Seminar on
"Strategy for Water Pollution Abatement in View of the Norwegian Experience"
Report Title:
Seminar on Strategy for Water Pollution Abatement in View of the Norwegian Experience.

Author(s):
Grazyna Englund

Client(s):
State Pollution Control Authority (SFT), Ministry of Environment (MD), Norway and Ministry of Environmental Protection, Natural Resources and Forestry (MOSZNil), Poland

Abstract:
As a part of the Program of Bilateral Co-operation between the Norwegian Ministry of Environment and the Ministry of Environmental Protection, Natural Resources and Forestry in Poland, this project has been executed by the Norwegian Institute for Water Research (NIVA) while sponsored by the State Pollution Control Authority (SFT). As Polish co-ordinator, the Department of Water Management of the Ministry of Environmental Protection, Natural Resources and Forestry was appointed.

The seminar was held from the 13th to the 18th of March 1995 in Oslo and Lillehammer. The seminar aimed in providing a forum in which the Polish environmental decision-makers, officials and scientists could exchange views on and learn about the Norwegian environmental management, particularly related to the water pollution abatement.

4 keywords, Norwegian
1. Bilateralt samarbeid
2. Forvaltning av vannressurser
3. Begrensning av vannforurensning
4. Miljøløsninger

4 keywords, English
1. Bilateral co-operation
2. Water Resources Management
3. Water Pollution Abatement
4. Environmental solutions

Project manager
Grazyna Englund

For the Administration
Gunnar Fr. Aasgaard

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Preface

This report presents a project organized as a part of the Program of Bilateral Co-operation between the Norwegian Ministry of Environment and the Ministry of Environmental Protection, Natural Resources and Forestry in Poland.

The project has been executed by the Norwegian Institute for Water Research (NIVA) while sponsored by the State Pollution Control Authority (SFT) (§ 4.8 in the workplan for the co-operation between Norway and Poland in 1994 classified within Water Protection, Water and Wastewater Treatment). As the Polish co-operation partner, the Department of Water Management of the Ministry of Environmental Protection, Natural Resources and Forestry was appointed.

NIVA was responsible for the organization of the Seminar "Strategy for water pollution abatement in view of the Norwegian experience" in order to provide a forum in which the Polish environmental decision-makers, officials and scientists could exchange views on and learn about the Norwegian environmental management, particularly related to the water pollution abatement.

The Polish partner was responsible for the proposal of modifications to the program of the seminar according to their needs and expectations, to present the Polish environmental protection strategy shortly, water management, monitoring and control, as well as for the selection of the Polish participants.

The following team participated in the organization and the performance of the seminar from NIVA:

Research Scientist Grazyna Englund - project manager
Head of Research Department, Environmental Technology Gunnar Fr. Aasgaard - quality assurance
Research Manager (Water Resources Management) Jon Lasse Bratli - professional assistance
Secretary Anne-Lise Hvistendahl - practical arrangements.

NIVA wishes to thank all the lecturers and their institutions for contributing to a successful seminar.

Oslo, 11.07.95

Grazyna Englund
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Summary

This report presents a project organized as a part of the Program of Bilateral Co-operation between the Norwegian Ministry of Environment and the Ministry of Environmental Protection, Natural Resources and Forestry in Poland.

The project has been executed by the Norwegian Institute for Water Research (NIVA) while sponsored by the State Pollution Control Authority (SFT) (§ 4.8 in the workplan for the co-operation between Norway and Poland in 1994 classified within Water Protection, Water and Wastewater Treatment). As Polish co-operation partner, the Department of Water Management of the Ministry of Environmental Protection, Natural Resources and Forestry was appointed.

NIVA was responsible for the organization of the Seminar "Strategy for water pollution abatement in view of the Norwegian experience" in order to provide a forum in which the Polish environmental decision-makers, officials and scientists could exchange views on and learn about the Norwegian environmental management, particularly related to the water pollution abatement.

The Polish partner was responsible for the proposal of modifications to the program of the seminar according to their needs and expectations, to shortly present the Polish environmental protection strategy, water management, monitoring and control, as well as for the selection of the Polish participants.

One week of exchanges of the experience was regarded as interesting and useful by both sides. Fruitful discussions, both professional and social, brought the participants closer to each other and established, hopefully, a basis for further co-operation. A list of proposals for further co-operation has been prepared.
1. Introduction

The project proposal for the organization of the seminar "Strategy for Water Pollution Abatement in View of the Norwegian Experience" was proposed by the Norwegian Institute for Water Research (NIVA) to the Norwegian Ministry of Environment (MD) (ref. 2657/93, d.16th of August 1993, Appendix 1), as a result of the preliminary visit to Poland (3-5th of August 1993) by Hans Olav Ibrekk, NIVA. Proposed program of the seminar was revised after discussions with the Polish partner; the Polish Ministry of Environment, Natural Resources and Forestry.

The State Pollution Control Authority (SFT) in Norway approved financial support (ref. 94/3968-1, d. 12th of April 1994, Appendix 2) to finalise the program (§ 4.8 in the workplan for the co-operation between Norway and Poland in 1994 classified within Water Protection, Water and Wastewater Treatment). Since Hans Olav Ibrekk was delegated to another mission, Grazyna Englund was appointed as project manager.

_Jon Lasse Bratli was responsible for contacting the institutions and finding the adequate lecturers for the performance of the sessions 1-4 (all connected to water resource planning, policies and management), while Grazyna Englund - for the remaining sessions (water/wastewater pollution control technologies). Gunnar Fr. Aasgaard functioned for quality assurance._

15 representatives from the authorities and local decision-makers, as well as scientists were representing the Polish side. The Norwegian group of participants represented a wide spectrum of expertise within water resources management, environmental legislation and other different aspects of the Water Pollution Abatement in view of Norwegian experiences.

According to the wishes of the Polish partners the seminar was performed early spring 1995 (from the 13th to the 18th of March) in Oslo and Lillehammer.

2. Program of the Seminar

In general the seminar was divided in following sessions:

- Water management
- Legal and economic instruments
- Water resources planning / policies
- Sources of water pollution
- Norwegian water pollution control technology, inclusive case studies
- New environmental solutions, inclusive excursion
- Identifying of further activities/project ideas.

The Polish water management system and pollution control was also shortly presented.

Detailed program of the seminar is attached (Appendix 3).
3. Further co-operation

The last session at the seminar gave a lot of ideas to be considered within the framework of the bilateral co-operation.

Future co-operation ought to be based on the following:

1. The co-operation must be attractive and useful for the both sides
2. One subject will be scientific co-operation between NIVA and the Polish institutes
3. An other subject will be direct co-operation between regional/local representatives/institutions in Poland and Norway
4. Commercial co-operation for developing and implementing environmental products may be included
5. Co-operation between the governmental departments will be important, not only for exchange of experience but also for the implementation of solutions (administration, management, monitoring and regulations).

Based on these criteria the following project ideas were presented:

- Environmental Impact Assessments
  - methodology
  - case study
  - implementation
- Strategy for water resource management, based on the Norwegian concept generated from the new "Law for water resources and ground water"
- Environmental objects for water resources:
  - master plan
  - methods for cost/effective analysis
  - strategy for nutrient removal (N and P)
- Establishing of criteria for water quality
- Waste water treatment and transportation
  - biological phosphorus and nitrogen removal
  - combined biological and chemical treatment of waste water
  - SBR-processes
  - on line process control
  - upgrading of existing waste water treatment plants
  - optimization of sewer systems.

From the long list of project ideas we also include:
- water management
- testing and improvement of biofilm reactors
- management of the rural areas
- organization of new seminars
- health related analyses
- environmental protection of the road areas
- treatment of hazardous/toxic waste; life cycle analysis (LCA) of chemical products
- hydrological balancing of surface and underground water resources.
The first reactions of interest for further co-operation in form of letters are attached in Appendix 7.

Based on the letters and personal contacts a few research proposals are already sent (Appendix 8), and some are in preparation (table 1):

Table 1. Project proposals based on responses from Institute of Environmental Protection, Poland.

<table>
<thead>
<tr>
<th>No</th>
<th>Project title</th>
<th>Applied from:</th>
<th>Budget, NOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Master plan principles for selected catchment area</td>
<td>Will be sent to SFT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Detailed action plan for technical solutions</td>
<td>Will be sent to SFT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Implementation of the most economically attractive alternative at the case study area</td>
<td>Will be sent to SFT</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Educational part and Follow up</td>
<td>NFR/Collaboration with Eastern Europe, June '95</td>
<td>1996: 133.000,- 1997: 100.000,- 1998: 110.000,-</td>
</tr>
<tr>
<td>5</td>
<td>Improvement of the professional competence and network</td>
<td>NFR/Collaboration with Eastern Europe, June '95</td>
<td>1995: 100.000,- 1996: 96.000,-</td>
</tr>
</tbody>
</table>

4. Conclusions and Acknowledgements

The seminar was performed according to the program and represented a high professional level with a lot of possibilities for exchange of experience both from Poland and Norway. All presentations were evaluated as very interesting and gave the participants some new insight on solving environmental protection problems. NIVA has obtained several positive comments both verbally and in writing (Appendix 6) about the professional content and the way the seminar was conducted.

The seminar had a broad and a general nature, it was therefore proposed to hold a follow-up seminar, with detailed practical examples of implementing procedures and strategies based on the Norwegian regulations.

Organization of the Seminar was fully supported by the Norwegian State Pollution Control Authority (SFT). NIVA is thankful to SFT for all the support, both financial and professional, by assuring the needed lecturers. All the participating lecturers are greatly appreciated, and many thanks to the institutions they represented.
Appendixes
Appendix 1.

