data of 150 selected wells, since these wells had long and reliable records. Some of the wells were equipped with data loggers, but good records were available for only those wells that are operated by the State Geological Institute MÁFI. The Budapest Waterworks has its own monitoring network on the Island of Szentendre. Water quality changes of the wells of the Budapest Waterworks were monitored at 200 wells.

with respect to deeper wells the records are less complete. 13 piezometer wells of VIZITERV and 3 deep wells of MÁFI were monitored but this

provided insufficient number of data. VITUKI has proposed the extension of the monitoring system several times (Liebe et al., 1993). With respect to water quality the monitoring system should be expanded with regular water quality observation of the production wells. At the present there are nearly 50 production wells in the area of concern assigned to the subsurface water quality monitoring network.

The greatest problem is related to the inappropriate evaluation of the data of the observation network. Even the faulty data have not been screened out in due time.

2. Summary of knowledge of subsurface waters and the impacts upon them

2.1 The Szigetköz and its adjacent areas

2.1.1 Hydrogeology of the area

The Szigetköz is located on a plain which is formed by the Quaternary alluvial cone of the River Danube. It is bordered by the main channel of the Danube and the Mosoni-Danube and thus the area is actually an island of 52 km length and 7-8 km average width with an area of 375 km^2. The alluvial cone of the Danube extends far beyond the Szigetköz and includes areas north of Danube called the Csallóköz, partial areas lying to the W and S of the Mosoni-Danube, the area between Mosoni-Danube and the River Lajta, and parts of the area

called Hanság. In this study we will be dealing with areas south of the River Danube only (Figure 3).

A sandy, clayey complex, storing thermal waters at larger depth, underlies the alluvial Quaternary formations which reach a thickness of 700 m (Figure 4) at some locations. The effect of the river barrage system on these underlying deep layers is not considered to be significant and thus will not be discussed in detail.

The Quaternary complex, consisting of rough clastic formations, was first described in 1938 and river morphological, hydrological and hydrogeological studies were undertaken in the nineteen-fifties. More detailed hydrogeological evaluations were prepared in the early seventies. Geophysical studies of the thirties dealt mainly with the deep structural aspects. Geological knowledge of the Quaternary coarse clastic formations was rather sparse until the eighties and corresponded to the near surface

zone only. Larger research projects, upgrading knowledge significantly, were launched in the eighties and nineties only, -that is after acceptance of the plans of the BNV project-, (the Kisalföld research programmes of the Geophysical Research Company, the Hungarian National Geological Institute and of the Eötvös Lóránd Geophysical Institute as well as programme DANREG which combined the Austrian, Slovak and Hungarian geological research results of this area). These programmes provided hydrogeological information, in addition to an improvement of geological knowledge. From these, significant information was provided in the framework of the Kisalföld Research Programme on the basis of water level observation data from wells drilled as part of the programme. These gave complementary information to the data of the earlier monitoring network which corresponded to the shallow formations only.

The upper part of the Quaternary alluvial cone consists of rough clastic formations: gravel, and gravel with medium- and rough sand. The depth of this layer reaches 250 m in the middle of the Szigetköz. The hydraulic conductivity varies between 20 and 300 m/d, with the average value of 150 m/d. The layer which had been considered homogenous one was later found to be anisotropic. The coefficient of anisotropy was estimated first as 4 then later corrected to 10. In reality one faces an inhomogeneous aquifer system, created by alluvial deposition, in which zones of good permeability provide hydraulic connection along complicated spatial pathways.

The alluvial complex is covered by a top layer of finer particles of 0-5 m depth. This layer is missing at some locations, especially in the Upper Szigetköz. The hydraulic conductivity of the top layers is estimated to be in the range of 0.02-1.00 m/d. The hydraulic conductivity of the cover layer in the floodplain was determined by in situ experiments, obtaining values in the range 0.08 - 0.4 m/d (Újfaludi, 1986). The top layer was formed by the silty deposits of the floods of Danube, flowing along the ridge of the alluvial cone, and of those of the side river-arms. The surface of the alluvial cone and the pattern of the interwoven channel system have been continuously changing over the course of time. Channel regulation, started at the end of the last century, and the subsequent river training activities has substantially affected these recent geological processes, but could not halt them. Due to the confining of floods the accumulation of fine sediments has accelerated over much of the floodplain and ceased on the protected side of the flood levees. High discharges of Danube were flowing at higher levels, due to the confinement by the flood levees, while the low flows were associated

with smaller water levels in the Upper and Lower Szigetköz, due to the deepening of the channel. These effects can be observed in the variation of the adjacent groundwater levels.

The Danube, having suspended channel, has always been, even before the river regulation, the main supplier of water to the aquifer of the Quaternary gravel complex. The infiltration of precipitation water has been generally insignificant in comparison to the recharge from the river. Hydraulic connection takes place mostly through the well washed gravel channel bed of the main river, while less water infiltrates over the flood plain and across the mostly sediment clogged channel beds of the side arms. According to research results the overall rate of recharge of the aquifer along the Danube reach of the Szigetköz amounts to 8-10 m^3/s. The groundwater table has a slope of 0.3 - 0.5 m/km towards S-SE of the Danube (Figures 5a, 5b.). Groundwater levels, slope and the direction and velocity of flow vary as a function of the water stage of the river. Groundwater levels (Figure 6.) show close correlation with the water regime of the River Danube, which also holds for the water levels of deeper wells. This effect diminishes with distance from the Danube (Figure 7.). Depending on the distance from the river the response of the groundwater to the changes of water level of the river has a time lag of 1-8 days, but the full effect will take place after several months only.

Water originating from the Danube can be identified (on the basis of tritium and oxygen 18 isotope studies) at several hundred meters depth and also beyond the Mosoni Danube. This latter indicates that the Mosoni-Danube taps the groundwater flow only partially and the rest of the flow proceeds towards the Hanság, where it is drained by smaller canals , and by the River Rábca. This is the characteristic situation also in the south-eastern parts of the Lower Szigetköz, where waterworks are tapping the flowing groundwater. On the basis of tritium investigation the actual flow velocities vary between 250 and 400 m/year. Propagation of tritium concentration peaks which occurred in the River Danube in the early sixties was analyzed by the tritium method in the groundwater and it was found that the peak today (thirty years later) has reached the middle of the Szigetköz, 5-10 km from the Danube (Figure 8.). Flow velocities are the highest at 50-100 m depth. Using another isotope method, the ^{18}O method, it was found that Danube water has flushed the entire gravel complex of the Szigetköz, and moreover can be traced in the groundwater as far as areas south of the Mosoni-Danube and in the Hanság.

The quality of water in the gravel complex is good, suitable for drinking water supply. Knowledge of water quality and flow velocities has been significantly updated by research carried out in 1991/92 under a contract with the Hungarian Academy of Sciences. According to the results of isotope investigations the water of the several hundred meters thick gravel formation of the Szigetköz originates entirely from the River Danube. In spite of this it is desirable to investigate the quality of the upper 20 m deep water layer separately from those of the deeper water layers, since human activities of the area mostly pollute the near surface ground water as indicated by locally identified quality problems at several places.

Evaluating the water quality data of water samples taken from 84 wells of the monitoring system, with respect to the quality of the upper 20 m deep layer, it is found that the concentrations of the most important quality constituents vary over wide ranges, but drinking water standard values are violated by iron, manganese and ammonium only. The relatively high average values are due to the data of a few wells only. Excessively high ammonium concentrations originate from direct local sources of pollution: open fertilizer storage, effects of animal farms, etc.

The quality of the water of layers deeper than 20 m has been regularly measured in the wells of the monitoring system. Due to sampling problems, however, these data are not suitable for the characterization of the quality of deeper aquifers. Consequently the data of 76 production wells have been used for evaluation. The quality of water of those layers of the gravel complex of the Szigetköz which are deeper than 20 m is excellent (Table 1) with the exception of manganese and iron in some of the wells. Even iron and manganese remain below drinking water standard values, with the exception of a few data. Nitrate is of uniform distribution. Its concentration nowhere exceeded half of the limit value (20 mg/l) in the deeper layers, and moreover it remained below 10 mg/l in the water of 90% of the samples examined. Nitrate and ammonia concentrations of samples taken from monitoring and waterworks wells did not exhibit any rising trend, which would have indicated continuing pollution. Moreover the water quality of certain wells was improving (for example in the water of well No.K1 of the Révfalu Waterworks iron content decreased from the original 3-4 mg/l to 2-2.5 mg/l during the period of 1984-90, then dropped to 1 mg/l by 1991/92. The ammonia level of the water of well No. 9/E of the Kisbajcs-Szőgye Waterworks has been continuously decreasing from the original 0.6 mg/l to the present 0.2 mg/l value).

In the neighbourhood of Szigetköz the dissolved solid content of the water of layers deeper than 20 m, which receive only partial recharge from the Danube only, is higher than that of the Szigetköz (Table 1.) It is mostly characterized by the substantial increase of ammonia, iron, manganese, hydrogen carbonate and sodium as well as by that of conductivity. This might be caused by blending with the water that is rising from the deeper confined Pannonian layers. This is supported by the results of isotope investigations which indicate that in the vicinity of Szigetköz 25% of the groundwater stems from local infiltration, while 20% originates from the deeper Pannonian layers.

Evaluating the above results with respect to their areal distribution (Figure 3.) it can be stated, although with reduced reliability due to the relatively low number of data, that in layers deeper than 20 m (Table 1.)

- water of the best quality is found in the Upper Szigetköz (I),

- further towards the Lower Szigetköz (III) the quality of water is deteriorating (iron, manganese, ammonium), but in the Middle Szigetköz the quality is still good (II), with the exception of locally high iron content;

- in the area between rivers Mosoni-Danube and Lajta the water is generally of good quality, with the exception of higher manganese concentrations of a few wells. Nitrate attains the highest values here, but nowhere exceeds the drinking water standard;

- in the area south of the River Lajta (V) the quality of water is similar; in the Hanság (VI-VII) nitrate is low but high manganese and iron concentrations are found.

The quality of groundwater of layers less deep than 20 m is extremely variable with differences of several orders of magnitude. The best water quality (in terms of ammonium, iron and manganese) is found in the western parts (IV-V) where flow rate is the highest of the water bearing layers of coarse particle size and good hydraulic conductivity. In the shallow zones nitrate concentrations are higher than half of the drinking water standard. The highest values are found in the western parts, due to the lack of the top cover layer (Table 1., Figure 3)

In 1991 the Hungarian State Geological Institute carried out ground water surveys in the vicinity of the main Danube channel and the side river-arms. The results of chemical analyses unambiguously verified the Slovak findings (Mucha et al., 1992), according to which the water exfiltrating from the Danube through the gravel preserves its oxygenated character, thus securing good water quality in the case of the present water quality conditions of the River Danube. However,in areas, where the exfiltration occurs through silty layers of high organic matter content (for example in the side river-arms) reductive conditions are created due to the decreasing dissolved oxygen content of the groundwater. A consequence of this is the remobilization of iron, manganese and toxic metals of the aquifer, associated occasionally with the generation of ammonia and hydrogen sulphide. Deeper ground water of such origin can be found in the south-eastern part of the Szigetköz at the waterworks of Révfalu and Kisbajcs-Szőgye. The water of both waterworks is characterized by nearly zero nitrate content, less than 0.5 mg/l dissolved oxygen and high manganese, iron and ammonium concentrations which indicate a reductive environment. Similarly reductive conditions would be expected to occur in the water exfiltrating from the gravel if the organic matter content of the River Danube water was increased or its dissolved oxygen content decreased.

Organic and inorganic micropollutants were analyzed by MÁFI in samples taken from the shallow groundwater layers adjacent to the main and side branches of the River Danube. Some deeper wells of the floodplain have also been investigated in this respect. No concentrations exceeding health criteria were detected in the deeper wells, but in some of the near-bank boreholes benzopyrene, carbon tetrachloride and chloroform were observed in concentrations above the respective limit values.

The volume of the above ground water resource which is continuously recharged from the Danube is estimated as 5 km^3. It is generally of good quality and thus it forms an unique potential drinking water resource even on a European scale. The National Water Management Masterplan (1984) considers this drinking water resource as a future resource of 750,000 m^3/d water yield. Most of this resource has not yet been utilized. The water production of existing larger waterworks (Győr, Kisbajcs-Szőgye and Révfalu: 90,000 m^3/d; Mosonmagyaróvár: 17,000 m^3/d) amounts to appr. 70,000 m^3/d, together with the production of the wells of smaller settlements of the region. There are no detailed plans for the potential future utilization of this resource and neither for the potential water users

involved. Earlier there had been plans made for the expansion of existing waterworks only. Investigations launched by the Hungarian Academy of Sciences in 1991-1992 (with the use of multi-layer numerical computer models) are focussed on the identification of potential sites and quantities of abstractable water (without environmental damage) for long term future development. The results, however, are not yet available, as the more detailed up-to-date modelling studies begun in 1993 only.

The location of the shallow groundwater table in the top layer of fine particle size is a very important feature from the view point of vegetation and thus agriculture. In the nineteen-eighties the mean groundwater level of the Upper Szigetköz was 4-6 m below ground level, while it was 1-3 m below the terrain in the Middle and Lower Szigetköz. As was already mentioned the area of the Szigetköz can be split into three parts from the view point of soil moisture supply from the groundwater: in the Upper Szigetköz groundwater does not generally reach the top layer. In the Middle Szigetköz it varies from time to time, while in the Lower Szigetköz capillary rise always reaches the top layer of fine particle size (Figures 9a, 9b.). These circumstance are especially important in drought years. In this context the seasonal fluctuation of groundwater level is also of importance. In the close proximity of Danube the fluctuation exceeds 2 m. while in the middle of the Szigetköz it amounts to about 1.0 m. Since the fluctuation of groundwater levels is in close relationship with the changes of the water stage of the River Danube the groundwater levels are also characterized by higher stages in the springtime, which can be considered a favourable condition since it coincides with the onset of the growing season.

2.1.2 Effects of the hydropower scheme

According to the KET the Danube would have been impounded at Dunakiliti. In the Dunakiliti reservoir settling of suspended solids and thus the clogging (colmatation) of the channel bed were to be expected. The infiltration capacity of the channel bed would have been thus substantially reduced, while, owing to the much larger surface and to the higher water levels in the reservoir, initially there would have been much higher infiltration rates than under the original conditions of the River Danube. A part of this excess exfiltration was to be caught by the seepage (catch-drain) canal, in order to avoid harmfully high groundwater levels in the vicinity of the reservoir. The water quality of the reservoir would have been worse, mostly in terms of the oxygen conditions, than the

original quality of the Danube water. Seepage through the silt accumulating on the channel bed would have created anaerobic, reductive conditions, and thus the dissolution of manganese and iron was expected probably associated with the increase of ammonia and sulfide concentrations. In the long term the exfiltration from the reservoir would have been substantially reduced, by an order of magnitude, due to the thickening silt and to the clogging of the channel bed. Since a portion of the water exfiltrating from the reservoir into the ground water would have been rejoining the abandoned main channel downstream of the dam, it could not have substituted the missing quantities that were originally recharged by the river. According to the KET, groundwater subsidence of several meters magnitude was foreseen along the old main channel downstream of the Dunakiliti dam (Figure 10.). In order to improve the moisture supply to the topsoil irrigation, was planned, but its effect on the properties of the soil would have been harmful ones.

After the KET had been accepted, studies on the possibilities of alleviating harmful effects have been launched. The contemplated strategies included supplementary recharge (infiltration) systems on both the floodplain and the protected side of the levee, and the construction of bottom dikes in the abandoned channel (where only 50 m^3/s flow was to be left in the channel as contrasted to the original 2000 m^3/s mean flow) in order to raise the water levels. These solutions, at their given level of elaboration, represented hazards for the subsurface waters. The channels of artificial recharge systems could be clogged and the quality of infiltrating water would be also questionable. The construction of bottom dikes would, for the low flows that were to be left in the channel, again result in the clogging of the gravel bed of the channel. Dredging of the clogged channel beds could perhaps maintain the original infiltration rates, but this would be associated with water quality problems.

Summarizing, solutions such as those contemplated in the KET would have endangered the above described drinking water resource both qualitatively and quantitatively, replacing the original, natural recharge conditions, provided by the River Danube, by an artificial system of rather uncertain character, that would create worse conditions than the original. Reduced flow velocities and changed flow directions would have increased, at some locations, the adverse effects of local sources of pollution. (Nevertheless in this latter case the solution is the elimination of these pollution sources and not the maintenance of subsurface flow at any cost). The elimination of local sources of pollution is under way and thus only the effects of earlier contamination must be taken into account.

From the view point of subsurface waters the "Variant C" strategy, that is the impoundment at Dunacsúny, is more favourable, to some extent, than the impoundment at Dunakiliti. Water of unknown quality, exfiltrating from the part of the reservoir downstream of Dunacsúny, is drained by the abandoned main channel. Consequently the main recharge area of the groundwater was shifted upstream of Dunacsúny, where the water quality and bottom sludge conditions are likely to be better than in the downstream part of the reservoir. Ground water level rise in the Upper Szigetköz was smaller in this case than it would have been in the case of the Dunakiliti impoundment, although it is still significant. Subsidence of the groundwater table of 2-3 meters occurred in the close proximity of the River Danube only, while in the Middle Szigetköz, outside the flood levee, the subsidence is 0-1 meter as compared to the earlier conditions. Groundwater level subsidence was alleviated to certain degree by the additional supply of water of 5 m^3/s ,starting in the spring of 1993,to the floodplain and to the outside of the levee. Some other, yet unknown, factors might have also contributed. A Rise in the level and increase of the flow of this complementary water supply system, that was started with 10 m^3/s in August 1993, might further improve the elevation of the groundwater table by a few decimeters, but in a 0.5 - 1.0 km wide zone along the Danube no groundwater level rise can be induced in this manner. No qualitative changes have yet been detected upon the effect of the water exfiltrating from the reservoir and infiltrating from the water recharge system, or due to the altered groundwater flow directions. Quantitative changes are illustrated by Figures 11-24 as a function of temporal and spatial changes of the groundwater level and also in relation to the changes of the moistened topsoil.

Figures 11-13 show the typical ground water table graphs. Graphs with index "a" show the measured time series, while those with index "b" the ground water tables calculated on the basis of correlations. For periods after the diversion of the Danube the latter show the situation that would have occurred if the full discharge of the Danube (measured at Pozsony/Bratislava) was flowing in the original channel. The ground water table marked with "c" would occur when it depended only on the lowered water levels of the "abandoned" main channel. Due to the effects of the reservoir, to backwater effects and to the artificial additional supply (recharge) measures the actual groundwater table was higher, after the diversion of the river, than what is shown in the figure. The substantial groundwater table increasing effect of the reservoir is best illustrated by **Figure 11.**

Figures 14-17 illustrate the groundwater table in typical points of time:

15 June 1991:	Approximate average conditions in the growing season, before the diversion of the River Danube.
01 March 1993:	Typical, lowest groundwater table after the diversion of the Danube, characterizing the entire affected area, with the exception of the immediate vicinity of the reservoir.
20 June 1993:	Groundwater conditions established in the first growing season, after the diversion of the Danube and before the artificial supply of water to the floodplain.
30 September 1993:	End of the vegetation season with artificial supply of water to the floodplain.

Figures 18-20 show the difference between the actual groundwater table and the groundwater table that would have occurred, in the previously mentioned points of time, if the Danube was not diverted.

Figures 21-24 show the position of the groundwater table relative to the bottom of the topsoil-layer (+ when groundwater tables is in the topsoil-layer; - when the groundwater table is below the topsoil in the gravel)

Since the diversion of the Danube, that is since the implementation of "Alternative C" there have been several negotiations on the subject of sharing (distribution) of the flow of the River Danube. The solution proposed by the Hungarian partner, and supported by the EC, according to which flows varying as a function of the season of the year, but always representing more than half of the original flow, should be rediverted back to the main channel, would certainly improve both the recharge conditions of the groundwater and the stage of the groundwater table. However, this allocation pattern has not yet been agreed upon and the most recent negotiations were dealing with a scheme which would allow the release of flows somewhat larger than the present 200-300 m^3/s flow into the main channel in association with the construction of bottom dikes and with the complementary supply of water into the floodplain and to the outside areas of the levee. Although these solutions would somewhat

mitigate the hazards of subsurface waters, the questions related to the quantity and quality of the water recharge to the ground water resources still remain open. Bottom dikes to be constructed in the main channel would highly endanger the possibilities of the rehabilitation of the main channel as the source of recharge of ground waters of the area. A similar problem is related to the present excessive growth of vegetation on the former, now dry, channel bed.

2.2 Areas on the Hungarian side of the Danube reach between Gönyü and Nagymaros

2.2.1 Hydrogeology

On the right bank of Danube between Gönyü and Dunaalmás, gravel layers are substantially thinner, approximately a few tens of meters deep, than those of the Szigetköz, and their connection with the Danube is discontinuous. This river reach is not characterized by steady water recharge from Danube into the gravel, but on the contrary some groundwater infiltrates into the river from the off-river background zone. From Nyergesujfalu towards Nagymaros the right bank aquifer of coarse clastic formations widens and becomes deeper in the Dorog basin. Starting at Esztergom the coarse gravel formations, which offer bank-filtered water abstraction possibilities, break up again along the right bank of the river and the next wider and deeper gravel formation is found in the Pilismarót basin. On the left bank of the Danube the only significant bank-filtered water resource is found in the vicinity of Szob.

Let us now consider, following the downstream route of Danube, the existing waterworks (Figure 25). The first significant waterworks is the one of Komárom-Koppánymonostor, constructed on an island of the river. Water quality problems of the waterworks of 5,000-6,000 m^3/d production capacity are also associated with iron, manganese and ammonia. Denitrification occurs in these waters.

The waterworks of the Viscosa factory of Nyergesujfalu of a capacity of 5,000-6,000 m^3/d has problems associated mainly with contamination arriving from the off-river background zone. The same refers to the Tát waterworks of 2,000-3,000 m^3/d capacity.

The total capacity of the three radial wells of the waterworks of Esztergom Prímás Island is 12,000-13,000 m^3/d. The water quality is good here but background contamination effects occur at low water stages

of the river. The capacity of the waterworks of Esztergom-Szentkirályi is about 2,000 m^3/d. The water quality is rather poor due to contamination from the off-river background zone and to the washout of pollutants from the sludge deposits in front of the islands of Tát.

Between Szob and Nagymaros waterworks of small (less than the total of 1,000 m^3/d)capacities but of good quality are found on both banks of the river (Szob, Zebegény, Dömös).

In addition to the existing waterworks there are unused bank-filtered drinking water resources "kept in stock": In the vicinity of Ács-Komárom-Almásneszmély 19,000 m^3/d, and 75,000 m^3/d at the neighbourhood of Esztergom. These potential drinking water resources have not yet been fully explored, and there might be hydrogeological and water quality problems encountered.

