Sida Evaluation 01/18

Flood Relief Assistance to the Water and Wastewater Services in Raciborz, Nysa and Klodzko, Southern Poland

Olle Colling

Department for Central and Eastern Europe

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Summary

This report presents the findings of the evaluation of the flood relief assistance to the water and wastewater services in Raciborz, Nysa and Klodzko, Southern Poland, financed by Sida.

In July 1997, Poland was hit by the worst flooding in two centuries. 55 persons lost their lives and an area with a population of 20 million people was seriously affected with widespread damage to buildings, infrastructure and agricultural land. Floods damaged water treatment plants, sanitary and storm-water pipe systems, sewage treatment plants, power stations and power distribution systems.

Sweden decided to allocate 125 million SEK for flood related assistance, out of which Sida was authorized to utilize 35 million for efforts in the environmental field. The support by Sida should be directed towards both acute relief and more long-term projects with the aim of minimizing negative social and economic effects. Projects to be supported should be given priority by the Polish Minister for Flood Relief, be possible to start within a short period of time, concern sewage, wastewater and water supply, and where possible, include transfer of know-how.

The purpose of the evaluation presented in this report has been to assess if the decisions and intentions of the Swedish Government and Sida, in relation to the flood relief, were fulfilled in an efficient, professional and cost-effective manner.

Polish authorities identified Raciborz, Nysa and Klodzko in Southern Poland to be among the most severely damaged towns in the flooded area. Swedish Water Development AB (SWD), requested by the Polish water and wastewater association, identified relief requirements and prepared a rehabilitation proposal for the three towns addressed to Sida. In a parallel activity, PULS AB, upon a request by the Municipality of Raciborz and subsequently commissioned by Sida, reviewed the requirements and made a proposal for prioritised relief in Raciborz. As a result of negotiations with Sida and subsequent confirmation of priorities by the Polish Minister for Flood Relief, SWD in consortium with Swedish Water Engineering (SWE) entered into contracts with each of the three towns. Similarly, PULS AB entered into an agreement with Raciborz for rehabilitation measures.

Given the urgent nature of the assistance, normal project preparation procedures, institutional strengthening and other prerequisites for Sida financing were not possible to adhere to. Due to this, a policy to focus on restoration of the water and wastewater services to the same standard as before the flooding was established.

The SWD/SWE contracts included project co-ordination, planning and design, procurement of design, services and equipment, supervision of implementation, contract administration and issuance of acceptance. The total value of the three contracts was about 14.8 million SEK, covering supply of chlorination equipment for water distribution disinfection, flushing and cleaning of sewer networks, supply of pumps, computer control system for a well field, as well as design, contracting and equipment for sewage treatment plants. The actual cost became 3.8 million less than the budget and it was agreed to utilize the remaining amount to additional services and equipment as the demand for further rehabilitation in the water and wastewater systems remained. SWD/SWE identified and agreed with the municipalities on new priorities, and following acceptance by Sida, procured additional design, services and equipment, including equipment for pipe repair, training, repair of pipes, rehabilitation of pumping stations and further rehabilitation of a sewage treatment plant.

Based on the identification and priorities for Raciborz, Sida agreed to finance a contract between PULS AB and the municipality for flushing, cleaning, TV-inspection, computerised planning system

and repairs of sewer pipes; to a total budget of about 7.7 million SEK. During the implementation, additional rehabilitation requirements were identified and a second contract to a value of about 11 million SEK was entered into and agreed for financing by Sida. The additional contract included additional flushing and TV-inspection of sewers as well as renovation and renewal of water and sewage pipelines.

The decisions in respect of the initial assignments fulfilled all basic criteria; confirmed priority by the Polish government, started within a short period of time, were related to water and wastewater, included (some) transfer of know-how. It was necessary and justified to disregard the normal process of project preparation and competitive procurement in order to reduce and shorten the impact of the disaster and restore water and wastewater services in the shortest possible period of time.

The policy of restoring the technical services to a pre-flood condition became in reality difficult to follow. Some components, such as flushing and cleaning of sewers and rehabilitation of existing blowers, resulted in restoration to the original service level. However, most of the components; such as rehabilitation of sewers and water mains, stationary chlorination units, supply of new pumps, computerised monitoring system, mechanical and biological treatment works, and rehabilitation of pumping stations; resulted in restoration to a higher service level or quality than before the flooding. In each case, justification for not only restoring to pre-flood conditions exists, although in some cases the level of ambition went beyond the original intention of the assistance. The increased standard has had significant environmental value. One component, a computerised planning system, had no relevance to the emergency situation, while in the case of the supply of mobile chlorinators, the insufficient training in the initial stage, resulted in the units not being taken into use according to the objectives.

A number of critical relief components, such as flushing of sewers, some of the pipe repairs and rehabilitation of existing blowers, were carried out in a short period of time with favourable service and environmental results. Other components, and in particular the computerised water well monitoring system became unreasonably delayed. The savings in the original SWD/SWE budgets and the additional allocation to the PULS AB services resulted in some of the rehabilitation works being carried out until early year 2000, well beyond a reasonable time frame for emergency repairs, based on a negotiated procurement for the purpose of rapid deployment and achievements.

The consultancy contractual model for the assignments was ill suited for the responsibilities of both the SWD/SWE and PULS AB assignments. Turnkey or similar form of contracts would have been appropriate given the implementation responsibilities of the firms. A turnkey approach, as such, is useful in similar situations when rapid results are essential.

The second engagement of SWD/SWE in each of the three towns, was never confirmed in any contractual sense, although at that time there should have been ample time of safeguarding formal approval and contracts.

Procurement documents, technical specifications, reporting and other documentation were in many cases prepared in Swedish, demonstrating a lack of involvement of the Polish clients in several aspects. SWD/SWE delivered a Final Report (in Swedish) for all three assignments, without the required approval by their Polish clients. The report was accepted, concluding the projects to be completed by Sida.

However, as regards Klodzko, sub-contractors have substantial contractual obligations remaining in force during guarantee periods with SWD/SWE, whom also retain bank guarantees. The sub-contractors are under no contractual obligations with the municipality. SWD/SWE is responsible for the sub-contractors obligations in relation to the municipality of Klodzko under the general clause of the contract. In one

case the situation is more complicated, in which the sub-contractor has a guarantee period valid towards SWD/SWE, while the latter has no contract with the municipality for the services.

One of the guarantee issues is related to a major component currently not in operation and at risk of not being sustainable. The computer monitoring system for the water wells in Klodzko has been a problem during the implementation phase as well as during the current guarantee period. SWD/SWE needs to play an active role to enforce service and any other action that may be required under the contract.

The services and commitment of SWD/SWE needs to be prolonged to the extent and time corresponding to the obligations of their sub-contractors. A dialogue should be initiated in order to resolve this issue.

In emergency situations, when normal routines and preparation stages are ill suited, Sida is advised to establish an emergency board, created for the occasion, with internal resources and external expertise, as appropriate to the situation. The board should develop a strategy for priority assessments, procurement and monitoring, engaging an independent advisor to assist the receiving organisation in their role as clients to the Swedish firms.


Bydgoszcz
Odra
Warta
Warszawa
Wroclaw
Odra
Czestochowa
Wisła
Katowice
Krakow
200 km
Wroclaw
Odra
Nysa Klodzka
Nysa
Klodzko
Raciborz
Katowice

1 Programme Context

1.1 The Development Context of the Projects

1.1.1 The Flooding in Poland

The worst flooding to hit Poland in two centuries occurred between 5 to 28 July 1997 in two consecutive waves, along the Odra and Wisla Rivers, in the South-West and South of the country. Areas with a population of about 20 million people were seriously affected. 55 persons lost their lives and 137 000 people had to be evacuated.

86 cities and towns, 875 villages, 40 000 farms and 450 000 hectares of land were affected by floods. 110 medical facilities, 250 schools were damaged or destroyed, as well as 140 bridges, 1 600 km of roads and several stretches of railway.

Most affected areas suffered from lack of fresh potable water, power supply and gas. Major problems occurred with sewage and water systems. Floods damaged water treatment plants, water distribution systems, pumping stations, sewage treatment plants, sanitary and stormwater pipe systems, power stations and power distribution systems and distribution of cooking gas became disrupted.

An inventory carried out by UN and Government of Poland officials towards the later part of the flooding concluded that priority sectors for the population at large were rehabilitation and upgrading of water and sewage systems, including water and sewage treatment plants and pipelines networks.

The Government of Poland coordinated the rescue work on the national level through an appointed Minister for Recovery of Flood Affected Areas (also referred to as the Government Minister for Flood Relief). Emergency response had been organised at the time of the flooding, engaging among others 35 000 troops, firefighters and police, together with additional efforts by the Polish Red Cross, Caritas, and thousands of volunteers.

The international community reacted with several countries dispatching disaster relief units with rescue teams from Germany, Switzerland, Austria, Lithuania, Ukraine, Hungary, Denmark and Sweden.

1.1.2 The Swedish Support

A Swedish Rescue Support Authority team, consisting of 15 persons with one hundred pumps, tents and other equipment arrived to Wroclaw on 19 July, at a time when a second major flood wave hit the already flooded areas. The team assisted in rescue and pump operations.

The Government of Sweden decided on August 7 to support Poland with additional assistance for rehabilitation measures to a total value of 125 million SEK. This includes 75 million for short- and long term measures within water, wastewater and housing, and 50 million for Swedish firms assisting the rehabilitation efforts.

Emergency housing became a major component in the assistance. Other components involving private firms included supply of equipment to power distribution, drying of public buildings, equipment to a hospital and machinery and training for restoration of the railway system.

Within the amounts indicated above, the government decision authorised Sida to utilize 35 million SEK for efforts in the environmental field, relevant to the flooding, subject to being of priority to the Polish authorities and considered particularly suitable for Swedish support. The contribution was to be developed in cooperation with the appropriate Polish authorities and be managed in the customary

fashion. The decision stated that the Swedish support should be directed towards both acute relief and more long term projects. The aim was to minimize the lasting negative effects on the social and economic consequences of the flooding. The acute assistance provided by the Swedish Rescue Support Authority should be followed up by activities regarding rehabilitation, mainly in the water and sewerage sector.