The Project Proposal.
O-93036

Seminar on Strategy for Water Pollution Abatement in View of the
Norwegian Experience
and
Feasibility Study of the Orzechowo Sewage Treatment Plant.
Project Identification Mission to Poland

Oslo, 6. August 1993

Hans Olav Ibrekk
1. Introduction

In 1991 the Norwegian Institute for Water Research (NIVA) applied for funding from the Norwegian Ministry of Environment to execute the project "Strategy for water pollution abatement in Poland". Due to delays in the decision making process and other priorities in Poland, Polish environmental authorities indicated their interest in receiving more information on the Norwegian environmental management system. A seminar could serve as a useful forum for this exchange of information. NIVA was requested by the Polish Ministry of Environment, Natural Resources and Forestry to prepare a seminar program.

The draft program was submitted to the Ministry of Environmental Protection, Natural Resources and Forestry in July 1992. The draft program was accepted in August 1992 (letter dated August 31, 1992). The proposal was considered by the Polish-Norwegian working group for the protection of the environment at its meeting in September 1992. It was agreed that the Norwegian Ministry of Environment should fund the seminar, however, the scope of the seminar should be revised. The seminar should be related to deal with specific environmental and management problems in the Orzechowo area. To facilitate the process of elaborating a seminar program designed to meet the needs of the Polish participants, the Norwegian Ministry of Environment decided to fund a fact-finding mission to Poland in early 1993. Due to other assignments the mission was delayed until August 1993.

In addition, the Polish delegation requested assistance from Norway in assessing the technical plans for the Orzechowo sewage treatment plant. This biological plant is under construction and it is proposed to upgrade the plant to comply with new standards. As part of the project a new sewer network is under construction. There is a need to undertake an independent assessment of the proposed technical solutions.

Objective of the mission

The objective with the study is to assess the local environmental and management problems in Poland to facilitate the preparation of the seminar. The seminar will focus on addressing issues of particular interest to local decision-makers and authorities. In addition the mission will collect and assess information related to the sewage treatment plant in Orzechowo to facilitate the process of preparing detailed terms of reference and work plan for the main project.

Execution of the mission

During the visit to Warsaw 3-5 August 1993 meetings were held with representatives from the Polish Ministry of Environmental Protection, Natural Resources and Forestry, Department of Water Management and Department of International Co-operation. In addition the Zegrze reservoir area was visited to study the environmental management problems around this reservoir and the construction of the Orzechowo treatment plant.

The Polish representatives presented a draft seminar program which was discussed and amended. This draft formed the basis for the program which is presented in this proposal. A revised program was prepared during the visit and discussed with Polish representatives before departure.

2. Justification

Poland as well as the other central and eastern European (CEE) countries in transition, is facing enormous challenges within the water sector. Nearly all major surface water resources are heavily polluted and some areas are facing water scarcity. This situation especially regarding water pollution,
is similar to the situation most Western European countries faced twenty to thirty years ago. The present water management administrative system in Poland lacks capacity and resources to solve the problems effectively. The system as well as the policies are now under revision. To facilitate this revision Polish authorities are keen to gain experience with the water management system in other countries. As such the water management system in Norway is of great interest.

Poland is receiving assistance from several countries within the environmental sector. However, the total international assistance amounts only to 5 percent of the total environmental investments. At the moment the donors finance approximately 200 projects of which about 70 are within the water sector. As such the water sector is considered extremely important from both parties, i.e. the donor and the Polish government. The most active donors in the water sector are the European Community (EC) and Sweden. The water sector in Poland has been able to prepare plans and strategies effectively enabling donors to select the most cost effective projects for funding.

In 1992 approximately 340 new sewage treatment plants were put into construction. Presently most major urban centers lack sewage treatment. The problems associated with municipal waste water treatment are therefore of great importance since considerable resources are spent each year. These resources should be utilized in the most cost effective way.

The legacy of the policy of the former government is evident in Poland, as well as in most other CEE countries. The water sector is currently under-going changes to meet the new challenges the sector is facing in the market economy. The water law is being amended, new water pollution abatement strategies are being formulated, the national monitoring program is under revision, and so forth. To use the scarce resources most effectively the Polish government wants to base its new policy on experience from other countries. By basing the new system and policies on experience from other countries, the Polish government hopes to avoid doing the same mistakes as other countries have done and as such use the resources more effectively.

The proposed seminar will provide a forum in which Polish water professionals can gain experience with the Norwegian water management system. This information can be compared with information from other countries, and if appropriate, used later in the formulation of new policies and strategies.

3. Proposed Program for the Seminar

Title:

"Strategy for Water Pollution Abatement in View of the Norwegian Experience"

Objective:

The seminar is convened to transfer Norwegian experiences on environmental management with specific emphasis on water pollution control to facilitate the process of improving the Polish policies for water protection from pollution.

Participants:

The Polish Ministry of Environmental Protection, Natural Resources and Forestry will select the participants. Representatives from the following institutions are expected to attend:

- Ministry of Environmental Protection, Natural Resources and Forestry
- Ministry of Building and Physical Planning
- Departments of Environmental Protection of Voivodship Offices
- Regional Water Management Authorities
Experts

The total number of participants will be limited to 15 persons. For budgetary reasons the number of participants can be limited further, however, the presented budget is based on 15 participants.

Speakers:

At the seminar each topic will be addressed by representatives from the Norwegian Ministry of Environment, the State Pollution Control Authority (SFT), Directorate for Nature Management, County Environmental Protection Departments, municipalities, Norwegian Institute for Water Research (NIVA), the Center for Environmental and Soil Research (Jordforsk), consulting firms, industries, and other institutions as appropriate. Speakers are expected to cover several of the topics presented in the program to reduce the number of speakers involved.

Language:

The presentations will be given in English with translation to Polish. Written material will be presented in English. The Norwegian organizers will prepare the written documentation. The documentation will be based on existing material to the extent possible.

Date and venue:

The seminar is tentatively scheduled for late November/early December 1993 or during winter of 1994 (depending on available funding). The seminar will last for 5 days. The participants have to stay one weekend in Norway (APEX tickets).

The venue for the seminar has not been selected, however, the seminar will be held in Oslo, Norway. Most likely the conference center at the headquarters of the State Pollution Control Authority (SFT) will be used.

Proposed Program:

Day 1:

Session 1. Water management system in Norway with emphasis on pollution control

- Water management system in Norway. Main structure. Overview of the structure (central, regional (county), and local level), ministries/institutions involved, division of responsibility, role, co-operation, policies, etc.. Representative from the Norwegian Ministry of Environment (MD).

- The State Pollution Control Authority's (SFT) role in water management. Representative from SFT.

- The Directorate for Nature Management's (DN) role in water management. Representative from DN.

- The role of County Environmental Protection Department (MVA) in water management. Representative from MVA.

- The role of municipalities. Representative(s) from municipalities.

- Discussion and exchange of views.
Session 2. Legal and Economic Instruments

- Legal instruments used in water management (focus on pollution control).
  The pollution act, the act on water-courses, Environmental Impact Assessment of water
  projects, etc.. Aim, scope, key paragraphs, amendments and regulations, enforcement, permits,
  licenses, procedures.
  Representatives from MD and SFT.

- Economic instruments
  Fees, charges, incentives, disincentives, grants, soft loans, etc..
  Representatives from MD, municipalities, etc.

- Water resources planning in Norway.
  Nation-wide master plans, river basin plans, planning and building act, municipal planning,
  integration of land use and water use planning, etc..
  Representative from NIVA.

- Discussion and exchange of views.

Day 2:

Session 3. Water Quality Criteria and Monitoring

- Norwegian Water Quality Criteria - Freshwater and Marine Waters
  Overview of the system, classification of level of pollution, suitability for use, parameters,
  chemical and biological criteria, comparison with EC criteria/standards.
  Representatives from NIVA.

- Assessment of water quality - methodology
  Brief overview of the most common methods used.
  Representative from NIVA.

- Monitoring of rivers and lakes.
  Scope of the program, objectives, methods, parameters, number of samples, international
  monitoring programs (acidification, North Sea (PARCOM), etc..).
  Representatives from SFT and NIVA.

- Presentation and use of results.
  How are the results used in policy and decision making? How are the results presented to the
  public and decision makers (politicians)?
  Representative from SFT.

- Examples of monitoring programs.
  1000 Lakes Study, National Study of Eutrophication, PARCOM, etc.. Presentation of key
  results and methods.
  Representatives from SFT and NIVA.

- Presentation of the Polish monitoring program.
  Representative from Poland.
  Discussion, exchange of views, recommendations, etc.
Session 4. Sources of Water Pollution; Industry and Agriculture

- Industrial pollution.
  Key polluting industries, processes, typical loading, treatment technology, discharge standards, introduction of new clean technology, control of compliance, instruments used to reduce industrial pollution, etc.
  Representative from SFT and industry.

- Agricultural pollution.
  Sources, point and non-point, typical loading, control measures, effects of measures, agricultural policy, instruments used to reduce agricultural pollution, future development, etc.
  Representatives from Jordforsk and the Agricultural University of Norway.

Day 3:

Session 5. Sources of Water Pollution; Municipal

- Master plan for sewage systems.
  Presentation of methods and experiences from the Norwegian project "Master plan for sewage systems".
  Representative from the project.

- Municipal sources.
  Overview as introduction, typical loading figures, point and non-point sources, type of sewage system, level of treatment, treatment technology, critical factors, discharge standards and permits, enforcement, industrial sources discharging into the municipal sewer network, etc.
  Representative from SFT

- Design of sewage treatment plants.
  Mechanical, biological, chemical, nitrogen removal, key processes, basic design parameters, sewer network, etc.
  Representative from NIVA or Aquateam.

- Sludge.
  Use of sludge (agriculture), standards, technology.
  Representative from Aquateam.

- Operation and maintenance (O & M) of treatment plants
  Representative from municipality.

- Financing of construction and operation of sewage treatment plants.
  Representative from SFT and municipality.

- Setting user fees.
  Representative from MD or municipality.

- Discussion and exchange of views.

Day 4:

If the length of the seminar should be reduced to four days, the program elements (session 6 and 7)
proposed on this day can be excluded.

