

Audit Conclusions

Concerning the Audit Event 01/32:

State Funds Spent on the Enhancement of Purity of Water in the Oder Watershed

The audit was included in the auditing plan of the Supreme Audit Office (“SAO”) for 2001 as 01/32. SAO staff member Ing Zdeněk Smělík managed the audit and wrote an audit report.

The objective of the audit was to check on management with state funds spent on measures to enhance the purity of surface waters in the Oder watershed and to assess the impact of the implementation of such measures on the overall degree of pollution of the Oder when it leaves the territory of the Czech Republic.

The audit was carried out from June to October 2001 by groups of SAO auditors from the Section for the Environment & Agriculture, the North Moravian Regional Department, and the Central Moravian Regional Department.

The persons audited: Ministry of the Environment (“MoE”); Ministry of Agriculture (“MoA”); Czech Republic State Environmental Fund (“SEF”); Czech Environmental Inspection (“CEI”); Povodí Odry, s.p. (i.e., Oder Watershed, state enterprise); Czech Republic Agency for the Protection of Nature and Landscape (“APNL”); City of Ostrava; Břidličná, Bruntál County; municipalities of Bernartice nad Odrou, Nový Jičín County; Kunín, Nový Jičín County; Písek, Frýdek-Místek County; Šenov u Nového Jičína; Severomoravské vodovody a kanalizace Ostrava a. s., Ostrava, 28. října 169 (“SmVaK”; i.e., North Moravian Water & Sewage).

Five audited persons raised objections against audit protocols; the objections were settled by heads of the auditing groups.

An appeal lodged by MoA was settled by a SAO Senate resolution.

(Having considered SAO Senate recommendations, on 5 December 2001 the President of SAO referred the audit report for approval by the SAO College pursuant to Section 13 (3) (e) of Act No. 166/1993 Coll., on the Supreme Audit Office.)

The SAO College at its session held on 10/12/2001

approved by Resolution No. 8/XXII/2001

the audit report of the following wording:

I. Introduction

The inclusion of the audit in the SAO plan tallies among other things with an agreement on collaboration between the SAO and Poland’s Supreme Audit Chamber (Polish acronym: NIK) in environmental matters. Slovakia’s Supreme Audit Office joined in at a later date under a trilateral international convention on cooperation of the landlocked countries in the protection of

the Baltic Sea. The audit's program took into consideration the requirements for parallel audits as recommended by the EUROSAT Environmental Working Group.

At the October 2000 Warsaw session, the EUROSAT Environmental Working Group proposed that the ongoing audit of the implementation of the Helsinki Convention on the Protection of the Baltic Sea be joined also by those landlocked countries, which are not Helsinki Convention signatories but in whose territories or through whose territories rivers emptying into the Baltic Sea either originate or flow.

In the Czech Republic ("CR"), it is the Oder, or its watershed, respectively. The Oder watershed accounts for some 7% of the Czech Republic's area and happens to be the smallest watershed (river basin) with an area of 8,127 square kilometers; of the entire Oder river basin the Czech part amounts only to 5 %. The Oder is 861 km long, of which 135 km are on the Czech territory. The area managed by Povodí Odry, s. p. (until 31/12/2000: Povodí Odry, a. s.) covers the counties of Ostrava, Opava, Frýdek-Místek, Karviná, Nový Jičín, Bruntál, Jeseník and Olomouc, or parts thereof, respectively, is notable for its unique geographic array. Different types of landscape and diverse geological composition represent a mosaic of ecosystems of tremendous biodiversity. The differences in elevation are large, too: from 220 to 1401 meters above sea level. In addition, this territory happens to be the northernmost reach of occurrence for several species of plants and animals found there. The area managed by Povodí Odry is 6,252 square kilometers (km²); the total length of streams managed by Povodí Odry is 1,328 km. Further to this, Povodí Odry manages, inter alia, 8 valley reservoirs.

A part of the territory is characterized by a high density of population and concentration of industry. This is manifested by the considerable exposure of streams to industrial and communal wastewater. Attenuation and restructuring of many traditional productions, mining included, has been going on here in the past decade.

The state-funded activities from 1995 to 2000 were assessed from the point of their resulting effect on the purity of the border river draining surface waters to Poland. During the audit, procedures were aimed at coordination of select criteria linked to the cooperation with the Poland's Supreme Audit Chamber as per Section 16 of Act No. 166/1993 Coll., on the Supreme Audit Office. In particular, this concerned the identification of effects of the implementation of environmental quality programs for which, due to their frequently unique local conditions, no direct causal nexus can be documented between the volume of funds and the individual degrees of the achieved improvement in water purity. In Section II, the audit report therefore gives an explanation of the issues involved in the existing framework of water purity improvements from international and national points of view; Section III presents an overview of findings noted during the audit in respect of individual audited persons involved in the program, and, finally, the data stated in respect of the changes in water purity as accomplished through program implementation are summarized in Section IV.

Note: Consult Enclosure for a list of symbols and abbreviations used.