The projects concerned should fulfil the following criteria:

- Be given priority by the Government Minister for Flood Relief.
- Be able to start within a short amount of time.
- Concern sewage, waste and water supply.
- Where possible, include transfer of know-how.

1.1.3 Background to the Projects

In the town of *Raciborz,* the flooding reached a peak level on 8–9 July 1997. The River Odra reached a water level some 11 metres higher than normal. More than half the town became flooded with severe damage to buildings and housing and practically all industrial activities were closed. With a population of 65 000, up to 10 000 were estimated to have lost their work for a considerable period of time. The damage to Raciborz, and in particular the disruption and damage to the industry was considered more extensive compared with other towns in the Katowice region.

An inventory by the municipal authorities arrived at the following requirements:

- Clean-up of stormwater sewers;
- Clean-up of sanitary sewers;
- Bailing out of flood water from residential buildings;
- Sludge removal from basements;
- Disinfection of water supply system;
- Reinstatement of water mains; and
- Cleaning-up of oil and chemicals.

Nysa is located along a tributary to the River Odra, River Nysa Klodzka. Upstream of the town, there are two major reservoirs, or man-made lakes with a total volume of 230 million m^3 of water. The continued heavy rains filled the reservoirs and eventually the sluice gates had to be opened in order to prevent destruction of the dam walls. This resulted in a major flooding of almost the entire town (except for a small section of the city centre) with a population of 62 000 inhabitants.

The two water works were operational despite the flooding, with water distribution maintained, (except for a pipe in the distribution network, carried away together with a bridge in the flood). Repairs to the town water supply were made quickly after the flood. The local water systems in adjacent villages were also flooded with subsequent problems with the water quality, being without disinfection units. In particular, the village of Morowo was badly affected.

The main problem occurred in the sewer network. Major sections of the system became blocked by debris, earth and sludge. The municipality was supported from other towns with equipment. Repair and cleaning work was to a considerable degree carried out by resources within the town. However, the resources were not sufficient for the major blockages and repairs.

The sewage treatment plant was flooded with water to a level of about 0.5 metres above ground level. Some of the equipment, including blowers, power distribution, automatic control and metering became damaged.

Klodzko with a population of 32 000 inhabitants was probably the most severely damaged town of all. Seven people died as a result of the flood. The main flood wave came in the middle of the night with no advance warning by the authorities. In parts of the central town, the water reached the second floor of the buildings. 450 families lost their homes, requiring temporary shelter. The small workshops and craft shops in the centre were destroyed.

The water supply system stopped functioning and drinking water had to be distributed by tankers to central collection points. Most of the water distribution system remained without major damage, with the necessary repairs carried out by the local resources. However, the water wells were flooded, resulting in pollution, power supply lines broken and cabling for the control system damaged. The new main water treatment plant under construction at the time of flooding was not damaged.

The situation as regards the sewer network was considered disastrous after the flooding. Manholes had been washed away, whole stretches of pipelines were gone, major parts of the network was filled with solid waste, earth, stones and asphalt.

The sewage treatment plant had been hit by a flood-wave almost three metres high. The main structures were intact, while all equipment was more or less destroyed. The laboratory building was severely damaged and all equipment washed away or broken.

The location of Raciborz, Nysa and Klodzko is indicated on the map, *page 4*. Illustrations of the flood levels in Raciborz are shown in *Appendix 4*.

1.2 The Projects

1.2.1 The Swedish Water Development AB (SWD) Initiative

The Polish water and wastewater association requested assistance by Swedish Water Development AB (SWD) to assess the damage and rehabilitation needs to the water and wastewater utilities in Raciborz, Nysa and Klodzko. Responding to the request, a group of experts from Polish and Swedish municipal water and wastewater organisations visited the three towns during the period 4–7 August 1997. The Polish organisation also made a request to the Government Minister for Flood Relief to make a proposition for financial support from Sweden. Subsequently, a request was forwarded to Sida on August 7.

The visits resulted in a proposal by SWD, commissioned by the Polish water and wastewater association, dated August 15, (in Swedish) submitted to Sida on August 16. The overall objective was to support the three towns in order to resume safe and efficient water and wastewater services. The proposed support was expected to result in a quick return to normal operation as well as in some cases, an improved situation compared with the status before the flooding. This would be achieved by a careful prioritisation and design, providing sustainable results.

The proposal contained the following components:

- Mobile chlorination units and generating sets for Raciborz and Nysa.
- Valves for water storage tanks and installation methodology in Raciborz.
- Disinfection unit for water wells in the village of Morowo (outside Nysa).
- ICA system and training for wells in Klodzko
- Assistance in cleaning of sewer systems and training in Nysa and Klodzko. (Radiborz was not included, as they would receive similar assistance by PULS AB).
- Drainage pumps for Nysa.
- New blowers to the biological wastewater treatment plant in Nysa.

- Rehabilitation of electrical equipment and flow meters for sludge in the wastewater treatment plant in Nysa.
- New screens, automatically operated, for the wastewater treatment plant in Klodzko.
- Manufacturing and installation of new aeration equipment in the biological tanks and training in Klodzko.

The proposal was based on SWD being allocated the role of project manager for planning and execution, also handling procurement of goods and services on behalf of the clients. The intention was that the project manager would utilize specialists for procurement from Göteborg water and wastewater utility, Helsingborg water and wastewater utility, and Stockholm Water Co. SWD would appoint local project management in coordination with the Polish water association. The Polish project management would be stationed in the project area and coordinate the activities between the three towns. This would also involve control of deliveries and execution in coordination with specialists from the municipal water and wastewater organisations in Warsaw, Katowice and Gdansk. The local project management would verify invoices and after acceptance of delivery and signing by the Client, the invoices would be sent to Sida through the Swedish project manager. The proposal also included for SWD to procure technical services from Swedish consultants. As the volume of work was not possible to define at the time of preparing the proposal, it was suggested that tenders should be obtained in a competitive process for establishing a framework agreement.

The time schedule was based on the assumption that the planning could commence immediately (corresponding to the first week of September). The time schedule for the Raciborz and Nysa water supply indicated delivery and completion, including training, during November 1997. In Nysa, the wastewater cleansing was scheduled for completion in early March, and the wastewater treatment plant in early September 1998. The planning for Klodzko was separated into activities related to the water supply with completion at end of May 1998, while the wastewater network cleansing was scheduled for completion in February 1998, and the wastewater treatment plant was to be completed in September 1998.

The cost estimate was summarised as follows (in SEK):

Town	Water	Wastewater	Design	Unforeseen	Management	Total
Raciborz	800 000	–	31 500	83 150	137 198	1 051 848
Nysa	1 250 000	1 575 000	120 000	294 500	485 925	3 725 425
Klodzko	1 475 000	8 275 000	696 000	1 044 600	1 723 590	13 214 190
Total	**3 525 000**	**9 850 000**	**847 500**	**1 422 250**	**2 346 713**	**17 991 463**

Note: Training to a budget of 375 000 SEK is included in the Water column above;
Training to a budget of 250 000 SEK is included in the Wastewater column above.

The proposal was evaluated by Sida and a number of modifications were agreed upon, such as excluding the Polish water and wastewater organisation from the assignment, clarifications and structure to the intended terms of reference in terms of objectives, scope of work, methodology, reporting and other matters. Some of the components in the proposal were not considered as flood relief measures and therefore rejected. A confirmation of the planned activities being in line with the central authorities in Poland was requested by Sida to the Polish authorities, responded to in letter of September 10, on behalf of the Government Minister for Flood Relief. The contents of the proposals were confirmed to be within the Polish priorities, and the letter also included a statement that the cost estimates appeared correct.

During the negotiations with Sida, SWD agreed to add resources for the assignment through co-operation with a firm with experience in management of project implementation. SWE, Swedish Water Engineering, a division within VAI VA-Projekt AB, was selected by SWD to form a consortium.

Following negotiations as regards priority issues in relation to the proposal, Sida decided on October 6 (decision no 291-97) to support the reconstruction of water supply and the environment in the three towns to a total budget of *SEK 14 773 425,* with the Consortium SWD/SWE as the Swedish part. The assessment by Sida was that the proposed support was essential in order to quickly restore the water and wastewater systems in the three towns in order to minimise the social and economic consequences of the flooding.

The Consortium SWD/SWE was recorded to have total responsibility for the assignment. An agreement was made between the two companies in which the following division of responsibilities was established:

Project Management	SWD	Contacts and co-ordination with the Polish clients.
	SWE	Main project management and overall responsibility in relation to budgets, quality and time.
Technical co-ordination and design	SWD	Technical specifications for screens, pumps, chlorination and generating units. Technical co-ordination in Poland.
	SWE	Basic descriptions and technical specifications, co-ordination of design and inputs by technical experts in Sweden.
Procurement	SWD	No responsibility for procurement. Assist SWE in evaluation of tenders.
	SWE	Procurement of goods, including procurement documents, tendering, evaluation and contracts with sub-suppliers.
Payments to suppliers and contractors	SWD	–
	SWE	Payments to the extent required
Approval of deliveries and verification of invoices	SWD	Check of delivery in Poland and review of invoices from sub-suppliers
	SWE	Final examination and verification of invoices from sub-suppliers for disbursement by Sida
Training	SWD	Responsible for the required training to be provided in connection with delivery of goods.
	SWE	–
Reports to Sida	SWD	Reports to Sida in relation to Services.
	SWE	Reports to Sida in relation to delivery of goods.

Consultancy Contracts were signed between the city administration of each town and the SWD/SWE Consortium on October 10 in Katowice.

The *Scope of Work* for each contract covered the following general obligations. The implementation of the project was to be planned and managed by the SWD/SWE Consortium in association with IGWP (the Polish water and wastewater association) and in co-operation with the city. The SWD/SWE Consortium was responsible for planning, design and implementation of the investment programme covering:

- Project co-ordination between the Polish clients and Swedish experts and suppliers;
- Planning and design of smaller investment components;
- Purchasing of services and equipment;
- Contract administration and issuing of certificate of acceptance of services and equipment;

- Supervision of project implementation, and
- Reporting to Sida of project progress.

Approval and verification of the delivered services and equipment was to be done by SWD/SWE Consortium in co-operation with the Client.