Session 6. Presentation of Norwegian Water Pollution Control Technology

Representatives from Norwegian environmental technology enterprises will be invited to present their products. Focus will be on waste water treatment and monitoring.

Session 7. Polish Case Study (optional item)

Presentation of the environmental problems in Zegrze reservoir area. Presentation of the current Polish approach. Discussion in working groups to identify possible strategies to solve the environmental problems based on the Norwegian approach. Norwegian experts will be present to contribute in the discussions.

Polish participants have to bring relevant information related to water quality, use of the water resources, sources to water pollution, loading figures (approximate), use of the catchment area, and so forth.

Day 5:

Session 8. Visit to Sites

Visits to selected waste water treatment facilities are planned (VEAS, Bekkelaget, or other plants as appropriate etc.).

Session 9. Evaluation and Closure

After the field visits the seminar participants are expected to evaluate the seminar and sum up some of their impressions before returning to Poland.

Organization of the seminar:

The Polish-Norwegian working group for the protection of the environment will consider the seminar program at its meeting in September 1993. If the program is approved the Polish Ministry of Environmental Protection, Natural Resources and Forestry will nominate the participants. The Norwegian Ministry of Environment has the overall responsibility for the organization and execution of the seminar.

An appropriate institution (NIVA?) will be contracted by the Norwegian Ministry of Environment to organize and to execute the seminar.

Finalization of the seminar program:

The seminar program will be finalized after a decision has been made. The presented program is subject to changes according to the availability of speakers and available resources.

Budget

The budget is based on the following cost-sharing principle: The Polish side will cover all expenses of the seminar participants' travel to the airport in Warsaw, translation of seminar documents, and the costs of printing. The other costs will be covered by the Norwegian side. This include airfare, subsistence for Polish participants during the stay in Norway, local transportation, preparation of seminar material (will be limited to existing, available material in English), fees of speakers and
interpreters. Other cost-sharing arrangements can be discussed.

Further the budget is based on 15 Polish participants.

**Polish participants:**
<table>
<thead>
<tr>
<th></th>
<th>15 x 3000</th>
<th>126000</th>
<th>10000</th>
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<tbody>
<tr>
<td>Air travel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per diem</td>
<td>15 persons, 7 days x 1200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local transportation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total for Polish participants: 181000

**Other costs:**
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Planning and execution of the seminar</td>
<td>30000</td>
</tr>
<tr>
<td>Seminar co-ordinator</td>
<td>30000</td>
</tr>
<tr>
<td>Secretary</td>
<td>15000</td>
</tr>
<tr>
<td>Remuneration to speakers (preparation, etc.)</td>
<td>100000</td>
</tr>
<tr>
<td>Seminar dinner</td>
<td>10000</td>
</tr>
<tr>
<td>Interpreter (from Poland if available)</td>
<td>38000</td>
</tr>
<tr>
<td>Contingency</td>
<td>26000</td>
</tr>
</tbody>
</table>

**Total budget for the seminar**

NOK 430000
4. Study of the Orzechowo Sewage Treatment Plant

4.1 Introduction

An important recreational area for the city of Warsaw is Lake Zegrzynski, a man-made reservoir constructed at the confluence between the two rivers Narew and Bug. The dam forming the reservoir is 8 m high and a small hydro-electric plant with an output of 20 MW is a part of the dam. The reservoir provides one-third of the drinking water to Warsaw. About 40,000 people live in the vicinity of the lake, however, on a nice summer weekend half a million people visit the lake. There are many recreational homes around the lake, as well as hotels. There are no major water pollution industries draining directly to the lake.

The water quality satisfies except for a few parameters (tot-P), Class I water quality. The lake is swimable. Estimates show that 65% of the pollution in the lake is caused by inputs from the Rivers Narew and Bug, while the rest is coming from a canal draining parts of the city of Warsaw. To maintain acceptable water quality and to allow further expansion of settlement areas, a new sewer system was planned.

Construction of the Orzechowo sewage treatment plant started in 1975 and the plant is still under construction. The plant was designed as a mechanical plant. The design capacity was 17,000 m³/day, however, the present loading is approximately 2,500 m³/day. Due to the low loading the plant functions as a biological treatment plant. The treatment efficiency is reported to be 95% for BOD₅ and SS.

A new sewer network is under construction around Lake Zegrzynski. A new collector and pumping station will be put into operation later this year and the loading to the treatment plant will increase to approximately 5,000 m³/d. The total loading to the sewage treatment plant is unclear. A study has been commissioned by the organization responsible for the construction of the sewer network and the treatment plant to determine the loading. Results will be available later this year. However, it is clear that the original design loading is overestimated (most likely the design loading will be between 10,000 - 12,000 m³/day).

The treatment plant has a permit/licences to discharge until the end of 1995. According to existing discharge standards the plant has to be upgraded to a biological plant with nutrient removal (phosphorous and nitrogen) before the end of 1995. Due to relatively long operation time most of the equipment is outdated and inefficient. The energy consumption is high and currently the operating costs is three times higher than the sewage fees/charges.

The decisive question facing the plant operators is how to upgrade the plant in a cost-effective way to meet the new discharge requirements.

4.2 Norwegian Assistance to Poland in the Field of Sewage Treatment

As part of the bilateral environmental program between Poland and Norway a project entitled "Upgrading of existing treatment plants in Poland" is being funded. The study is executed by the Norwegian Institute for Water Research (NIVA) with Aquateam A/S as partner. The Polish counterpart is Centrum Techniki Budownictwa Komunalnego (CTBK).

The objectives of this study are:

- To increase waste water treatment efficiency in existing mechanical and biological treatment plants in a cost-effective way.
• Through evaluation of existing treatment plants facilities, pilot plants and full scale experiments, obtain results which will give inputs to the development of a strategic plan and policy regarding waste water treatment in Poland.

• To exchange knowledge between the two countries.

Phase I of this study is completed and reported in 1992 and the phase II is funded and will be executed in 1993.

Through this project Norwegian experts have gained practical experience with the Polish conditions and established close working relationship with a Polish institution.

4.3 Project Proposal

To assess the state of the treatment plant and propose measures for upgrading the treatment plant to meet new discharge requirements, a feasibility study is proposed. The study should be executed jointly by Norwegian and Polish experts. It is foreseen that Polish experts/consultants will be responsible for the design phase of the project, i.e. Norwegian experts will take part in the feasibility study only.

Title:

"Feasibility Study of the Orzechowo Sewage Treatment Plant"

Objective:

Assess the possibility of upgrading the Orzechowo sewage treatment plant to a biological plant with nutrient removal (phosphorus and nitrogen) to comply with new discharge standards. The present facilities should be utilized to the extent possible. Further the feasibility study should focus on designing a new sludge management system.

Scope of work:

1. Assessment of the existing facilities at the treatment plant.
The status of the existing technical facilities; strainer, grit trap, aeration tanks, sedimentation tanks, sludge digester tanks, sludge dewatering station, chlorination station, etc. should be assessed to determine if these facilities can be utilized in an upgraded plant.

2. Assessment of appropriate treatment process.
Based on the existing facilities and equipment a new modern treatment process complying with the new discharge standards will be proposed. Full scale experiments will most likely be carried out for a limited period of time. Based on the results, the team will come up with recommendations for upgrading/rehabilitation and other improvements.

3. Sludge management system.
The existing sludge management system has to be improved. A new system will be proposed.

4. Financing.
Estimates for capital investments, operation and maintenance costs will be made. Based on these estimates a plan for financing of the project will be proposed.

5. Reporting.
A report outlining the proposed treatment process, key design figures, and costs will be
Prepared.

Organization

To facilitate an efficient project implementation the experts/consultants should have experience with Polish conditions. It is therefore proposed to include the assessment of the Orzechowo sewage treatment plant in the on-going project "Upgrading of Wastewater Treatment Plants in Poland". However, the scope of this project has to be expanded to facilitate the inclusion of the assessment of the Orzechowo sewage treatment plant.

The study will be executed by the Norwegian Institute for Water Research (NIVA) with Aquateam A/S as partner. The Polish counterpart will be Centrum Techniki Budownictwa Komunalnego (CTBK).

Time Schedule

The Orzechowo sewage treatment plant has a permit to operate the existing plant until the end of 1995. The upgraded/rehabilitated plant should be operational by the end of 1995.

The feasibility study should be undertaken in 1993 and reported by January 31, 1994.

Budget

The budget includes only remuneration, international travel, and per diem to Norwegian experts. Interpreter is not included in the budget. The treatment plant's laboratory is expected to undertake the necessary water analysis. Costs are expected to be covered by the treatment plant. Remuneration to Polish experts is expected to be covered by Poland.

<table>
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<tr>
<th>Remuneration:</th>
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<th>Costs:</th>
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<tr>
<td>Task 1: Assessment of facilities</td>
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<td>Task 4: Financing</td>
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<td><strong>Total</strong></td>
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International travel and per diem 113400
Contingency 8600

**Total budget for the study** NOK 350000
Miljøvern Samarbeidet Polen - Norge. Revidert søknad om støtte til gjennomføring av prosjekter.


Vi bistår gjerne med ytterligere opplysninger.

Med vennlig hilsen
NORSK INSTITUTT FOR VANNFORSKNING

Hans Olav Brekk
Forskningsleder
Direkte linje 22 185109

Vedlegg: Revidert rapport med prosjektbeskrivelser.
Date: 17 August 1993

For: Mr. Hans Olav Ibrekk, Research Manager, Norwegian Institute for Water Research
Fax: +47 22 18 52 00

From: Ms. Eugenia Koblak Kalińska, Deputy Director, Department of Water Management

Page(s): 1

Dear Mr. H.O. Ibrekk

Thank you very much for sending the documents resulting from your visit to Poland. I would like to congratulate you for true presenting our intentions in the draft seminar programme you have elaborated as well as in the project of upgrading/modernization of sewage treatment plant in Orzechowo.

