Project Title: Waste Water Treatment Plant "FORDON" in Bydgoszcz  

Sub-programme: Environment  

Location: Bydgoszcz  

Objectives: Construction of a mechanical and biological WWTP with sludge management in Bydgoszcz will ensure wastewater treatment according to EU Directives and standards in force beyond 2000. Bydgoszcz is included into the "hot spot" liquidation programme under Helsinki Convention. Implementation of the project will result in reduction of pollution in discharged wastes which currently contaminate Vistula river because of the lack of biological treatment.

Anticipated removal of the following pollution loads from effluents for the throughput 26 710 m$^3$/24h to 33 000 m$^3$/24h:
- reduction of organic compound discharge expressed as BOD$_5$ by min. 6,945 kg/24h
- reduction of total nitrogen compounds by min. 1,148 kg/24h
- reduction of total phosphorus compounds by min. 215 kg/24h

Anticipated removal of the following pollution loads from effluents for the target throughput 90 000 m$^3$/24h:
- reduction of organic compound discharge expressed as BOD$_5$ by min. 10,353 kg/24h
- reduction of the suspended matter discharge by min. 12,423 kg/24h
- reduction of total nitrogen compounds by min. 1,822 kg/24h
- reduction of total phosphorus compounds by min. 332 kg/24h

Description: The investment includes construction of a mechanical and biological WWTP with sludge processing, biogas generation and utilisation for sludge heating and generation of electric energy. The WWTP will receive municipal wastewater from Osielsko Community and Stary and Nowy Fordon districts of Bydgoszcz as well as several industrial plants. The current population of the serviced residential districts and Osielsko Community is 65,000 which is targeted to rise to 80,000 in 2005. The project is geared to protection of two major drinking water intakes for the town of Bydgoszcz: surface water intake “Czyzkówko” on Brda - and underground water intake “Las Gdański”. This water intake meets the drinking water needs for above 367,000 residents - it constitutes about 97.8 % of needs of the city of Bydgoszcz. Currently, the wastewater from Fordon districts (55 000 m3/24h) flow to the ground settling reservoir and through the old river-bed to the Vistula river.

The new mechanical and biological wastewater treatment plant will provide the significant improvement of purity of Brda and Vistula rivers below discharge points by radical reduction of discharged waste. At the same moment it will allow the removal of contamination of the old river-bed of Vistula river and remove an odour from anaerobic mineralization of sediments.

The planned throughput for stage 1 of construction of Fordon WWTP is 26 710 m$^3$/24h and target throughput 90 000 m$^3$/24h. The project has a complete documentation of WWTP construction and a water permit issued to this purpose with a warranty for implementation over 1998-2000.
Phare funding under this project will include supply, installation, put into operation with appropriate training for operators, the following equipment:

1. task I a: *for the mechanical part*
screens, weirs, pumps, gate valves, scrapers, grinders, gauging devices for mechanical facilities:
   - large and fine meshed screens
   - slot and circular grit chamber
   - central and surge wastewater pumping station
   - chambers and sedimentation tanks
   - building for mechanical removal of smell from sand

2. task I b: *for the sedimentation facilities*
pumps, flotation chamber, centrifugal thickener, flushing system, helical heat exchanger, agitators, gauging devices, centrifuges, valves, tanks for the sedimentation facilities:
   - multi-functional building
   - separate digestion chambers
   - sludge thickener
   - mechanical dewatering station
   - chemical building
   - process water pumping station

3. task II: *for the biological part:*
agitators, weirs, gate valves, aerating system, throttles, weirs, scrapers, overflows, inflows, throttles, blowers, pumps for the biological part:
   - activated sludge chamber
   - separating chamber
   - secondary sedimentation tanks
   - blower station
   - return sludge pumping station

4. task III: *for the gas facilities:*
gas tank with fittings, aggregate, gas meter for the gas facilities:
   - gas tank
   - generator station

**Institutional framework:**
This project will be implemented under the responsibility of the Ministry of Environmental Protection and the Municipality of Bydgoszcz. Upon the completion of the investment the Municipality of Bydgoszcz will hand over the operation of the WWTP to Municipal Company for Water Supply and Sewage Treatment (MPWiK Sp. z o.o.). The Company is 100% owned by Municipality of Bydgoszcz.
Budget (MECU):

<table>
<thead>
<tr>
<th></th>
<th>Investment</th>
<th>Total Phare</th>
<th>Poland</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP &quot;Fordon&quot;</td>
<td>3.21</td>
<td>3.21</td>
<td>13.678</td>
<td>16.888</td>
</tr>
<tr>
<td>Bydgoszcz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3.21</td>
<td>3.21</td>
<td>13.678</td>
<td>16.888</td>
</tr>
</tbody>
</table>

**Implementation arrangements:**
Phare DIS procedures for tendering, contracting and payments will be followed by the National Fund for Environmental Protection as Implementing Agency.