The *manning* for each contract consisted of four Swedish staff from SWE, including the project leader, and five Swedish staff from SWD, including deputy project leader, and five Polish staff including site coordinator.

The objectives, contents and implementation for each town are outlined in the following sub-sections.

As the procurement and execution of the project components progressed, it became evident that substantial reductions in costs were achieved, compared with the budgets.

Cost follow-up, summary for the SWD/SWE Contracts for three towns:

	Budget	Total Cost	Saving
Raciborz, equipment	475 000	302 617	172 383
Nysa, equipment	2 250 000	1 396 161	853 839
Klodzko, equipment	9 750 000	7 084 240	2 665 760
Consultancy	2 298 425	2 162 950	135 475
TOTAL	**14 773 425**	**10 945 968**	**3 827 457**

In May 1998 a representative of Sida visited the three towns, received a positive impression of the execution of the project and at the same time was briefed about further needs for the restoration from the flooding. Given the substantial savings, it was agreed to develop further assistance components within the framework of the remaining amounts in relation to the budget for each town.

SWD/SWE agreed with Sida to develop additional programmes for each town and prepared a proposal for extension of the projects, dated October 15, 1998. Sida accepted by letter in December 22, 1998 to support the proposal.

Cost follow-up, summary for the SWD/SWE Second Stage for three towns, based on data in the Final Report:

	Budget	Total Cost	Saving
Raciborz: training, equipment	120 000	121 465	-1 465
Nysa: training, equipment	610 000	606 330	3 670
Klodzko: training, equipment	2 115 600	1 600 150	515 450
Consultancy	962 600	961 515	1 085
TOTAL	**3 808 200**	**3 289 460**	**518 740**

1.2.2 The SWD Raciborz Project

The *objective* of the Raciborz project was to improve the existing situation regarding supply of potable water to the consumers. The investments and training would allow a step by step disinfection of the water network contaminated during the flooding period. The final result would be the previous function (before the flooding) of the water distribution system supplying the same quality of water as before.

Investment components:

- 2 mobile chlorinators for network disinfection inclusive training. Ceiling cost SEK 275 000.
- 2 mobile generators, ceiling cost SEK 200 000.

The aim of the training programme was to introduce the equipment and prepare the operation personnel to carry out disinfection of the network. The disinfection was to be done step by step, until the whole network at that time being contaminated, would be disinfected.

Budget summary:	**SEK**
Fees, Swedish and Polish staff	71 850
Reimbursable	14 375
Equipment and training	475 000
TOTAL	**561 225**

The *time schedule* indicated commencement of work in the second half of October 1997, equipment on site before end of December, and completion mid-January 1998.

Implementation:

The two mobile chlorination and mobile generators were procured on basis of a competitive tender procedure. The selected supplier, Miljömontage i Kalmar AB, delivered the equipment in late February 1998 (according to SWD letter to Sida of 1998-12-16) or in January 1998 (according to Final Report). Training (3 days in total for Raciborz and Nysa) gave an introduction in handling the equipment and the local staff was thereafter expected to continue practicing on their own. However, a follow-up by phone by a member of the Polish SWD team reported a need for additional training.

Cost follow-up of the supplied equipment, including training (in SEK):

	Budget	**Total Cost**	**Saving**
2 mobile chlorinators	275 000	117 117	157 883
2 mobile generators	200 000	185 500	14 500
TOTAL	**475 000**	**302 617**	**172 383**

(The fees and reimbursable is presented as a total for all three towns in the Final Report. A comparison for the individual town in this respect has therefore not been carried out.)

Additional Components:

The following additions were agreed upon based on savings in the Contract:

- Complimentary training in the use of the mobile chlorination equipment in the field.

The additional training would be related to the process and include practical application in the field. The training was intended to be co-ordinated and carried out in Nysa with staff trained from both towns, in total eight persons.

- Supply of hydraulic power unit and tools for repair of pipes.

A considerable volume of repairs remained on the network, in particular of small diameter house connections. Equipment for this purpose was given priority by the Raciborz water and wastewater utility and the detailed components were selected in a coordinated effort with SWD/SWE. The power unit and tools would considerably increase the capacity and thus shorten the time for completion of the repairs.

Budget for the additional components:	SEK
Consultancy	27 900
Training- chlorination	24 450
Hydraulic power unit and tools	120 000
TOTAL	**172 350**

A *time schedule* was not included in the proposal.

Implementation of the Additional Components:

The additional training in chlorination was carried out in Nysa with participants from the water and wastewater utilities of both Nysa and Raciborz participating. The training, reportedly carried out in March 1998 during two days, included handling of the equipment, dosage, sampling and control, sectioning of the water network, as well as theoretical knowledge.

The hydraulic power unit and tools were procured through direct negotiation in order to secure the supply of similar equipment to the existing. The equipment, supplied by Märsta Hydraulik & Pålkapning AB, was delivered in June 1999. The equipment enhanced the capacity to carry out repairs of the network and reduced time of restoration. The cost of the equipment was 121 465 SEK, almost corresponding to the budget amount of 120 000 SEK.

1.2.3 The SWD Nysa Project

The *objectives and results* of the Nysa project were to support Nysa in its work on rehabilitation of the water and sewerage system in the city damaged during the flooding.

Investment components:

- 3 mobile chlorination sets and generators. Budget 675 000 SEK.
- 2 stationary chlorination units in Morowo. Budget 200 000 SEK.

Investment relating to disinfection in the distribution system and for the ground water wells in Morowo was given priority, in order to avoid health problems. Training of operational personnel was included.

- Cleaning of sewer network. Budget 475 000 SEK.

Cleaning of clogged sewage network in order to recover the functioning of the system in order to achieve good sewage services in Nysa as soon as possible was considered essential. The component also included training of operational personnel.

- 5 pumps. Budget 100 000 SEK.

The aim of the investment related to purchasing of pumps was to replace equipment destroyed during the flooding.

- 4 blowers. Budget 800 000 SEK.

Procurement of blowers as replacement of the equipment destroyed at the sewage treatment plant. Blowers would be necessary to achieve biological treatment.

Budget summary:	SEK
Fees, Swedish and Polish staff	225 750
Reimbursable	45 200
Equipment and training	2 250 000
TOTAL	**2 520 950**

The *time schedule* indicated commencement of work in the second half of October 1997, equipment for the water supply to be on site before end of December, and completion mid-January 1998. The cleaning of the sewer network was to be finalized in the second half of December, pumps installed mid-November, while the blowers were scheduled for installation by mid-March 1998.

Implementation:

The three mobile chlorination units and mobile generators were procured based on aa competitive tender procedure. The selected supplier, Miljömontage i Kalmar AB, delivered the equipment in February 1998. Training (3 days in total for Raciborz and Nysa) gave an introduction in handling the equipment and the local staff was thereafter expected to continue practicing on their own. At the time of delivery it was found that continuous chlorination was not required. The equipment would be utilized in the future in instances such as after repairs of pipelines.

The disinfection units for the wells in the village of Morowo were also procured from Miljömontage, including installation in a container. The units were delivered in January 1998, with basic training carried out at the time of delivery. The disinfection units were taken into operation for the village water supply system.

The services for cleaning of the sewer network was procured from WMI Sellbergs AB after a competitive tendering procedure with invitations to eight firms and tenders received from four. Two special flushing vehicles were sent to Nysa in the beginning of November. The work was carried out during one month. During this period, some 40 km of pipes were cleaned according to the Final Report. (According to the Progress Report of December, the work had been finalised by 27 of November with 16 km cleaned by WMI Sellbergs AB, corresponding to 67% of the complete cleansing operation having been carried out by the Swedish contractor). The function of the network had been restored.

The five pumps were sent to Nysa in the beginning of January 1998. The pumps were procured directly from Flygt AB, as it was considered important to procure the same make as the destroyed pumps, in order to facilitate installation.

Procurement of blowers to the sewage treatment plant was not carried out. Instead, part of the budget allocation was utilized to reimburse the Municipality of Nysa for rehabilitation of the existing blowers. This major change in scope of work was based on the development that took place in Nysa in parallel to the process of financing and agreement with SWD/SWE. Blowers had only just been installed on site, when the flooding occurred. The Municipality was under pressure to commission the plant before the end of December 1997, as this was a prerequisite for the grant component in the financing by the Polish Environmental Funds. The Municipality agreed with the Polish manufacturer of the blowers to have the units sent back to the factory, dismantled, cleaned, rehabilitated, returned and installed in time for the plant to be commissioned before the dead-line according to the terms of financing. Sida accepted to reimburse the Municipality for the cost, after a separate review by SWD/SWE. The total cost reimbursed to Nysa was 437 333 SEK.

Cost follow-up of the supplied equipment, including training (in SEK):

	Budget	Total Cost	Saving
3 mobile chlorinators	375 000	161 040	213 960
3 mobile generators	300 000	140 300	159 700
Disinfection in Morowo	200 000	161 150	38 850
Flushing of sewers	475 000	400 000	75 000
5 pumps	100 000	96 338	3 662
Blowers	800 000	437 333	362 667
TOTAL	**2 250 000**	**1 396 161**	**853 839**

(The fees and reimbursable is presented as a total for all three towns in the Final Report. A comparison for the individual town in this respect has therefore not been carried out.)

Additional Components:

The following additions were agreed upon based on savings in the Contract:

- Complimentary training in the use of the mobile chlorination equipment in the field.

This additional training was to be carried out jointly with staff from Raciborz. See above.

- Rehabilitation of 105 metres of sanitary sewer in Central Nysa.

The 300 mm diameter pipe was damaged as a result of the flood and required repair. The location in the city centre, in a street adjacent to the church, created a situation when conventional excavation would be very difficult and beyond the capability of the local resources.

- Repair of a combined sewer at River Nysa Klodzka.

The 350 metres of sewer along the river was severely damaged during the flooding. Although the water and wastewater utility had repaired some 50 metres on their own, the total length of the pipe was in a very poor state with risk of collapsing. An extended repair, to the extent the surplus funding would permit, was proposed. The funds would not allow for repair of the whole section. The repair method was proposed to be identical to the one used for the first 50 metres, by PVC sleeve inserted into the existing pipe.