I would like to propose, because of very wide scope of the seminar, to replace in session 2 the topic "Water Resources Planning in Norway" with a topic "Procedures of giving licenses for waste water disposal to waters and sewage installations - practical example".

After introducing the above correction, the project you have elaborated can be presented to the Ministry of Environmental Protection of Norway as approved by the Polish party.

I share your opinion, that in case of shortening the duration of the seminar up to 4 days we can leave out some topics from session 5 and 7.

Yours sincerely,

Eugenia Koblak-Kalińska
Appendix 2.

The Project Approval.
Statens
forurensningstilsyn
Postadresse: Pb. 8100 Dep, 0032 Oslo
Kontoradresse: Stremveien 86
Telefon: 22 57 34 00 Telefax: 22 67 67 06

Norsk institutt for vannforskning
Postboks 69 Korsvoll
0808 Oslo

Deres ref.
IBR J.nr 2657 S.nr 93036

Vår ref. (Bes oppgitt ved svar)
94/3968-1

Dao
12 APR. 1994

Statsbudsjettet 1994, Kap. 0118 Post 75

TILSAGN OM MIDLER TIL SEMINAR OM STRATEGI FOR BEGRENSNING AV VANNFORURENSNING, SNR 7369

Svar på Deres søknad om støtte til å gjennomføre et seminar under det polsk-norske samarbeidet: 94/1649

-----------------------------------------------

På bakgrunn av fullmakt fra Miljøverndepartementet av 17.03.94, gir Statens Forurensningstilsyn med dette NIVA tilsagn om inntil kroner 430.000 til et seminar, for representanter fra polske miljø- og planmyndigheter, om strategi for begrensning av vannforurensning. Beløpet skal benyttes i overensstemmelse med de planer og budsjett som er gitt i NIVAs søknad av 18.08.93 og de generelle kravene satt i dette brevet.

-----------------------------------------------

Vi viser til Deres søknad av 18.08.93 om støtte til seminar om strategi for begrensning av vannforurensning.

SFT har i brev av 17.03.94 fra Miljøverndepartementet fått fullmakt til å gi støtte med inntil kroner 430.000 til dette seminaret.

Beløpet er innvilget i henhold til de planer og budsjett som er gitt i søknaden av 18.08.93, og de spesielle villkår som er gitt i dette brevet. NIVAs forslag til seminarprogram innebærer bred deltakelse fra den norske miljøforvaltning. SFT forutsetter at NIVA selv avklarer slik deltakelse. Når det gjelder deltakelse fra polsk side, ber det vurderes om det kan være aktuelt å invitere personer involvert i andre polsk-norske prosjekter vedr vannforurensing.

Hvis det skulle oppstå vesentlige avvik fra planen må dette meddeles SFT. Tilsagnet kan endres (tilsagnsbeløpet evt. reduseres) eller trekkes tilbake dersom prosjektet blir avbrutt, eller det forevig er gitt uriktige eller utilfredsstillende opplysninger i forbindelse med søknadsbehandlingen.
IInnen 3 måneder etter tilsagn om støtte må mottakeren skriftlig bekrefte at tilsagnet vil bli benyttet og at vilkårene for tilskuddet vil bli oppfylt. Etter denne tid bortfaller tilsagnet, med mindre fristforlengelse er gitt.

Utbetaling skjer mot revisorbekreftet regnskap, hvor det fremgår at kostnadene tilhører prosjektet. Eventuelle a konto utbetalinger skal skje mot fremliggelse av regnskap over påløpte utgifter. For utbetalinger i 1994 bør faktura være SFT i hende før 05.12.94.

Godkjente reiser dekkes etter statens regulativ.

Endelig regnskap og sluttrapport sendes inn senest en måned etter at prosjektet er avsluttet. Sluttrapporten skal foreligge på engelsk og i 5 eksemplarer.

Riksrevisjonen har adgang til å kontrollere om tilskuddsmidlene er nyttet etter forutsetningene.

Opplysninger og informasjon som måtte være nødvendig for å evaluere tiltaket må fremskaffes på anmodning.

Prosjektets virksomhet i Øst-Europa forutsettes gjennomført i henhold til regler i angjeldende land.

Miljøvernmyndighetene vil informere om de prosjektene som støttes. Prosjektene vil derfor bli offentlig kjent, med mindre avtale om fortrolighet foreligger.

Med hilsen

[Signature]

Harald Rensvik (e.f.)

Øivind Schreiner

Kopi til: Miljøverndepartementet, ILP-avdelingen v/ Irene Bauer (vedlagt G-24 skjema)
Utenriksdepartementet, Øst-Europasekretariatet (vedlagt G-24 skjema)
Den norske ambassade i Warszawa
Appendix 3.

Final Program.
Program for the Seminar
"Strategy for Water Pollution Abatement in View of the Norwegian Experience"
"Strategi for begrensning av vannforurensning - norske erfaringer"

Date: 13th - 18th of March 1995
Language: Norwegian with translation to Polish
Place: The conference centre at the headquarters of the Norwegian Pollution Control Authority (SFT), Oslo and Municipal House, Lillehammer
Co-ordinator: Grazyna Englund
Project team: Jon Lasse Bratli, Gunnar F. Aasgaard & Anne-Lise Hvistendahl

<table>
<thead>
<tr>
<th>Time</th>
<th>Subject</th>
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<td>13 March</td>
<td>Session 1:</td>
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<td>900-910</td>
<td>Opening of the seminar</td>
<td>NIVA, Haakon Thaulow</td>
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<td>910-940</td>
<td>• Water management system in Norway</td>
<td>MD, Dag Petter Sødal</td>
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<td>Forvaltningen av vannressursene i Norge</td>
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<td>940-1010</td>
<td>• The role of the State Pollution Control Authority (SFT) in water</td>
<td>SFT, Gunnar Jordfald</td>
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<td>management in Norway</td>
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<td>SFT's rolle i vannforvaltningen i Norge</td>
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<td>1010-1040</td>
<td>• The role of the Norw. Water Resources and Energy Administration (NVE)</td>
<td>NVE, Are Tvede</td>
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<td>in water management in Norway</td>
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<td>NVE's rolle i vannforvaltningen i Norge</td>
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<tr>
<td>1040-1110</td>
<td>Coffee, tea, refreshments</td>
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<td>1110-1130</td>
<td>• The role of the County Environmental Protection Department (MVA) in</td>
<td>MVA, Leif Nilsen</td>
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<tr>
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<td>water management in Norway</td>
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<td>MVA's rolle i vannforvaltningen i Norge</td>
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<td>1130-1150</td>
<td>• The role of municipalities in Norway</td>
<td>Municip., Tormod Schei</td>
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<td>Kommunenes rolle i Norge</td>
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<td>1150-1210</td>
<td>• Wat. Res. Management, views on organization</td>
<td>NIVA, Haakon Thaulow</td>
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<td>Vannforvaltning, synspunkter på organisering</td>
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<tr>
<td>1210-1310</td>
<td>Lunch</td>
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<td>1310-1340</td>
<td>• Water management system in Poland</td>
<td>MD/Poland/ Eugenia</td>
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<td>Vannforvaltningen i Polen</td>
<td>Koblak-Kalinska</td>
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<td>State Inspectorate for Environmental Protection in Poland</td>
<td>PIOS/Poland/ Andrzej</td>
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<td>Den Polske stats inspektorat for miljøvern</td>
<td>Miloszewski</td>
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<td>1340-1410</td>
<td>• Discussion and exchange of views</td>
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<td></td>
<td>Diskusjon og utveksling av synspunkter</td>
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Session 2:
Legal and Economic Instruments
Juridiske og økonomiske virkemidler

1410-1430 • Regulatory framework in water management
    Lovverk for vannforvaltningen
MD, Julie Danbolt Ajer

1430-1500 • Economic instruments (charging systems, pricing policies, grants, soft loans etc.)
    Økonomiske virkemidler (avgiftssystemer, tilskudd, "myke" lån etc.)
MD, Dag Petter Sødal

1500-1530 Coffee, tea, refreshments

1530-1600 • Regulatory framework in water management
    Lovverk for vannforvaltningen i Polen
MD/Poland/Eugenia Koblak-Kalinska

1600-1700 • Discussion and exchange of views
    Diskusjon og utveksling av synspunkter
Evening: Informal Discussions at the Seminar Dinner
After: Uformell diskusjon på seminarmiddagen

Tuesday
Session 3:
14 March
Water Resources Planning / Policies
Planlegging av vannressursen/policy

0900-0930 • Case study North Sea Plan and environmental goals for Norway
    "Case study" Norsjøplanen og miljømål for vannforekomstene
NIVA, Jon Lasse Bratli

0930-1000 • Monitoring of rivers and lakes, programs, results, presentation
    Overvåking i elver og sjøer - metodikk
NIVA, Dag Berge

1000-1030 • Monitoring, methodology, parameters, assessment
    Vurdering av vannkvalitet - metodikk
NIVA, Dag Berge

1030-1100 Coffee, tea, refreshments

1100-1130 • Norwegian/EU Water Quality Criteria
    Kriterier for vannkvalitet Norge/EU
SFT, Isabelle Thélin

1130-1200 • Presentation of the Polish monitoring program
    Presentasjon av det Polske overvåkingsprogram
PIOS/Poland/Adam Mierzwinski

1200-1230 • Discussion and exchange of views
    Diskusjon og utveksling av synspunkter
Lunch

Session 4:
Sources of Water Pollution: Industry and Agriculture
Kilder til vannforurensning: Industri og jordbruk

1330-1400 • Agricultural pollution, management, measures
    Jordbruksforurensning, forvaltning, tiltak
SFT, Janne Sollie