**Implementing agency:** National Fund for Environmental Protection and Water

**Beneficiary of the project:** Municipality of Bydgoszcz

**Implementation schedule:**
- Feasibility Study: 1992
- Detailed Design: 1994
- Water permit: August, 1994
- Environmental Impact Assessment: September, 1994
- Construction permit: December, 1995
- Start of WWTP construction contract: June, 1997
- Start of tendering (Phare component): September, 1998
- Technical specification will be ready by: August 1998
- Start of project activity: March, 1999
- Completion: March, 2000

**Equal opportunities:** Contractors and sub-contractors will be contractually liable to promote equality, guarantee fundamental rights and fight against discrimination on the grounds of sex. The National Fund and the Beneficiary will monitor project employment to ensure that this condition is being fully implemented.

**Environment:**
An environmental impact assessment was prepared in September 1994 and is available at the Ministry of Environment in Poland. In summary the results show that:

- the project is not extra arduous for local environmental - it is located outside area under special protection;
- a new mechanical and biological wastewater treatment plant will provide the significant improvement of purity of Vistula river below discharge point;
- the proposed solution matches environmental protection requirements, e.g atmospheric phenomena are significantly reduced because of the 'micro-bubble' aeration system (which is based on compressed air);
• the plant is not environmentally unfriendly and human health aspects such as emitted
gases, microbiological substances and odour contamination are not expected to provide
difficulty;
• the rigid design of the equipment for wastewater treatment and sediments and its ability to
be very effectively sealed will protect the soil, the ground and deep-waters in the
surrounding area from all harmful influences;
• in line with current regulations, the emission of the air contaminated by the plant will not
be dangerous to either environmental or human health;
• regarding noise level, the plant will not create noise in excess of the limits set in the
relevant environmental specifications.

Ecological effect: implementation of the project will result in reduction of pollution in
discharged wastes which currently contaminate Vistula water because of the lack of biological
treatment.

Anticipated removal of the following pollution loads from effluents for the throughput 26 710
m$^3$/24h to 33 000 m$^3$/24h:
- reduction of organic compound discharge expressed as BOD$_5$ by min. 6,945 kg/24h
- reduction of total nitrogen compounds by min. 1,148 kg/24h
- reduction of total phosphorus compounds by min. 215 kg/24h

Anticipated removal of the following pollution loads from effluents for the target throughput
90 000 m$^3$/24h:
- reduction of organic compound discharge expressed as BOD$_5$ by min. 10,353 kg/24h
- reduction of the suspended matter discharge by min. 12,423 kg/24h
- reduction of total nitrogen compounds by min. 1,822 kg/24h
- reduction of total phosphorus compounds by min. 332 kg/24h

Rates of return: The rate of return has been computed on a non-profit basis for services of
wastewater treatment on behalf of town inhabitants. The full economic and financial analysis
which is being prepared for Fordon project will include the full running costs of the plant. The
first estimates are 0% for scenario I and 4,74% for scenario II.

Investment criteria:
The Phare support as a grant together with preferential loan from National Fund will allow to
achieve the planned ecological results and to finish the investment within scheduled time. The
project is ready to be implemented. The complete documentation of WWTP has been done
and the construction and a water permit were issued for this purpose with a warranty for
implementation over 1998-2000. The Municipality of Bydgoszcz will be the beneficiary of
the project. Upon the completion of the investment Municipality will hand over the operation
of the WWTP to Municipal Company for Water Supply and Sewage Treatment (MPWiK Sp.
z o.o.) The Company, 100% owned by Municipality of Bydgoszcz, is fully capable to run the
investment and to cover future maintenance and operating costs.