Here we must mention the relationship between the karstic water resources of the Dunántúli Középhegység (Middle Mountain Ranges of Transdanubia) and the Danube Hydropower scheme. The karstic water system in direct connection with the Danube at Esztergom and Dunaalmás, where, -under the original conditions-, karstic water fed into the Danube through bottom springs. Due to mine drainage operations hydraulic heads of the karst were so much decreased that the danger of Danube water intrusion into the karst has to be faced (Figure 26). It would have been very harmful at Esztergom, endangering both the quality and the temperature of the luke-warm karstic spring of Esztergom and also the thermal wells of the other side of the river at Párkány (Sturovo). According to the research results of VITUKI (Lorberer, 1987-89) the hydraulic connection takes place in varying forms:

- "There is direct connection between the main karstic reservoir and the Danube in Esztergom, in the vicinity of the Turkish Bath;
- Triassic-Eocene formations of the karstic storage system communicate via the gravel terraces of Danube with the river in Esztergom, at the riverside promenade, along a length of appr. 650 m;
- A more indirect relationship is found at Dunaalmás over a length of about 300 m, where among the Jurassic-Triassic limestone formations of the main karstic storage system a Pliocene (Upper Pannonian) sandy aquifer of 35-40 m depth is found (without impermeable clayey layers);
- A similarly indirect relationship is found in Esztergom, in the vicinity of the lido."(Figure 27)

On the basis of computer model studies the author finds that

- "At present there is about 3 m^3/min and 2 m^3/min recharge of Danube water, at Esztergom and Dunaalmás, respectively, from the gravel terrace to the main karst (these rates are decreasing due to restrictions set on mine water drainage operations since 1990)"

2.2.2 Effects of the hydropower scheme

If the plans of the KET had been implemented, this Danube reach would have been an impounded one with daily water level fluctuation due to peak operation of the Bős hydropower station. Even the KET had foreseen considerable sediment deposition along this reach, especially in the section between Nyergesujfalu and Nagymaros. Anaerobic, reductive zones would have developed in the bottom silt layer, further amplifying the problems related to iron and manganese. More pronounced reductive processes might have resulted in the generation of hydrogen sulphide and methane gases. There would have been positive effects too, in term of the quality of the groundwater resources, since the intrusion of contaminated groundwater flows from the off-river background zone, associated with low flows/water stages of Danube, would have been eliminated by the impoundment. Obviously this is not the way to eliminate pollution from the off-river background areas; but the sources of pollution must be found and removed.

With respect to the connection between the Danube and the karstic system the increase of the Danube's water level by the impoundment would have only increased the danger of Danube water intrusion into the karstic system which has already reduced pressure heads. Nevertheless with the curtailing of mine-drainage operations this danger becomes less and less significant. Relevant research results of VITUKI (Lorberer, 1987-89) are quoted below:

- "In Esztergom, in the vicinity of the Turkish Bath, the karstic water level is 2-3 m lower than the water levels of Danube. Special local control measures (cementing, compression) would be needed because the impoundment that will increase the mean water level of the River Danube by 4.6 -9.6 m would ,very likely, break through the Oligocene impermeable layers which protects the spring-cave of Prímáskút. No increase of karstic water heads can be expected due to the depressions caused by the mine Lencsehegy II. in the close proximity"

- "In the vicinity of Esztergom the impoundment would (according to our calculations) result in a maximum 3.3 m pressure increase

associated with excess exfiltration of Danube water of 1.5 - 2 m^3/min." "Exfiltration and backwaters would not cause operationaL problems either at the thermal well no. FGS-1 of Párkány (Sturovo), or at the Lencsehegy II. mine, not at the water supply systems of the Dorog basin, the latter relying on karstic water abstraction".

- "In the vicinity of Dunaalmás the impoundment will cause 1.5 m pressure head increase only, associated with transfiltration of 1.2 -1.5 m^3/min".

- "Excess transfiltrations and pressure head increase, associated with the impoundment, can appreciably affect neither the head conditions nor the water budget. The maximum effects will occur along those point-like sections where the main karst communicates with Danube and here the effects are by no means negligible."

- "In the vicinity of Süttő-Lábatlan-Nyergesújfalu the channel of the Danube was cut into the Lower Cretaceous- Middle Eocene karstic formations of the Gerecse mountain. Upon the effects of the impoundment further decrease of rates lost from the karstic reservoir to the river are to be expected in association with smaller increase of the rate of discharge of the near-bank springs."

The difference between the karstic water level and the water stage of the River Danube is illustrated by Figure 28.

2.3 The Danube banks downstream of Nagymaros

2.3.1 Hydrogeology

Along the Danube reach between Nagymaros and Budapest the most significant bank-filtered drinking water resource is the one of the Island of Szentendre utilized by the Waterworks of Budapest (Figure 29). There is a 10-20 m deep gravel aquifer below all of the area of the Island. At mean water stages of the River the depth of ground water in the aquifer is 10-15 m, which is decreased by 2-3 m due to the depression caused by the wells. At low water stages of the river the water yielding aquifer depth is further reduced by about 2 m, and the natural filter area of the channel bed decreases accordingly.

Water is being abstracted at 17 waterworks sites from 31 shafts from 83 radial- and 439 pipe wells. The maximum capacity of the entire group of wells is 0.8 million m^3/d, while the annual average water production is nearly the same. This is about two-thirds of the total drinking water demand of Budapest.

In general the quality of water abstracted by the wells is directly suitable for human consumption. Average values of iron, manganese and ammonium are 0.01 mg/l, 0.04 mg/l and 0.06 mg/l respectively. In some areas nitrate contamination represents a potential hazard due to local sources of pollution (at some locations nitrate in the groundwater exceeds the health limit value of 40 mg/l, but it will not appear in the wells due to dilution water drawn from the Danube).

In the period of 1970-1987 approximately 16.5 million m^3 gravel had been dredged from the Danube channel between Budapest and Nagymaros, mostly for commercial (industrial) purposes. Three characteristic "dredging reaches" can be distinguished: the section between Nagymaros and Vác from where approximately 10 million m^3 gravel had been dredged in the period of 1970-77. The section between Vác and Göd yielded four million m^3 gravel in 1974-1980, while somewhat less gravel had been dredged from the channel between Göd and the downstream end of the Szentendre Island (2.4 Mm^3). In the other, the Szentendre, river arm most of the total of 4.0 million m^3 gravel that had been dredged in the period of 1970-1987 originated from the river reach between Dunabogdány and Kisoroszi and from that between Szentendre and Tahi. Commercial/industrial gravel dredging was terminated in 1980. Dredging operations in 1985 were related to the construction of the Nagymaros river dam. Dredging activities continued in the Szentendre arm also in 1987.

An R&D project on "the protection and development of bank-filtered drinking water resources " was carried out in the period of 1980-85 under the leadership of the Waterworks of Budapest. Under the framework of this programme a survey of existing waterworks and of the potentially utilizable bank-filtered drinking water resources was made. The Szentendre Island, the northern water resource of the Budapest Waterworks, was a prominent area of these studies. Some of the findings of this project will be quoted below:

> "The water level of Danube has decreased in the low-to-medium flow domain, both in the Main Danube and in the Szentendre arm. The water stage corresponding to the annual lowest flow has decreased , in comparison to that of 1947, by 60 cm and 123 cm at Budapest and Nagymaros, respectively. In between it might be as much as 1.5 m, due to the uneven channel bed. The duration of low flows has also been increasing. The reason is the lowering of the channel bed caused by the industrial gravel dredging activities of the past 15-20 years. The consequence is that the depressions of the production wells and the recharge to the off river background aquifers are decreasing. Both effects reduce the production capacity of the wells. The estimated capacity loss is 80,000 - 100,000 m^3/d. The present total capacity, withdrawn without damaging the recharge system of the water resources, of the northern bank-filtered water abstraction

units can be 800,000 m^3/d at the mean water stage of the river (3.0 m at the Budapest gauge)"

"The channel of the River Danube has changed significantly during the past 15-10 years;- it has subsided due to the effects of commercial gravel dredging (20 million m^3). The average channel subsidence amounts to 1.6 m, while in the main streamline it reaches 2.5 m. The low-flow channel cross-section area was increased and the channel bed became uneven.

These changes resulted in the change of the slope and flow velocity conditions of the reach of concern. In the low flow period the slope of the water surface varies in the range of 2-28 cm/km and the mean velocity of the cross-section area remains, at some locations, below 50 cm/s.

As a consequence of these features fine fractions of suspended solids, silt and organic matter have deposited onto the channel bed, and especially into the dredging pits and in the vicinity of the banks as well as in the vicinity of river training facilities (e.g groins). Upsilted banklines were formed along about a length of 15 km.

The consequences are: The permeability of the river bed decreases; reduction processes are taking place; the iron and manganese content of the water produced increases. The production capacity involved might be as much as 100,000 m^3/d."

"The gravel terrace under the Danube channel can be divided into two parts, in terms of its water yielding function. The first is the so called filter layer which is of a few centimeters thickness and acts as an ultra-slow filter, removing 99 per cent of the contaminants. The second part is the gravel aquifer proper which conveys the infiltrated water. About 50 - 3000 m of the length of the wetted perimeter of the cross-section can act as a filter zone, depending on the water level of Danube and on local circumstances.

Under "natural" circumstances, in the early nineteen-sixties, the thickness of the aquifer below the Danube channel was about 4-7 m, both in the main and the Szentendre arm of the river. Due to the effect of commercial gravel dredging this thickness has decreased to 1 - 4 m. The area of the filterzone has decreased by about 2 km^2, and the associated capacity loss is about 200,000 - 300,000 m^3/d."

"The quality of the groundwater resource of the Szentendre Island is determined by the quality of the Danube water, the effectiveness of the filtration process and the activities (sources of pollution) on the off-river background zone.
Water quality processes taking place during filtration across the gravel bed are not fully known yet. Nevertheless it has been proven that most of the processes take place in the channel bed. Depending on the bed material (reductive and oxygenated zones), they exhibit spatial and temporal variation.

It follows from the above conditions that the loss of capacity will be the highest under unvafourable hydrological circumstances. The wells became sensitive to the variation of Danube water

stages. There is a danger of the continuing tendency of these unfavorable effects, since in the periods of low water stages filtration velocities are accelerated to an extent which results in the increase of filter resistance.

The only remedial or control strategy that remains available for these northern subsurface drinking water resources is to maintain water recharge conditions by all means. In the opposite case, in the case of further damage to the filter zone, the deterioration of the complete drinking water resource must be taken into consideration in the long term, a process that might lead to the abandonment of the system. The channel regulation downstream of Nagymaros must be planned with due concern for the above hazards.

The water quality of the water withdrawal units is determined by that of the Danube water, by the groundwater quality (sources of pollution) in the background zone, and by the mixing/blending of the above two types of water, which changes as a function of time and space and of the operational conditions of the waterworks. At present the quality of the water produced by the northern waterworks units is well below the standard limit value in terms of oxygen consumption and total hardness. The iron content regularly causes slight problems at some wells and occasionally at other ones. Manganese and ammonium tend to occur jointly, and their occurrence is usually related to the redox conditions of the infiltration zone."

In order to demonstrate the vulnerability of bank-filtered drinking water resources to river training interventions the deterioration of the quality of the water of some of the wells of series of 20 wells of the Surány Waterworks is illustrated in Figure 30 (László, 1987):

"In the preparatory phase of the works exploratory wells were drilled in 1965 and 1966 and the water samples taken from these wells indicated good water quality free of iron, manganese and ammonia; thus proving the bankline suitable for the establishing waterworks.

The waterworks of Surány is one of the best protected waterworks in the Szentendre Island, consequently the causes of water quality deterioration, should be also investigated in the main channel side.

At the section of well No.7 there were two gravel dredging pits 4.5 and 1.5 m deep, respectively, filled with silt, as identified by channel survey and sediment sample data.

This dredging pit continued towards wells Nos. 8. and 9. in a ditch-like fashion. Particle size, organic matter, iron, manganese, biological and bacteriological data provided an exact picture of the silt thickness and position, and provided evidence for the intrusion of manganese and iron from the sludge to the water bearing layers. The channel bed, damaged by dredging allowed the penetration of bacteria and other microorganisms into the aquifer, that is the bank-filtration function was severely damaged

and its efficiency was rendered insufficient."

Along the Nagymaros-Budapest Danube reach the following bank-filtered drinking water resources can be found on the right bank of the river, in addition to the above discussed Szentendre Island resource (values in brackets indicate the average production rates):

The Dunabogdány Waterworks (700 m^3/d),
The aquifer at Leányfalu (also utilized by the Szentendre Waterworks) (14,000 m^3/d),
The Northern water resource of the Szentendre Waterworks (500 m^3/d),
The Southern water resource of the Szentendre Waterworks (2500 m^3/d),
The Southern regional water resource of the Szentendre Waterworks (8,000 m^3/d).

These water resources are facing problems represented by contamination originating from the off-river background zones of the aquifers.

On the left bank of the Danube reach of concern the following bank-filtered drinking water resources are found:

The Verőce unit of the Vác Waterworks (22,000 m^3/d),
The Buki Island unit of the Vác Waterworks (out of operation),
The southern unit of the Vác Waterworks (out of operation),
The Felsőgöd Unit of the Göd Waterworks (800 m^3/d),
The Alsógöd Unit of the Göd Waterworks (1,600 m^3/d) and the Dunakeszi Waterworks (1,500 m^3/d).

These water resources are also characterized by the intrusion of contaminated groundwater flow from the background zone. The Souther water resource of the Vác Waterworks became fully contaminated and its operation had to be terminated. The Felsőgöd unit is utilized in peak operation mode only (e.g to be blended with other waters), due to its bad water quality. At the water resources of the Verőcemaros and Felsőgöd units water quality problems occur also at the river side: silt depositions, caused by sluggish flow behind river training structures, created iron, manganese and ammonia problems (Figure 29.).

2.3.2 Effects of the hydropower scheme

Downstream of Nagymaros the river barrage system would have caused problems of the bank-filtered drinking water resources due to the changes of the water regime, sediment loads and the channel geometry as far downstream as Budapest.

The outstanding importance of the drinking water resource of the island of Szentendre would not have allowed the slightest increase of the risks of damage to these resources, which were to be caused by the expected changes of water- and sediment regime and of the water quality of the river.

If the facilities contemplated by KET were implemented the following risks would have been faced:

- The water quality of the river upstream of the Nagymaros dam could have become worse than the original water quality,

- Removal of the silt deposited upstream of the Nagymaros dam was to be facilitated by the occasional flushing of the headwater basin. Settling pattern of the thus released excess sediment loads downstream of the dam could have created rather uncertain conditions;

- Reduced sediment content of the river, associated with the energy of the water released, could have caused channel erosion downstream of the dam. The risk of this was even higher since the channel here contains more sand than that of the gravelly channel of the Szigetköz area.

With respect to the above mentioned risks no detailed investigations that could have quantified these effects had been made. Nevertheless neither were results of investigations available to prove the insignificance of the above hazards. Research into the mechanism of the bank-filtration process of the Szentendre island has provided evidence that the process, which converts Danube water of non-potable quality into ground water of excellent quality takes place in a few cm thick layer of the river channel, where the attached ecosystem has an important biological role in this treatment process. This thin layer is very sensitive to disturbance and thus one should avoid any river training or regulation works along the Danube

reach of concern, which could endanger the stability of this channel layer.

3. Summary evaluation

3.1 Summary grouping of the effects

3.1.1 Favourable and unfavorable effects of the original design, as of the KET

The problems of groundwater resources that would occur in the case of implementing the original plans of the hydropower scheme BNV (as it was contemplated in the Mutually Agreed Plan KET) can be summarized as follows:

- In the Szigetköz and the related Danube reach:

  - It is very likely that the quality of the water exfiltrating into the groundwater from the Dunakiliti reservoir through the silt deposited there will be worse than the water recharged originally by Danube through the gravel channel bed: due to anaerobic conditions dissolution of iron and manganese is to be expected, while reductive processes resulting in the generation of hydrogen sulphur or methane gasses are less probable. One might state also with lower probability that the above processes would accelerate the enrichment of organic and inorganic micropollutants. With the propagation of the channel bed clogging process (colmatation) the rate of exfiltration from the reservoir would certainly decrease but there is no reliable knowledge that would allow the estimation of the time dependence of this process.

  - It can be also stated with confidence that similar problems would occur if the water level in the abandoned Danube channel was raised by the construction of bottom dikes, since this would also be associated with decreased flow velocities. There are contradictions among the opinions of experts on the magnitude of flow velocity that

would be required for avoiding the above harmful effects. The range of critical flow velocities is 0.15 -0.3 m/s. At flow velocities larger than this there is less probability of the clogging of the channel bed and of the occurrence of water quality deterioration.

- In the case of artificial recharge (infiltration) systems, aimed at the complementary supply of water into the dewatered side river arms and thus to the ground water, the clogging of channels and the deterioration of the quality of recharge waters can also be expected with great certainity, although time variation of these processes can not be estimated reliably.

- Several meters lowering of the water level of the abandoned main channel downstream of the Dunakiliti dam would certainly result in substantial subsidence of the ground water table of the zone near to the river. Knowing the hydrogeological parameters of this gravel aquifer one is able to estimate the expected changes with 1-2 dm accuracy. Groundwater subsidence will be counteracted, moderated, by seepage flows from the reservoir and by the artificial water recharge systems. Knowledge that would allow the confident prediction of these processes is not yet available. The "topography" of the groundwater table resulting from the above processes will, at the same time, influence the recharge conditions determining the direction and velocity of subsurface flow. It is most certain that there will be changes in this field but the extent, and time variation of these changes can not be predicted in a reliable way.

- In the light of the above considerations it is certain that damage to the potential drinking water resources of the Szigetköz will occur, but its extent or magnitude can not be predicted in a reliable manner. Among other factors there is no

knowledge available about the sites and withdrawal rates of contemplated future waterworks and water abstractions.

In the Lower Szigetköz and in the Gönyü-Nagymaros reach of the river there would certainly be sludge deposition, owing to the lower flow velocities of impounded river sections, and this would certainly be associated with water quality deterioration at the waterworks relying on bank-filtered water resources. Since the existing waterworks of this reach are in any case facing water quality problems independently of the river barrage system, the damages due to further water quality deterioration can not be quantified in a reliable way.

The intrusion of Danube water from the impounded reach into the Karstic storage system, in the vicinity of Dunaalmás and Esztergom, would have occurred in various ways, depending of the changes of the hydraulic head conditions of the karst. Exploration of this site was insufficient in respect to the hydraulic connection between the river and the karst and neither were the effects of the banning of large-scale mine water drainage on the rate of rising of hydraulic heads in the karst known.

In the reach downstream of Nagymaros only the effects of preliminary dredging, as contemplated by KET, on the capacity loss of existing waterworks could be forecast with reasonable reliability. Further problems, such as the sinking of the channel downstream of the Nagymaros dam and the deposition of silt, are only estimates and there is no knowledge that would permit the confident prediction of the extent of these processes.

3.1.2 Actual damage

Damage that has certainly occurred during the construction works of the project is the loss of water production capacity of the wells of the Szentendre Island, caused by the preliminary dredging operation downstream of Nagymaros. The magnitude of this loss is still disputed, with estimates varying in the range of 70,000 - 300,000 m^3/d. Uncertainities of judging this damage stem from the fact that dredging was made not only for the purposes of the river dam but also for commercial/industrial ones and the extent of dredging was also larger than contemplated by KET.

Following the diversion of the River Danube in 1992, that is upon the implementation of "Alternative C" the groundwater table has actually subsided, as it was discussed above. This subsidence has resulted in damage related to natural ecosystems, forestry and agriculture. The actual damage to the existing waterworks of the Szigetköz can not yet be evaluated. Damage to the potential drinking water resource of the gravel complex can not be unambiguously determined: The location , direction and magnitude of recharge into the gravel have substantially changed, but the deterioration of the quality of subsurface waters is expected to occur in the long term and can not yet be detected.

3.1.3 Expectable future damages in the case of maintaining the present conditions of water distribution

If the present conditions were maintained in the long run then damage to nature conservation, forestry and agriculture will be done, with high probability, at all those sites where the topsoil of fine particle size had earlier received moisture from the groundwater, and this supply has now been terminated.

The potential drinking water resource of the gravel complex will be most certainly damaged but this is a long process that will develop over several decades. Damage is mostly expected in terms of water quality deterioration but the form and magnitude of this deterioration can not be quantitatively estimated yet. The possibilities of establishing further water abstraction wells in this potential drinking water resource are much curtailed by the facts that the source of water recharge to the gravel was shifted from the main channel of Danube to the area of the Dunacsúny

reservoir and became rather uncertain and also to the similarly uncertain source of recharge that is provided by the artificial recharge system of the floodplain and the areas outside the flood levee. It has became an urgent necessity to eliminate the local sources of pollution at an accelerated rate and by all means.

It is expected with great certainity that the impounding effects of the tailwater canal will cause the settling of considerable silt quantities in the area of the river arm system of Ásvány and Bagomér and this will influence the subsurface waters. However there is insufficient knowledge available for the estimation of the effects of the related processes.

3.1.4 Risks related to the alternatives which emerged at the tripartite negotiations

In the tripartite negotiations held in 1992-93 with the participation of Slovakia, Hungary and the EC the possibility of rediverting Danube back to its original main channel was also discussed. In this material we will not be dealing with this solution.

The EC has supported the Hungarian proposal according to which more than half of the flow of Danube would be rediverted, as a function of the season of the year, to the old channel, while keeping the establishments and structures of "Alternative C". This could, however, only be a temporary solution for a period of a few years, since groundwater subsidence would also be associated with this solution, although higher rediverted rates requested for the growing season, might reduce this subsidence to a tolerable level. Water of degraded quality, expected to infiltrate from the Dunacsúny reservoir into the gravel, will be encountered also in the case of this alternative; moreover this might become even more pronounced with the lessening of the drainage effect by the now abandoned main Danube channel.

A recent proposal supported by the EC was that more water would be discharged into the old channel than the present rate but less than that discussed above and this would be associated with the simultaneous construction of bottom dikes and with the artificial recharge system to the floodplain and to the area outside the flood levee. This could, in principle, solve the problems related to groundwater subsidence and to the damage to the potential drinking water resource. Nevertheless this plan has not been elaborated in sufficient detail. It is highly uncertain

whether clogging of the channel bed (colmatation) would occur in the abandoned main channel after impoundments are created by the bottom dikes, whether it would occur in the artificial recharge system or not and whether there will be water quality changes and if so of what magnitude. The same is the case with the other complementary water supply systems which are to utilize water from the partially impounded reach upstream of the Dunakiliti dam.

3.2 Reliability of knowledge

3.2.1 Lack of knowledge in various phases of the history of the BNV system

Before the preparation of KET and before the elaboration of the impact assessment study and until the suspension of the construction works of the river barrage system, until 1989, the lack of knowledge can be summarized as follows:

- Specialists dealing with subsurface waters had no knowledge of the expected quality of water to be recharged into the groundwater resources and neither were known the extent, site and rate of accumulation of pollutants in the impoundments. This refers to the Dunakiliti reservoir as well as to the Danube reaches upstream and downstream of the Nagymaros dam;

- The above mentioned water quality and sedimentation (colmatation) problems have not yet been resolved and they also refer to the proposed artificial water supply and recharge systems too;

- Hydrogeological research into the gravel complex aimed at the more detailed exploration of the inhomogeneities of the gravel formation has not yet been completed and the same refers to the hydrogeological modelling of transport processes as well as to the actual design activities related to the protection of water withdrawal systems to be based on these resources;

  More detailed exploration of the connection between the Danube and the karstic water storage system would

provide much needed further information;

- The outstanding importance and high vulnerability of the bank-filtered drinking water resource of the Island of Szentendre, downstream of Nagymaros does not allow the undertaking of risks due to the lack of knowledge of the properties of this complicated system.