1400-1430 • Agricultural pollution, sources, processes, effects of measures
    Jordbruksforurensning, årsaker/kilder, prosesser, effekter av tiltak
Jordforsk, Nils Vagstad
| Time       | Session 5: Sources of Water Pollution: Municipal  
|------------|------------------------------------------------|
| 0900-0930  | Municipal sources  
|            | Kommunale kilder                                          |
| 0930-1030  | General master plan for sewage systems  
|            | Hovedplan avløp                                           |
| 1030-1100  | Sludge management  
|            | Slumbehandling                                             |
| 1100-1200  | Lunch                                                        |
| 1200-1230  | Wastewater treatment systems - chemical processes  
|            | Avløpsvannsystemer - kjemiske prosesser                   |
| 1230-1300  | Wastewater treatment systems - biological processes  
|            | Avløpsvannsystemer - biologiske prosesser                |
| 1300-1330  | Discussion and exchange of views  
|            | Diskusjon og utveksling av synspunkter                   |
| 1330-1400  | Coffee, tea, refreshments                                 |

| Time       | Session 6: Presentation of Norwegian Water Pollution Control Technology  
|------------|-----------------------------------------------------------------------------|
| 1400-1500  | Representatives from Norwegian companies will present  
|            | products and services relevant for the items of the seminar  
|            | Representanter fra norsk næringsliv vil presentere produkter  
|            | og tjenester relevant for seminarets tema                                 |
| 1500-1530  | Financing possibilities of Norwegian/Polish projects  
|            | Finansieringsmuligheter for norske/polske prosjekter                       |
| 1530-1600  | SFT's representative - about Polish Norwegian cooperation  
|            | Polsk-Norsk bilateral- avtale og samarbeid                                |
| 1600-1630  | Discussion  
|            | Diskusjon                                                                  |
### Thursday
#### Session 7:
**16 March**
**Case Study**

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<th>Activity</th>
<th>Speakers</th>
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<tr>
<td>0900-1000</td>
<td>Case study Upgrading of existing treatment plants</td>
<td>NIVA, Svein Stene Johansen</td>
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<td><em>Oppgradering av eksisterende reneanlegg</em></td>
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<tr>
<td>1000-1100</td>
<td>Case study Kielce area</td>
<td>Biovac, Helge Eliassen, Zbigniew Dyk</td>
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<td><em>Case studie av Kielce området</em></td>
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<td></td>
<td>Seasonal (tourism)</td>
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<td></td>
<td><em>Sesongartet turisme</em></td>
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<tr>
<td>1100-1130</td>
<td>Coffee, tea, refreshments</td>
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<tr>
<td>1130-1230</td>
<td>Case study Bytom</td>
<td>Berdal Strømme, Tore Laugerud</td>
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<td><em>Case studie av Bytom</em></td>
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<tr>
<td>1230-1330</td>
<td>Lunch</td>
<td></td>
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<tr>
<td>1330-</td>
<td>Bus departure for Lillehammer / We will have a stop at Sørumsand, to have a demonstration of Biovac WWTP</td>
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<td><em>Bussavgang til Lillehammer. Vi vil stoppe på Sørumsand for å få en demonstrasjon av Biovac reneanlegg</em></td>
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<td></td>
<td><strong>Evening: Dinner</strong></td>
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<td><strong>Aften: Middag</strong></td>
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### Friday
#### Session 8:
**17 March**
**Presentation of new environmental solutions**

**Presentasjon av nye miljøløsninger**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speakers</th>
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<tr>
<td>0900-0930</td>
<td>Strategy for water pollution abatement in Lillehammer</td>
<td>Lillehammer municipality, Ellen Birgitte Strømø</td>
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<td></td>
<td><em>Strategi for å forhindre vannforurensning i Lillehammer</em></td>
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<tr>
<td>0930-1000</td>
<td>On-line process control in treatment plants</td>
<td>NIVA, G.Fr. Aasgaard</td>
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<td><em>On-line prosesskontroll i reneanlegg</em></td>
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<tr>
<td>1000-1030</td>
<td>Environmental surveillance and information system</td>
<td>NIT-Envirotec, Vidar Sannerhaugen</td>
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<tr>
<td></td>
<td><em>Miljøovervåkning og informationsystem</em></td>
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<tr>
<td>1030-1100</td>
<td>Coffee, tea, refreshments</td>
<td></td>
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<tr>
<td>1100-1300</td>
<td>Visit to R2; Lillehammer waste water treatment plant and Korgen; Lillehammer water works (ground water)</td>
<td>Lillehammer municipality, Steinar Bungum</td>
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<tr>
<td></td>
<td><em>Besøk til R2; Lillehammers avløpsrenseanlegg og besøk til Korgen; Lillehammer vannverk (grunnvann)</em></td>
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<tr>
<td>1300-1400</td>
<td>Lunch</td>
<td>Fylkesmann i Oppland, Tor Brustugun</td>
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<tr>
<td>1400-1430</td>
<td>Financing of construction and operation of the plants, operation and maintenance, payment and collection procedures</td>
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<td><em>Finansiering av bygging, drift og vedlikehold av anlegg. Tilskuddsordninger av vann/kloakk avgifter</em></td>
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<tr>
<td>1430-1500</td>
<td>Discussion and exchange of views</td>
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<td><em>Diskusjon og utveksling av synspunkter</em></td>
<td></td>
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<tr>
<td>1500-1530</td>
<td>Coffee, tea, refreshments</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
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<tr>
<td>1530-1700</td>
<td><strong>Session 9:</strong> Identifying of further activities/project ideas, and Evaluation and Closure</td>
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<td><strong>Identifisering av fremtidige aktiviteter/prosjektideer, evaluering og avslutning</strong></td>
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<tr>
<td>Saturday</td>
<td>Guided tour to the Olympic Arenas in Lillehammer</td>
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<tr>
<td>18 March</td>
<td>Destinations: <strong>Guidet tur til Lillehammers OL-arenaer</strong></td>
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<td>1300-1400</td>
<td>Lunch</td>
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<td>1400-</td>
<td>Retur to Oslo</td>
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<td><strong>Retur til Oslo</strong></td>
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<tr>
<td>Sunday</td>
<td>Departure to Poland</td>
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<tr>
<td>19 March</td>
<td><strong>Avreise til Polen</strong></td>
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Appendix 4.

List of the Polish Participants.
List of the Polish participants of the Seminar:
"Strategy for Water Pollution Abatement in View of the Norwegian Experience"
"Strategi for begrensning av vannforurensning - norske erfaringer"
(13.-18.03.1995; Oslo og Lillehammer)

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<thead>
<tr>
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<th>Name</th>
<th>Institution</th>
<th>Address</th>
<th>Telefon</th>
<th>Telefax</th>
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<tbody>
<tr>
<td>1.</td>
<td>Eugenia Kobialk-Kalinska</td>
<td>Min. of Environmental Protection, Natural Resources and ForestryDept. of Water Management</td>
<td>00-922 Warszawa ul. Wawelska 52/54</td>
<td>22. 25-63-09</td>
<td>22. 25-27-04</td>
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<tr>
<td></td>
<td>vice-director (contact person)</td>
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<td>vice-director, pollution control</td>
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<td>3.</td>
<td>Adam Mierzewinski</td>
<td>State Inspectorate for Environmental Protection (PIOS)</td>
<td>00-922 Warszawa ul. Wawelska 52/54</td>
<td>22. 25-41-29</td>
<td>22. 25-41-29</td>
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<td></td>
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<td>expert-environmental engineering</td>
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<td>7.</td>
<td>Andrzej Badowski director</td>
<td>Regional Board of Water Management (RZGW) in Warsaw</td>
<td>02-237 Warszawa P.B. 11</td>
<td>22. 46-67-75</td>
<td>22. 46-61-97</td>
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<tr>
<td>8.</td>
<td>Tomasz Malinowski director</td>
<td>Voivodeship Office, Dept. of Environmental Protection</td>
<td>90-926 Łódz ul. Piotrowska 104</td>
<td>42. 36-05-31</td>
<td>42. 32-02-49</td>
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<tr>
<td>10.</td>
<td>Hanna Baradziej expert-water resources management</td>
<td>Min. of Environmental Protection, Natural Resources and Forestry Dept. of Water Management</td>
<td>00-922 Warszawa ul. Wawelska 52/54</td>
<td>22. 25-00-00 int. 427</td>
<td>22. 25-27-04</td>
</tr>
<tr>
<td>11.</td>
<td>Maria Apolinarska expert-environmental engineering</td>
<td>National Fund for Environmental Protection and Water Management</td>
<td>02-673 Warszawa ul. Konstruktorska 3A</td>
<td>22. 49-00-80 int. 421</td>
<td>22. 49-72-72</td>
</tr>
<tr>
<td>12.</td>
<td>Lech Pieczynski director</td>
<td>Voivodeship Office of the National Fund for Environmental Protection and Water Management</td>
<td>70-502 Szczecin ul. Waly Chrobrego 4</td>
<td>91. 303-705</td>
<td>91. 303-504</td>
</tr>
</tbody>
</table>

Appendix 5.