II. The existing framework for the spending of state funds on improving the purity of water in the Oder river basin

1. International cooperation

1.1. Treaty on the protection and the use of border-forming streams and international lakes

The Treaty on the protection and use of border-forming streams and international lakes was ratified in the CR in May 2000 and it entered into force on 10/09/2000. Its objective is to prevent, control and restrict undesirable cross-border effects, to give support to sustainable management of water resources, to monitor and evaluate the situation in border-forming streams, to cooperate in research and development, to exchange information, etc.

The requirements as formulated by the Treaty have already been enacted in the Czech legal system. The Czech Republic has ratified the convention on the International Commission for the Protection of the Oder from Pollution. The Czech Republic has signed bilateral cooperation agreements on the border-forming water bodies with all neighboring countries.

1.2. International Commission for the Protection of the Oder from Pollution

The Convention on the International Commission for the Protection of the Oder from Pollution was signed in April 1996. The Commission started working as a provisional one and drew up the basic documents for enforcement of the Convention. Upon ratification on 28/04/1999, the Commission has gained a definitive statute. The parties are the CR, Poland, Germany and the European Communities. The parties have undertaken to cooperate in the area of preventing the Oder and the Bay of Stettin, including its river basin, from pollution.

The Commission composed of delegates of the parties assessed the status of implementation of the 1997 – 1999 investments in a “Program of Urgent Measures Aimed At Protecting The Oder From Pollution, 1997 – 2002”; the expected goal was to achieve a water quality improvement in the Oder and its tributaries and to restrict the adverse influence of the Oder’s waters on the Baltic Sea’s purity of water by cutting down on the quantity of pollution drained from the principal urban agglomerations and industrial plants located in the river basin. The Commission resolved to produce by the end of 2002 an “Action Program for the Protection of the Oder from Pollution, 2003 –2010”. Out of the total number of 278 entities on record, the program is intended for 138 polluters that implement or plan investment through 2002; of these, 86 are urban agglomerations and 52 industrial enterprises. In CR, a total of 58.4 million EURO is to be spent on the construction of municipal wastewater treatment plants (“WTP”) that will be launched by the year 2002.

Prior to 1999, WTPs were built or revamped in Opava and Ostrava; WTPs were under construction in Frýdek-Místek, Ostrava, Český Těšín, Orlová, Bohumín, Třinec and Karviná. At the time of the audit, all were operated with the exception of those in Český Těšín and Karviná, which are undergoing trial operations.

1.3. Bilateral cooperation on border-forming waters

The cooperation on the border-forming waters between the CR and Poland is regulated by The Convention between the Government of the Czechoslovak Republic and the Government of the Polish People’s Republic concerning water management on the border-forming waters (“Convention”) signed on 21 March 1958. The parties undertook to decrease pollution of the border-forming waters, taking into consideration the needs and economic & technical capabilities. Each party appointed a plenipotentiary for the fulfillment of tasks under the Treaty and the plenipotentiaries were to meet once a year. These meetings have not been held since 1997

as the Polish side has failed to appoint a Government plenipotentiary. Cooperation continues on the level of four working groups, which conduct regular joint monitoring of the border-forming streams in 7 profiles in Northern Moravia; for the individual streams they specify, depending on the degree of pollution, the number of samples taken, the composition of pollutants (10 indicators monitored on average; while 16 indicators are monitored in the Oder and the Zlatý potok).

2. Legal regulations in water management from the angle of accession to the EU

The current legal regulations are still not fully compatible with the Community laws in the given area. However, amendments that incorporate the transposition of relevant EU Directives are being enacted.

3. Research and development

In the period under review, a total of CZK 42,144,000 was disbursed from the MoE chapter to research assignments of the Project Oder (1995 – 1998) and Project Oder II (since 1998 working with Project Oder results). The researcher is the Ostrava branch of the TGM Water Management Research Institute (WMRI).

Next to issues of methodology, the program ascertained the point sources of pollution and data about them. The outcome was an action plan with proposed measures to cut down on the shortcomings. The objective of the Project Oder II is to produce a water management plan of the river basin, which incorporates the EU requirements.

The Oder river basin area has been monitored by yet another assignment entitled “The incidence and movement of hazardous substances in the Czech Republic’s hydrosphere” that has been worked on by the Czech Hydro-Meteorological Institute (CHMI) since 2000 and its completion is scheduled for 2002. A total of CZK 6,290,000 was spent up to the date of the audit. The assignment aims at monitoring of the contents of hazardous substances in the hydrosphere, the identification of problem areas and potential sources of pollution, and proposals of measures to rectify such problems.

4. Water management information system

Since 1993, the MoE water management information system, the so-called hydro-ecological information system of the Czech Republic (HEIS CR) has been gathering, processing, storing and making available pieces of information for state administration in the water management area and for the professional water management. As authorized by MoE, WMRI serves as the coordinating workplace for HEIS. HEIS CR consists of three supra-regional and eight regional information systems. The HEIS CR Steering Committee set up by MoE for the purpose of establishing, operating and overseeing the system has not met since April 1997, although its statutes stipulates it is to sit at least once a year.