Conditionality and sequencing:
• Cofinancing from the Government and other sources as proposed and completion of
the project on schedule (by end March 2000)
• Maintenance and pricing policy towards residents to ensure sustainability and renewal
of the project’s capacity in the medium term.
• Continued development of approximation and implementation strategies for the water
sector.
<table>
<thead>
<tr>
<th>Immediate Objectives</th>
<th>Indicators of Achievement</th>
<th>Source of Information</th>
<th>Assumption and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection of potable water intakes (surface and underground water) for Bydgoszcz City</td>
<td>Water quality index</td>
<td>Statistical studies</td>
<td>National environmental policy remains stable</td>
</tr>
<tr>
<td>Improvement of water quality in Brda and Vistula Rivers</td>
<td>Incidence rate index</td>
<td>Reports of the State Inspectorate of Environmental Protection</td>
<td>Government continues to give priority to the environmental protection</td>
</tr>
<tr>
<td>Improvement of community health and life quality in the region</td>
<td></td>
<td></td>
<td>Public ecological awareness advanced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results of Project</th>
<th>Indicators of Achievement</th>
<th>Source of Information</th>
<th>Assumption and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of pollutant load in effluents discharged to Brda and Vistula Rivers</td>
<td>Sewage treatment in accordance with the rules of the water supply and sewage parameters</td>
<td>Reports on water pollution measurement</td>
<td>Adequate technology economic and available</td>
</tr>
<tr>
<td>Put into operation the biological facilities and abatement of hazardous substance discharge</td>
<td></td>
<td>Voivodeship Inspectorate of Environmental Protection</td>
<td>Local authorities policy environmentally oriented</td>
</tr>
<tr>
<td>Put into operation the mechanical and sedimentation facilities and reduction of sewage sludge</td>
<td></td>
<td>Reports on control measurements</td>
<td>Programme of the water protection in the Vistula River Basin developed and implemented</td>
</tr>
<tr>
<td>Put into operation the gas facilities and utilization of waste energy for electricity production</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inputs of Project</th>
<th>Indicators of Achievement</th>
<th>Source of Information</th>
<th>Assumption and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply, installation and put into operation the equipment</td>
<td>Implementation schedule:</td>
<td>Contracts awarded</td>
<td>Adequate technical/management sources available for operations and development</td>
</tr>
<tr>
<td>Provide the training for operators of equipment</td>
<td>I stage: till May 2000</td>
<td>Report on final acceptance of tasks</td>
<td>Deliveres in time</td>
</tr>
<tr>
<td>Grant of ECU 3.210.400 from Phare</td>
<td>Target throughput: 90.000 m3/24h (for I stage: 26.710 m3/24h)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PL9806.04 Annex 2: Cost breakdown: Construction of the WWTP „Fordon” in Bydgoszcz

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Value ECU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mechanical part</td>
<td>578,000</td>
</tr>
<tr>
<td>2</td>
<td>Sediment unit</td>
<td>863,000</td>
</tr>
<tr>
<td>3</td>
<td>Biological unit</td>
<td>1,077,000</td>
</tr>
<tr>
<td>4</td>
<td>Gas unit</td>
<td>692,000</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>3,210,000</td>
</tr>
</tbody>
</table>
PL9806.04 ANNEX 3  Detailed Implementation Chart

IMPLEMENTATION SCHEDULE: Construction of the WWTP „Fordon” in Bydgoszcz

<table>
<thead>
<tr>
<th>Programme Title</th>
<th>Date of Drafting</th>
<th>Planning Period</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Projects</th>
<th>Sub-Projects</th>
<th>Implementation Schedule (Quarters)</th>
<th>Budget Allocation Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP „FORDON” in Bydgoszcz</td>
<td>D D C</td>
<td>C C C</td>
<td>C C I</td>
</tr>
<tr>
<td>Total Project</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:

- D = design of sub-projects.
- C = tendering and contracting.
I = contract implementation and payment.
<table>
<thead>
<tr>
<th>Programme</th>
<th>Title</th>
<th>Date of Drafting</th>
<th>Planning Period</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Projects</th>
<th>Expected Contractual Commitments (cumulative) (Quarters) MECU</th>
<th>Budget Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PLANNED</td>
<td>Cost Estimate MECU</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>WWTP „Fordon” in Bydgoszcz</td>
<td>3.21</td>
<td></td>
</tr>
<tr>
<td>Total Project</td>
<td>3.21</td>
<td></td>
</tr>
</tbody>
</table>

Total Project: 3.21 MECU
# ANNEX 4b

**DISBURSEMENT (PAYMENT) SCHEDULE:** Construction of the WWTP „Fordon” in Bydgoszcz

<table>
<thead>
<tr>
<th>Programme Title</th>
<th>Date of Drafting</th>
<th>Planning Period</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Projects</th>
<th>Disbursement (Payment) Schedule (Quarters) MECU</th>
<th>Budget Allocation Cost Estimate MECU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PLANNED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I    II   III   IV   V       VI   VII   VIII   IX   X   XI   XII</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sep 98   Dec 98  Mar 99  Sep 99  Dec 99  Mar 00  Jun 00  Sep 00  Dec 00  Mar 01  Jun 01</td>
<td></td>
</tr>
<tr>
<td>WWTP „Fordon” in Bydgoszcz</td>
<td>2.0</td>
<td>3.21</td>
</tr>
<tr>
<td>Total Project</td>
<td>2.0</td>
<td>3.21</td>
</tr>
</tbody>
</table>
ANNEX 5  
Relation of project to previous PHARE activities and with ongoing projects financed from other sources