List of the Norwegian Institutions.
List of the Norwegian Institutions:

NIVA: Norwegian Institute for Water Research, P.O.Box 173 Kjelsås, 0411 Oslo
Phone: 22 18 51 00, fax: 22 18 52 00
Contact persons: Grazyna Englund, Gunnar Fr. Aasgaard, Jon Lasse Bratli, Dag Berge, Harsha Ratnaweera, Bjørnar Nordeidet, Svein Stene-Johansen

MD: Ministry of Environment, P.Box 8013 Dep., 0030 Oslo
Phone: 22 34 90 90, fax: 22 34 95 63
Contact persons: Irene Bauer, Julie Danboet Ajer, Dag Petter Sødal

SFT: State Pollution Control Authority, P.O.Box 8100 Dep., 0032 Oslo
Phone: 22 57 34 00, fax: 22 67 67 06
Contact persons: Nina Hedlund Markussen, Bjørg Storesund, Gunnar Jordfald, Isabelle Thèlin, Janne Sollie, Anne-Grete Kolstad, Øddvar Lindholm

DN: Directorate for Nature Management, 7005 Trondheim
Phone: 73 58 05 00, fax: 73 91 54 33

MVA: County Governor in Oslo and Akershus/Voivodeship Office for Environmental Protection for Oslo and Akershus, P.O.Box 8111 Dep., 0032 Oslo
Phone: 22 00 35 00/22 00 36 50, fax: 22 00 36 58
Contact person: Leif Nilsen

NVE: Norwegian Water Resources and Energy Administration, Dept. of Hydrology, P.O.Box 5091 Majorstua, 0301 Oslo
Phone: 22 95 95 95, fax: 22 95 92 01
Contact person: Are Tvede

MVA*: County Governor in Sarsporg/Sarpsborg Voivodeship Office for Environmental Protection, P.O.Box 237, 1701 Sarpsborg
Phone: 69 11 60 00/69 11 61 14, fax: 69 16 17 08
Contact person: Tormod Schel

MVA**: County Governor in Oppland, Storegaten 170, 2600 Lillehammer
Phone: 61 26 60 00/61 26 60 70, fax: 61 26 61 67
Contact person: Tor Brustugun

OVA: Oslo Water and Sewage Works, P.O.Box 4704 Sofienberg, 0506 Oslo
Phone: 22 66 40 37, fax: 22 66 40 83
Contact person: Bente Myhre Haast

KMT: Kaldnes Miljøteknologi AS (Environmental Technology), P.O.Box 2011, 3103 Tønsberg
Phone: 33 37 67 00, fax: 33 31 55 18
Contact person: Torbjørn Westrum

Aquateam: Norwegian Water Technology Centre AS, P.O.Box 6326 Etterstad, 0604 Oslo
Phone: 22 67 93 10, fax 22 67 20 12
Contact person: Bjarne Paulsrud
Biovac: AS, P.O.Box 148, 1920 Sørumsand
Phone: 63 82 61 22, fax: 63 82 64 27
Contact person: Helge Eliassen

Eksportfinans: P.O.Box 1601 Vika, 0119 Oslo
Phone: 22 83 01 00, fax: 22 83 22 37
Contact person: Tor Østbo

Envirotec: Norwegian Information Technology (NIT)/Envirotec, P.O.Box 77, 0611 Oslo
Phone: 22 63 58 00, fax: 22 64 88 00
Contact person: Vidar Sannerhaugen

Jordforsk: Centre for Soil and Environmental Research, P.O.Box 1432 Ås
Phone: 64 94 81 00, fax: 64 94 81 10
Contact person: Nils Vagstad

Lillehammer Municipality, P.O.Box 98, 2601 Lillehammer
Phone: 61 26 65 00, fax: 61 26 64 74
Contact persons: Ellen Birgitte Strømø, Steinar Bungum

Norconsult International (Partner: Berdal Strømme S.S.), P.O.Box 626, 1301 Sandvika
Phone: 67 57 10 00, fax: 67 54 95 90
Contact person: Tore Laugerud
Appendix 6.

Letter of Appreciation.
Dear Colleague,

With reference to the Polish - Norwegian seminar on "Strategy for Water Pollution Abatement in view of the Norwegian Experience", which was held in Oslo and Lillehammer on March 13 - 18, 1995, as a result of the implementation of the programme of cooperation between the Polish and Norwegian Ministries for the Environmental Protection, I would like, with a great pleasure to inform you, Mr. Minister that the Polish experts, taking part at this seminar have a high opinion of the merits of the seminar and of the logistical arrangements.

We appreciate very much the received knowledge concerning the implementation by the Norwegian side for many years the policy of water protection against the pollution. This knowledge was given to us by the learned Norwegian specialists. The implementation of the received knowledge can approach us to the positive state of the water cleanness.

Now, our economy system, including environmental protection matter is reconstructed. We learn the rules of taking democratic decisions in a very important national matters. Based on the experiences other countries, like Norway we have a chance to avoid some mistakes, which could be done.

I would like, Mr. Minister to express my thanks all staff of the Norwegian Institute for Water Research for the arrangements and realization of the seminar. Particularly, we are very grateful to Mr. Hakon Thawlow, Director of the Institute, Mr. Gunnar Fr. Aasgaard, Main Technologist and to Ms. Grażyna Englund - Borowiec. She was conversant with the subject of water protection against pollution, and her very good knowledge of the Polish and Norwegian languages was contributed to the success of the seminar. Also, I would like to express my thanks all lecturers from other Norwegian institutions.
Dear Mr. Aasgaard,

Having returned home from seminar in Oslo and Lillehammer I would like to thank you and your colleagues for your hospitality and kindness shown me during my stay there.

As I promise I am sending you official letter of our President hoping that our cooperation will go on. It will be nice to visit all these basins together.

I look forward to hearing from you.

Your sincerely,

Maciej Dzikiewicz
Dear Mr. Aasgaard,

Water Supply Foundation would like to establish a demonstration program for one or more small river basins in Poland to demonstrate to rural communities in those areas the need and the feasibility for improving water pollution control by installing waste water treatment systems to protect the groundwater and surface water quality.

Water Supply Foundation (WSF) was established by the Primate of Poland Józef Cardinal Glemp in 1987. According to its statutes, main goal of the WSF is assistance in constructing water supply installation and sewage treatment plants for villages where most farms are in private hands. Up to date WSF supported the supply of running drinking water in 2611 villages and 148 064 houses of Polish farmers and 33 wastewater treatment systems.

Participating in the development of water supplies for the rural areas, the Water Supply Foundation also recognizes the need for control of pollution of ground and surface waters from the areas being served with their assistance and with assistance from other sources. Because of the high priorities to fulfill other needs, the local governments and residents have not always recognized the need for pollution control facilities as being of high priority. Competing demands for resources include: water supply systems and their expansion; road improvement including paving; telephone services; community structures including buildings for government services and recreation (i.e., community centers); and school facilities and improvements. Therefore, the WSF has tried to attract attention to
the need for water pollution control consisting of demonstration project funded by grants.
One such demonstration program was conducted by the Water Supply Foundation in the Rawka River Basin near Warsaw where eight wastewater treatment systems were completed.

It will be a good opportunity to establish a demonstration program for one or more river basins in other parts of Poland using Norwegian good experience.
This time we will concentrate on not only on construction of demonstration plants using different treatment process but also on possibility of central management and maintenance system which could be implement in these basins.

Our Foundation is able to find the localization of these basins where communities are willing to participate in demonstration programme. We already have two basins where communities were interested in demonstration programme: Śwędrnia river basin and Zielawa river basin.

Swędrnia river basin has an area of 544 km² and falls within jurisdiction of nine communities and have total population of 70000 inhabitants.
Zielawa river basin has an area of 1226 km² and it falls within the jurisdiction of nine communities and have total population of 40 000 inhabitants.

So together with your experts we can select the best basin and prepare the programme of realization of this project. Our Foundation is able to finance some of construction cost by low interest loans. But we are not able to support planing and preparation works. It will be the best to cover these cost and same construction cost by Norwegian founds because the communities can not afford such high your prices in comparison to ours.

Thank you in advance for any assistance you can offer.

Your sincerely

Piotr Szczepański
Vice President
Proposal for Norwegian-Polish cooperation project:
WASTEWATER TREATMENT & DISPOSAL SYSTEMS FOR SMALL COMMUNITIES

1. Principles of system selection:
   - law regulation (comparison Polish & Norwegian approach),
   - methods of preliminary evaluation of local conditions (soil and natural water survey, topography, land development),
   - methods of preliminary evaluation of wastewater quantity & quality,
   - cost-effective methods for preliminary selection of wastewater treatment and disposal.

2. Cost-effective analysis for Polish & Norwegian conditions of various options of wastewater:
   - collection,
   - treatment (including sludge),
   - disposal (including sludge).


4. Options for financing of the wastewater systems (comparison Polish & Norwegian approach).

5. Testing of the result of the proposed work in selected Polish & Norwegian communities located at small river basin (for example: pointed out by Water Supply Foundation in Poland)

Proposed project participants:

INSTITUTE for WATER RESEARCH - NIVA. NORWAY
INSTITUTE of ENVIRONMENTAL PROTECTION - IOS. POLAND
WATER SUPPLY FUNDATION, POLAND

Z dużym opiniowaniem przekazujemy też podziękowania za interesujący pod względem zawodowym i przyjemny pobyt w Norwegii.

W pełni zgodzam się z zawartą we wnioskach oceną Seminarium norweskiego; zaś przedstawione propozycje przyszłej dwustronnej współpracy polsko-norweskiej wydają się interesujące, chociaż należy traktować je jako wstępne i obejmują praktycznie całość zagadnień w dziedzinie ochrony wód i gospodarki wodnej, wymagające bardziej szczegółowego sporządzania.

W nawiązaniu do wcześniejszych deklaracji, Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej podtrzymuje swoją gotowość dalszej współpracy w dwóch płaszczyznach:
- Przygotowanie master planów dla zlewni rzek, lub ich odcinków, np. zlewnia rzeki Pilicy, Zatoka Pucka, Ziemia Lubuska lub inne.

- Modernizacja istniejących oczyszczalni ścieków, pod kątem zwiększenia ich przepustowości oraz efektywności. Mogą to być oczyszczalnie stosunkowo niedawno oddane do eksploatacji /np. w Lublinie lub Białymstoku/, ale charakteryzujące się procesami konwencyjonalnymi, w których w niedalekiej przyszłości niezbędne będzie zapewnienie usuwania związków biogennych.

Szczegółowe sprecyzowanie tematów wymaga jednak ich uszczelnienia z Departamentem Gospodarki Wodnej w Ministerstwie Ochrony Środowiska, Zasobów Naturalnych i Leśnictwa oraz zgody poszczególnych inwestorów, którzy będą odbiorcami projektów. W przypadku master planów konieczna będzie koordynacja propozycji w ramach Porozumień województw kilku województw, które obecnie znajdują się na etapie powstawania.