Budget for additional components:	**SEK**
Consultancy	156 900
Training- chlorination	24 450
Pipe rehabilitation Central Nysa	150 000
Pipe repair at River Nysa Klodzka	460 000
TOTAL	**791 350**

A *time schedule* was not included in the proposal.

Implementation of the Additional Components:

As regards the additional training in chlorination, see above under Raciborz additional components.

The damaged sewer pipe in Central Nysa, 114 metres of 300 mm pipe, was replaced by means of a no-dig method, in which welded sections of pipes were forced into the old pipe with high pressure. The work was carried out by Per Aarsleff AB, completed and inspected by SWD/SWE in November 1999.

134 metres of the 350 metres, of sewer along the river severely damaged during the flooding, was rehabilitated by PVC sleeves inserted into the existing pipes. The section in the most serious condition was selected. The procurement was based on a per metre unit price in order to be able to have the work carried out to the extent of financing permitted. Per Aarsleff AB was selected also for this component, again with inspection after completion in November 1999. As a result, the sanitary conditions along the river have improved and the life expectancy of the sewer considerably extended.

The total budget for the sewer rehabilitation works was 610 000 SEK. The expenditure was 606 330 SEK.

A separate cost follow-up for the consultancy has not been made available.

1.2.4 The SWD Klodzko Project

The Contract *objectives and results* was the support to Klodzko in its work on rehabilitation of the water and sewage system in the city damaged during the flooding.

Investment components:

- New ICA system. Budget 1 475 000 SEK.

The aim of the new ICA system for the ground water fields was to restore the drinking water production and distribution system. This also included training of the waterworks personnel in order to introduce the system and transfer of know-how regarding operation and maintenance.

- Cleaning of sewer network. Budget 875 000 SEK.

The purpose of the assistance to cleaning of the sewer network was to give support to the city in its work in this respect. This would enable rapid restoration of the sewage services, also including cleaning services training.

- 2 automatic screens for the STP. Budget 800 000 SEK.
- Equipment for the biological block in the STP. Budget 6 600 000 SEK.

The aim of investments related to purchasing of equipment for the sewage treatment plant (screens and equipment for the biological stage) was to replace the equipment destroyed during the flooding. After installation it would be possible to achieve mechanical and biological treatment of the sewage.

Design and technical specifications for two large investment components; the ICA system for the ground water fields, and the biological stage for the sewage treatment plant was contracted to be carried out by VAI VA-Projekt. Ceiling amount for the design work for the two components was SEK 700 000.

The *budget* for fees and reimbursable was divided into two phases; Phase I for the period September–December 1997 and Phase II for the period January–August 1998.

The Phase I fee budget for SWD/SWE Swedish staff was 399 500 SEK for a total input of 612 hours and for the Polish staff 18 200 SEK for a total input of 43 days.

The budget for reimbursable in Phase I was SEK 70 975 for the Swedish team and SEK 4 200 for the Polish team.

The Phase II fee budget for SWD/SWE Swedish staff was 611 600 SEK for a total input of 928 hours and for the Polish staff 48 500 SEK for a total input of 110 days.

The budget for reimbursable in Phase II was SEK 74 275 for the Swedish team and SEK 14 000 for the Polish team.

Budget summary:	**SEK**
Fees	1 077 800
Reimbursable	163 450
Equipment	9 750 000
Design	700 000
TOTAL	**11 691 250**

The *time schedule* indicated commencement of all work components in the second half of October. The ICA system was planned to be installed and in operation in September 1998. The cleaning of sewer network was scheduled to commence on site in the beginning of December and be completed by end-January 1998. The screens for the inlet of the sewage treatment plant were to be in operation by mid-March 1998 and the biological equipment to be installed and in operation by the end of December 1998.

Implementation:

The ICA system for the groundwater well system was tendered based on a conceptual design prepared by VAI VA Projekt AB, dated February 1998. The new system, based on PLC (Programmable Logical Controller) units located in the waterworks and in the wells operations building, is programmed to monitor the status of each well. The system also contains a SCADA (Supervisory Control and Data Acquisition) programme installed in the main computer. The communication between the water works and wells operations building is based on radio link. As a result of a tendering process, Transformator AB was awarded the contract in the second half of June 1998. Detailed specifications of the metering, transmitters by radio links, automatic system, PC, monitors, and other related components in the system, developed by Transformer AB; was approved by SWD/SWE in the beginning of October 1998, followed by pre-shipment tests supervised by the Consortium and delivery to Poland, with installation commencing on site in November 1998.

The installation work took a very long time, the final acceptance (with some exceptions) inspection was carried out in mid-March 2000. The guarantee period is until mid-March 2002, when a guarantee inspection is scheduled. Within the guarantee period, the supplier is obliged to carry out service at four occasions, 6, 12, 18 and 24 months after the final acceptance inspection. The contract also calls for the supplier to provide the buyer, SWE, with a bank guarantee to a value of 10% until the end of the guarantee period.

The tendering for flushing of sewers resulted in the selection of the firm Power clean Syd AB, with the work commencing in Klodzko in the beginning of November and ended late December 1997. The condition in the network was difficult and the flushing and cleaning by the Swedish team was supplemented by local manual clearance of debris as well as by heavy machinery brought from other resources in Poland. A broken sewer main, 1200 mm diameter and at a length of 200 metres, was also repaired by local resources, for which financing was arranged through the Environmental Fund.

The new screens for the inlet works of the sewage treatment plant were procured in a competitive tendering from Miljömontage i Kalmar AB and delivered on site at the end of March 1998. The final acceptance inspection was made in April.

A preliminary design of the biological treatment was prepared and presented in a report to the Municipality in January 1998. The report contained three alternative ambition levels for the rehabilitation works. The first with a level of treatment less than prior to the flood (without nitrogen removal), the second including nitrogen removal, and the third with an optimised process allowing for both nitrogen as well as phosphorus reduction in the biological process. The Municipality opted for the last alternative, which was accepted by Sida in mid-February 1998.

A competitive tendering based on the preliminary design and mechanical- and electrical specifications was made, resulting in the selection of Goodtech MRAB for the implementation.

The installation was carried out and confirmed completed by a final acceptance inspection at the end of March 1999. The equipment installed includes a new aeration system with blowers, pipes and bottom diffusers, mixers, pumps and pump systems, ICA system, new flow meters and reconstruction of concrete walls in the basins. The walls were constructed by local resources and not included in the contract with the Swedish firm.

Cost follow-up of the supplied equipment (in SEK):

	Budget	Total Cost	Saving
ICA-System for water wells	1 475 000	797 963	677 037
Flushing of sewer network	875 000	712 377	162 623
Screens	800 000	854 600	– 54 600
Biological treatment equipment	6 600 000	4 719 300	1 880 700
TOTAL	**9 750 000**	**7 084 240**	**2 665 760**

(No separate follow-up for the consultancy (design as well as project management) has been provided for Klodzko.)

Additional Components:

The following additions were agreed upon within the framework of savings in the Contract:

- New return sludge pipeline and boxes for sampling units.

Intended as replacement of the old mild steel pipe with a new pipe of stainless steel, for return sludge in the biological units of the sewage treatment plant. Included as a preventive measure in order to avoid future problems of corrosion of the existing pipe.

Two automatic samplers were to be located outdoors (supplied in the first stage contract). The proposal was for housing the samplers in isolated boxes as protection of the equipment.

- Training of staff in operation of biological treatment.

The rehabilitated and improved sewage treatment plant is operated for biological nitrogen and phosphorus removal in a modified process configuration, compared with the old design of the plant. The proposal included for two persons to be trained at the two sewage treatment plants of Bromma and Henriksdal for one week during February 1999.

- Training of staff in operation of ICA system for water supply.

The training related to the ICA system for the water supply well field in Phase I. Training proposed to be carried out on the job was aimed for the operators to handle the advanced system as well as common knowledge in process optimisation and computer supported operation. The training was to be

carried out at two occasions. At first, prior to the start up of the installed system, utilising a PC/PLC system and SCADA programme of the same type as installed. Secondly, at the time of commissioning of the installed system, allowing for a more in-depth training and preventive maintenance and repair routines.

- Rehabilitation of a raw water pumping station.

The raw water pumping station, supplied by siphon from seven wells, with dry mounted pumps was damaged during the flooding, including the electrical installations. The proposal included for refurbishing the pumping station with new wet well type pumps, internal piping and new electrical and control systems.

- Rehabilitation of a sewage pumping station.

The sewage pumping station is located in a residential area with the pumps situated some 10 metres below ground level. The flood resulted in considerable damage and the pumping had not been operating properly ever since. The proposal included rehabilitation of the pumping station.

- Rehabilitation of the grit chamber at inlet of the sewage treatment plant.

The grit chamber is located after the screens in the inlet works of the treatment plant with the function of separating sand and other heavy particles. The lamella units in the grit chamber were crushed by the flood wave. The lamellas were partly restored by the operational staff, although the function was not satisfactory. The advanced biological treatment and related equipment introduced requires efficient mechanical treatment. The proposal included for rehabilitation of the grit chamber with a new system for sand removal and dewatering, incorporating the control system with the screen controls.

Budget:	**SEK**
Consultancy	768 300
Return sludge pipe and samplers	175 000
Training in biological treatment	98 600
Training in operation of ICA system	78 000
Rehabilitation of water pumping station	1 170 000
Rehabilitation of sewage pumping station	294 600
Rehabilitation of grit chamber	300 000
TOTAL	**2 116 200**

A *time schedule* was not included in the proposal.

Implementation of Additional Components:

Supply of the new return sludge pipeline and boxes for sampling units were negotiated with Goodtech MRAB as additions to their on-going contract for the biological unit. The pipe and equipment was inspected as a part of the whole handing-over inspection in March 1999. The cost for the additional work corresponded to the budget, SEK 175 000.

The training in operation of biological treatment was carried out in June 1999. Three staff members responsible for the treatment process participated. The training was carried out during one week, covering theoretical as well as practical aspects, focusing on the biological removal of nutrients. The training was to some extent carried out on the sewage treatment plants owned and operated by Stockholm Vatten. The cost was equal to the budget, SEK 98 600.