This investment project for city of Bydgoszcz was not financed from earlier PHARE Programmes but some studies and supplies were prepared within previous programmes for Bydgoszcz Voivodeship:

PHARE PL9002: Prefeasibility and Feasibility studies for the Hazardous Waste Management for three Voivodships, including Bydgoszcz and Master Plan for Warta River Basin.

PHARE PL9102: Supply of equipment for five wastewater Treatment Plants in Warta River Basin and Supply of equipment for Regional GIS for 15 Environmental Protection Divisions in Warta River Basin.

Budget with all other resources of funds

<table>
<thead>
<tr>
<th>Resources of funds</th>
<th>Scope of work/equipment</th>
<th>Amount ECU</th>
<th>%</th>
</tr>
</thead>
</table>
| Municipality of Bydgoszcz (Beneficiary budget) | - financial and economical analysis  
- environmental impact analysis  
- complete documentation for construction of WWTP  
- building works  
- electrical works  
- foundation works  
- road work                                     | 7,659,000  | 46 |
| Voivodeship Fund of Bydgoszcz           | - construction works for the screens, chambers, building for mechanical removal of smell from sand  
- dewatering works  
- construction works for sedimentation facilities  
- technological works for activated sludge chamber  
- works for electrical cables                                               | 2,809,000  | 16 |
| National Fund                          | - construction and installation works for screens, chambers, sedimentation tanks  
- technological works for mechanical, sedimentation and biological facilities | 3,210,000  | 19 |
| PHARE                                  | - supply and installation of equipment for:  
  • mechanical facilities - task IA  
  • sedimentation facilities - task IB  
  • biological part - task II  
  • gas facilities - task III                                                    | 3,210,000  | 19 |
| TOTAL                                  |                                                                                         | 16,888,000  | 100 |
Executive Summary of Financial and Economic Assessment

The FORDON Wastewater Treatment Plant will be located in Bydgoszcz and is designed for mechanical and biological treatment of the wastewater from the STARY FORDON housing estate as well as a number of the small workshops and service shops with the total quantity 26,710 m$^3$/24h. The current population of the serviced residential district is 65,000 which is targeted to rise to 80,000.

The fees to be paid by inhabitants will be calculated on the basis of normal service costs of a non-profit operation of the wastewater network and wastewater treatment plant. This financial policy has been introduced by the City Council of Bydgoszcz for the following reasons:

a/ ecological factors: the main objective of the proposed investment is the preservation of the Vistula river and ca 460 ha of the lands which are flooded by river water.

b/ public relation causes: the wastewater plant is financed in 45% from Bydgoszcz's municipal funds thus, indirectly from inhabitant's taxes.

c/ economic reasons: if heavy charges must be paid for wastewater treatment services this will result in:
- protests from residents;
- decreased payment of taxes;
- in consequence, reduced municipal income which will jeopardise the water treatment plant’s financial self-dependence.

It is assumed, that the project will be financed in 35% from preferred low interest credits which are granted by National Fund for Environmental Protection and Water Management as well as Voivodeship Fund for Environmental Protection and Water Management. The estimated cost of the project is ca ECU 16,888,000 and this will be increased by bank interest rates from the loans. The loan interest rates will be equal up to 11% of total project costs and the highest loan repayments are expected in the year 2000.

Executive Summary of Environmental Impact Assessment

- the project is not extra arduous for local environmental - it is located outside area under special protection;
- a new mechanical and biological wastewater treatment plant will provide the significant improvement of Vistula river water Quality (below discharge point);
- the proposed modern solutions are well matched with environmental protection requirements, e.g atmospheric phenomena is significantly reduced because of the 'micro-bubble' aeration system (which is based on compressed air);
- the plant is environmentally friendly and human health aspects such as emitted gases, microbiological substances and odour contamination are not expected;
- the rigid design of the equipment for wastewater treatment and sediments and its ability to be very effectively sealed will protect the soil, the ground and deep-waters in the surrounding area from all harmful influences;
- in line with current regulations, the emission of the air contaminated by the plant will not be dangerous to either environmental or human health;
- regarding noise level, the plant will not create noise in excess of the limits set in the relevant environmental specifications.