Jednocześnie pragniemy poinformować, że w Narodowym Funduszu przygotowywane jest spotkanie z delegacją norweską na szczeblu rządowym, którego tematem będzie ustalenie listy projektów przewidywanych do dwustronnej współpracy polsko-norweskiej. Mamy nadzieję, że w/w piasczysty współpracy w zakresie ochrony wód i gospodarki wodnej znajdą się również na tej liście. Pozwoli to wtedy na przystąpienie do szczegółowego sprecyzowania projektów.

Dziękując za gotowość współpracy, przesyłamy serdeczne pozdrowienia.

Z poważaniem

[Podpisanie]

Z-ca Przem. Zamojski

[Imię i nazwisko]

49
Fax fra Nasjonalt Fond for miljøvern og vannressursforvaltning
Dato: 15.05.95
NF/MA/ 9092 /95

 Oversettelse

- Takk for brev og fax med konklusjoner fra seminaret "Strategi for begrensning av vannforurensning i Polen i lys av norske erfaringer" samt for innledende forslag til videre samarbeid.
- Beklager sen tilbakemelding.
- Tusen takk for faglig og sosialt interessant tid i Norge.

- De er helt enige i konklusjonene fra seminaret og nisjer for det videre bilaterale samarbeid. De sist nevnte er veldig interessante, men de har for videre detaljering av hver problemstilling.
- Nasjonal Fond deklarerer fortsatt sin beredskap til videre samarbeid, spesielt i to temaer som de prioriterer:

  - Utarbeide master-planer for flere nedbørsfelt el. deler av dem, for eks. nedbørsfelt for elva Pilica, Zatoka Pucka, Ziemia Lubuska m.m.

  - Oppgradering av eksisterende renseanlegg, med vinkling mot både økning av hydraulisk kapasitet og effektivitet. Oppgraderingen kan også gjelde relativt nye renseanlegg (f.eks. i Lublin og Białystok), som benytter seg av en konvensjonell prosess nå, men som skal tilpasses fjerning av næringsalter i nær fremtid.

- Detaljert program for hvert tema krever imidlertid videre diskusjoner med det polske MD og investorer.
  I tilfelle utarbeidelse av master-planer, må forslaget koordineres gjennom avtaler mellom de fylkene dette gjelder.

- Vi vil også informere at Fondet forbereder et møte med norske representanter på regjeringsnivå for å drøfte og konkretisere listen av prosjekter som egner seg til bilateralt samarbeid.

Vi håper at ovenfor nevnte teamer innenfor vern av vann og vannressursforvaltning vil bli inkludert på denne listen. Det blir da gitt klarsignal for start av detaljeringsfase av prosjekter.

Vi takker for deres samarbeidsvilje og sender hjertlige hilsener,

deputy direkte

Janusz Ostapiuk

oversatt av Grazyna Englund
16.05.95
Appendix 8.

Project Proposals sent NFR in June 1995.

Master and Action Plan for Chosen Area in Poland:
- Improvement of the Professional Competance and Network...52
- Educational Part and Follow Up........................................58
Master and Action Plan for chosen Catchment Area in Poland:

5. Improvement of the Professional Competence and Network

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   2.2. Project organisation .................................................................................................. 2
   2.3. Objectives .................................................................................................................. 3
   2.4. Main activities and time schedule ......................................................................... 4
   2.5. Budget of the sub-project 5 ..................................................................................... 4
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   3.5. State Inspectorate for Environmental Protection (PIOS), Poland ...................... 6
   3.6. Water Supply Foundation, Poland ........................................................................ 6
   3.7. Biowac, Poland ........................................................................................................ 6
   3.8. Technical University of Kraków, Poland ................................................................. 6
4. Follow-up ...................................................................................................................... 6
1. Project title

Master and action plan for chosen catchment area in Poland:
5. Improvement of the professional competence and network.

2. Project description

2.1. Background

The environmental issues related to water resource management and wastewater treatment in Poland have been focused in several projects financed by the Norwegian State Pollution Control Authority (SFT), the Norwegian Ministry of Environment (MD) and the Norwegian Foreign Ministry (UD). The Norwegian Institute for Water Research (NIVA) has been engaged in a number of these projects (a list attached).

The idea of the proposed project was initiated during the seminar "Strategy for water pollution abatement in view of the Norwegian experience" held in Norway 13th-18th of March 1995 in Oslo and Lillehammer. Representatives of the polish participants and NIVA discussed the need for a joint project in order to develop strategy and methods for integrated water supply and wastewater treatment and disposal. There exist in Poland expertise on this subject at different institutions, but it is need for co-operation in order to build up a well structured and integrated master planning, methods for cost-effective analysis and routines for maintenance and process control.

2.2. Project concept

Further contacts between the representatives of the different institutes in Poland led to make a priority on the integrated approach, namely master plan for a chosen catchment area (letters included). This project will be performed as six sub-projects, which are interconnected with each other, though can function separately. Figure 1 illustrates the concept and the scope of each sub-project.

NIVA will apply for financial support for sub-projects 1, 2 and 3 from the State Pollution Control Authority (SFT), while we need a financial support from the Programme for Eastern Europe for sub-projects 4, 5 and 6. This proposal consider sub-project 5; improvement of the professional competence and network.

A project for improvement of the professional competence and network (5) will involve many R&D institutes, as well as suppliers, constructors, commissioners of finance, control bodies and environmental authorities. They will all have an interest in implementation and testing out the optimal alternative at the demonstration area (case-study). In order to specify in details the content and the dimension of the project and to get know the project participants, as well as the area where the project will be executed, we need some research and educational visits to Poland. A visit of the Polish researchers to Norway will also be considered.

In this way the network will be extended and the bilateral co-operation between Poland and Norway will be professionally strengthened.
Figure 1. Project concept and scope of the sub-projects.

2.3. Objectives

The general objective is:
Network building and technology transfer to local users for planning tools for water management and water/wastewater treatment and disposal.

The specific objectives are:

- To meet the project participants and evaluate the area where the project will be executed.
- To specify in details the content and the dimension of the project.
- To establish the durable contacts between the R&D institutes and the sector for water and wastewater treatment.
- To strengthen the Norwegian-Polish co-operation between the R&D institutes and the users.
2.4. Main activities and time schedule
The main activities and time schedule are listed in table 1.

Table 1. Main activities and time schedule.

<table>
<thead>
<tr>
<th>Sub-project / Main activities</th>
<th>1995</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Master and action plan for chosen catchment area in Poland</td>
<td>-</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2. Detailed action plan for the technical solutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Implementation of the most economic alternative at the case study area</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4. Educational part</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5. Improvement of the professional competence and network</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Visiting Poland for discussions with the project participants and evaluation of the project area</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>- Project specification</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>- Establishment of durable contacts between the R&amp;D inst. and w&amp;wwtp sector</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6. Follow up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.5. Budget of the sub-project 5
Project will be performed according to the following budget:

<table>
<thead>
<tr>
<th>Main activities</th>
<th>Time-expenses</th>
<th>Direct expenses</th>
<th>1995</th>
<th>1996</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Visiting Poland for discussions with the project participants and evaluation of the project area</td>
<td>70.000</td>
<td>43.000</td>
<td>90.000</td>
<td>23.000</td>
<td>113.000</td>
</tr>
<tr>
<td>- Project specification</td>
<td>20.000</td>
<td></td>
<td></td>
<td>20.000</td>
<td>20.000</td>
</tr>
<tr>
<td>- Establishment of durable contacts between the R&amp;D inst. and w&amp;wwtp sector</td>
<td>30.000</td>
<td>23.000</td>
<td>10.000</td>
<td>43.000</td>
<td>53.000</td>
</tr>
<tr>
<td>- Reporting</td>
<td>8.500</td>
<td>1.500</td>
<td></td>
<td>10.000</td>
<td>10.000</td>
</tr>
</tbody>
</table>

Total | 100.000 | 96.000 | 196.000 |
3. Participants in the project

3.1. Norwegian Institute for Water Research (NIVA)

NIVA has been Norway's leading research centre of water related expertise since 1958. NIVA is a non-profit research foundation which carries out research, surveys and development work on contracts or public authorities and private clients in Norway and abroad. NIVA has a staff of 190, of whom 90 are research scientists. NIVA does research on environmental technology connected to treatment of water and wastewater, aiming to find practical solutions to environmental problems in water. NIVA takes actively part in the environment related projects in Eastern Europe, where a number of projects are related to Poland. For the titles of the projects, please refer to the attached NIVA-information sheet.

The project manager for the main project (the project concept), Gunnar Fr. Aasgaard is the head of the research department for environmental technology consisting of 17 research scientists. Mr. Aasgaard is graduated from the Norwegian Institute of Technology, University of Trondheim (1977) in environmental engineering. He has specialised in system planning and treatment of water and wastewater. Mr. Aasgaard is a well experienced project manager from national and international projects.

Grazyna Englund is a research scientist at NIVA working in the same department. She is graduated as M.Sc. in environmental engineering both from the Technical University of Warszaw, Poland (1976) and the University of Delft, the Netherlands (1986). Mrs. Englund has specialised in wastewater treatment and especially on pilot testing and developing of new treatment processes. She is currently involved in various projects in Poland, and was the co-ordinator of the above mentioned seminar Strategy for water pollution abatement in view of the Norwegian experience (march '95). Mrs. Englund will be the project manager for the applied sub-project.

Jon Lasse Bratli is a research manager at NIVA, responsible for the working area Water Resource Management. Mr. Bratli is graduated as M.Sc. in limnology from the University of Oslo (1989).

Enclosed you will find CVs for Aasgaard, Englund and Bratli.

3.2. National Foundation for Environmental Protection, Poland

Organisation which participate in the partial financing of the prioritised projects, chosen together with the governmental authorities, within environmental protection.