The training of staff in operation of ICA system for water supply included theoretical as well as practical applications of the system installed for the water supply well field. The training was carried out in Klodzko in June 1999. The cost was equal to the budget, SEK 78 000.

VAI VA Projekt AB carried out the design for the rehabilitation of the raw water pumping station as well as for the sewage pumping station. The supply contract was procured in a tender process and awarded to Miljömontage i Kalmar AB. Both components were competed and subject to final inspection by SWD/SWE in October 1999.

Also the rehabilitation of the grit chamber at inlet of the sewage treatment plant was awarded to Miljömontage i Kalmar AB with final inspection in October 1999.

The budget follow-up does not provide a separation of the budget components for the two pumping stations and the grit chamber. The total cost for the three components was 1 248 550 SEK, to be compared with the budget of SEK 1 764 000.

The budget follow-up does not separate the consultancy for each town.

1.2.5 The PULS AB Initiative in Raciborz

The Swedish firm *PULS AB* received a request for assistance to restore the damages to the water and wastewater systems in Raciborz. The request came from the municipal authorities responsible for the flood relief, also supported by the regional authorities in Katowice. As the first contribution, indeed on the very same day as the Swedish government decision on August 7, Sida decided to finance a mission by PULS AB to Raciborz.

Based on a contract with Sida, PULS AB carried out a survey of the requirements in Raciborz (Sida decision no 230-97). The survey was carried out during the period 13–17 August by a team of four. The budget covered fees to an amount of SEK 100 000 and SEK 30 000 for reimbursable costs. The main focus of the mission was to assess the damage and priority rehabilitation requirements in the water supply system, the drainage and sewer systems and certain buildings. Main findings:

- The Water Works: The water treatment plant, main pumping station and ground reservoir had been flooded to 2.5 metres above ground level. Repairs were well under way when the mission arrived and it was concluded that the immediate situation was under control and the remaining work could be carried out by local resources.
- The Sewage Treatment Plant: The new plant was due to commence operation at the time of the flooding. As the plant was flooded, damage was done to cables and control equipment. The contractor on site carried out repairs of the damaged parts and no external assistance was considered necessary for the time being.
- The sewer network: The flooding had caused extensive damage to the two main sewer systems serving the central parts of the town. Long sections of the pipes were choked with sludge, sediment and debris. In at least five locations the main pipes were fractured and collapsed. The intercepting pipe along the River Odra had severe damage and found to be very brittle. The water and wastewater organisation, with assistance from other towns, had started up the repairs and cleanup at sections, where this could be carried out by the limited resources available. The overall length of pipes estimated to require cleanup operation was assessed to about 50 km. Repairs of main sewers would require no-digging techniques due to a combination of difficult soil conditions and high groundwater level.
- Oil and Chemical Spills: Local authorities had collected oil discharged from the thermal power station. No external assistance was deemed necessary.

- Buildings: Over half of the buildings and structures in the town had damages to basements and ground floors. The immediate bailing out of water and sludge had to a considerable extent been made or was in progress as well as repairs of damage. No external assistance was regarded necessary in this respect, other than a requirement of dehumidifying units to a severely damaged school for handicapped children.

The inventory of the damage by the team and discussions with the municipal authorities and the water and wastewater organisation resulted in a proposal for a staged approach to the assistance:

1. Short-term emergency rehabilitation, including:

- Inspection and cleaning of the two most damaged main sewer pipelines, about 4 600 metres of 600 and 700 mm diameter pipes. Budget amount SEK 1 526 000.
- Fitting of polyester sleeves along the most damaged stretches of piping, about 500 metres of 600 mm diameter pipe at a budget of 2 250 000 SEK and 1 000 metres of 700 mm diameter pipe at a budget of SEK 5 500 000.
- Introduction of a computerised planning system for storage and processing of information. Budget SEK 320 000.
- Loan of 20 dehumidifiers to dry the school for handicapped children. Budget SEK 302 000.

2. Long-term improvements and extensions of the water and sewerage systems. The support was intended to be carried out during a period of two to five years with a budget of SEK 10 million.

The proposal was forwarded to Sida as a request for assistance by the municipal authorities. Following a review and contacts with PULS AB, Sida decided to finance the short-term measures, excluding 500 metres of polyester sleeves to a 600 mm pipeline. The revised total budget was agreed to *SEK 7 650 175.* The decision as regards the main component, polyester sleeves to a budget amount of SEK 5.5 million was subject to specification of costs after TV-inspection of the pipeline. The proposal for long-term improvements was not considered. The decision by Sida was made on September 5 (decision no 249/97). Beforehand, Sida had requested a confirmation of the priority of the project by the Government Minister for Flood Relief, whom confirmed this by letter of September 10, also indicating that the cost estimate appears correct.

PULS AB signed a consultancy contract for the services with the Municipal Board of Raciborz on September 16, including a provision for the services to commence during September 1997, with completion not later than December 1998. Prior to signing the Contract, Sida had reviewed a draft version and the comments were applied in the final version. At the time of signing the Contract, work was already in progress with flushing of sewers, preparations for installation of dehumidifiers and inventory for the computerised database.

By the end of October, sufficient flushing and TV-inspection had been carried out in respect of the main sewer to enable a design and cost estimate of the polyester sleeve. The existing pipeline was partly of vitrified clay and partly of concrete. The clay pipes were found to have cracks and fissures while the concrete pipes were corroded, caused by sulphuric acid in the wastewater. The fragile condition of the concrete pipes was not able to withstand the exceptional conditions during the flooding. A total length of 1 150 metres (1 000 m of 700 mm and 150 m of 600 mm pipe) was considered necessary to be rehabilitated by a flexible plastic sleeve to a total cost of 5 447 550 SEK. Sida engaged an expert to evaluate the cost estimate. The cost were assessed and found reasonable and subsequently the work was accepted to be carried out according to the Contract.

Flushing and TV-inspection of main sewers was completed in January 1998, the relining with polyester sleeves was finalised in week 10, 1998 and all other work within the Contract was completed before October 31, 1998.

The cleaning of the main sewers was reportedly very tedious, as pipes were choked with sludge and sediment. In several places the pipes had collapsed, resulting in all wastewater being discharged untreated to the river for a considerable period of time. The poor quality of the pipes was also a complication, as flushing had to be carried out with great care. Personnel from the municipality assisted during the flushing and carried out excavation and repair of collapsed pipe sections. By the end of 1997, most of the wastewater was piped to the treatment works, which at that time had been made operational.

The dehumidifying of the school was reported made according to plan with the school re-opened in time for the autumn semester 1998.

The introduction of the computerised planning system was installed according to plan, including inventories and training. The system was linked to the information from the TV-inspection.

The budget follow-up presented in the Final Report of PULS AB of December 1, 1999 is as follows (in SEK):

Component	Budget	Spent	Balance
Cleaning and TV-inspection	1 526 900	1 505 504	21 396
Dehumidifying	301 275	289 850	11 425
Computerization	322 000	311 919	10 081
Sleeving	5 447 550	5 438 790	8 760
TOTAL	**7 597 725**	**7 546 063**	**51 662**

In parallel to the work carried out by PULS AB, the water and wastewater organisation continued their work with inventory and assessment of all water and sewer pipelines. As a result, the following additional major priority components were identified:

- Flushing and TV-inspection of 21 km of sewers, including evaluation and rehabilitation planning. Indicated cost 5 million SEK.
- Relining (sleeves) of 2 km of sewers, including connections and manholes. Indicated cost 5.2 million SEK.
- Renewal of pipelines through conventional methods, water and sewer pipelines, total length 9 km. Indicated cost 10.3 million SEK.

In May 1998, Raciborz was visited by a representative of Sida. The need for further assistance was indicated by the Mayor and in June, Sida received a proposal for further assistance, (in Swedish) signed by the Mayor and PULS AB. This included, in order of priority:

- Polyester sleeve lining of 300 metres of 400–600 mm sewer pipes to a budget amount of 1 260 000 SEK.
- Flushing and TV-inspection of 10 km of sewer pipes, including evaluation and action plan to a budget amount of 1 651 500 SEK.
- Renewal of surge pipe under the River Odra, 110 metres of 600 mm pipe. Budget amount 660 000 SEK.

- Rehabilitation of main water distribution pipeline. 2 600 metres of sleeve in 500 mm pipeline and new 500 mm pipe in a section 400 metres in length. Budget amount 6 528 000 SEK.
- Sleeve lining in sewer network, total length 1 400 metres, pipe diameters 300 to 600 mm. Budget amount 4 319 500 SEK.

The total amount of the proposal was 14 418 500 SEK.

Financing of the second assignment was made possible by utilizing a budget of 10 million SEK originally intended to be channelled for on-lending by the Polish Environmental Fund. As a result of the elections during late 1997, and subsequent change of management, financing to the Fund was not implemented.

Sida made decisions at two occasions in relation to the request; in June 18, 1998 by decision 310/98 to an amount of 8 500 000 SEK, followed by decision 420/98 for an additional 2 468 500, bringing the total to *10 968 500 SEK.* Also this new project was considered as a consultancy assignment (10 803 500 fees, 165 000 reimbursable). With reference to the project being a continuation of the ongoing project, the procurement was made without competition (as noted in the Sida decision). As in the previous financing, the Client (Municipality of Raciborz) is expected to cover local costs including local staff, interpreters, and lodging for visiting Swedish experts. In addition, the Contract requires the Client to pay for all possible duties, customs, taxes or other charges or fees on goods or services.

The second Contract between Raciborz and Puls AB:

The new Contract between the Municipality of Raciborz and PULS AB was signed on September 17, 1998. A summary of the contractual budget elements is as follows:

Component	Fee	Reimbursable	Total
Sleeving of 300 m of 400–600 mm sewer pipes	1 260 000		1 260 000
Flushing, TV-inspection, action plan; for 10 km of sewer pipes	1 486 500	165 000	1 651 500
Renewal of pipe crossing Odra River	660 000		660 000
Renovation of water pipe, diam. 500 mm, length 1 350 m	3 077 500		3 077 500
Polyester sleeving of sewer pipes, 300 to 600 mm diam. Length 1 400 m	4 319 500		4 319 500
TOTAL	**10 803 500**	**165 000**	**10 968 500**

According to the Contract, the work was planned to commence in October 1998 and be completed before the end of April 1999.