The regional information systems, known as RHEIS, are operated by the individual Povodí, state enterprise (Watershed). The Oder Watershed’s RHEIS happens to be the least developed system. During the period under review, the Oder Watershed’s RHEIS supplied no data to the provided no data the HEIS CR.

In 1995 through 1998, Povodí Odry used CZK 11.8 million from the system subsidy earmarked for HEIS to purchase hardware and standard software. Routinely operated are modules entitled “Land Records” (at Povodí Odry since 11/200) and “Records of Users and

Discharge of Water”, which keeps a track of surface and underground users, of pollution sources, and of water management decision reporting, addresses the agenda on payments for underground water purchases, and serves to store and evaluate control analyses of the individual pollution sources’ waste water.

Pursuant to the new Water Management Act, MoA will manage, effective of 2002, public administration information systems in water management, cooperate with the using and interlinking of the information systems run by water stream managers, above all with MoE-gathered data on water.

III. The audit has noted:

A. In respect of the recipients of state funds

- **SmVaK** owns and operates the Opava WTP, for whose enlargement and revamping a total of CZK 89,200,000 in state funds has been disbursed (a subsidy of CZK 66,900,000 and a repayable loan of CZK 22,300,000). The undertaking commenced in 1995 and the WTP was launched as planned in 1998. The WTP degrades annually 2,155.5 t of BOD5 (99.1% efficiency) and 1,210.1 t of US (96.0% efficiency), and the removal of phosphorus is being gradually perfected. Based on the efficiency achieved, the operator of the WTP has been liable to no charges since 2000. The revamped WTP has improved the oxygen regime in the Opava River, lowered concentrations of the monitored forms of nitrogen, and there was a significant decrease in fecal coliform bacteria downstream from the City of Opava. In the period of 1995 – 2000, there occurred a two-class water quality improvement (from class V to class III) and in the BOD5 and COD indicators in the river profile below the WTP.
- **City of Břidličná** received a SEF subsidy of CZK 14,804,000 plus an interest-free loan of 14,804,000 to enlarge and revamp its WTP and for the sewer system. The investor used up CZK 28,127,000. The audit established that the aid recipient failed to adhere to the terms of the aid agreement by not maintaining the proportion of own funds in the course of the works. In 1996, the investor did not participate in the funding of the undertaking with own resources to the tune as prescribed by the aid agreement. In addition, the construction of the sewer system was not executed according to the SEF-approved blueprint. Further to this, the investor did not keep his end of the terms of a security agreement with SEF by not crediting an insurance payment to SEF. The works commenced in 1996 and permanent operations were launched as planned in 1999. The final assessment of the undertaking, which makes the definitive entitlement to the subsidy conditional on a refund of a portion thereof is currently discussed at the SEF.

WTP Břidličná achieves such a level of efficiency, which removes the operator from all liability to pay charges. The cleaning efficiency of the WTP is as follows per the BOD5 (96.6%) and US indicators (94,3%), which complies with the terms of the aid agreement; the works has lowered the discharge of contaminants by 70 t of BOD5 and 60 t US annually. The water quality in the Moravice River below the WTP has shown improvements especially in the COD indicator (by one class) and nitrate contamination was even cut down from class III to class I, which means the highest quality.

- **Municipality of Kunín** obtained a SEF subsidy of CZK 14,908,000 and an interest-free loan of CZK 14,908,000 to enlarge and revamp its WTP and for its sewer system. The works commenced in 1995 and permanent operations were launched in 1998. The audit established that the aid recipient failed to adhere to the terms of the aid agreement by not maintaining the proportion of own funds in the course of construction: it did not meet the share of own funds in agreement with the payment schedule in 2Q 1995. Furthermore, the aid recipient did not meet the terms of the agreement with SEF by not sticking to the dates of work commencement, completion and permanent operations. On the basis of deficiencies noted, the definitive aid was lowered to CZK 29,773,713 (balance lowered by CZK 42,287).

By launching this CZK 40,676,000 water management works, the quantity of contaminants discharged into the Jičínka in the Poodří Protected Landscape Area was cut by 37 t of BOD5 and 22 t N annually.

- **Municipality of Bernartice nad Odrou** owns a WTP, for whose enlargement and revamping it received a SEF subsidy of CZK 2,495,000 and a CZK 2,495,000 loan at 3% interest. The aid agreement decreased the amounts with respect to the contractual cost of construction so that the 40% proportion of own funds would be preserved. The works commenced in 1996 and permanent operations were launched in 1999. The audit established that the aid recipient did not meet the BOD5 indicator. Further to this, the dates of completion (longer by three months) and of permanent operations were not adhered to (longer by six months). On the basis of deficiencies noted, the definitive aid was lowered to CZK 4,285,910 (balance lowered by CZK 43,292, i.e. by 2 % of the subsidy).