Contact persons:
Janusz Ostapiuk, M.Sc.
the National Foundation for Environmental Protection
ul Konduktorska 3a
02-673 Warszawa
Poland

3.3. Institute of Environmental Protection (IOS), Poland

Contact person:
Barbara Osmulska-Mróz, Dr. Eng. and Pawel Blaszczyk, Dr. Eng.
the Institute of Environmental Protection (IOS)
ul. Krucza 5/11
00-548 Warszawa
Poland
3.4. Ministry of Environmental Protection, Natural Resources and Forestry, Poland

Contact person:
Eugenia Koblak-Kalinska, M.Sc.
the Ministry of Environmental Protection, Natural Resources and Forestry
ul.Wawelska 52/54
00-922 Warszawa
Poland

3.5. State Inspectorate for Environmental Protection (PIOS), Poland

Contact person:
Adam Mierzwinski, Dr. Eng.
ul.Wawelska 52/54
00-922 Warszawa
Poland

3.6. Water Supply Foundation, Poland

Contact person:
Maciej Dzikiewicz, M.Sc.
the Water Supply Foundation
Skwer Kard. S. Wysynskiego 6
01-015 Warszawa
Poland

3.7. Biovac, Poland

Contact person:
Zbigniew Dyk, M.Sc.
Biovac
ul. Kolonia 41
25-819 Kielce
Poland

3.8. Technical University of Kraków, Poland

Contact person:
Jerzy Kurbiel, Prof. Dr.Eng.
ul. Warszawska 24
31-155 Kraków
Poland

All these institutions, together with representatives from the municipalities in the case-study-area, represent the combined competence needed to get a successful project performance.

4. Follow-up

After performance of the main sub-projects all gained experience will be presented on different seminars and workshops.
Master and Action Plan for chosen Catchment Area in Poland:

4 & 6. Educational Part and Follow Up

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   3.1. Norwegian Institute for Water Research (NIVA) ............. 5
   3.2. National Foundation for Environmental Protection, Poland 5
   3.3. Institute of Environmental Protection (IOS), Poland .... 5
   3.4. Ministry of Environmental Protection, Natural Resources and Forestry, Poland 6
   3.5. State Inspectorate for Environmental Protection (PIOS), Poland 6
   3.6. Water Supply Foundation, Poland ............................. 6
   3.7. Biovac, Poland .................................................... 6
   3.8. Technical University of Kraków, Poland ..................... 6
4. Follow-up ........................................................................ 6
Programme for Eastern Europe
Application for financial support for collaboration within Higher Education and Research between Norway and Eastern Europe 1995-1996

1. Project title

Master and action plan for chosen catchment area in Poland:
4 & 6. Educational part and follow up.

2. Project description

2.1. Background

The environmental issues related to water resource management and wastewater treatment in Poland have been focused in several projects financed by the Norwegian State Pollution Control Authority (SFT), the Norwegian Ministry of Environment (MD) and the Norwegian Foreign Ministry (UD). The Norwegian Institute for Water Research (NIVA) has been engaged in a number of these projects (a list attached).

The idea of the proposed project was initiated during the seminar "Strategy for water pollution abatement in view of the Norwegian experience" held in Norway 13th-18th of March 1995 in Oslo and Lillehammer. Representatives of the polish participants and NIVA discussed the need for a joint project in order to develop strategy and methods for integrated water supply and wastewater treatment and disposal. There exist in Poland expertise on this subject at different institutions, but it is need for cooperation in order to build up a well structured and integrated master planning, methods for cost-effective analysis and routines for maintenance and process control.

2.2. Project concept

Further contacts between the representatives of the different institutes in Poland led to make a priority on the integrated approach, namely master plan for a chosen catchment area (letters included). This project will be performed as six sub-projects, which are interconnected with each other, though can function separately. Figure 1 illustrates the concept and the scope of each sub-project.

NIVA will apply for financial support for sub-projects 1, 2 and 3 from by the State Pollution Control Authority (SFT), while we need a financial support from the Programme for Eastern Europe for sub-projects 4, 5 and 6. This proposal consider sub-project 4 and 6; educational part and follow up.

A project for the educational part (4) and follow up (6) will involve many R&D institutes, as well as suppliers, constructors, commissioners of finance, control bodies and environmental authorities. They will all have an interest in implementation and testing out the optimal alternative at the demonstration area (case-study). Improvement of the skills for integrated environmental approach for master planning will be ensured by the exchange of experiences by the transfer and propagation of master plan principles for chosen catchment area in Poland (in form of meetings, manuals, reports, seminars, workshops, etc.). In this way the bilateral co-operation between Poland and Norway will be strengthened.
2.3. Objectives

The general objective is:
To transfer the gained experience, during the project performance, to the users at different levels (decision makers, local authorities, users, suppliers, consultants, plant operators, etc.) by different educational means (manuals, publications, reports, seminars, workshops, etc.)

The specific objectives are:
- In order to give a tool for the users at the different levels, describing of the developed methods and the ways of optimisation of the water resource management in form of:
  - publications of the results
  - manual with the principles for EIA and cost-effective analysis of the alternative environmental solutions in the procedures followed for master planning
  - manuals for maintenance and operation of the plants
  - manuals for simulation models and on-line process control
- Propagation/transfer of the results during the project performance as well as experiences from the case-study by organising seminars for different users
- Strengthening of Norwegian-Polish co-operation between the R&D and the users.
2.4. Main activities and time schedule

The main activities and time schedule are listed in table 1.

Table 1. Main activities and time schedule.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Master and action plan for chosen catchment area in Poland</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2. Detailed action plan for the technical solutions</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3. Implementation of the most economic alternative at the case study area</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>4. Educational part</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>- publications of the results</td>
<td></td>
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<td></td>
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<tr>
<td>- manuals with the principles for EIA and cost-effective analysis</td>
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<tr>
<td>- manuals for maintenance and operation of the plants</td>
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<tr>
<td>- manuals for simulation models and on-line control</td>
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<tr>
<td>5. Improvement of the professional competence and network</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6. Follow up</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>- organising seminars and workshops for decision makers, users of the methods in practice</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

2.5. Budget of the sub-projects 4 & 6

Project will be performed according to the following budget:

<table>
<thead>
<tr>
<th>Main activities</th>
<th>Time-expenses</th>
<th>Direct expenses</th>
<th>1996</th>
<th>1997</th>
<th>1998</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Visiting Poland to discuss the content of educational presentations</td>
<td>50.000</td>
<td>33.000</td>
<td>83.000</td>
<td></td>
<td></td>
<td>83.000</td>
</tr>
<tr>
<td>- Preparation publications and manuals based on sub-project 1</td>
<td>170.000</td>
<td>10.000</td>
<td>20.000</td>
<td>100.000</td>
<td>60.000</td>
<td>180.000</td>
</tr>
<tr>
<td>- Organising of seminars and workshops</td>
<td>50.000</td>
<td>20.000</td>
<td>30.000</td>
<td></td>
<td>40.000</td>
<td>70.000</td>
</tr>
<tr>
<td>- Reporting</td>
<td>8.500</td>
<td>1.500</td>
<td></td>
<td></td>
<td>10.000</td>
<td>10.000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>133.000</td>
<td>100.000</td>
<td>110.000</td>
<td>343.000</td>
</tr>
</tbody>
</table>
3. Participants in the project

3.1. Norwegian Institute for Water Research (NIVA)

NIVA has been Norway's leading research centre of water related expertise since 1958. NIVA is a non-profit research foundation which carries out research, surveys and development work on contracts or public authorities and private clients in Norway and abroad. NIVA has a staff of 190, of whom 90 are research scientists. NIVA does research on environmental technology connected to treatment of water and wastewater, aiming to find practical solutions to environmental problems in water. NIVA takes actively part in the environment related projects in Eastern Europe, where a number of projects are related to Poland. For the titles of the projects, please refer to the attached NIVA-information sheet.

The project manager for the main project (the project concept), Gunnar Fr. Aasgaard is the head of the research department for environmental technology consisting of 17 research scientists. Mr. Aasgaard is graduated from the Norwegian Institute of Technology, University of Trondheim (1977) in environmental engineering. He has specialised in system planning and treatment of water and wastewater. Mr. Aasgaard is a well experienced project manager from national and international projects.

Grazyna Englund is a research scientist at NIVA working in the same department. She is graduated as M.Sc. in environmental engineering both from the Technical University of Warsaw, Poland (1976) and the University of Delft, the Netherlands (1986). Mrs. Englund has specialised in wastewater treatment and especially on pilot testing and developing of new treatment processes. She is currently involved in various projects in Poland, and was the co-ordinator of the above mentioned seminar Strategy for water pollution abatement in view of the Norwegian experience (March '95). Mrs. Englund will be the project manager for the applied sub-project.

Jon Lasse Bratli is a research manager at NIVA, responsible for the working area Water Resource Management. Mr. Bratli is graduated as M.Sc. in limnology from the University of Oslo (1989).

Enclosed you will find CVs for Aasgaard, Englund and Bratli.

3.2. National Foundation for Environmental Protection, Poland

Organisation which participate in the partial financing of the prioritised projects, chosen together with the governmental authorities, within environmental protection.

Contact persons:
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the National Foundation for Environmental Protection
ul Konduktorska 3a
02-673 Warszawa
Poland

3.3. Institute of Environmental Protection (IOS), Poland

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3.5. State Inspectorate for Environmental Protection (PIOS), Poland

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3.6. Water Supply Foundation, Poland

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the Water Supply Foundation
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Poland

3.7. Biovac, Poland

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Biovac
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25-819 Kielce
Poland

3.8. Technical University of Kraków, Poland

Contact person:
Jerzy Kurbiel, Prof. Dr.Eng.
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31-155 Kraków
Poland

All these institutions, together with representatives from the municipalities in the case-study-area, represent the combined competence needed to get a successful project performance.

4. Follow-up

After performance of the main sub-projects all gained experience will be presented on different seminars and workshops.
Norwegian Institute for Water Research

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