Between the suspension of the construction works (1989) and the cancellation of the contract (1992) knowledge has been expanded in the following fields:

- Hydrogeological conditions of the Szigetköz;

- More detailed information on the contemplated artificial water supply and recharge systems.

After the cancellation of the contract and the diversion of Danube (1992) knowledge of the Szigetköz area has been significantly expanded:

- Ground water levels before and after the diversion of the Danube have been evaluated;

- knowledge on the efficiency of artificial complementary water supply and recharge systems has been expanded.

There is still insufficient knowledge available with respect to the following issues:

- Clogging (colmatation) of the channel by deposited sediment and the related water quality problems;

- Water movement and water quality of the deeper layers of the gravel complex of the Szigetköz;

- Concrete plans for the future utilization of the potential drinking water resource of the Szigetköz (about the construction of wells);

- Risks related to river training interventions contemplated in the area of the Island of Szentendre.

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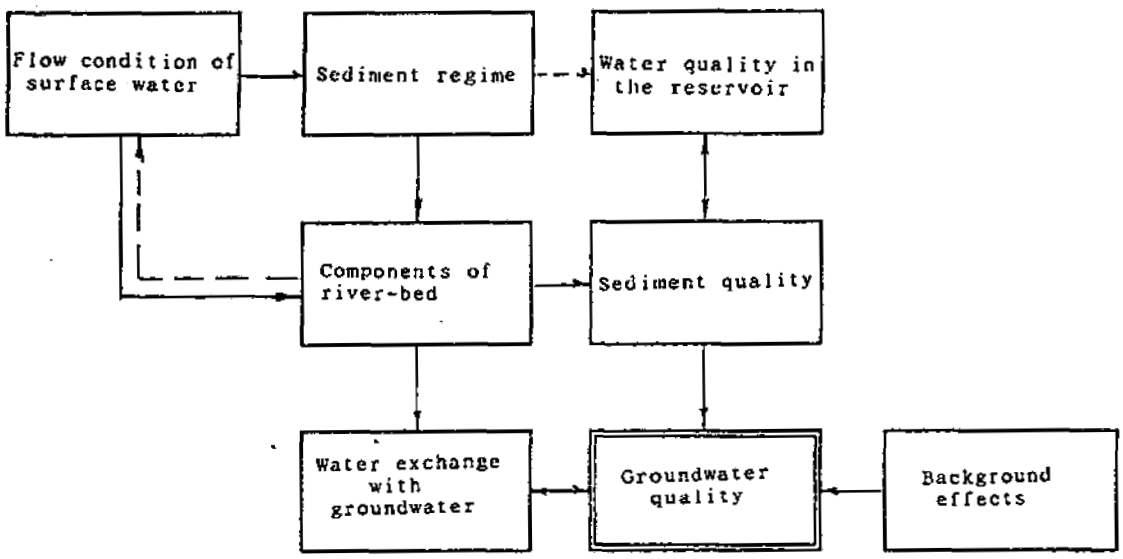


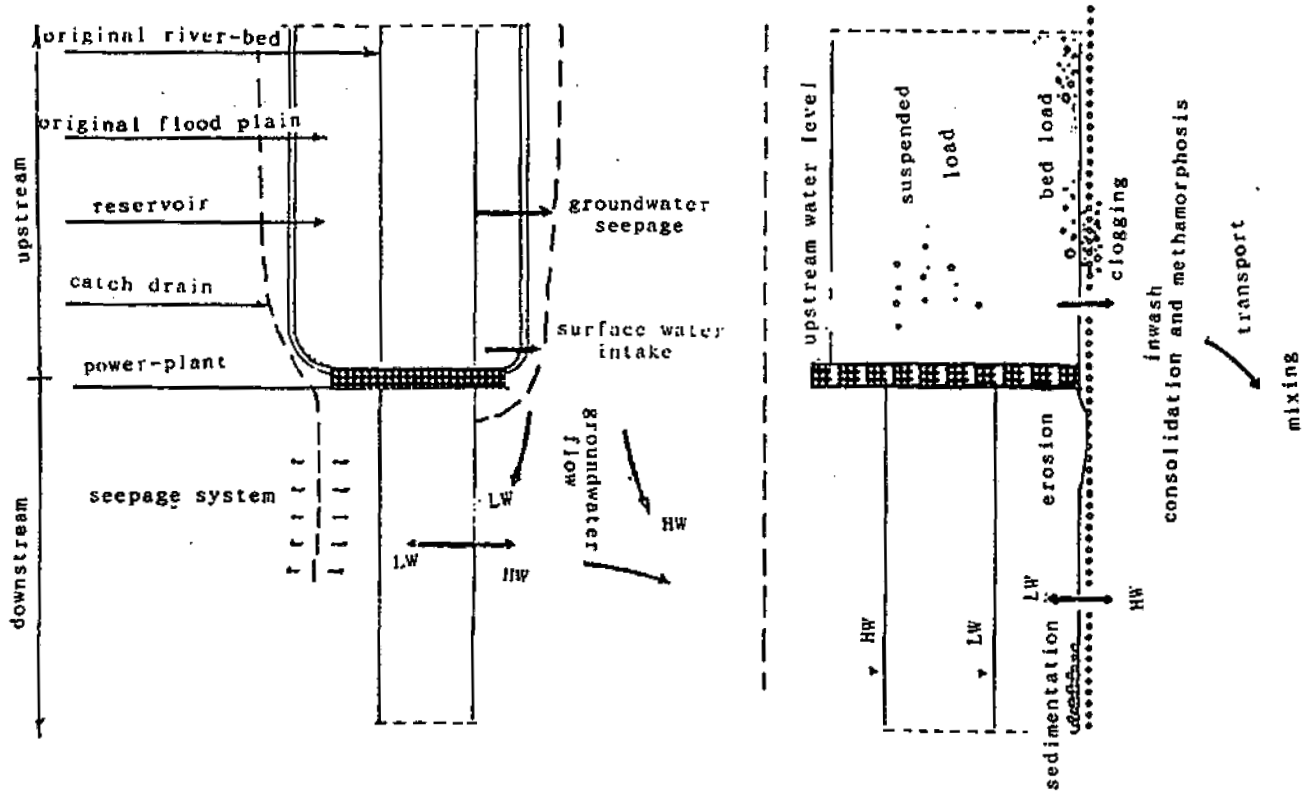


Fig 1. Effect of barrage systems to the groundwater. Principal scheme. (After Z. Simonffy)

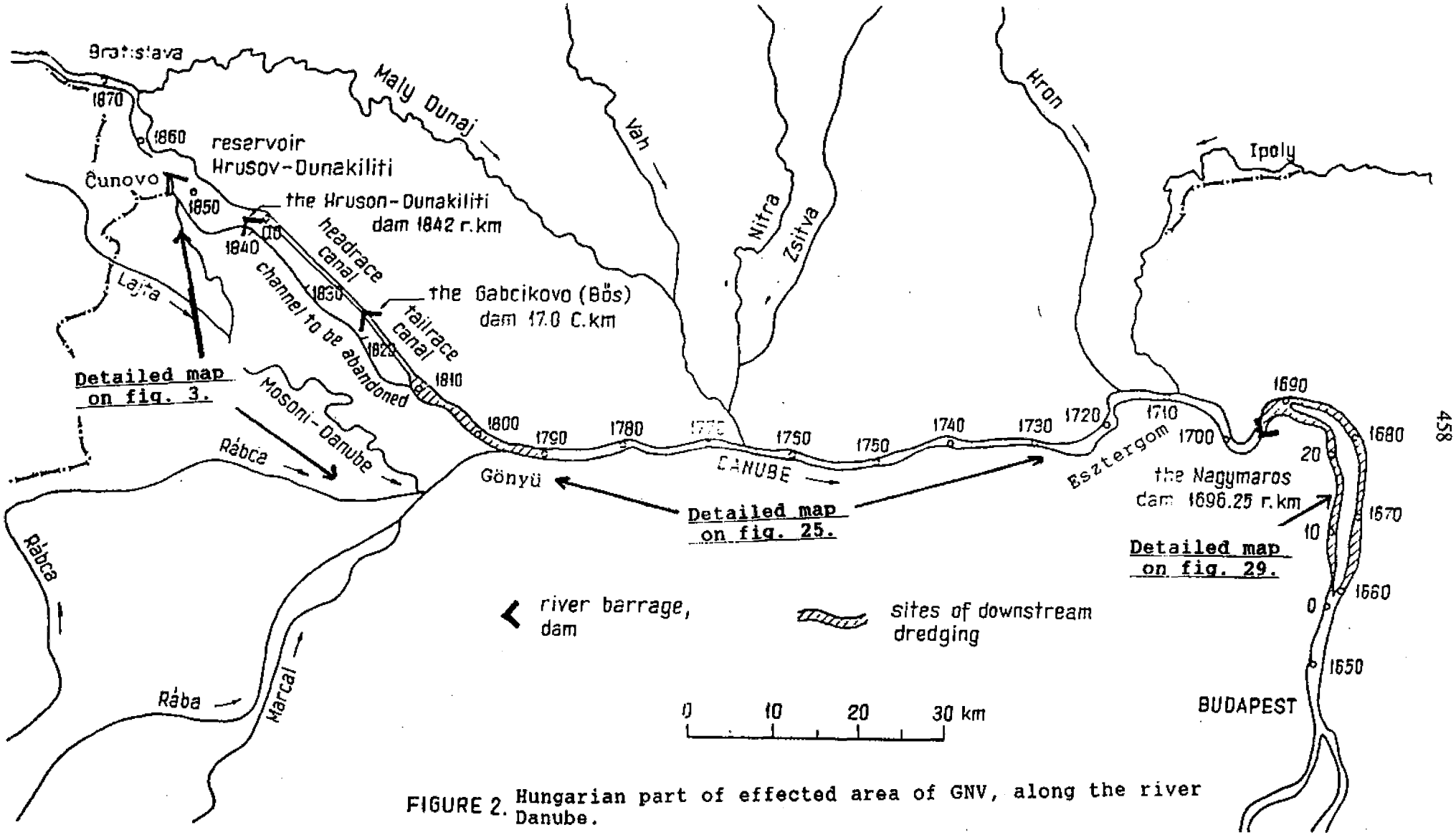


FIGURE 2. Hungarian part of effected area of GNV, along the river Danube.

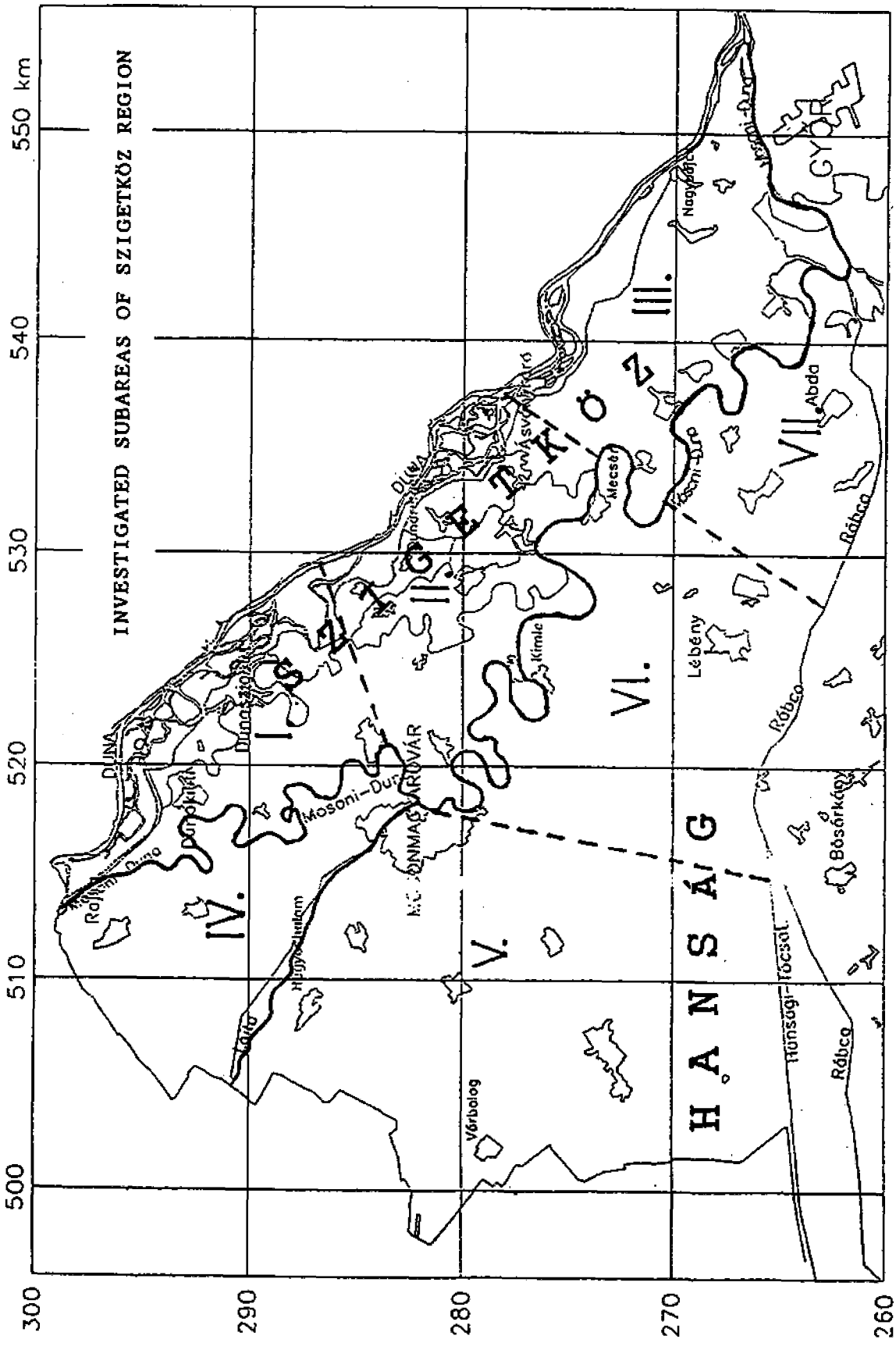

INVESTIGATED SUBAREAS OF SZIGETKÖZ REGION
550 km
540
530
520
510
500
300
290
280
270
260
I.
II.
III.
IV.
V.
VI.
VII.
SZIGETKÖZ
HANSÁG
DUNA
Dunaszigeti-Duna
Mosoni-Duna
Rajkai-Duna
Hajógyári-sziget
Lajta
Vérbalog
Kimle
Mecsér
Lébény
Abda
GYÖR
Rába
Hanságí-főcsat.
Bősárkány

Fig.3.

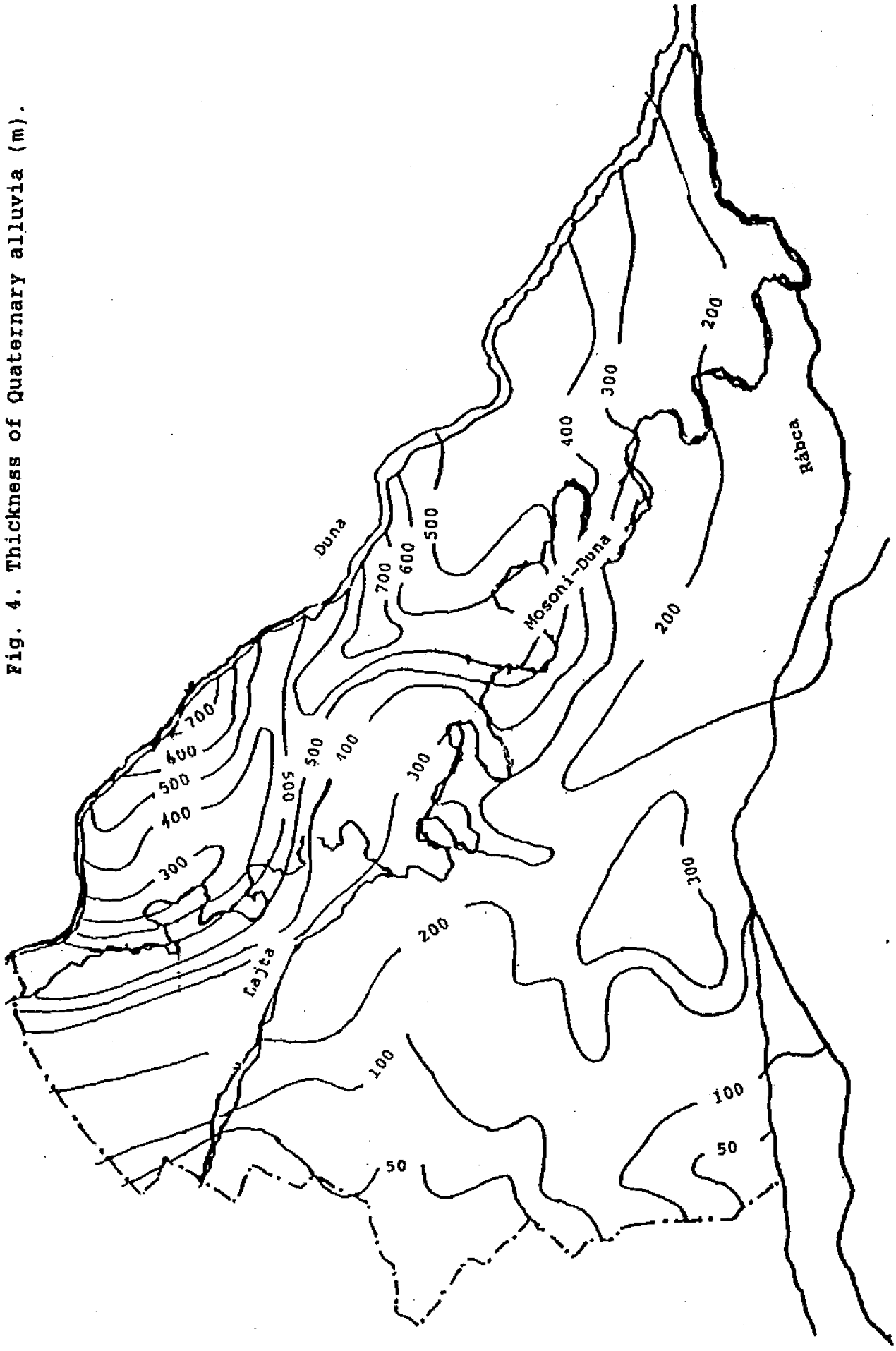


Fig. 4. Thickness of Quaternary alluvia (m).

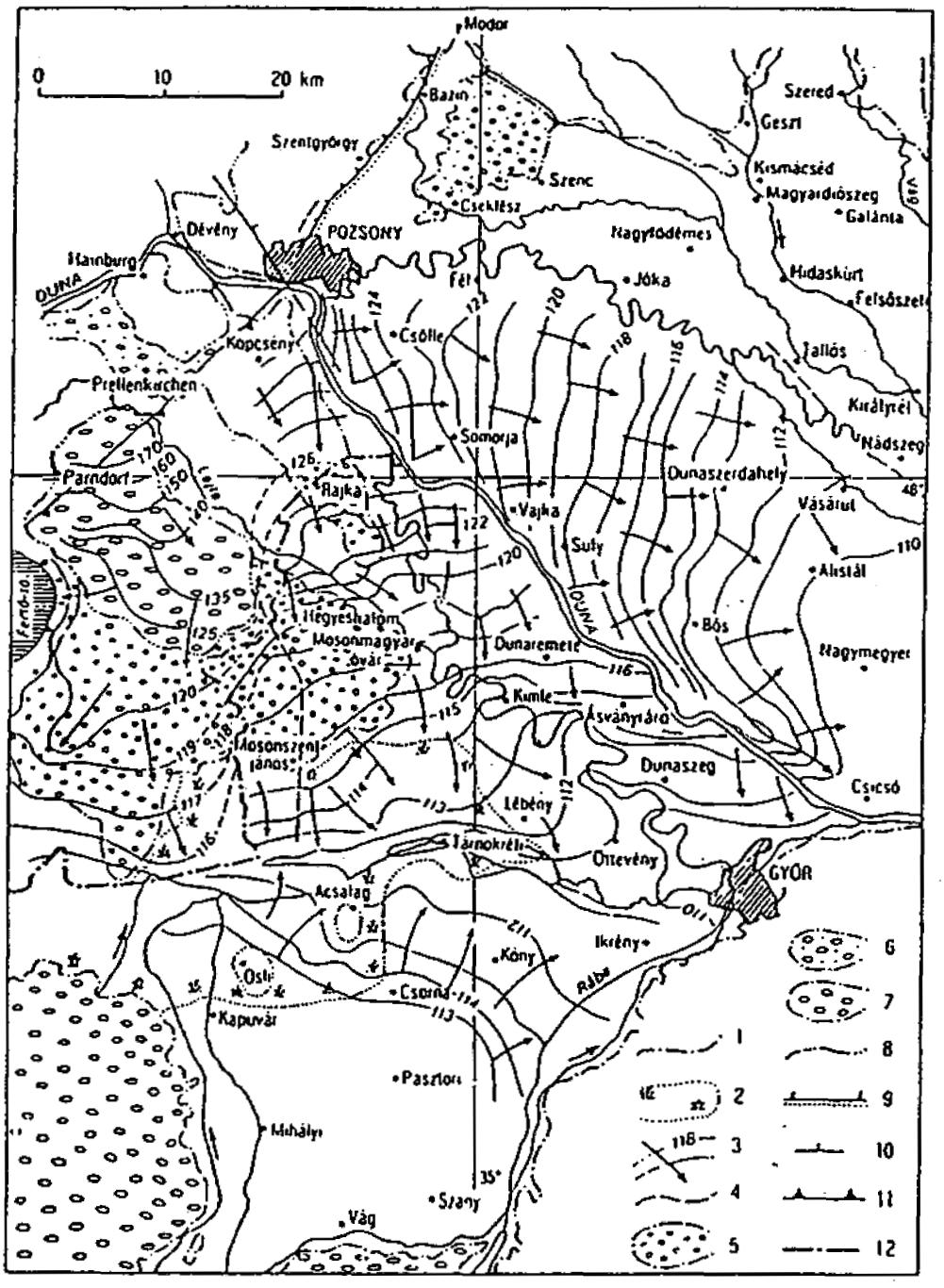
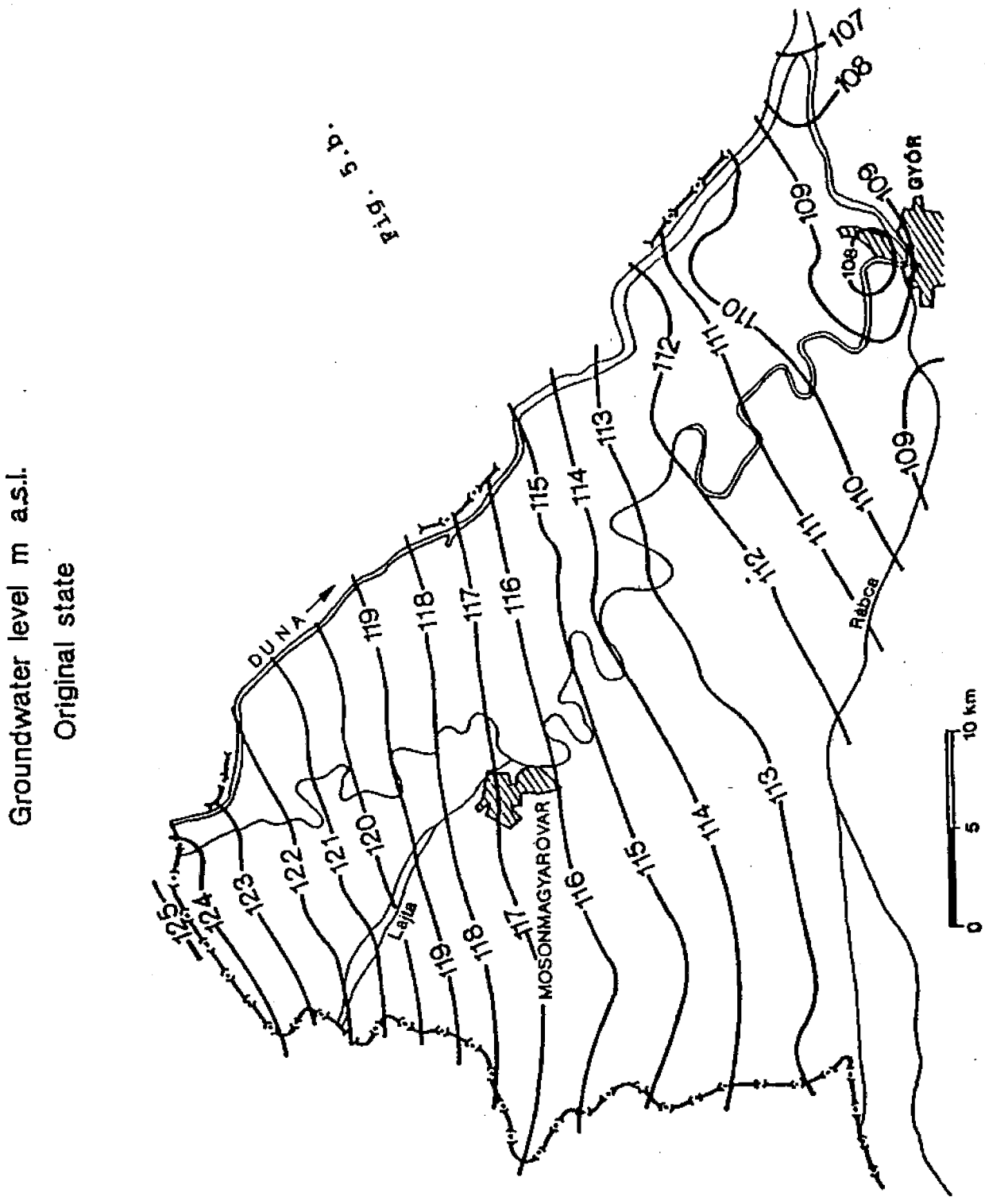