By launching this CZK 23,779,000 water management work, the quantity of contaminants discharged into the Oder at the center of Poodří Protected Landscape Area was cut by 9.2 t BOD5 and 8.3 t US annually.

- **Municipality of Šenov u Nového Jičína** received a SEF subsidy of CZK 4,500,000 thousand and a loan of CZK 4,500,000 at 3% to construct a sewer system; the proportion of own funds was set at 40 %. The works commenced in January 1998 and operations were launched in June 1999. The water management works had a total value of CZK 23,676,000. Upon the undertaking's completion, the required 80% effect in the US indicator was not accomplished (only 78%) due to the fact that the sewer system did not link the number of buildings as stipulated in the agreement. On the basis of this deficiency, the definitive aid was lowered to CZK 8,955,000 (balance lowered by CZK 45,000, i.e. by 1 % of the subsidy).

The implementation of the undertaking has resulted in cutting down 10.7 t of BOD5 and 9.5 t of US annually in the Jičínka.

- **Municipality of Písek** obtained a SEF subsidy of CZK 6,384,000 and an interest-free loan of CZK 6,384,000 to construct a WTP and a sewer system, the share of its own funds was set at 20 %. The works commenced in 1996 and permanent operations were launched in 1999. The water management works had a total value of CZK 18,851,000. The aid was given in full. Contaminants in the Olše River were cut by 15 t of BOD5 and 15.2 t of US annually.

- The extensive investment undertaking “Enlargement of the Ostrava Central WTP (CWTP) got underway with an SEF assistance (or the State Water Management Fund); the second works received a CZK 208,756,000 subsidy on the basis of a 1988 decision by the Minister. The third works obtained a state budget subsidy of CZK 678,678,000 plus a repayable loan of CZK 222,999,000. **The City of Ostrava** has not yet settled ownership rights to land on which the CWTP is located. The audit has established that the land concerning the investment undertaking, whose individual parts received both state budget and SEF funds are not owned by the investor who uses real estate worth nearly CZK 105 million without any legal rights. The final evaluation of the SEF-aided segment is currently discussed at SEF.

A check of the sewage collector, whose investor is also The City of Ostrava, established that the undertaking had received a SEF subsidy of CZK 19,000,000. The undertaking commenced on 23/08/1999 and was completed on 30/06/2000 with a one-month delay. The check established non-compliance with the terms of the SEF aid agreement – a failure to deliver the annual indicator contribution (BOD5: a mere 38.4 t removed, instead of 128.7 t; US: only 35.8 t as opposed to 117.7 t). The final evaluation is currently discussed at SEF.

It was noted that construction periods were exceeded (e.g. by 4.5 years in the case of the second works). The projected wastewater rate of flow has not been accomplished due to the lack of hydraulic load.

B. Additional findings

1. State budget funds

a) In the period under review, **MoA** extended support under the “Construction and technical revamping of sewer systems and wastewater treatment plants” program to the construction of 6 WTP and sewer systems in the Oder river basin. Out of the total volume of CZK 2,336,300,000, the state budget contributed CZK 1,567,000,000. The largest undertaking was the Ostrava WTP whose costs totaled CZK 1,055,400,000 and where the state budget contributed CZK 904,800,000 (SEF aided the remaining works comprising the undertaking). The enlargement of the Frýdek-Místek WTP came next: CZK 559,300,000 (CZK 438,900,000 respectively) Karviná – CZK 497,400,000 (CZK 97,200,000). Most of these extensive undertakings began prior to 1995 and were completed in the course of the 1995 – 2000 period or commenced in that period; one undertaking has not been completed yet.

MoA did not deal with the overall contribution of financial assistance to improve water quality. The program evaluation had not been assessed by the audit’s time.

b) A program entitled “Construction and technical renovation of water mains and water treatment plants” contributes towards regulated management of municipal wastewater. Under the program, undertakings in the Oder river basin were implemented to the tune of CZK 8,896,403,000 (54 undertakings over CZK 5 million and 93 undertakings under CZK 5 million). For the most part, these involved construction, an extension of a term, repairs after the floods or enlargements of water main systems. Within the deadline set for final program evaluation, aid recipients requested project reviews and project conclusion. The whole program had not been evaluated at MoA by the audit’s time.

c) Apart from the two aforementioned programs, MoA disbursed funds for the water management-related programs below: Acquisition and technical renovation of MoA-managed investment assets, Anti-flood Measures, Floods 1997 and Floods 1998.