The work was carried out in three periods:

- September – November 1998,
- February – March 1999, and
- July – August 1999.

The components listed in the Terms of Reference were carried out to the extent agreed upon. Some 10 km of sewer pipes were flushed and inspected, followed by a priority plan for rehabilitation works. 1 700 metres of sleeves were installed in such stretches of pipes where repairs were most needed. The pipe crossing River Odra was drilled clean for the whole length of piping, followed by insertion of a welded PEH pipe.

The renovation of the 1 350 metres of the raw water main pipe from well fields to the water works was cleaned out and fitted with a new welded PEH pipe. Existing valves and fittings were replaced.

PULS AB was assisted by local staff from the water and wastewater utility in Raciborz, whom in turn received on the job training in modern cleaning, maintenance and no-dig repair methods.

By the completion of the work carried out by PULS AB, assisted by the local workforce, the main sewer network, and to some extent the water mains, have been flushed and substantial rehabilitation carried out. Considerable amount of work on secondary sewers and house connections remained for the local authorities to continue with.

The budget follow-up of the second assignment with Raciborz is as follows (in SEK):

Component	Budget	Spent	Balance
Sleeving of sewer pipes	1 260 000	1 222 200	37 800
Flushing, TV-inspection	1 651 500	1 597 454	54 046
Renewal of river crossing pipe	660 000	660 000	0
Rehabilitation of potable water pipe	3 077 500	3 048 360	29 140
Sleeving of sewer pipes	4 319 500	4 178 370	141 130
TOTAL	**10 968 500**	**10 706 384**	**262 116**

2 Evaluation Methodology

2.1 Purpose and Scope of Work

The purpose of this evaluation is to assess if the decisions and intentions of the Swedish Government and Sida, in relation to the flooding, were fulfilled in an efficient, professional and cost-effective manner.

The Terms of Reference for the evaluation is enclosed as *Appendix 1.* The evaluation covers the assistance to the three towns in Southern Poland; Raciborz, Nysa and Klodzko for flood relief measures in the fields of water and sewerage services.

The Scope of Work has an emphasis on the following questions:

- Was the Polish part included in planning and implementation in a satisfactory way?
- Was the cooperation between the Polish and Swedish parts satisfactory?
- Regarding the acute situation- where the right priorities made to solve the most immediate water and sewage problems in an efficient way?
- Was it appropriate to give up normal decision routines for hiring of consultants and allocating funds, i.e. public procurement, with reference to an emergency situation – knowing now that the project took well over two years to be completed?
- Was the water and sewage system restored to the same standard as before the flooding or did the project end up raising the standard and modernizing old systems?
- Has the project been cost-effective from the restoration perspective?
- Has the project been cost-effective from an environmental perspective?
- Did the consultants handle invoicing and payments in a correct, efficient and professional way?

Regarding the SWD/SWE Consortium:

- Were the process for hiring of under-consultants and procurement of goods handled with professionalism, in concurrence and in a cost-effective manner?
- Was the method of two companies working in a consortium satisfactory for the outcome of the project?

The evaluation should also include an analysis of the sustainability of the investments from an economic /financial and environmental perspective.

2.2 Approach and Methodology

The evaluation has been formulated after study of documentation provided by Sida, the municipal authorities of Raciborz, Nysa and Klodzko, SWD, SWE, PULS AB; and based on interviews, discussions and evaluations.

A mission to Poland was made during the period 13 to 17 November 2000, with visits to the three towns. Meetings were held with the water and wastewater utility organisations as well as the municipal administrations. Visits were made to the water works, sewage treatment plants and other installations of relevance to the Swedish assistance.

Separate meetings have been held with representatives of Sida, SWD and SWE. Contacts by phone have been had with PULS AB and Tekis AB.

A draft version of the report has been subject to review by Sida, SWD/SWE Consortium and PULS AB, with the comments received considered as considered appropriate.

Olle Colling of Colling Water Management was appointed by Sida to perform the evaluation.

2.3 Limitations

The evaluation report cover the services carried out by, or through, the SWD/SWE Consortium for Raciborz, Nysa and Klodzko, and PULS AB for Raciborz.

The supply of equipment by PULS AB for rehabilitation of handicapped children in two schools in Raciborz has not been included in the evaluation.

3 Findings

3.1 General

The everyday life in Raciborz, Nysa and Klodzko has not returned to the situation prevailing prior to the flooding. Three and a half year after the disaster, some families are still housed in temporary shelters, buildings remains damaged and some infrastructure are still to be rehabilitated. However, in most respect, life is back to normal where electricity, heating, water and sewage facilities function, in some cases even more efficient than before the flooding.

The overall impression from meetings held with the directors for water and wastewater services and the mayors of the three towns, as well as from direct observations of most of the utilities subject to rehabilitation, is positive. Repairs and cleaning operations, supply and installations of equipment, as well as to some extent training; all, with a few exceptions, have been carried out with sustainable results. The representatives of the towns expressed genuine appreciation for the assistance received, as well as the dedicated efforts by individuals of the Swedish firms.

An evaluation of many actions and decisions taken in an emergency situation expose details that in a retrospect is possible, and in some cases necessary, to criticize. The purpose of the evaluation is not to look for faults for the purpose of blame. The intention is to review and report as to share a common knowledge in order to learn for the future.

3.2 Coherence with Decisions and Policy

The overall aim and direction of the rehabilitation assignments financed by Sida corresponds to the decision of the Swedish Government. Sida was empowered in early August 1997, to utilize 35 million SEK for environmental assistance, relevant to the flooding, subject to being of priority to the Polish authorities and considered particularly suitable for Swedish support.

The documentation at hand confirms an exchange of correspondence and later meetings, between Sida and the Government Minister for Flood Relief in Poland, whereby the priority to rehabilitation of water and sewer services in the towns of Radiborz, Nysa and Klodzko was confirmed. The contents of the proposed service of the SWD/SWE Consortium and PULS AB were confirmed by the Polish ministry.

The principal decision by Sida (ÖST 266/97) in September states that the decision by the Swedish Government allows a freedom of choice between short- and long-term measures within the framework of financing. It is stated that the extra allocation of about half the total amount made available should target short-term measures although environmental measures with longer-term effects should not be excluded from consideration.

The contents of the assistance have also been well harmonized with the priorities of the municipal governments of the three towns. The scope of works of the contracts were developed by the same firms also implementing the services, in direct contact with the decision makers in the water and wastewater utility organisations as well as in the municipal administration in each of the towns.

The emergency situation did not allow for an evaluation for the purpose of ensuring assistance based on priorities such as sustainable environmental development incorporating institutional strengthening, gender perspectives and other main development aspects.

The project preparation and procurement of the services has not followed a normal procedure, i.e. a competitive tendering process for consultancy as well as for implementation. The principal justification was the emergency situation, calling for immediate assistance in order to reduce and shorten the impact of the disaster and restore water and wastewater services in shortest possible period of time. A project preparation cycle, involving independent exploratory and identification review, feasibility study, design and procurement documentation by consultants, having been procured in a competitive process, followed by tendering and contract with contractors and suppliers, was not a viable option, given the urgency of the situation.

The policy of Sida for the flood relief assistance focused on rehabilitation of damaged or destroyed water and wastewater utilities, restoring the functions to the pre-flood situation. This level of ambition became subject to numerous exchanges between Sida and SWD/SWE, as the practical interpretation of this policy became difficult to apply to individual components.

3.3 Services provided by the SWD/SWE Consortium

3.3.1 Findings Common to the Services provided for all Towns

The fact finding by SWD and local resource personnel resulted in a proposal for technical services and equipment for each of the three towns. The proposal was presented to the authorities of the towns and following their approval, negotiated with Sida as regards contents, budget, unit rates for fees, creation of a Consortium SWD/SWE and conditions of Contract.

No external resource appears to have assisted Sida in review of scope of services, contents, pricing or contract model.

The implementation of the projects was to be planned and managed by SWD/SWE Consortium in association with the Polish water and wastewater organisation in co-operation with each city administration. The obligations of the consortium included: project co-ordination between Polish clients and Swedish experts and suppliers, planning and design of smaller investment components, purchasing of services and equipment, contract administration and issuing of certificate of acceptance of services and equipment, supervision of project implementation, and reporting to Sida of project progress.

It was further stated that approval and verification of the delivered services and equipment should be done by SWD/SWE Consortium in co-operation with the Client.

It appears as if the SWD/SWE had a dual and conflicting role from a contractual point of view. In the SWD/SWE contracts with respective town administration, the Consortium was *the Consultant*. As such, the Consortium would be expected to administer the implementation services on behalf of the Client (the municipality), with the municipality as the buyer and contractual partner with contractors and suppliers.

However, all contracts with contractors and suppliers had SWD/SWE as buyer, although the Consortium was a consultant to the Client (each town administration). SWD/SWE planned, procured, issued certificate of acceptance of its own supplies, including approval and verification.

The obligations of the contractors and suppliers such as guarantee periods were not carried forward to the respective town administration. Furthermore, the suppliers guarantee periods are normally two years while the damage indemnification claim period according to the SWD/SWE contracts with the municipalities is limited to one year.

It is evident that the role and responsibility of SWD/SWE should have been established through:

- Consultancy assignments managing the projects on behalf of the clients, with suppliers and contractors having separate contracts with the town administrations.

Or:

- Turnkey assignments with full responsibility of the services, including supply and installations, with guarantees and liabilities by the Consortium.

The technical specifications for the equipment procured, appears to have been prepared professionally and to a required level of detail, albeit in Swedish. (All procurement and technical documentation, with the exception of the preliminary design report for the biological treatment in Klodzko, appears to have been prepared in Swedish only). Minutes of inspections and operational manuals have reportedly been translated into Polish.

The procurement of equipment and services were based on competitive procurement procedures, except in a few cases when direct negotiations were carried out. Direct negotiations were used in such cases when a particular brand or other limitation was evident, such as for Flygt pumps to replace the damaged pumps of corresponding brand and model. The call for tenders, evaluations, negotiations and verification of orders appears to have been carried out according to Swedish procedures and in a professional manner.