Fig. 5.a. Hydrogeological map of the Little Pannonian Lowland (Erdélyi 1990.p.9)

Explanation: 1 = boundary of the alluvial plain; 2 = area of the Hanság swamp (in 1769); 3 = groundwater contour a.s.l. and direction of flow; 4 = outer boundary of the Danube river recharge of the groundwater (high river stage); 5 = area of groundwater susceptible for surface contamination (thin gravely soils); 6 = higher alluvial terrace; 7 = high level of old gravel sheet; 8 = border of pre-Quaternary rocks; 9 = upthrust (Cepek, 1938); 10 = fault-zone (Cepek, 1938). 11 = fault-zone (geological map of Austria, 1961); 12 = western frontier of Hungary


Groundwater level m a.s.l.
Original state
Fig. 5.5.
DUNA
Lajta
MOSONMAGYAROVAR
Rábca
GYÖR
0
5
10 km

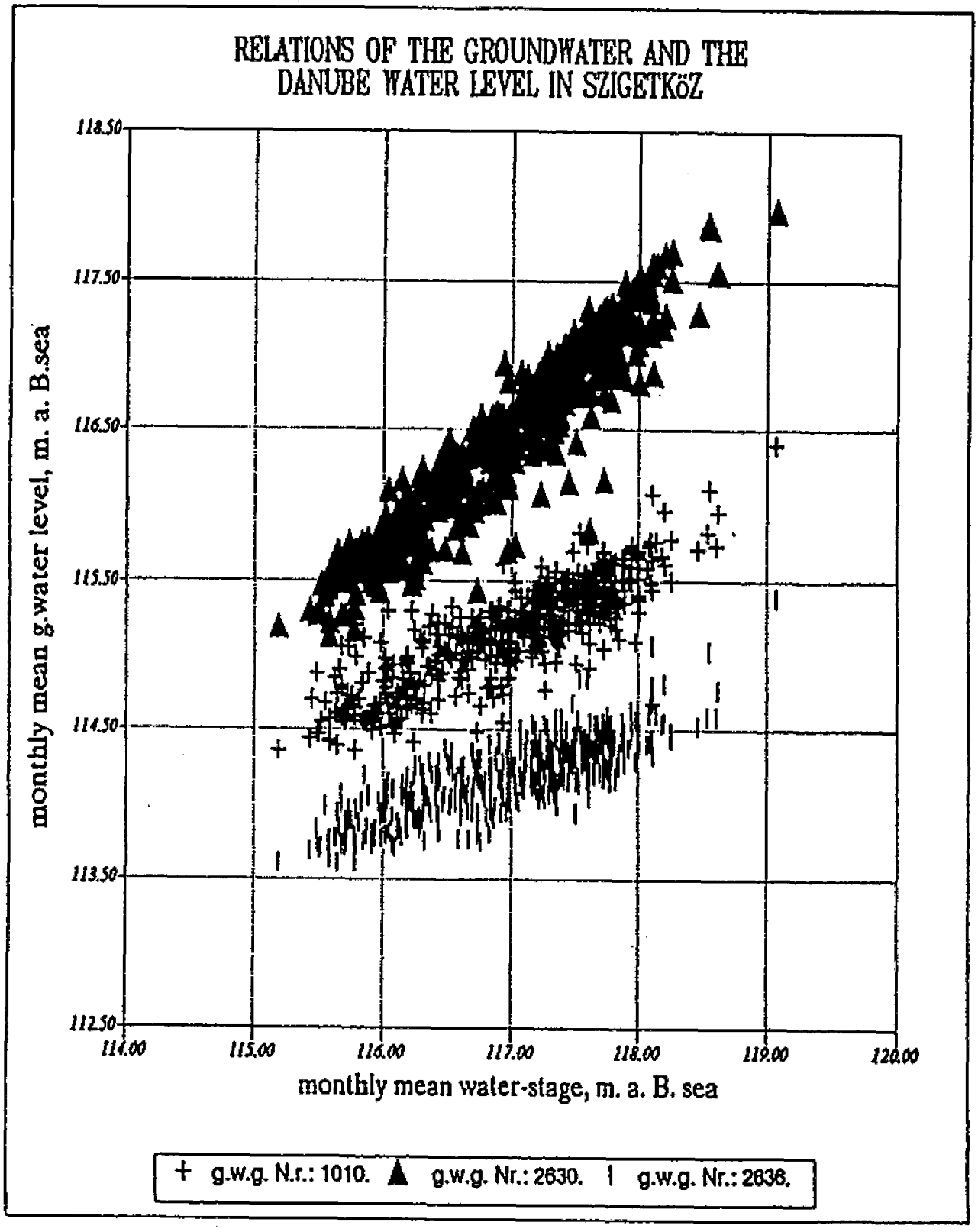

RELATIONS OF THE GROUNDWATER AND THE DANUBE WATER LEVEL IN SZIGETKÖZ
monthly mean g.water level, m. a. B.sea
118.50
117.50
116.50
115.50
114.50
113.50
112.50
114.00
115.00
116.00
117.00
118.00
119.00
120.00
monthly mean water-stage, m. a. B. sea
+ g.w.g. N.r.: 1010.
g.w.g. Nr.: 2630.
g.w.g. Nr.: 2636.

Fig. 6.

Change in groundwater level correlated to 1 meter change in Danube water level calculated on the base of monthly averages

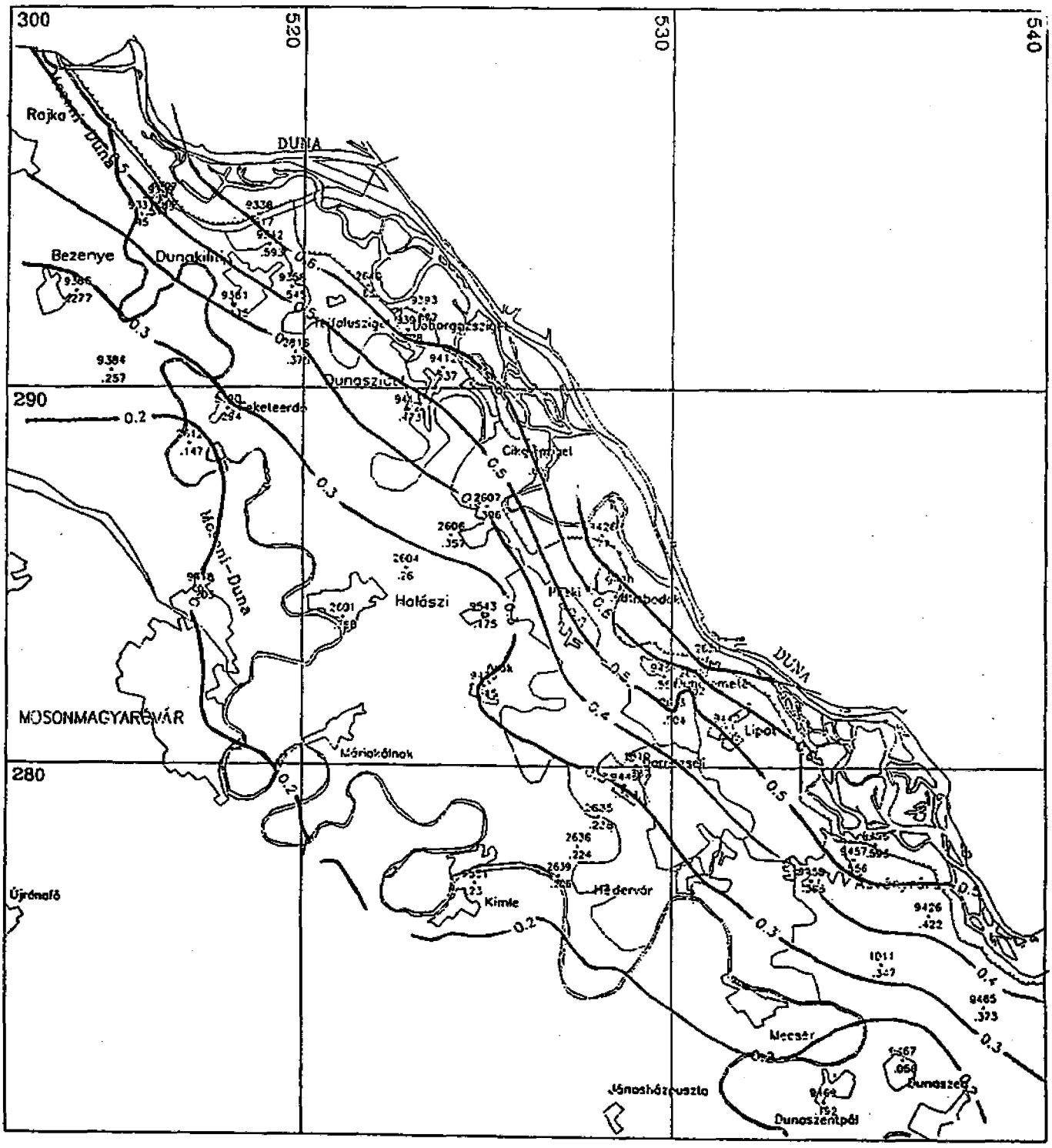
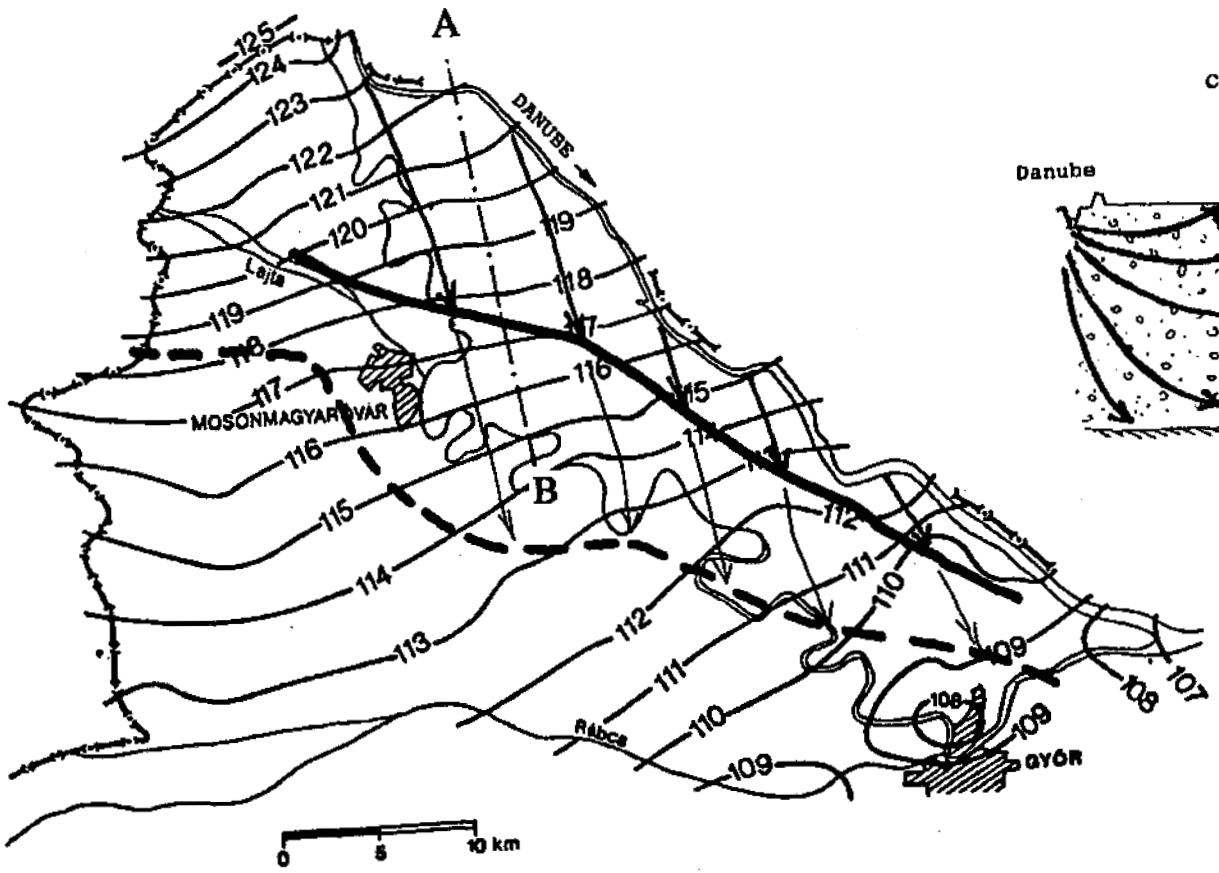
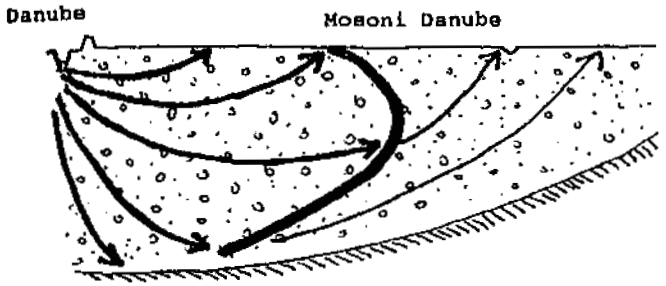


Fig.7.



cross section A - B



LEGEND

—115— ground water level (m a.s.l.) in original state

present location of the shallow ground water recharged from the Danube 30 years ago by tritium data

border of the ground water originating dominantly from Danube by oxygen isotope ratios

Fig.8.

Depth of groundwater table compared to the base of the top-layer [m].

Original state

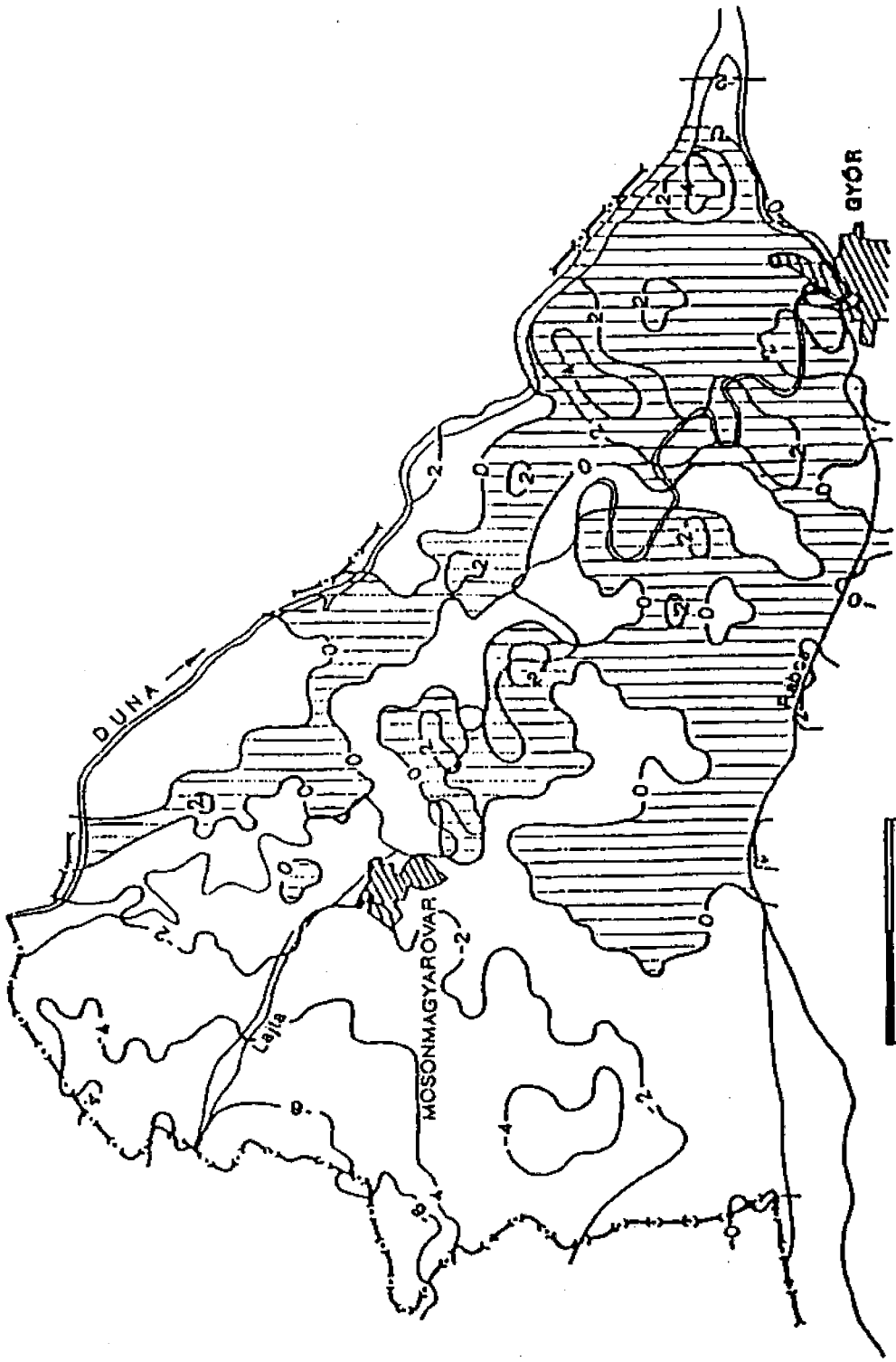


Fig. 9a.

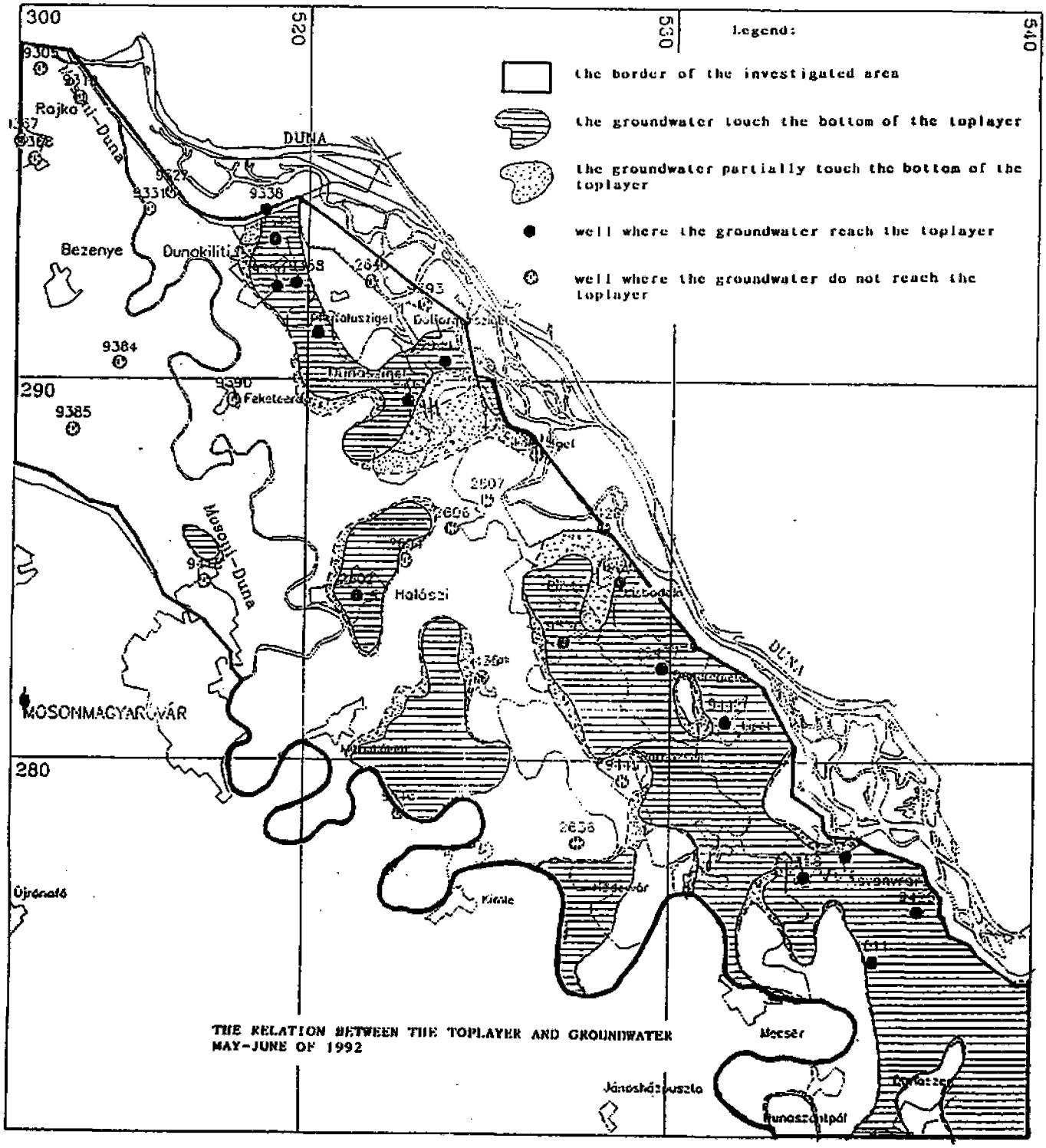

300
520
530
540
290
280
Legend:
the border of the investigated area
the groundwater touch the bottom of the toplayer
the groundwater partially touch the bottom of the toplayer
well where the groundwater reach the toplayer
well where the groundwater do not reach the toplayer
DUNA
Rajka
Bezenye
Dunakiliti
Mosoni-Duna
MOSONMAGYARÓVÁR
Halászi
Feketeerdő
Újrónafő
Kimle
Mecsér
Jánossházagyarte
Dunaszentpál
THE RELATION BETWEEN THE TOPLAYER AND GROUNDWATER
MAY-JUNE OF 1992

Fig. 9b.