In the period under review, State enterprise Povodí Odry received a total of CZK 928,020,000 in Floods 1997 funds. The flood damage removal provided by State enterprise Povodí Odry commanded an aggregate amount of CZK 2,943,341,000.

d) MoA-provided funds to grow grass on arable land contribute to the improvement of landscape, including water management. In the period under review, some 427 hectares of land were seeded with grass in the Oder river basin and subsidies amounting to CZK 4,337,380 were received. In 2000, MoA conducted an audit of just a single aid recipient (out of 18 recipients) and no irregularities were noted.

e) Being the administrator of minor streams, the Agricultural Water Management Administration (AWMA) spent state budget funds totaling CZK 251,808,000 under programs entitled Acquisition and technical renovation of MoA-managed investment assets, Anti-flood Measures, and Floods 1997. The programs were not completed and evaluated by the audit's time. AWMA contributed to the purity of waters by the maintenance of streams, which included in particular mowing, cleaning, maintenance of structures, eradication of *Heracleum* plants, and the upkeep of riverbank growth. Out of the 4,000 kilometers of minor streams within the Oder river basin, some 321 kilometers were cleaned.

f) Provision of state funds to forest management

The funding of work done on brooks in forests via minor stream administrators is subject to entitlement.

Other water management aid includes financial assistance to reforestation of agricultural land. In 1998 – 2000, the state budget contributed to selected counties a total of CZK 6,946,000. In 2000, there was a considerable drop in the reforestation of agricultural land in select counties, even though the reforestation of land, which is hard to exploit for agricultural purposes, is on the upswing in nationwide terms.

The audit provided an outline of those forestry management indicators, which exert a major influence on the water regime in select counties, and a 1995-2000 comparison with the nationwide average. The area under review is forested by 34%, which matches the nationwide average.

g) River System Revitalization Program (RSRP) managed by **MoE** jointly with APNL creates conditions for the renewal of the natural environment as well as of the exploited resources, and for the optimization of the landscape's water regime. These include measures to help revitalize the natural function of streams, the establishment and revitalization of elements in the system of ecological stability tied to water regime, the retention capability of the landscape, the reconstruction of technical elements and the removal of silt from producing fishponds, the construction of new core treatment plants, and the creation of manmade wet grounds. Indirectly, all such measures contribute to the enhanced quality of streams.

In 1996 – 2000, 35 undertakings received subsidies amounting to CZK 52, 238,000 in the Oder river basin. 13 undertakings were funded by municipalities or cities, while AWMA was the investor in 9 cases as the administrator of the streams concerned. Final assessment was conducted

as part of the definite allocation of a subsidy; the fulfillment was evaluated for all given conditions, acceptance procedures included. The audit included 8 Oder river basin undertakings commenced 1999 – 2000.

h) Minor Water Management Environmentally Friendly Events Program (MWEFE) is also provided for and run by MoE and APNL in collaboration with the Ministry of Finance. Financial contributions take the form of a systemic subsidy and a repayable loan. The assistance goes to the construction, or revamping, of WTPs and sewer systems.

Under the MWEFE program, begun in 1998, a total of CZK 59,128,000 was invested into 8 undertakings (construction of 2 WTPs, the rest is sewer systems); of this, subsidies and repayable loans from the state budget totaled CZK 31,941,000. All applicants received assistance. 5 undertakings have been completed to date. Although the MWEFE program as aimed at the construction of sewer systems and WTPs, that is structures of specific parameters for contamination removed, the envisaged or the actually achieved ecological effects are not assessed in aggregate.

2. Funds from the State Environmental Fund of the Czech Republic

In the Oder river basin, SEF assisted in the period under review a total of 45 water protection undertakings to the tune of CZK 752 million. The aid recipients included 40 municipalities or cities, 2 business entities, a state contributory organization (a hospital), a budgetary organization (a social care institution) and a church entity. The measures were put in place mostly in agglomerations in the under-10,000-inhabitants category. In this period, SEF provided some CZK 486 million worth of subsidies and some CZK 266 million in loans on favorable terms (assistance to the maximum 80% accounted costs). The recipients were obliged to provide the rest out of their own resources.

Out of the 45 undertakings, a full 29 were completed construction-wise by the audit's time. The actual costs of the completed undertakings amounted to CZK 1,388 million, while the SEF assistance provided totaled some CZK 639 million (CZK 408 million in subsidies; loans: some CZK 231 million). The final evaluation with the definitive allocation of assistance has taken place or is currently taking place for those undertakings that were completed construction-wise.

The audit established that SEF, which pursuant to Section 5 (4) of Act No. 58/1998 Coll. has to pay for costs related with analysis and checks of contamination of wastewater for the purposes of execution of state administration, had belatedly concluded contracts with accredited laboratories during 1999 – 2001.

3. State funds in aggregate

Out of the state budget, MoA spent a total of CZK 1,578 million on water management-related aid in 1996 – 2000. These involved mainly subsidies and repayable loans under the “Construction and technical revamping of sewer systems and wastewater treatment plants” program. The evaluation of the program as a whole has not been carried out to date, and MoA

puts no aggregate figure on the ecological benefit achieved & commensurate with the funds spent.

The MoE investment programs (a total of CZK 82 million in the Oder river basin) went to several undertakings of lesser financial volume. They were used primarily by municipalities, which were obligated to participate financially in the undertakings.

SEF funds amounting to CZK 752 million gave support to 45 undertakings in the Oder river basin. Again, the recipients of subsidies and loans were chiefly municipalities that participated with their own resources in the construction of WTPs and sewerage systems. A figure was put on the environmental benefit of a respective undertaking in 29 completed undertakings – contamination removed as linked to the state funds spent and to the total costs of such an undertaking.