However, in a few cases the ambition to keep cost low has impaired the results. The relief results in terms of disinfection of water distribution systems would have benefited from substantially more training combined with direct action on site by the supplier at the time the equipment was delivered. The ICA system for the water wells in Klodzko was procured at about half the price received from other tenderers and the low price has been thoroughly reflected in the poor performance of the supplier.

The overall conclusion of the evaluation of the procurement is that it in most respects has been managed professionally with cost effective results, although the procurement, made in Swedish, did not involve the Polish clients.

The invoices of the suppliers, sometimes addressed to the municipal administration, care of Sida, sometimes addressed directly to Sida, were sent to SWD/SWE for verification, followed by verification by the municipal administration, and then forwarded to Sida for payment. The handling of the invoices and time consumed prior to disbursement from Sida resulted in some cases in late payment. In at least one case, a formal claim was forwarded for extra payment due to delays, although rejected by Sida. Based on the documents at hand, it is difficult to judge where the responsibility for the delays rests.

Procurement of design services primarily relates to Klodzko, see comments under the appropriate heading below.

The additional services provided to each of the towns were confirmed by Sida in a letter to SWD dated 1998-12-22. The financing was not subject to a new formal decision in Sida, apparently due to the new components were financed within the budget amounts in the previous decisions. However, new components, not covered by the previous decisions, were introduced.

For some reason, confirmation of financing of the additional components by Sida to the municipal administrations was never made. Additional contracts or addenda to the existing contracts were never prepared and entered into between SWD/SWE and the municipal administrations. Subsequently, there was no contractual platform for the additional services. Nevertheless, the services were carried out, invoices certified and accepted for payment.

The contracts for the first stage services include a requirement for retention of ten percent of the total remuneration until a final report has been presented and approved by the Client. This is also required according to the confirmation of financing by Sida for each of the three contracts. The reports should be written in English and be approved by the Client.

However, only one report was written, in Swedish, not approved by any of the three Clients. The costs have not been split up to enable a comparison of fees and reimbursable for each contract. Final payment was made irrespectively of the lack of required documentation.

In February 2000, SWD/SWE requested Sida to provide financing for support to the Client in Klodzko during the guarantee period and guarantee inspections. The request was rejected by Sida, with the argument that such consultancy services are not financed, also considering the receiving nation to be capable of looking after their own interests. The contractual obligation of SWD/SWE in this respect, with the sub-contractors having no contractual relation with the municipality, appears to have been overlooked in the request as well as in the decision.

3.3.2 Findings in Respect of SWD/SWE Services in Raciborz

The Contract included the supply of two mobile chlorinators and generating sets, as well as training in order to enable the operational personnel in the water utility to carry out disinfection of the water distribution network. The objective was to provide equipment and training to allow for a step-by-step disinfection of the network contaminated by the flooding in order to reach the quality prevailing prior to the flooding. The equipment should be delivered before end of December 1997 and be operational by mid-January 1998.

The equipment and training was procured at a considerably lower cost than the budget allocation. Delivery and training in handling of the equipment took place in January 1998. However, the equipment was not put into use as intended. The training was insufficient for the operational staff to handle the disinfection procedures and utilizing the equipment in practice. As a consequence of this, additional training became necessary and was carried out for staff from both Nysa and Raciborz in March 1998 (although included in the proposal for additional services much later, in October 1998).

As a result of the second training, the operational staff is now reported to be able to use the equipment. The mobile chlorination units are used at occasions when disinfection is required in sections of the network following network repairs or other reasons. However, by the time the second training had been completed, the network had been disinfected through the central chlorination unit. The mobile units were never used according to the original objective.

As the units were procured far below the budget amount, it is difficult to justify the lack of initial training. Indeed, in order to reach the objective, a combined effort with flushing of network sections by the Swedish personnel combined with on the job training at the time of delivery would have been required.

The additional services also included for the provision of a hydraulic power unit and tools for repair of pipes. The equipment was delivered and is used for repairs, primarily of small diameter pipes and house connections. The repairs carried out are reported to be of pipes damaged during the flooding, as well as for the regular maintenance and repairs by the water utility.

3.3.3 Findings in Respect of SWD/SWE Services in Nysa

As regards the mobile chlorination units and generating sets, the comments and conclusions presented above for Raciborz, are also valid for the corresponding services to Nysa. By the time the training had been completed, there was no demand for the units in accordance with the original objective. However, as in Raciborz, the equipment is reportedly used for disinfection of networks after pipe repairs.

The stationary chlorination units for the well system in the village of Morowo were reported to have been delivered, and commissioned, according to schedule, in January 1998. The units are in continuous use and fulfilles the objective of the contract.

The cleaning of the clogged sewage network had the objective of recovering the functioning of the system in order to achieve good sewage services in Nysa as soon as possible. The time schedule called for completion of services during the second half of December 1997. WMI Sellbergs is reported to have carried out a very professional work and through overtime inputs by the personnel completing the assignment somewhat earlier than planned. Although the data on work accomplished differs considerably in the reports, the objective of this task has been fulfilled.

The five pumps, of the same brand and models as the pumps destroyed during the flood, were delivered as intended and within budget, although later (beginning of January 1998) than scheduled (mid-November 1997).

The contract called for the supply of four blowers to the sewage treatment plant, to replace the recently installed units, believed initially to have been damaged beyond repair. However, given the urgency to complete the installations close to commissioning at the time of flooding in order to safeguard the grant component of the local financing for the construction of the treatment plant, in combination of not being certain of the assistance from Sweden to be confirmed, action was taken by the municipal administration to rehabilitate the existing blowers. The budget for new blowers in the SWD/SWE Contract was 800 000 SEK. The factory rehabilitation of the existing, never operated units, was charged by the manufacturers to the Municipality a cost corresponding to 437 333 SEK. Apart from enabling the Municipality to commission the new plant in time, the rehabilitation was carried out at a considerable lower cost than procurement of other new units. Although there may be reason to believe that the charge by the manufacturer for rehabilitation was exorbitant, it was still the most cost effective solution, given the circumstances. The reimbursement of this cost by Sida to the Municipality was not according to normal routines. As the municipal budget was burdened by the effects of the flooding, the decision in this respect appears well justified. The objective of this project component was thus reached in a cost-effective and pragmatic fashion. In addition, valuable time and thus period of sewage treatment was gained as the blowers were operational some three months earlier than the scheduled installation of blowers in the SWD/SWE Contract.

The additional services included the additional training in the use of the mobile chlorination equipment in the field, as a combined effort for staff from both Raciborz and Nysa. Findings reported above for Raciborz are also valid for Nysa.

The rehabilitation of the 300 mm diameter sanitary sewer in central Nysa was carried out to a length of 114 metres by means of a no-dig method involving cracking the old pipe on location and inserting a new welded pipe, jacked inside the remains of the original pipe. The result of the work was reportedly to the full satisfaction of the municipality and sewer functions as intended. The objective of the component was fulfilled.

Also the rehabilitation work of the sewer along the river was reportedly carried out according to the objective of improving a stretch of the pipeline to the extent the budget permitted. The pipeline is functioning as intended.

The two rehabilitation components were carried out within the budget. As no time schedule was included in the proposed additional works, it is not possible to evaluate if the work was done within a planned period of time.

3.3.4 Findings in Respect of SWD/SWE Services in Klodzko

The ICA system for the groundwater wells is currently not operational. During autumn 2000, a major thunderstorm with lightning had struck with substantial damage to the system as a result. The system is reportedly equipped with lightning protection although obviously not capable of preventing the damage. The lightning also caused damage to other installations in the town. The water utility considered the intensity of the lightning as highly uncommon and the consequences to the system beyond the responsibility of the supplier. The possibility to repair the system by engaging the Swedish supplier or by a local specialist was under consideration at the time of the visit for the purpose of the evaluation, in mid-November 2000.

The ICA system was scheduled for commissioning in September 1998. In reality, the system was operational in March 2000, and even then impaired by a number of faults to be corrected. The whole chain of events were subject to delays, the outline design was several months delayed by the consultant, the procurement of supplier, originally scheduled to be completed late January 1998 was finalised end June 1998. The Contract between SWD/SWE and the supplier, Transformator AB called for the system to be installed with a final inspection latest October 30, 1998. However, detail design by the supplier was approved in October 1998, followed by installations on site commencing in November 1998. The installations, initially scheduled to take 5 weeks, ended up taking more than ten times of that, i.e. close to 60 weeks. The supplier was reported to allocate insufficient resources, incapable of handling the technology.

The system includes special transmitters reportedly recently developed by Transformator AB. The function of the transmitters needs to be followed up and replacement provided if the units are not functioning properly.

During the installation, some changes were made upon the request of the water utility (integration of a third reservoir into the ICA system and change of location of some components). The additional work justifies some extra time, although by no means to the extent utilised.

The system was originally procured based on tender price far below the consultants cost estimate and the pricing of other tenderers. As Transformator AB is a small supplier and provided some components new to the market, the award of contract would obviously require a substantial allocation of resources by SWD/SWE to monitor and control the performance of their supplier.

The contract between Transformator AB and SWE calls for the following remaining issues:

- Guarantee inspection in mid-march 2002, at end of guarantee period.
- Bank guarantee to a value of 10% until the end of the guarantee period.
- Service at four occasions, 6, 12, 18 and 24 months after the final acceptance inspection, i.e. calculated from mid-March 2000.

SWE has been asked to confirm the existence of the bank guarantee, although no reply has been received.

The contract between SWD/SWE and the municipality shall remain in force until the services and all obligations of the parties have been fulfilled. The Consortium is responsible for the procurement and implementation of the ICA system, including issuing certificates of acceptance of services and equipment.

The contractual responsibility of the Consortium is still in force. However, Sida has not accepted financing of the SWD/SWE guarantee inspection, a final report has been delivered to Sida (without the required acceptance by the Municipality), the report has been accepted and the financing of the SWD/SWE assignment been terminated.

There is no contractual relationship on record between Transformator AB and the municipality. Transformator AB is obliged to fulfil their contract in relation to SWD/SWE, who in turn is obliged to fulfil their contractual obligations to the municipality.

The current situation as regards the remaining obligations is not acceptable and has to be resolved. There is a very real risk that the component will not be operational unless renewed efforts are made and the service responsibility of the supplier is monitored to ensure a sustainable future of this investment.