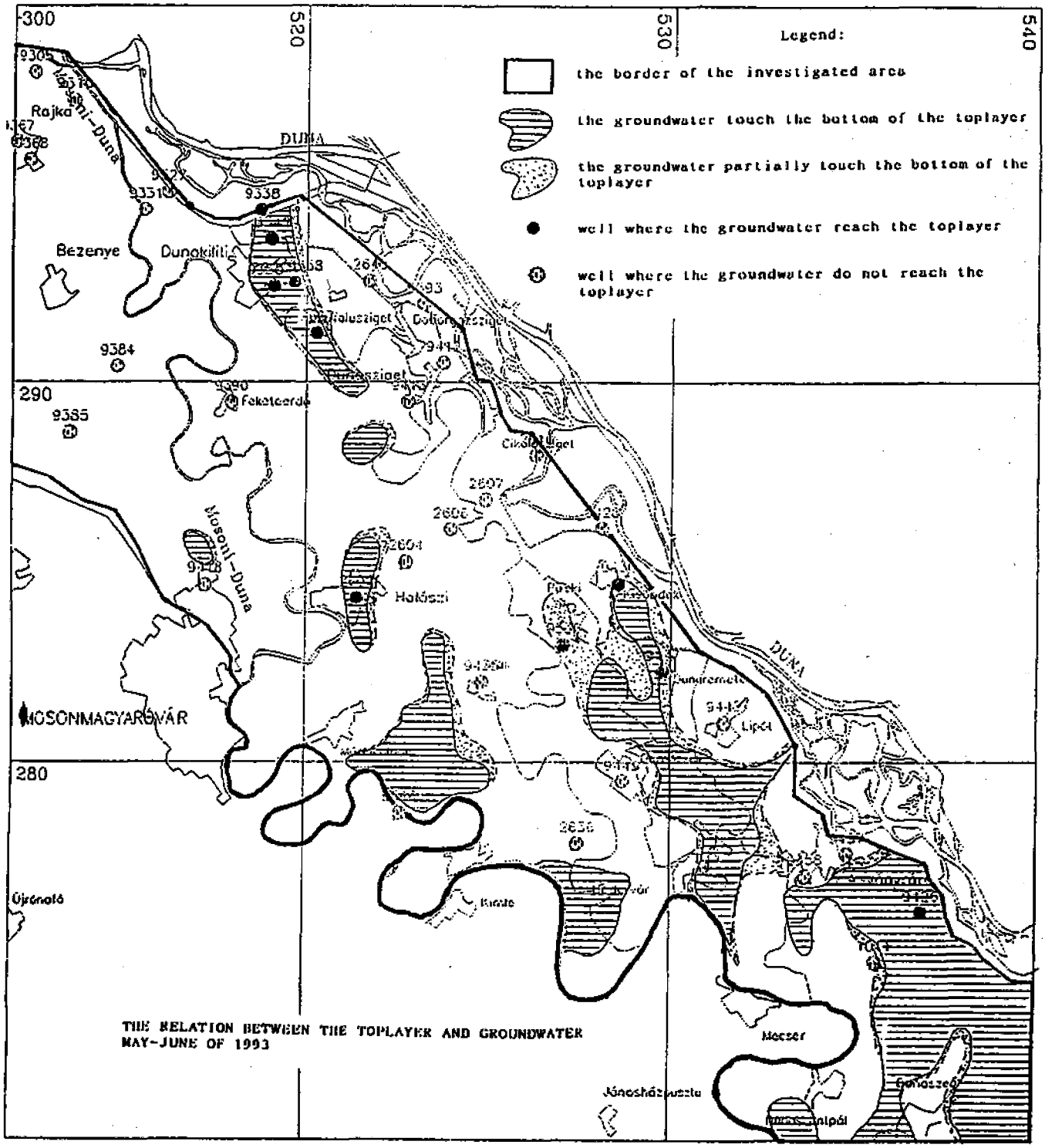
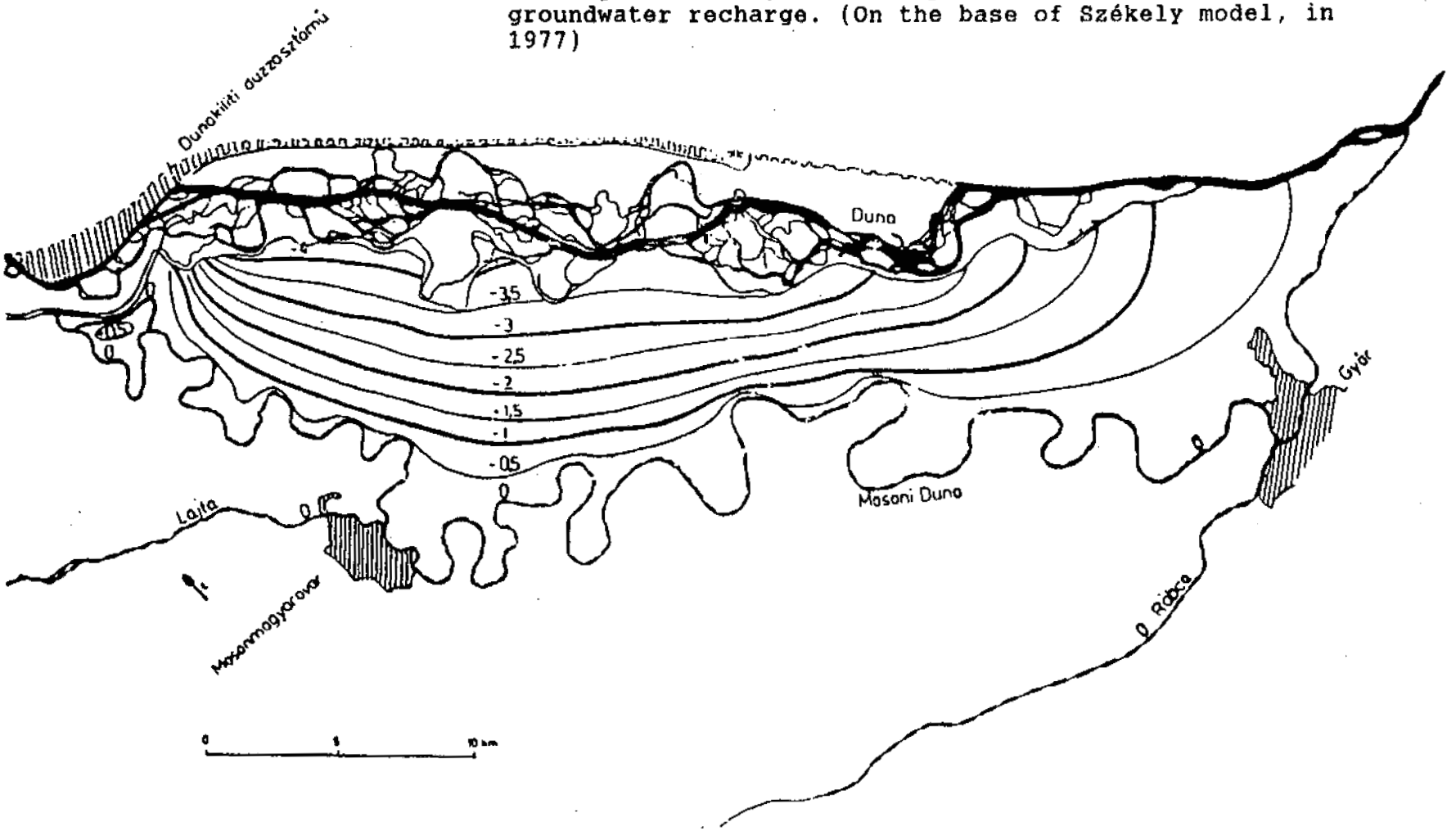

300
520
530
540
290
280
Legend:
the border of the investigated area
the groundwater touch the bottom of the toplayer
the groundwater partially touch the bottom of the toplayer
well where the groundwater reach the toplayer
well where the groundwater do not reach the toplayer
Rajka
DUNA
Bezenye
Dunakiliti
Feketeerdő
Halászi
MOSONMAGYARÓVÁR
Lipót
Ásványráró
Jánossomorja
Mecsér
THE RELATION BETWEEN THE TOPLAYER AND GROUNDWATER
MAY-JUNE OF 1993

Fig. 9c.

Fig. 10. Decreasing of groundwater table referring to the average of original state, in North part of Kisalföld. No groundwater recharge. (On the base of Székely model, in 1977)



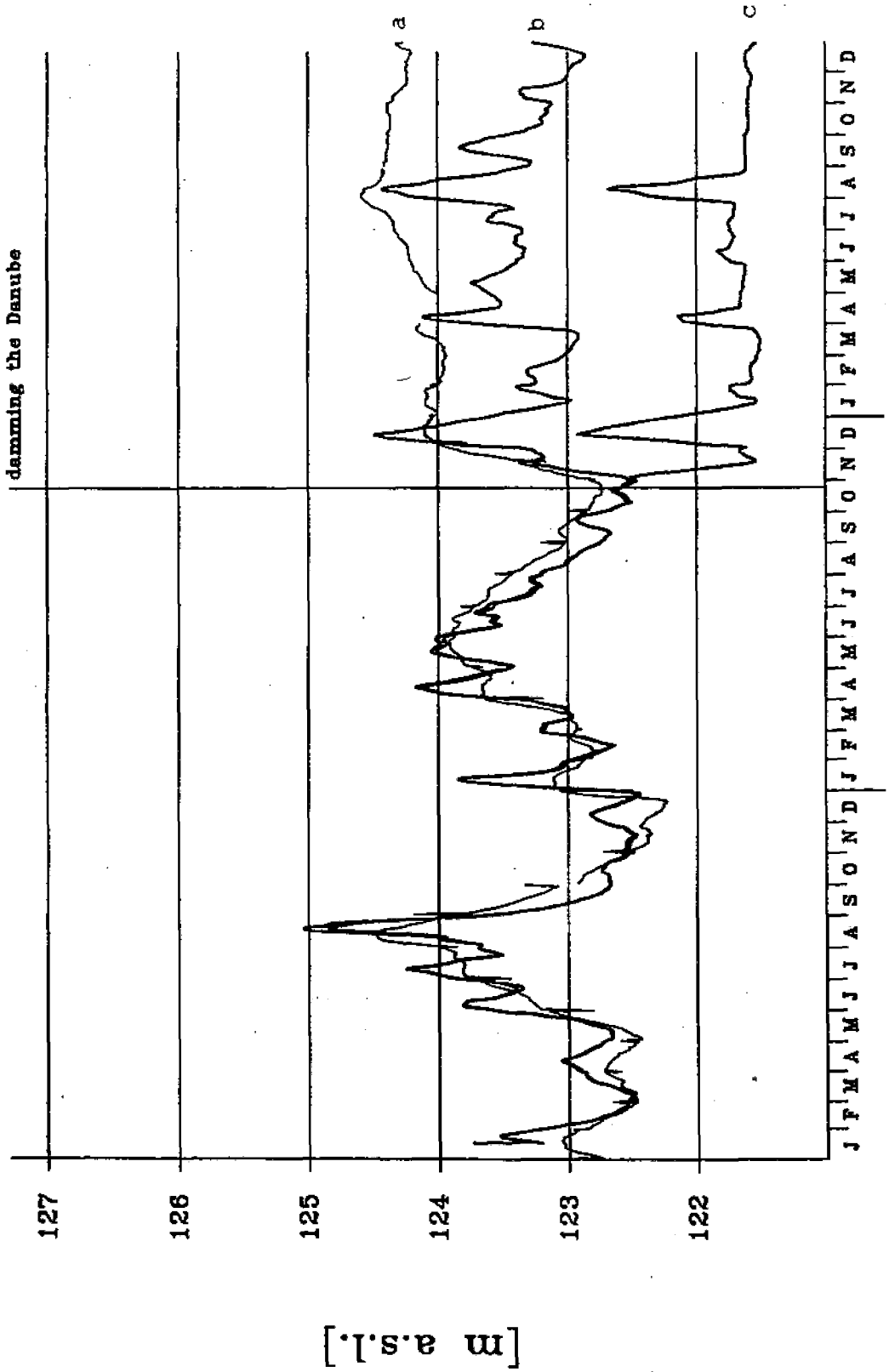

damming the Danube
a
b
c
127
126
125
124
123
122
[m a.s.l.]
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1991
1992
1993
R366 WELL

Fig.11.

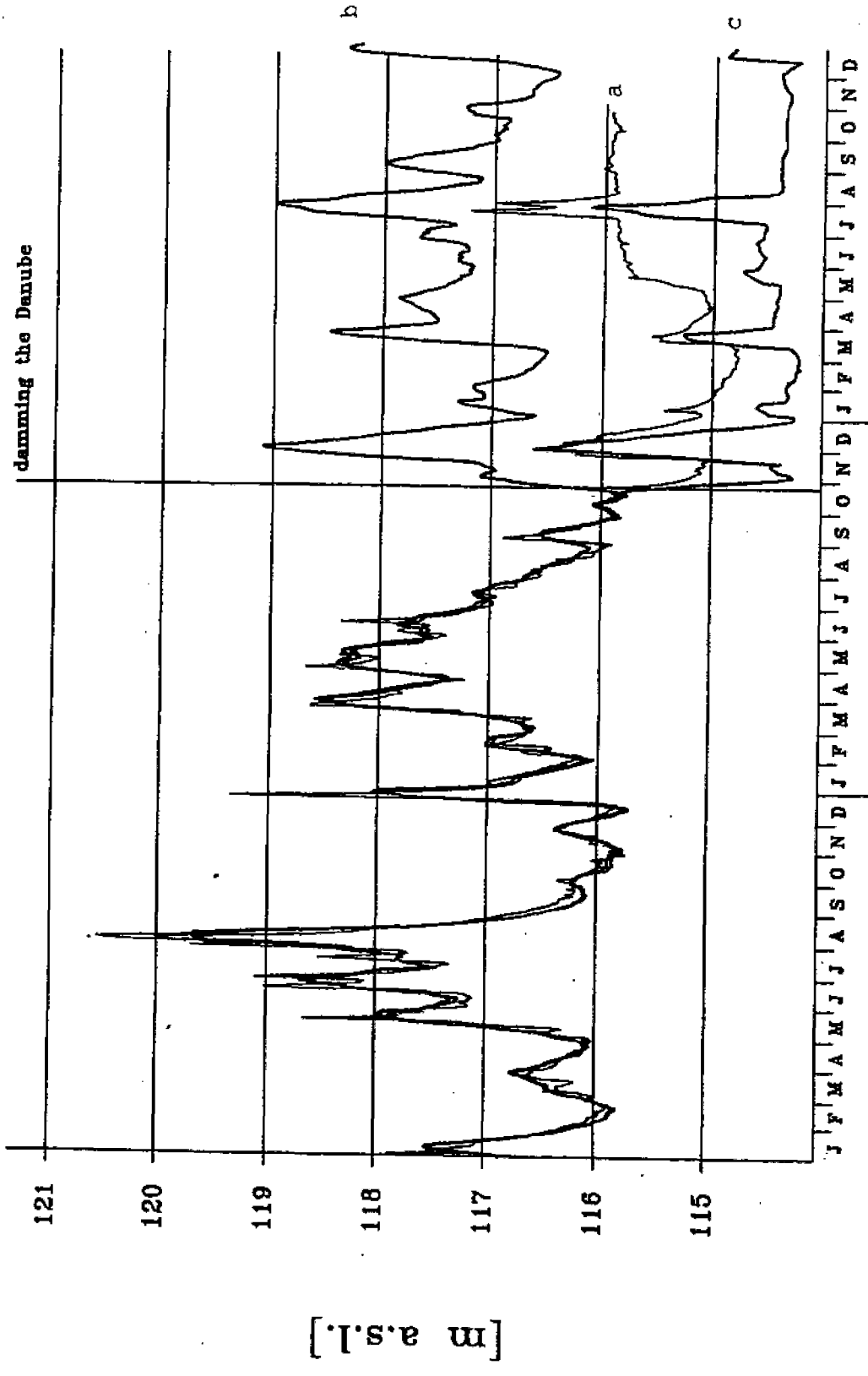
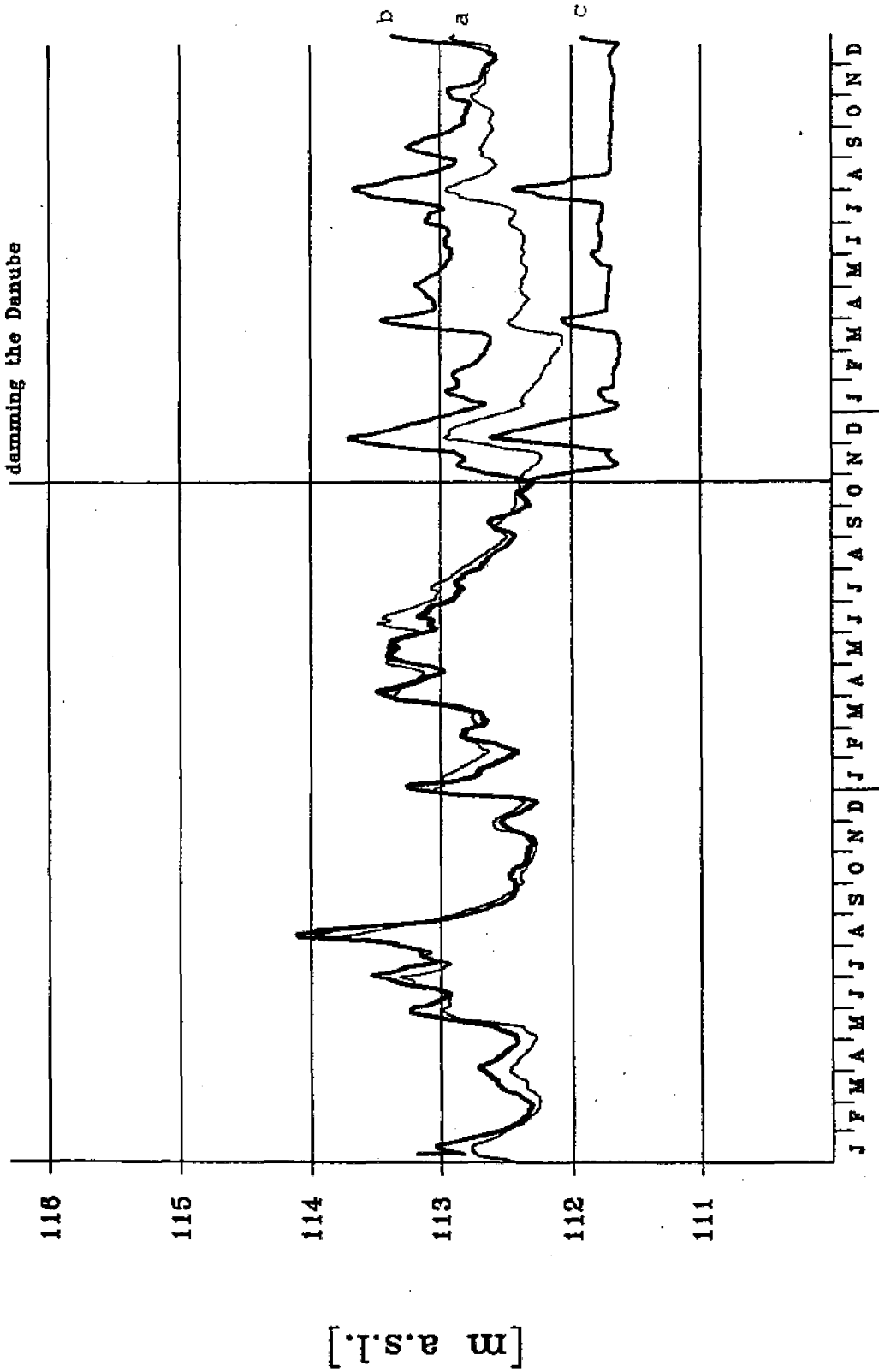

damming the Danube
b
a
c
121
120
119
118
117
116
115
[m a.s.l.]
J F M A M J J A S O N D J F M A M J J A S O N D
1991
1992
1993
9503 WELL

Fig.12.



H452 WELL

Fig.13.