State funds amounting to CZK 369 million were spent in investment undertakings aimed to reduce the adverse effects of water in the mines (mine water).

In the Oder river basin, state funds totaling CZK 2,835 million were spent in the period of 1996 – 2000. These funds have demonstrably contributed to the improvement of stream purity in the decisive profiles.

IV. Data given about the changes in water purity

(Sources: Povodí Odry, ČIŽ and WMRI)

1. The quality of alluvia and river sediments in the Oder river basin

Sediments and alluvia are a sensitive indicator of surface water contamination, as they bind many a pollutant, which may be detected in them even though the concentration of contaminants in the water phase are below the detection threshold. While sediments provide information about the accumulation of contaminant in the stream over a longer period, the alluvia indicate the immediate status of contamination.

The routine monitoring of select indicators of the quality of river sediments and alluvia has been conducted since 1999 by State enterprise for CHMI. The following profiles are monitored in the Oder river basin: the Oder – at Bohumín, the Olše – at Věřňovice, the Opava – at Děhylov, the Ostravice – at Ostrava, and the Oder – at Jakubčovice (monitored through 2000) for the following indicators: sediments: < 0.02 mm 17 metals, in the sample of a specific organic substance; alluvia: 17 metals in the overall sample. The evaluation included results of analyses of the indicators monitored in the alluvia samples (samples taken once a month) and of analyses of the indicators monitored in the sediment samples (samples taken twice a year) and a comparison of 1999 and 2000.

All profiles monitored showed in the alluvia collected in 2000 slightly higher contents of Cu, Cr, As and Ni as set by the MoE Soil Contamination Methodological Instruction. Only rarely, higher values were found for a higher level of contamination, namely for As in the Oder at Jakubčovice profile (Actual/MoE limit – 82/70 mg/kg) and in the Oder at Bohumín profile (Actual/MoE limit – 71/70 mg/kg), which mean meant inclusion in Category C – Risk Contamination.

The enduring exposure to Zn and Hg was shown in all the profiles, while a new finding was the nearly risk content of Hg in the Oder at Jakubčovice profile, and above all the risk exposure to Cd that persists in the Oder at Bohumín (Actual/MoE limit - 29/20 mg/kg) and in the Ostravice at Ostrava; the rest of the profiles are slightly exposed, which corresponds to Category A (below the threshold of contamination) and Category B (tolerable degree of contamination). A reduction in the exposure to Cr, Pb and Ni was noted in 2000 in the Oder at Bohumín profile, however twice to three times higher values of the content of Cd in this profile constitute a serious finding (86 mg/kg in 2000 – the limit: 20 mg/kg).

All sediments monitored in profiles during 2000 were not exposed to As, Cr, Cu, Hg, Ni, Pb, Zn and P – the content was below the threshold of contamination (Category A). Only the Oder at Bohumín profile, the exposure to Cd was on the tolerable degree of contamination.

The exposure of sediments to specific organic substances as compared with criteria listed in the MoE Methodological Instruction corresponded to Category A for the majority of substances monitored. The only exception is the risk contamination with benzopyrene, which puts the Opava at Děhylov and the Oder at Bohumín profiles into Category B, and the Olše at Věřňovice profile into Category C.

2. Dam reservoirs

State enterprise Povodí Odry manages and operates 8 dam reservoirs, of which 3 drinking water reservoirs. The individual water management works constitute an interlinked water management set. The purity of water in these dam reservoirs is monitored in indicators and frequency set according to the reservoir's significance. The drinking water reservoirs (DR) have their monitoring evaluated pursuant to Czech Norm (ČSN) 757214 (and additionally compared to Council Directive 75/440/EEC).

The auditor examined in particular materials, which included a comparison of water quality in the DR in the Oder river basin with the Czech and EU, a comparison of water quality in the DR and in non- DR in the 1995 – 2000 timeline, or a comparison of 1995 over 2000, in select indicators; water quality in DR tributaries in 2000 per same indicators was also assessed.

There was an improvement in the DR in the five-year comparison in all indicators. Thus, for example, the DR Šance and DR Kružberk displayed a significant improvement in the N-NH₄ and N-NO₃ indicators, which made it possible to reclassify them in Class I, and in the BOD₅, COD and P Total into Class II. The quality of water was positively influenced by the construction of the Slezská Harta reservoir, especially as regards the reduction of the content of nitrogen and phosphorus. In the recent years there has been an improvement especially with respect to the nitrogen indicators, thus the DR Těrlicko recorded a drop by 65% in N-NH₄, and by 53% in the N-NO₃ indicator.

3. Mine waters

Mine waters permanently contaminate surface waters, particularly in the DS, Cl, and SO₄ indicators in the right-bank area of the Oder some 22,8 km from the Polish border. In order to comply with the Convention, such water is discharged in a regulated manner according to technological capabilities while taking into consideration requirements of the water management authorities.

Although mine waters comprise some 5 – 6% of the total volume of discharged wastewater in the Oder river basin in Northern Moravia, they bring into the surface waters nearly one half of the total dissolved substances (46 %) from the point sources of pollution on record. Salinity of the mine waters ranges from 4 to 15 g/l, and the total volume of discharged mine water ranges from 13 to 20 million cubic meters annually and accounts for 55 to 180 thousand tons of dissolved inorganic salts. It was established that a significant worsening occurs in the Olše River where the Polish Szotkówka empties into it (an increase of 1,216 mg/l of DS, and by 694 mg/l of Cl, respectively). The Czech side did not have the necessary data available on the pollution the Szotkówka pours into the Olše. A change occurred upon a decision taken in September 2001 by the Czech-Polish Convention Working Group. Since January 2002, the Polish side will do the monitoring and its results will be available to both sides.

In regard of the requirement to reduce the adverse effects of the mine waters, an investment undertaking entitled “Yeremenko Water Pit” was implemented to the expense of CZK 368,517,000 through the end of the period under review. These funds were allocated as an investment subsidy from the state budget to finance the attenuation of coal and ore mining.

In the past six years, there occurred no breaches of the Convention in the Oder at Bohumín border profile, and the monitored Cl and SO₄ indicators display an ever-decreasing trend and they are significantly below the set limits.

4. The status of surface waters in the backbone streams in the Oder river basin

The quality of surface waters in the Oder river basin were assessed by the Czech Norms (ČSN) at “closure profiles” of the Moravice, the Opava, the Ostravice, the Olše and the Oder. A comparison of contamination in the OR, BCI, SCI and BI indicators was carried out for the period of 1995 through 2000.

Moravice – Branka – In respect of the OR indicators, the stream ranks as Class III, in the set of the BCI indicators, there was a marked improvement and now ranked as Class II in 2000, as opposed to Class IV in 1995; the SCI indicators put it steadily into Class I; the BI indicators into Class II (earlier, Class IV). The overall 2000 assessment was favorable and the Moravice was reclassified into Class III, e.g. it went up by an entire Class.

Opava – Třebovice, the mouth of – The stream classified as Class III per OR indicators; the set of BCI indicators attest to an improvement from Class V in 1995 to Class IV in 2000; in SCI indicators it is permanently in Class I, and per BI in Class III, earlier in Class V. The water quality improved and the overall assessment of the stream went up by an entire Class, i.e. Class IV.

Ostravice – Muglinov – The OR indicators ranked the stream up by an entire class as Class IV, the BCI indicators place it permanently into Class IV, while in the SCI indicators improved by one entire Class, i.e. from Class III to Class II; there was an improvement in the BI indicators: a change from Class V to Class III. The 1995 over 2000 comparison is a favorable one: The stream was reclassified from Class V to the current Class IV.

Olše – Věřňovice – A slight improvement in the OR set and thus reclassification of the stream to Class IV. The BCI indicators rank it permanently in Class V, which goes also for the SCI indicators; there was a slight improvement in the BI set and reclassification to Class IV. Overall, the stream was classified in Class V and it was the Oder's most contaminated tributary. As it

borders with Poland, it is also exposed to the right-hand side tributaries from Poland, of which the most significant one is the Szotkówka flowing through an industrial agglomeration and receiving saline mine waters.

The final border Oder at Bohumín profile is the most important one in respect of an assessment of the entire Czech part of the river basin - There was an improvement in the OR indicators from Class V in 1995 up to Class IV in 2000. In 1999 and 1998, the stream was in Class III, the reclassification in 2000 was due to a slight increase in BOD₅. The BCI indicators witnessed an improvement and a reclassification from Class V to Class IV, but out of the 8 indicators of this category, only 3 (US, Fe, P Total) ranked Class IV, while the rest were Class II and Class III compliant. The SCI set improved by an entire Class, i.e. from Class III to Class II in respect of a single indicator (SO₄), the remaining 3 indicators are in Class I. There was a marked improvement in the BI indicators and the stream was reclassified from Class V to Class III.

The overall assessment is favorable as the border-forming river chalked up an improvement in quality indicators, primarily in the past two to three years, which manifested itself in the ensuing reclassification from Class V up to Class IV in water quality.

The course of changes (per statistical data as delivered) in the content of individual contaminants in the Oder at Bohumín profile from 1980 to 2000 depicts a falling trend, especially in the most recent period. Thus in respect of BOD₅, the concentration in 1980 was 12 mg/l, in 2000 only 4 mg/l, while the Czech Norm (ČSN) is 8 mg/l (1995 concentration: 6 mg/l). Zn: 1980 concentration - 1.3 mg/l, in 2000 down to 0.08 mg/l, and the Czech Norm (ČSN) is 0.2 mg/l (1995: 0,2 mg/l). Similar developments were in COD, DS and phenols.

The municipal and industrial WTPs have done their part by removing the largest amount of impurities. The typical municipal WTP indicators are: BOD₅, US, N-NH₄, N-NO₃, COD and P Total. As regards the industrial WTPs, indicators are selected by production, e.g. DS and NES.