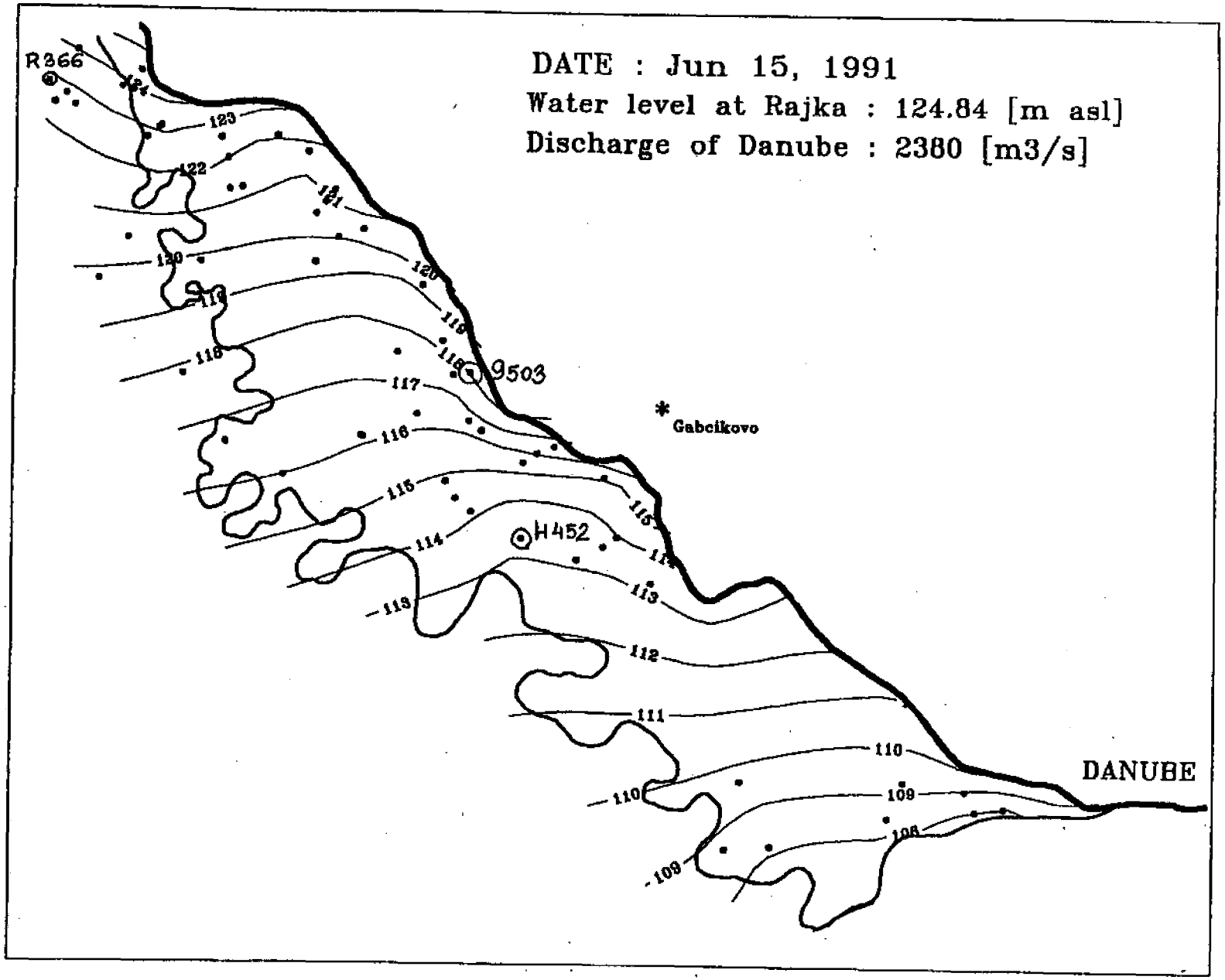

DATE : Jun 15, 1991
Water level at Rajka : 124.84 [m asl]
Discharge of Danube : 2380 [m3/s]
R366
124
123
122
121
120
119
118
117
116
115
114
113
112
111
110
109
108
9503
H452
Gabcikovo
DANUBE

Fig.14.

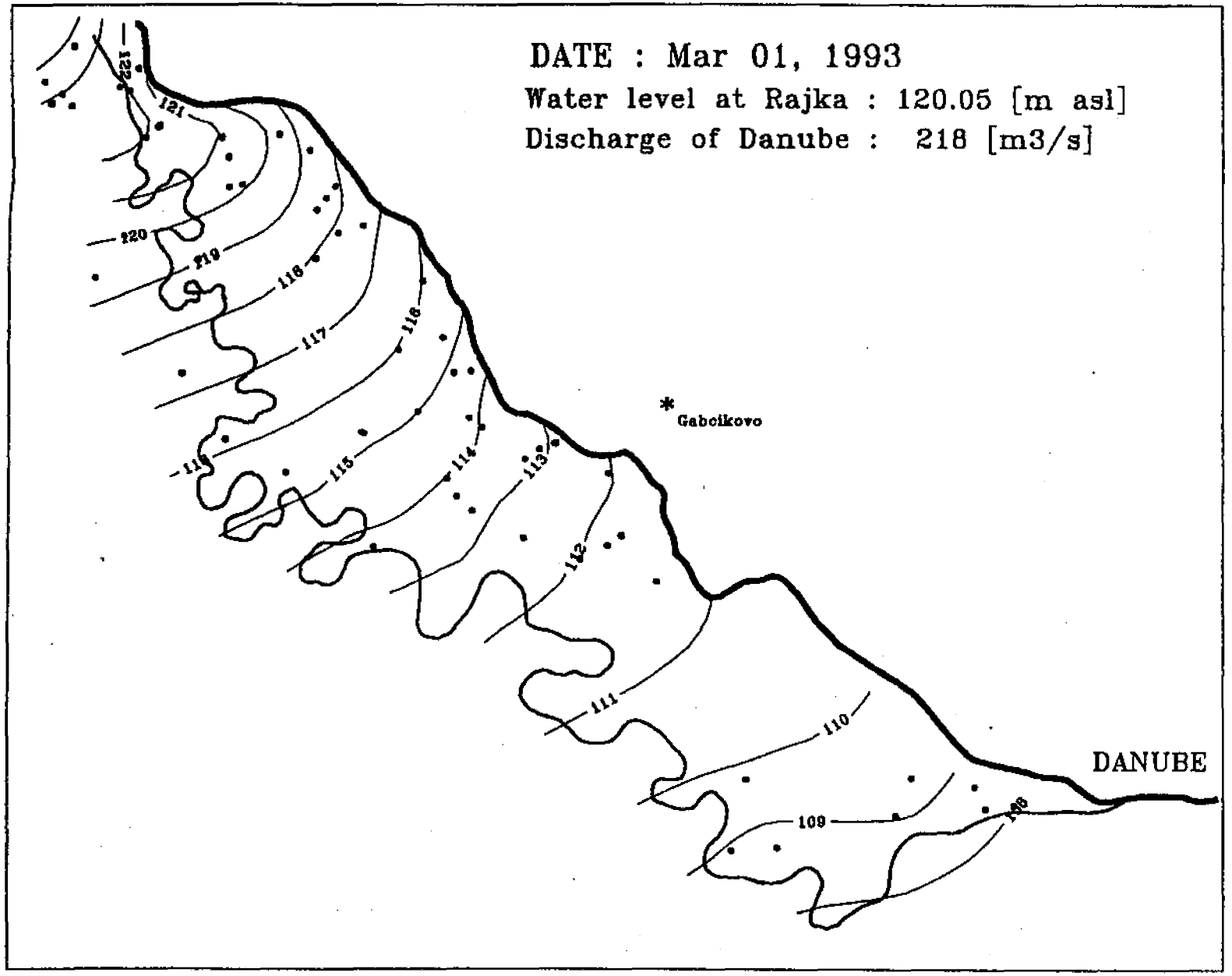

DATE : Mar 01, 1993
Water level at Rajka : 120.05 [m asl]
Discharge of Danube : 218 [m3/s]
122
121
120
119
118
117
116
115
114
113
112
111
110
109
108
Gabcikovo
DANUBE

Fig.15.

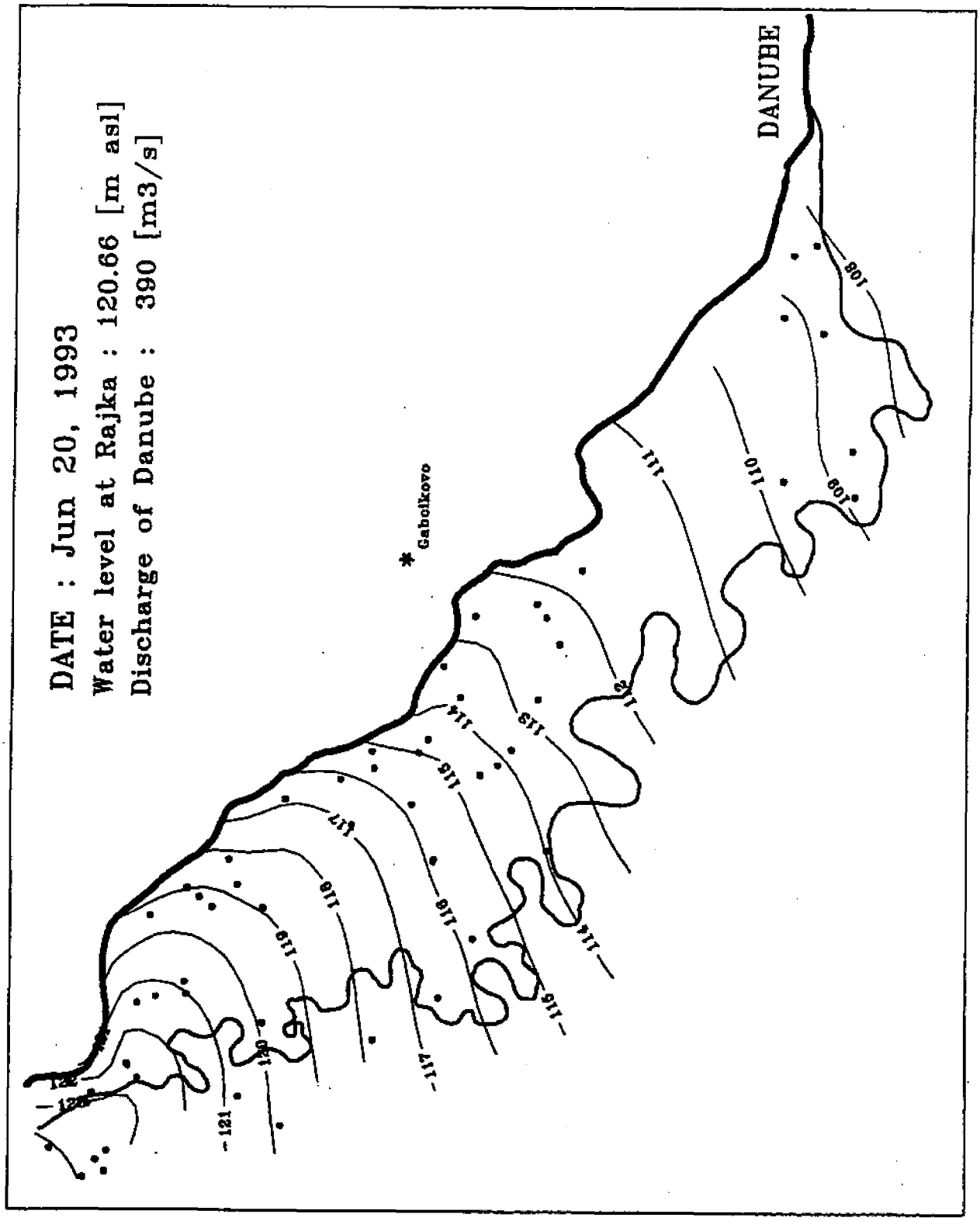

DATE : Jun 20, 1993
Water level at Rajka : 120.66 [m asl]
Discharge of Danube : 390 [m3/s]
DANUBE
Cabolkovo
121
120
119
118
117
116
115
114
113
112
111
110
109
108

Fig.16.

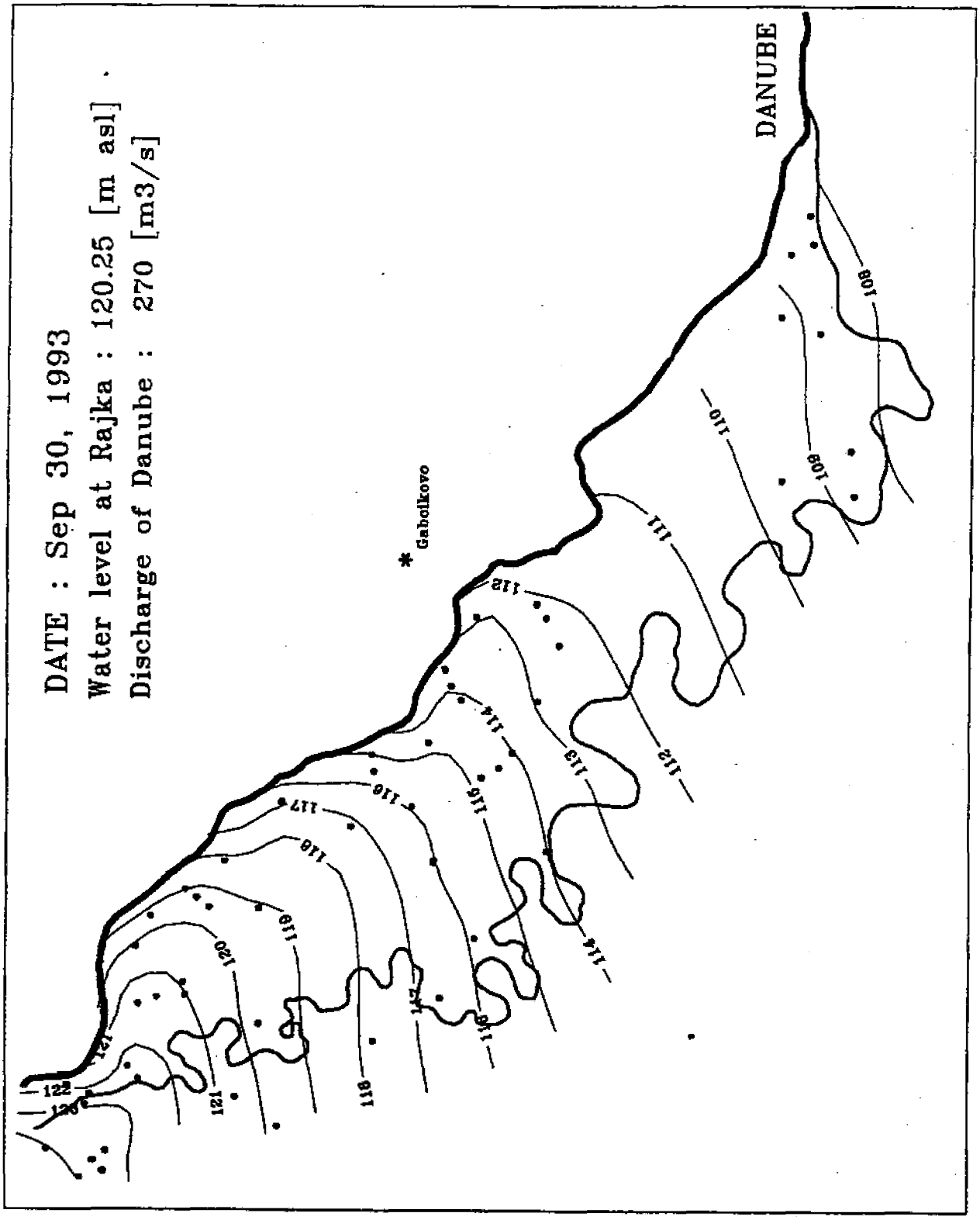

DATE : Sep 30, 1993
Water level at Rajka : 120.25 [m asl]
Discharge of Danube : 270 [m3/s]
DANUBE
Gabcikovo
122
121
120
119
118
117
116
115
114
113
112
111
110
109
108

Fig.17.

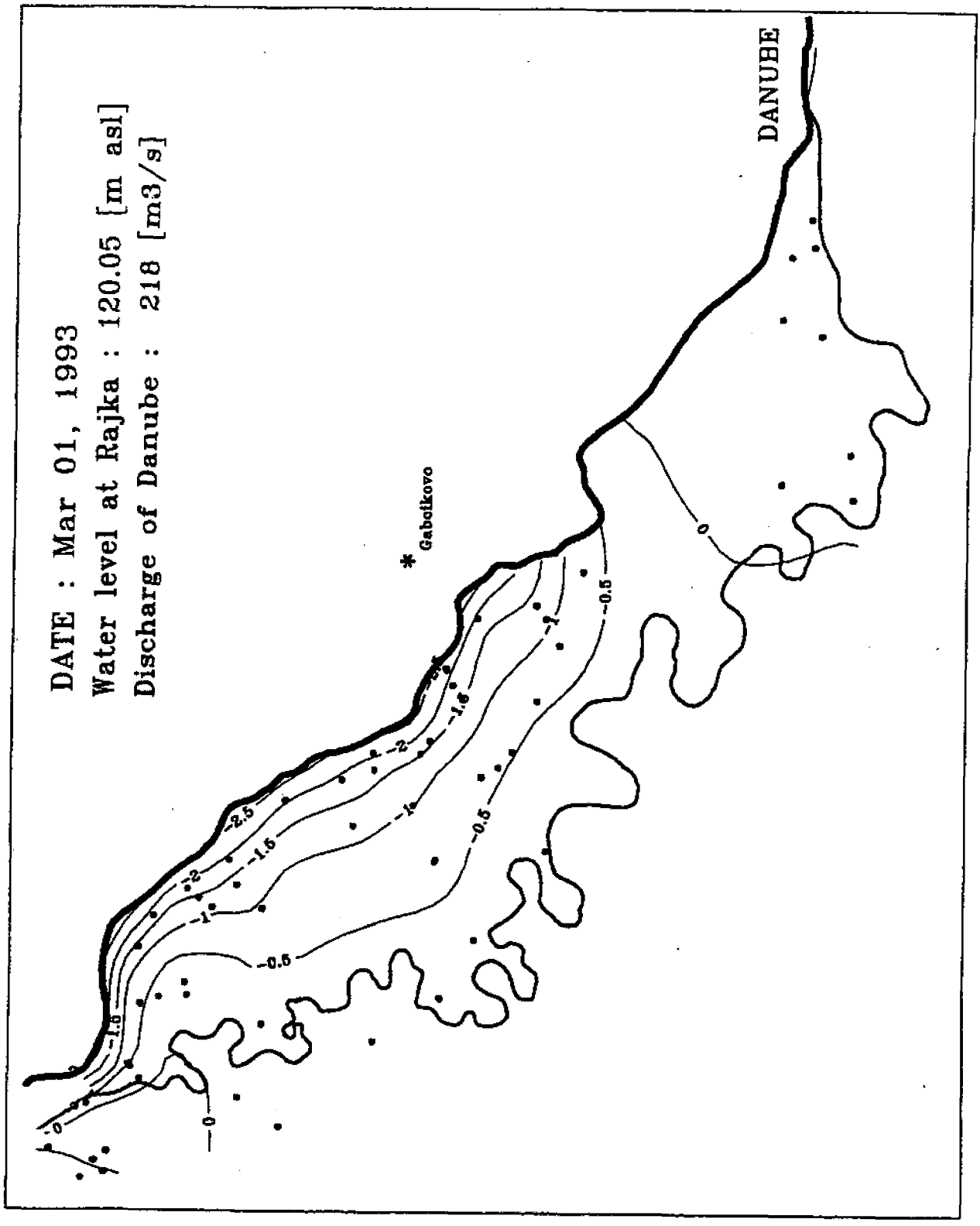

DATE : Mar 01, 1993
Water level at Rajka : 120.05 [m asl]
Discharge of Danube : 218 [m3/s]
DANUBE
Gabcikovo
0
-0.5
-1
-1.5
-2
-2.5

Fig.18.

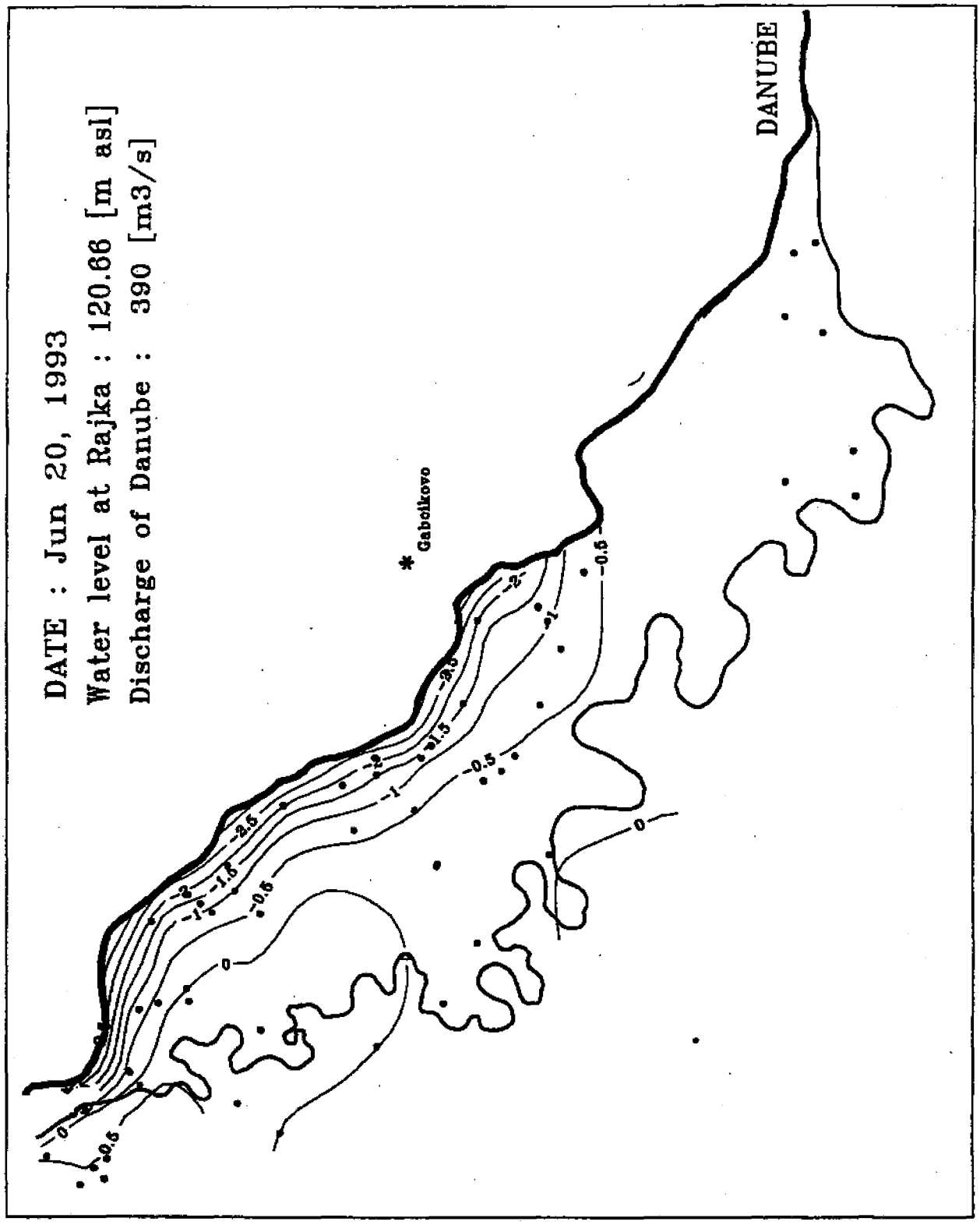

DATE : Jun 20, 1993
Water level at Rajka : 120.66 [m asl]
Discharge of Danube : 390 [m3/s]
DANUBE
Gabcikovo
-0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-2
-1
-0.5
0

Fig.19.

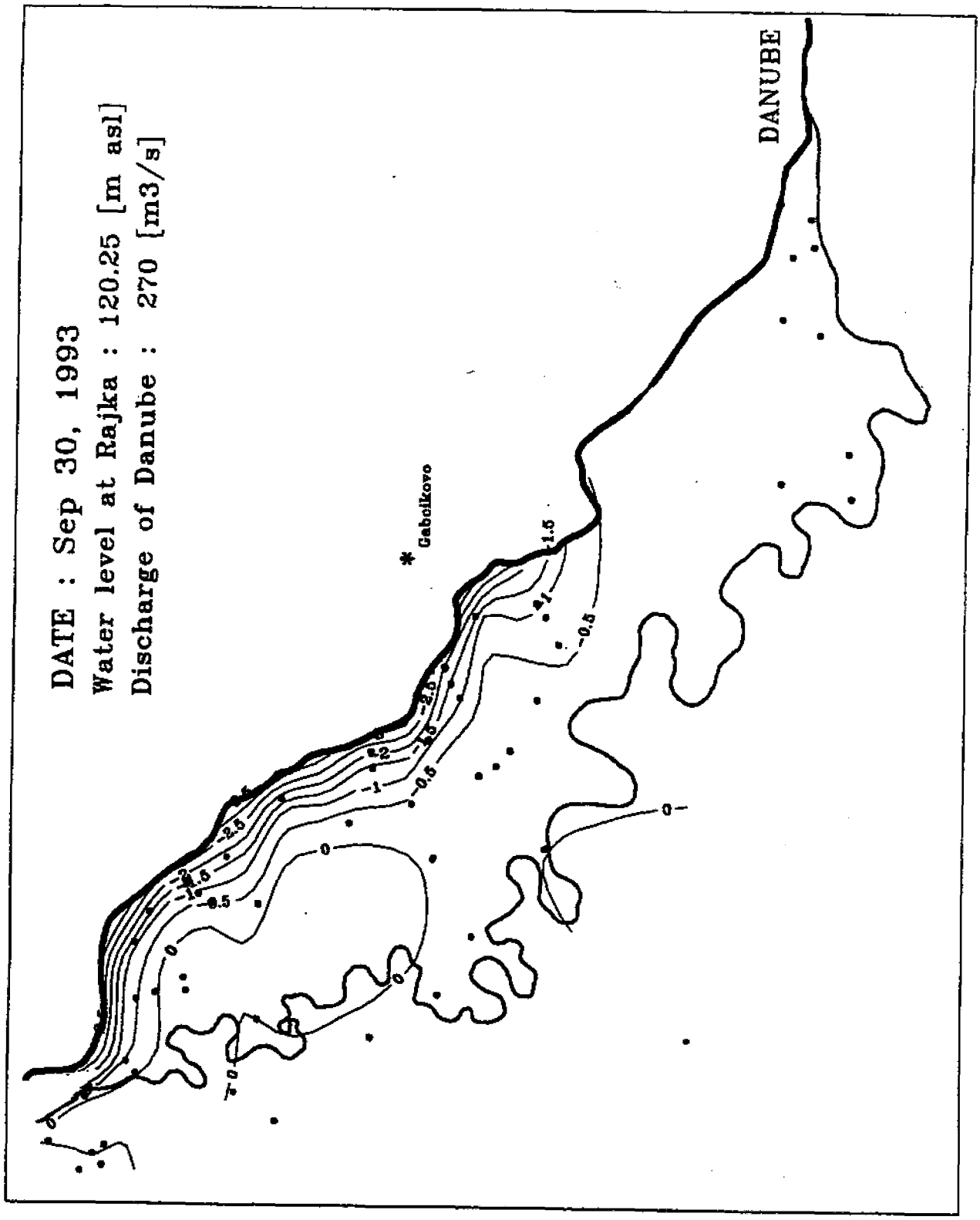

DATE : Sep 30, 1993
Water level at Rajka : 120.25 [m asl]
Discharge of Danube : 270 [m3/s]
DANUBE
Gabcikovo

Fig.2o.

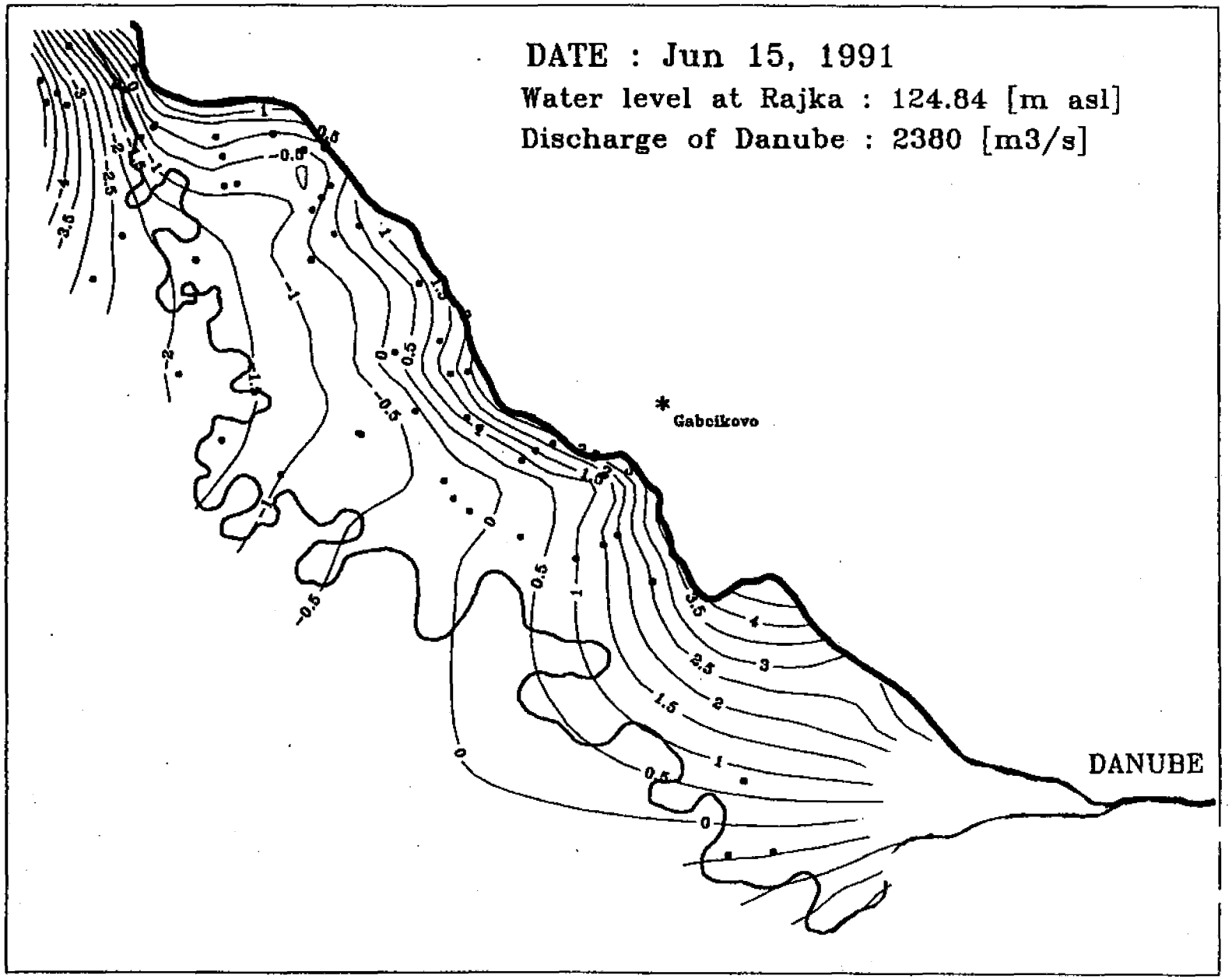

DATE : Jun 15, 1991
Water level at Rajka : 124.84 [m asl]
Discharge of Danube : 2380 [m3/s]
Gabcikovo
DANUBE

Fig.21.

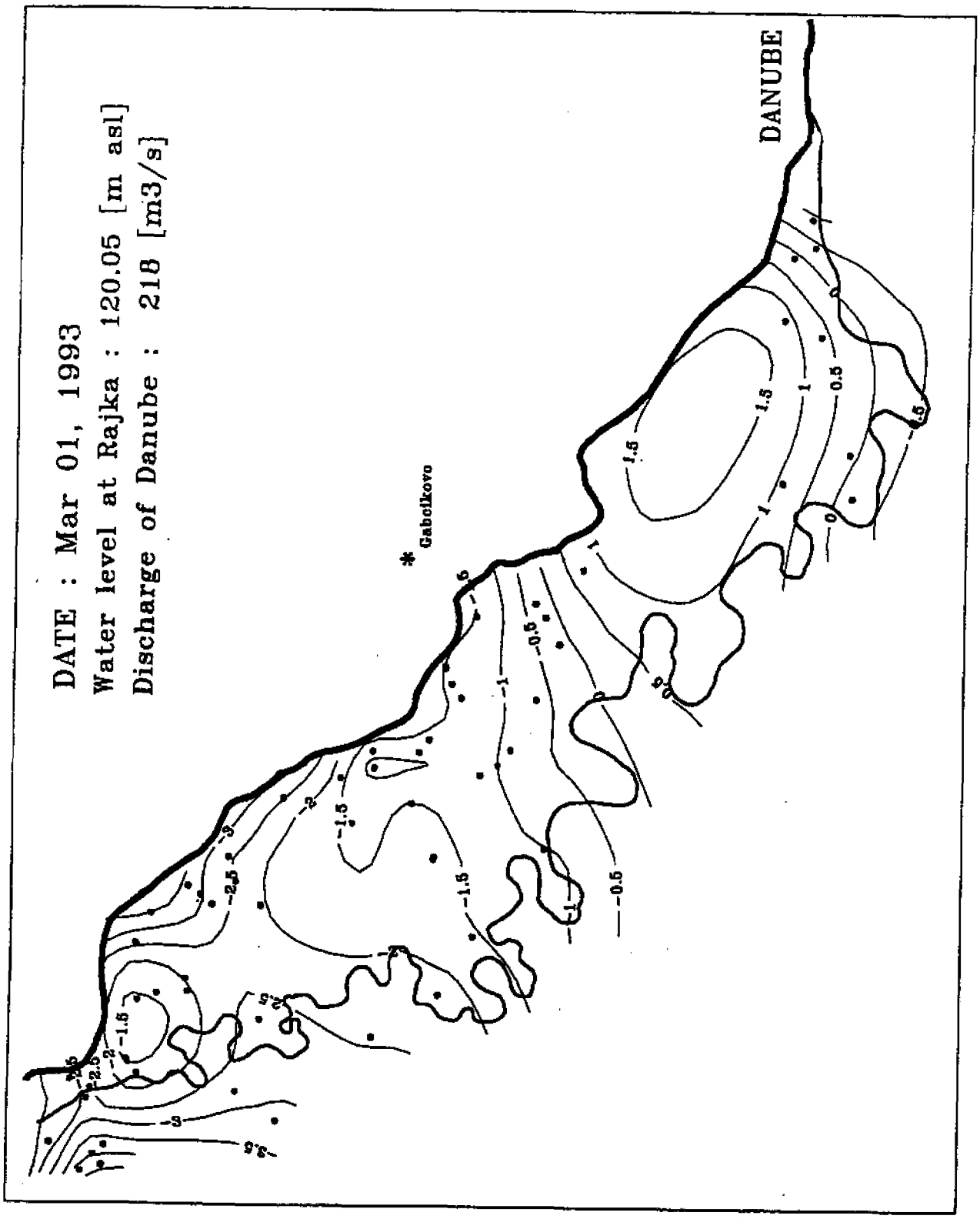

DATE : Mar 01, 1993
Water level at Rajka : 120.05 [m asl]
Discharge of Danube : 218 [m3/s]
DANUBE
Gabcikovo

Fig.22.

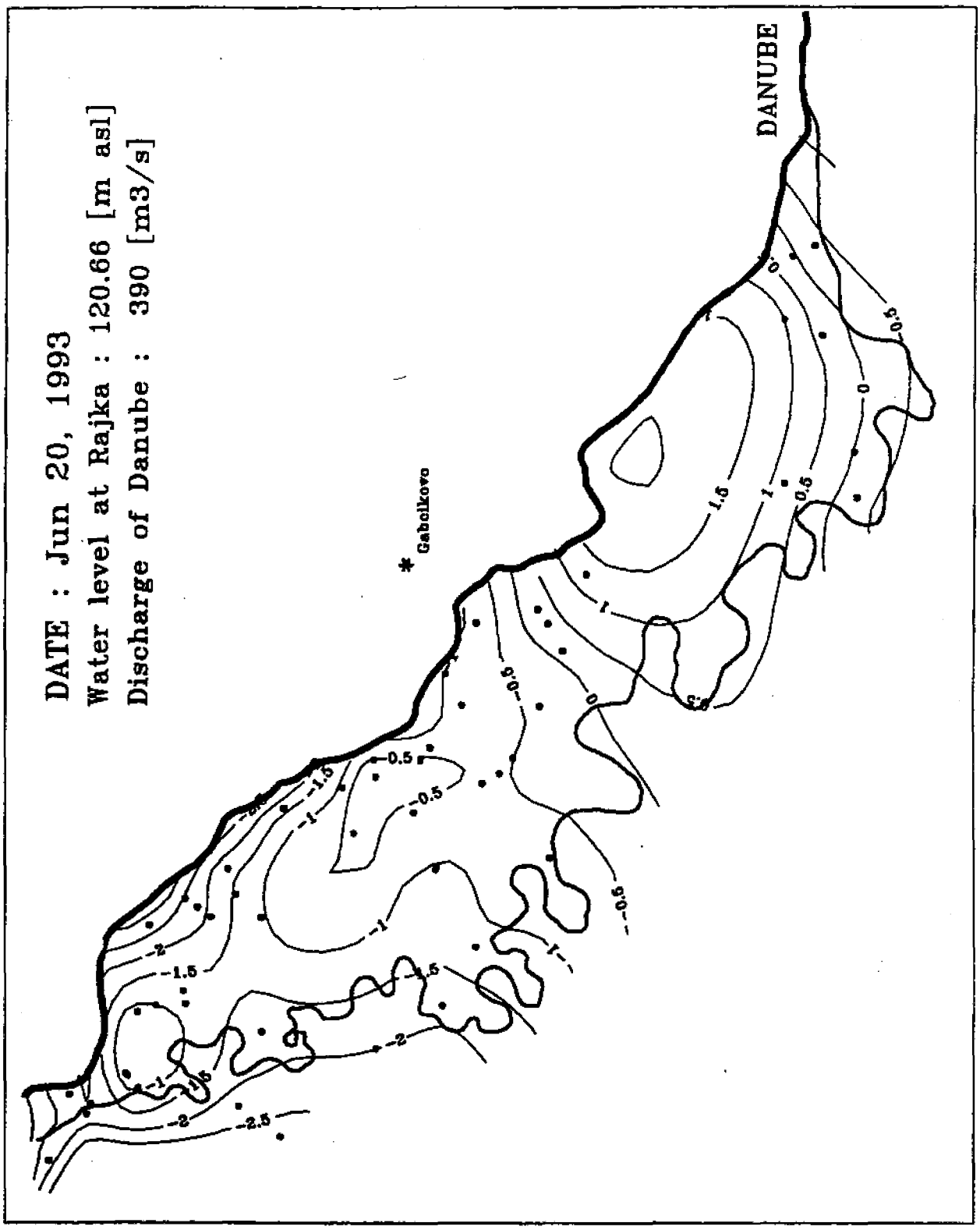

DATE : Jun 20, 1993
Water level at Rajka : 120.66 [m asl]
Discharge of Danube : 390 [m3/s]
DANUBE
Gabcikovo

Fig.23.

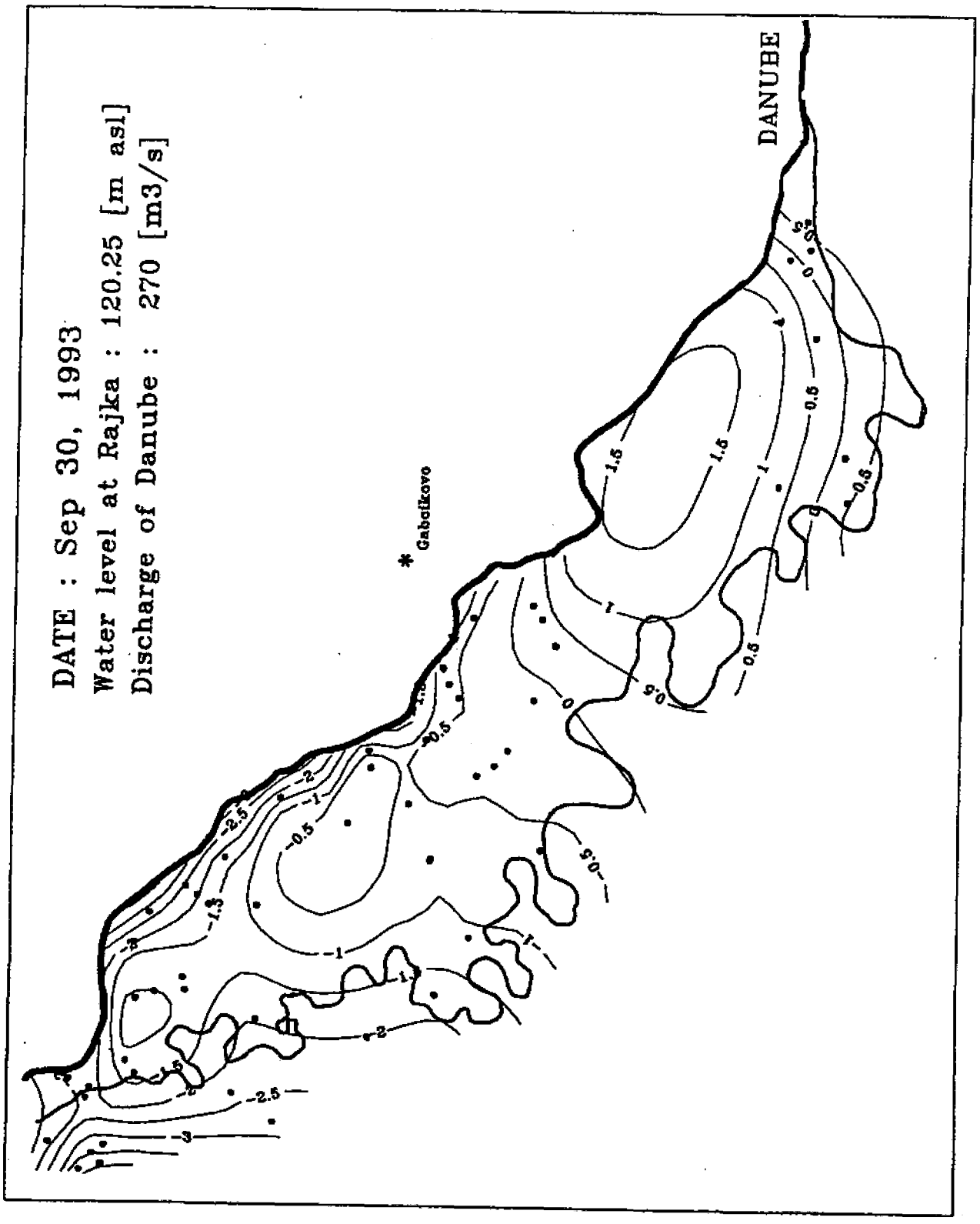
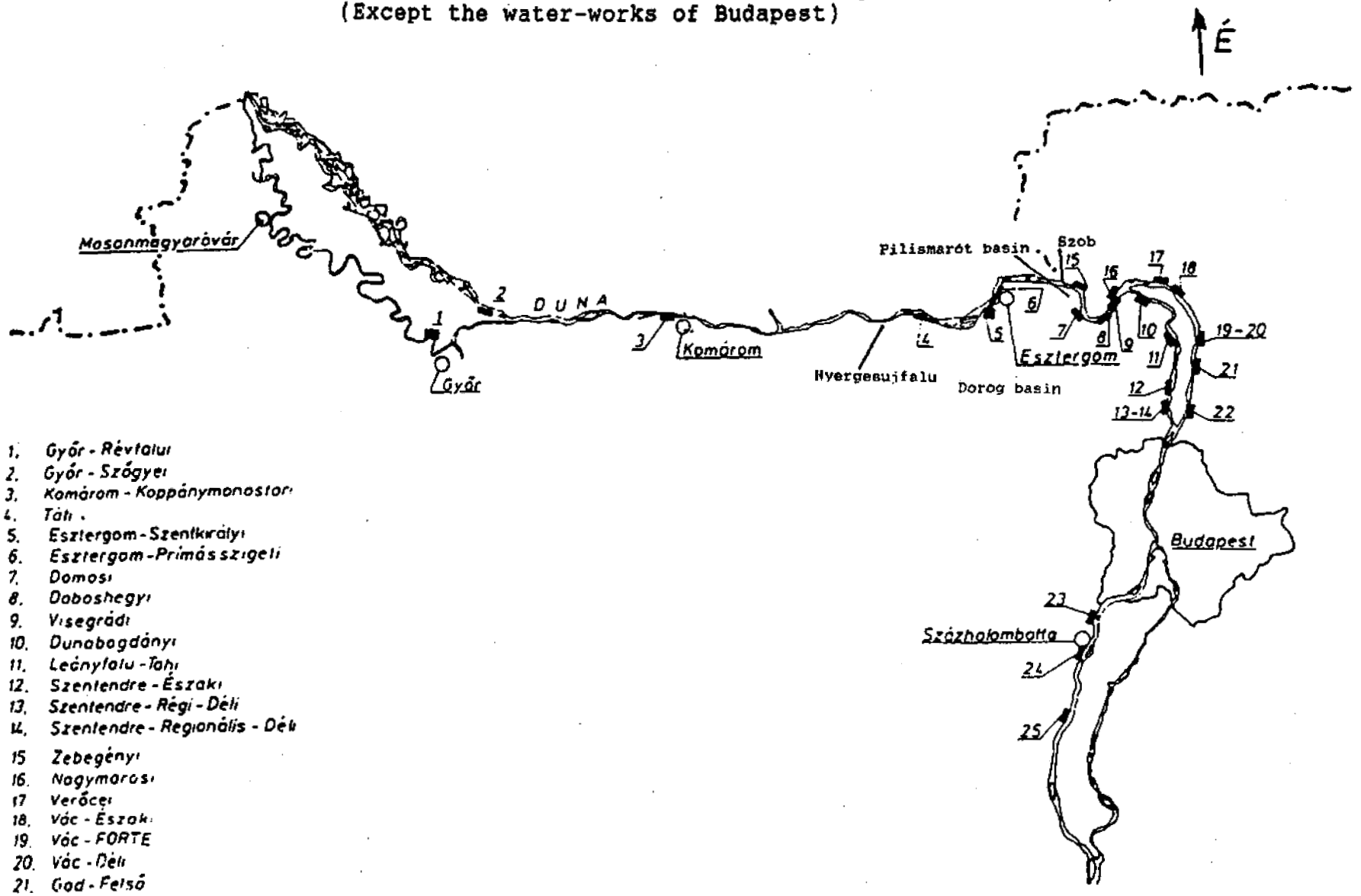

DATE : Sep 30, 1993
Water level at Rajka : 120.25 [m asl]
Discharge of Danube : 270 [m3/s]
DANUBE
Gabcikovo

Fig.24.