The wastewater discharged by the major surface water polluters has considerably improved their qualitative and quantitative indicators in the past five years. The exposure of the Oder has been reduced chiefly due to the cleansing effect of the Ostrava CWTP, where the most significant drop by 63% was noted for the discharges of BOD₅, by 78% in US and by 96% in N-NH₄. Measured by total volume, Ostrava's Borsodchem-MCHZ plant also discharges into the Oder fewer pollutants that contaminate the surface waters. There were improvements in all the quantitative indicators (however, the rate of flow in 2000 was lower by nearly one third). The most significant contaminants in this respect are DS, whose discharges were slashed by 19%. Only the N-NH₄ posted an improvement among the qualitative indicators.

It is also important for the Oder that polluters discharging wastewater into its tributaries (the Ostravice and the Olše) post quality improvements. Contributing to this is also the Třinec WTP (an Olše outlet), which posted better values in all monitored indicators in 2000; N-NH₄ was cut down to 0.9 mg/l, i.e. by 85%. The quantitative indicators posted reductions, even though there was a slight decrease in the rate of flow. A drop by 58% was noted for US. The industrial plants of Energetika Třinec and Třinecké železářny (an Olše outlet) put in place measures that resulted in gradual improvements on the most afflicted discharge outlets (14 in all), e.g. the coke plant reduced US by 74%, Power Plant II slashed NES by 77%, the sintering plant and the foundry cut US by 77%. These values achieved did meet the requirements handed down by the

water management authority. During 2000, the individual discharge outlets were channeled into two WTPs in order to further the cleansing effect.

The Biocel Paskov WTP (an Ostravice outlet) posts on average a twofold improvement in the quality of discharged wastewater per qualitative and quantitative indicators while complying with the decision handed down by the water management authority. The Frýdek-Místek WTP (an Ostravice outlet) posts improvements in qualitative and quantitative indicators in the period of comparison. Thus BOD5 discharge was slashed by 84% and US by 81%.

V. Assessment

The audit's objective was to check management of funds spent on measures intended to improve the purity of surface waters within the Oder river basin, and to assess the impact of the implementation of such measures on the overall contamination of the Oder as it leaves the Czech Republic since execution of agreements related to the protection of the Baltic Sea requires considerable sums of money from the signatories. The bilateral cooperation with Poland as per the 1958 Convention took place only on the level of working groups.

The audit verified and summed up state-supported activities evolved throughout the Oder river basin that lead to the reduction of pollution drained by the Oder into Poland in the period from 1995 through 2000. These activities lend support to the implementation of undertakings that directly impact point sources of pollution (WTPs, sewer systems, stream maintenance and renewal) or indirectly through revitalization (soil protection measures, retention capabilities of the forests, research and development, monitoring). During the period under review, CZK 2,835 million from state funds and - if additional resources are included - a total of CZK 7,323 million was spent on the improvements in the purity of water in the Oder river basin as disclosed in the statistical unit of North Moravian Region. The reduction in wastewater production, however, brought about a lowering in the hydraulic load of the capacities that were built.

Certain shortcomings were noted by the audit in respect of the management of funds, namely:

- The binding terms of construction and the contractual proportions of own resources in cost-sharing were not observed;**
- Work rendered did not match SEF-approved blueprints;**
- Some works did not observe the technical parameters as stipulated by project documentation;**
- SEF entered belatedly into contracts with accredited laboratories in 1999 and 2001;**
- There was no program to limit area-wide sources of pollution in the Oder river basin.**

The funds spent manifested themselves in the improvements of all indicators in the most important river profiles monitored. An increase in the P Total indicator caused that

the river profiles under assessment were not classified in a higher class. The majority of profiles were Class III (32.5%) and Class IV (33.7%), followed by Class II (22.5%) and in Class V – the worst (10%). Deficiencies related to the high content of the P Total indicator persist. The best improvement of the indicators monitored and the ensuing classification of the quality of streams were noted for the border-forming Oder at Bohumín profile.

Enclosure

A list of symbols and abbreviation used in respect of water quality:

1. BOD5 – Five-day biochemical oxygen demand (with suppression of nitrification)
2. COD – Chemical oxygen demand
3. US – Undissolved substances
4. DS - Dissolved substances
5. NES – Nonpolar extractable substances
6. N Total. - Total nitrogen
7. N-NH₄ – Ammoniacal nitrogen
8. N-NO₃ – Nitrate nitrogen
9. P Total. - Total phosphorus
10. SO₄ - Sulfates
11. OR - Set of indicators of the oxygen regime
12. BCI - Basic chemical indicators
13. SCI- Supplementary chemical indicators
14. BI- Biological indicators
15. Fe – Iron, Cu – Copper, Cr – Chromium, As – Arsenic, Ni – Nickel, Zn – Zinc, Hg – Mercury, Pb – Lead, Cd – Cadmium, Cl – Chlorine