Fig. 25. Working bankfiltered water-works along the river Danube.
(Except the water-works of Budapest)



1. Győr - Révfalui
2. Győr - Szógyei
3. Komárom - Koppánymonostori
4. Táti
5. Esztergom - Szentkirályi
6. Esztergom - Primás szigeti
7. Domosi
8. Dobosheg yi
9. Visegrádi
10. Dunabogdányi
11. Leányfalu - Tahi
12. Szentendre - Északi
13. Szentendre - Régi - Déli
14. Szentendre - Regionális - Déli
15. Zebegényi
16. Nagymarosi
17. Verőcei
18. Vác - Északi
19. Vác - FORTE
20. Vác - Déli
21. God - Felső
22. Dunakeszi

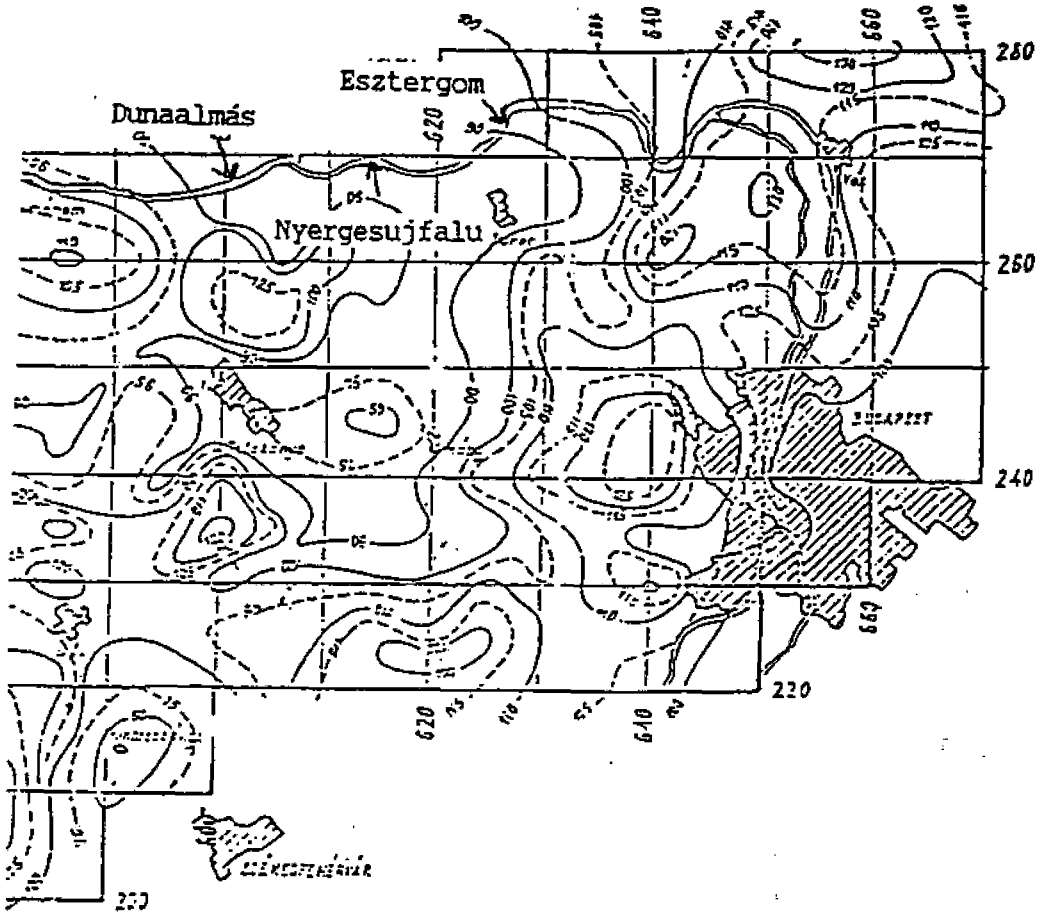
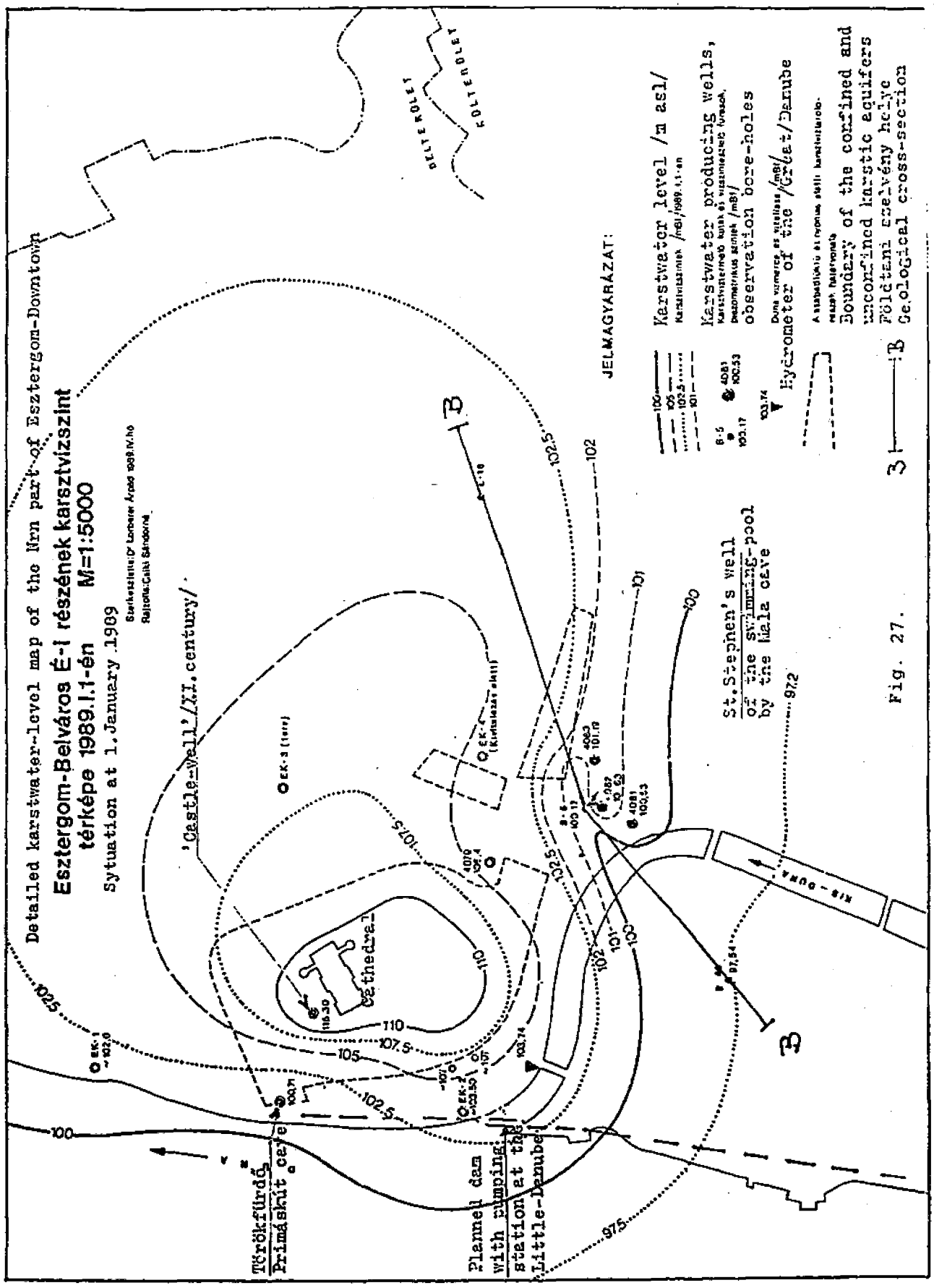


Fig.26.

Hydrogeological modelling of the Transdanubian Central Montains Range-Predicted piesometric levels of karstic water (m a.s.l.) on Ist January 2010 (VARIANT No.1.: with low infiltration, maximal mining-water-withdrawals and with the operation of the barrage Nagymaros from 1992)

Computed by András Csepregi
Constructed by Dr.Árpád Lorberer

Research Centre for Eater Resources Develepment VITUKI
Institute of Hydrology, 1988

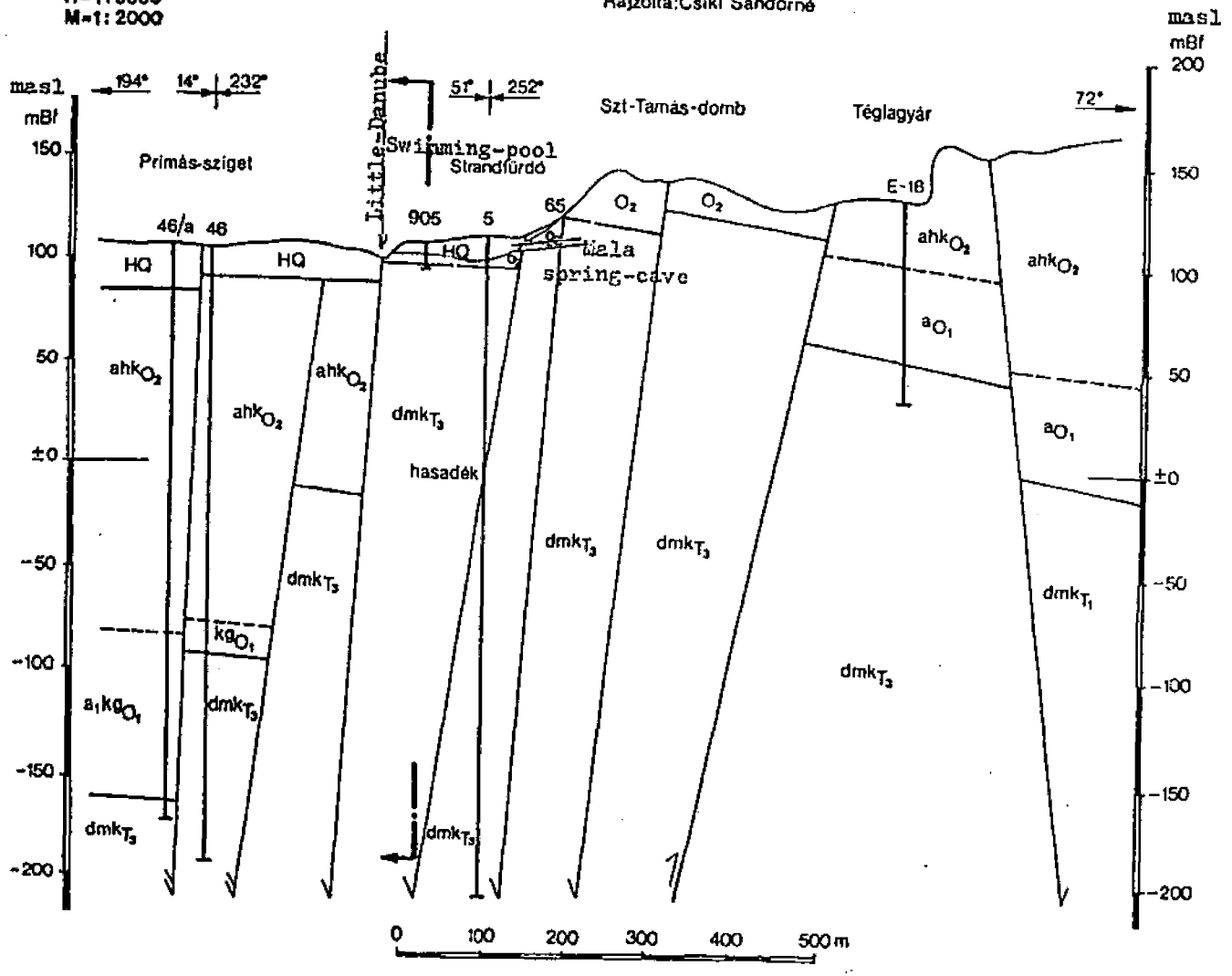

Detailed karstwater-level map of the Nw part of Esztergom-Downtown
Esztergom-Belváros É-i részének karsztvízszint térképe 1989.I.1-én M=1:5000
Sytuation at 1.January 1989
'Castle-wall'/XI.century/
Bethedra
Plannell dam with pumping station at the Little-Danube
Törökfürdő Primáshút cave
St.Stephen's well of the swimming-pool by the Hála cave
DÉLI ÖBÖL
JELMAGYARÁZAT:
Karstwater level /m asl/
Karstwater producing wells, observation bore-holes
Hydrometer of the /Great/Danube
Boundary of the confined and unconfined karstic equifers
Földtani szelvény helye
Geological cross-section
Fig. 27.

B-B Geological profile at the Esztergom swimming-pool and Szent-Tamás-hill
mélyföldtani szelvény Esztergom karsztkútjain keresztül

Fig. 27.a.

(2,5-szeres túlmagasítással)
H=1:5000
M=1:2000

Szerkesztette: Dr Lorberer Árpád 1987. XII.hó
Rajzolta: Csiki Sándorné



JELMAGYARÁZAT:

Neotectonic fault
Neotektonikus vetődés

Older fault
Idősebb, vagy felújult vetődés
with rejuvenations

Paleogén utáni pikkelyes feltolódás
Praepaleogene overtrust-fault

A képződmények jelmagyarázata a 12/c. sz. földtani térképen található!

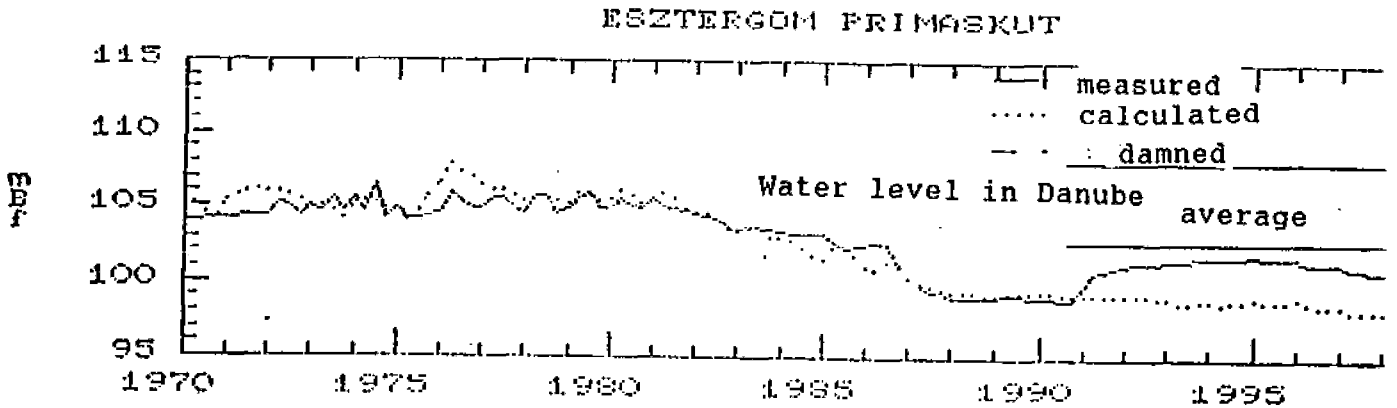
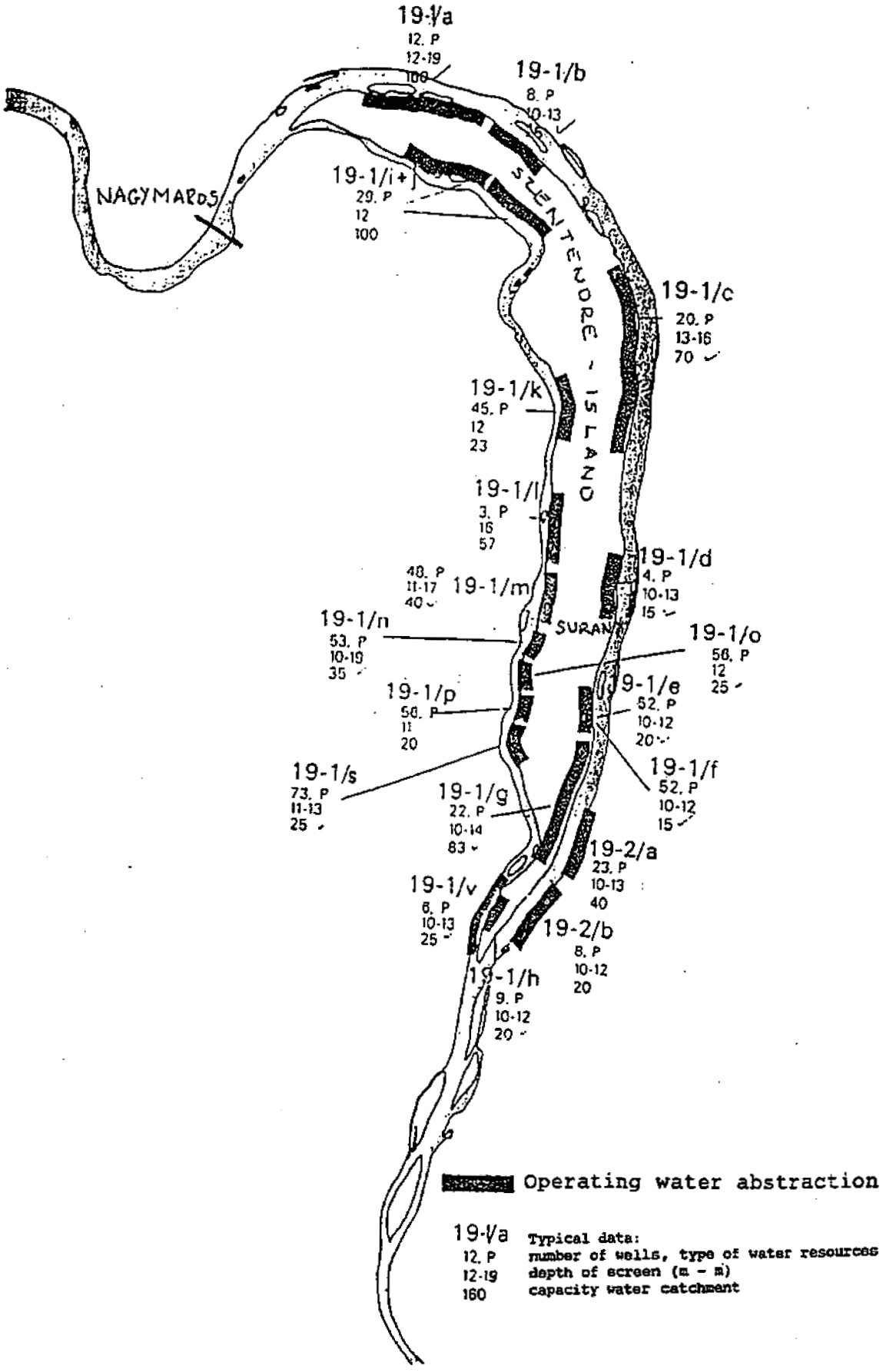


Fig. 28. Observed and simulated karstwater level in Esztergom with the predictions (Csepregi A., Lorberer Á.: 1988)

Fig 29. NORTHERN WATER-WORK OF BUDAPEST



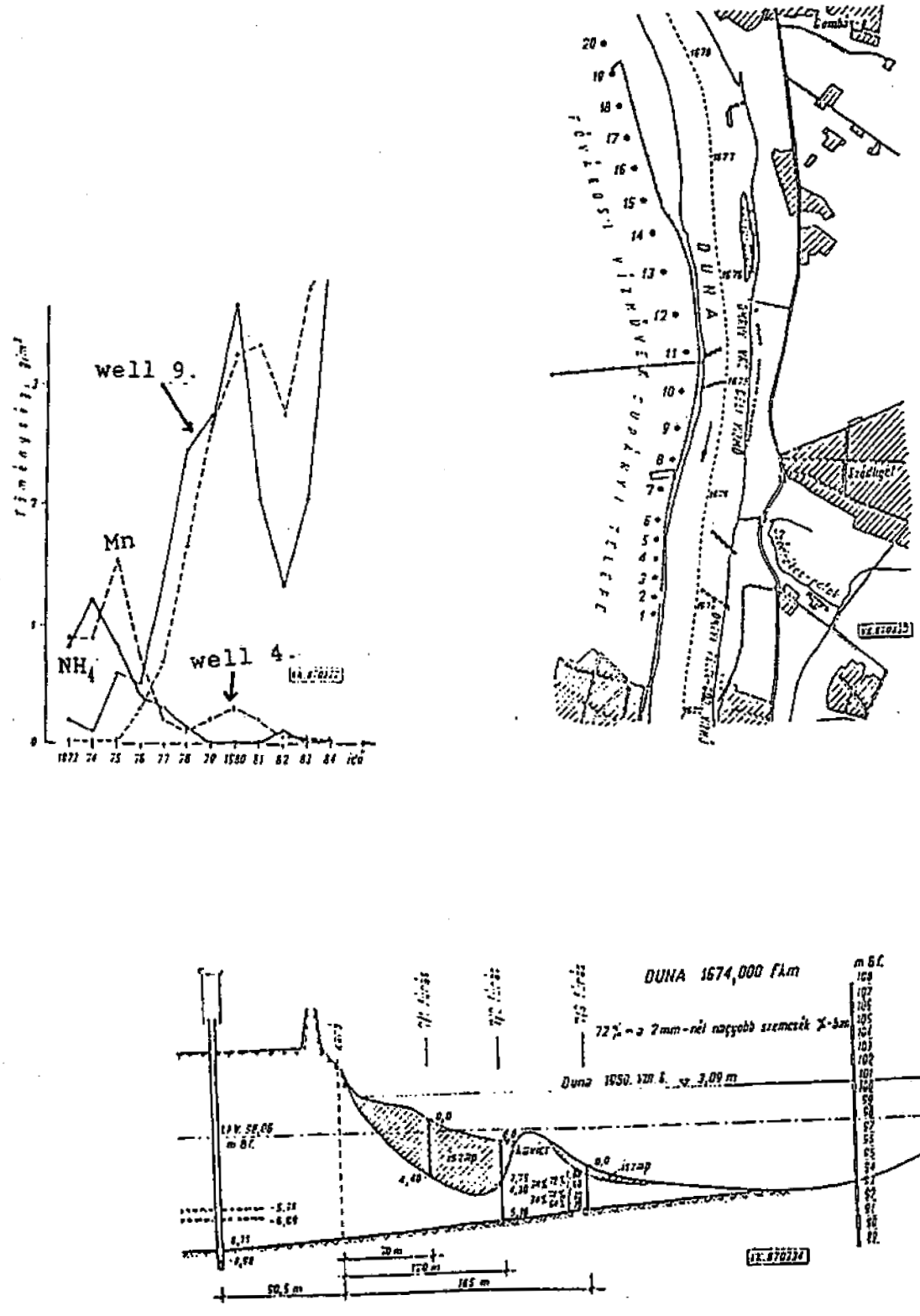


Fig. 30. Manganese and ammonia concentration caused by siltation, near Surány. (László et. al. 1987)

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Photo 3 - Construction of Variant C. (Closure of the Danube at Cunovo)

Photo 4 - Construction of Variant C. (Closure of the Danube at Cunovo)

Photo 5 - Construction of Variant C. (Closure of the Danube at Cunovo)

Photo 6 - Construction of Variant C. (Closure of the Danube at Cunovo)

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Photo 26 B - An area around Cikolasziget: May 1993.

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Annex 3. Closing Protocol Regarding the Work of the Border Drafting Commission Consisting of Representatives of the Hungarian and Czechoslovak Governments in accordance with Article 1, Paragraph 4, Subparagraph "D" of the Peace Treaty of Paris, Bratislava, 22 December 1947.

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Annex 9. Agreement between the Hungarian People's Republic and the Czechoslovak Republic regarding the Establishment of a River Directorate on the Rajka-Gönyű Reach of the Danube, Budapest, 29 May 1952.

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Annex 13. Closing Protocol of negotiations between the Government Delegations of the Hungarian People's Republic and the Czechoslovak Republic on the utilisation of the hydro-power of the Devin-Visegrád reach of the Danube, Prague, 8-10 July 1954.

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