For the cleaning of sewers, Power clean Syd AB provided two combination vehicles (flushing and suctioning), with crews, sent to Klodzko in the beginning of November, with the work carried out until the end of the year. According to the contract between SWE and Power clean Syd AB, the work should be carried out during 44 working days on site. The length of sewers flushed and cleaned in this effort does not appear to have been recorded in minutes of completion, nor in the final report. According to the water utility, the result of the work was satisfactory, although there had been problems with the personal behaviour of some individuals.

The new screens in the inlet works of the sewage treatment plant were procured in a competitive tendering process, delivered and installed during March 1998 with final acceptance inspection in April. The delivery and installation was almost on time according to the contractual timetable and the screens have been reported to function without problems.

The design and technical specifications for the two technical systems in Klodzko, the water wells ICA system and the biological unit in the sewage treatment plant, were contracted to be carried out by VAI VA-Projekt AB. The ceiling amount for the two components was 700 000 SEK. No budget breakdown with unit rates and man-hours was included in the Contract. Nor were the personnel to carry out the services indicated. The Contract contained no conditions for how the consultancy services should be called upon or reported. Upon the request of Sida, SWE provided a manning and budget schedule with unit rates per hour, for the SWD/SWE as well as the VAI VA-Projekt AB services. The same fee levels (in the range of SEK 575–700 per hour) were applied for SWE as for VAI VA-Projekt AB staff.

SWD/SWE prepared a specification for the consultancy assignment regarding the biological treatment unit. Accordingly, the consultant provided a preliminary design in English and this document provided the basis for an acceptance of the level of technology and treatment standard by both the Client and Sida. The consultant also prepared the mechanical and electrical technical specifications for the procurement and execution of the work (in Swedish). Although not evaluated in detail, it is noted that the procurement was based on the preliminary design instead of the detailed design drawings in scale 1:50 called for in the SWD/SWE specification for the assignment. The specification also required the consultant to prepare proposal for contract with the supplier based on FIDIC model agreement. This appears not to have been carried out, as the Minutes of Procurement were made in Swedish fashion and language.

Of the seven firms invited to tender, three proposals for the implementation were received. Following the evaluation, Goodtech MRAB Sweden AB was contracted by SWE as buyer at the end of May 1998. The installation was carried out and confirmed completed at the end of March 1999. This represents a three months delay in relation to the time schedule in the contract between the municipality and SWD/SWE.

The results of the treatment process have been considerable improved through the investment in the modified biological basins and new equipment. The reconstructed and improved biological basin provides efficient biological treatment, including nitrogen and phosphorus reduction, especially during

the summer, when the water temperature is sufficient for both nitrification and denitrification in the process. The upgrading of the plant has resulted in the plant effluent fulfilling the new Polish standard.

The municipality has made additional investment for dosage equipment and chemicals for chemical precipitation for phosphorus reduction. This is used as additional treatment at times when the biological removal is insufficient.

Performance data:

Parameter		Old standard	New Standard	Effluent before upgrading	Effluent after upgrading
BOD_5	mg/l	30.0	15.0	25.0	10.0
COD	mg/l	150.0	150.0	50.0	25.0
Phosphorus	mg/l	5.0	1.5	4.5	1.5
N_{total}	mg/l	30.0	30.0	25.0	6.0
NH_4	mg/l	8.0	6.0	6.5	2.5
SS	mg/l	50.0	50.0	30.0	20.0

The water and wastewater utility is generally satisfied with the equipment and installations, although with some exceptions. The mixers have broken at two occasions and been subject to repairs under the mechanical performance guarantee by Flygt. There were also some faults in the welding seam of parts of the pipe installations.

In the contractual relation between SWD/SWE as buyer and Goodtech MRAB Sweden AB as contractor, the following issues remains:

- Guarantee inspection March 25, 2001.
- Guarantee inspection for blower no 2. Date not known.
- Guarantee inspection for improved welding of pipe sections. Due on March 25, 2003.
- Bank guarantee of 5% from the contractor, valid for the guarantee period.

The contract between SWD/SWE and the municipality shall remain in force until the services and all obligations of the parties have been fulfilled. The Consortium is responsible for the procurement and implementation of the system for biological treatment, including issuing certificates of acceptance of services and equipment.

The contractual responsibility of the Consortium is still in force. However, Sida has not accepted financing of the SWD/SWE guarantee inspection, a final report has been delivered to Sida (without the required acceptance by the Municipality), the report has been accepted and the financing of the SWD/SWE assignment been terminated.

There is no contractual relationship on record between Goodtech MRAB Sweden AB and the municipality. The contractor is obliged to fulfil their contract in relation to SWD/SWE, who in turn is obliged to fulfil their contractual obligations to the municipality.

The current situation as regards the remaining obligations is not acceptable and has to be resolved.

As a substantial amount remained in the budget, a number of additional components were agreed upon and accepted by Sida for financing. Findings about these items are given below.

The new return sludge pipe and boxes for sampling units in the treatment plant were such additions that were desired to be added to the work on the biological block in order to ensure the life expectancy of the overall treatment system. The items were ordered extra and installed by the same contractor as for the other components with the work completed within the same period of time.

The upgraded biological treatment, with biological nutrients removal is based on the technology used in several treatment plants in Stockholm. The study visit and training in Sweden was complementary to the training received on site in Klodzko. The training has been highly appreciated and appears to have provided sufficient basic knowledge for the day-to-day operation of the plant.

The additional training in operation of the ICA system for the water supply well field appears to have been justified as it was carried out not only for the handling of the actual system but also for the system in relation to the function in optimising the well field utilisation through the system. A Polish computer firm attended the training. The water utility is considering negotiating a service contract with the local firm after the contractual service obligations of the Swedish supplier expires.

The rehabilitation of the raw water supply pumping station, the sewage pumping station as well as the grit chamber at the inlet of the sewage treatment plant were designed by VAI VA-Projekt AB and procured from Miljömontage i Kalmar AB. In all three areas had the municipality a general need for refurbishment, as the equipment was old and subject to a lot of emergency repairs. The flooding further impaired the function of the two pumping stations and the grit chamber. All three installations have been carried out to the satisfaction of the municipality and have been functioning as intended after the commissioning and guarantee inspection in October 1999.

In the contractual relation between SWD/SWE as buyer and Miljömontage i Kalmar AB as contractor, the following issues remains:

- Guarantee inspection October 7, 2001.
- Bank guarantee.

The contractual obligation between SWD/SWE and the municipality is more complicated. The additional work is not covered by the scope of work in the Contract, nor has any addendum to the contract for the additional services been prepared and agreed. As there is no contract between the contractor and the municipality, there is a gap in the chain of responsibility. This situation is not acceptable and has to be resolved.

3.4 Services provided by PULS AB

PULS AB carried out services in Raciborz based on three contracts, the first as a fact-finding and action plan mission on a contract with Sida, followed by two consecutive contracts with the Municipality of Raciborz, financed by Sida.

The initial assignment, carried out in mid-August 1997 reviewed the situation and assessed the priorities in relation to the water supply system, drainage and sanitary sewerage and in some buildings. The proposal prepared by PULS AB based on the findings contained short-term emergency rehabilitation components, as well as proposals for long-term improvements and extensions of the water and sewerage systems.

Sida agreed to finance the emergency rehabilitation components, excluding repairs of one pipeline, and excluding the long-term improvements. The agreed components included the following: 1) inspection and cleaning of the two most damaged main sewer pipelines, 2) repair by fitting of polyester

sleeves in a main sewer, 3) introduction of a computerised planning system for storage and processing of information, and 4) loan of dehumidifiers to a school for handicapped children. Within the financing of about 7.7 million SEK, the main component with pipeline repair to an estimated cost of 5.5 million, the financing was on condition that the budget was detailed and verified after a TV-inspection had been carried out.

The components given priority by Sida in the proposal were verified by the Government Minister for Flood Relief.

According to the terms of the contract, the work was to commence in Raciborz in mid-September 1997 and be completed not later than December 1998. The work on site started the same week the contract was signed and was completed already by October 31, 1998.

As agreed within the agreement, the TV-inspection provided data for a plan of repair and detailed budget for utilization of the 5.5 million SEK. As the only component within the total Sida assistance to the three towns, the cost estimate was subject to an external review by an independent consultant, and verified as reasonable. Subsequently, Sida confirmed the financing.

The Contract between PULS AB and the municipality was a consultancy contract, in which the actual work carried out was expressed in terms of fees. However, the assignment was not a consultancy assignment. The work carried out was done by a contractor for execution, not consulting purposes, and the terms of contract should have been developed accordingly. Guarantee and liability obligations are normally defined differently in contracting, compared with consultancy assignments. A construct (build) contract would appear to have been more appropriate, in which a requirement for inspection at completion and a guarantee inspection at the end of a liability or guarantee period would be called for, carried out by an independent inspector. Despite the contractual shortcomings, the work actually performed was to the intentions and expectations of the Municipality.

The contract liability period was not defined in the Contract.

Although not called for in the Contract, PULS AB provided the municipality with a guarantee with a validity of two years for the work carried out.

The Contract as well as the acceptance of financing by Sida specified that a final payment of a minimum of ten percent would not be made until a final report, approved by the Client, had been presented. However, the final payment was made by Sida in November 1998, while the Final Report was received by Sida in December 1999, over a year late. Approval of the report by the Client has not been documented.

The execution of the work performed by PULS AB, as well as the results of inspections, flushing, rehabilitation of pipes by polyester sleeves, and the dehumidifying of a school; all have been to the full satisfaction of municipality.

One component of the assignment, the introduction of the computerised planning system, does not appear to have any lasting effect in the water and wastewater organisation, nor can it be justified from an emergency rehabilitation perspective.

The installation and introduction of the Vabas system for preventive maintenance was carried out by Tekis AB, specialised in the system in Sweden where it is used by many municipal water and wastewater organisations, and also having been a partner earlier with PULS AB in Sopot. The installation and introduction was made according to the Contract and the local staff was provided with training in handling the programme, collection and organising information, and practical applications of the system.

The justification for the component into the emergency rehabilitation programme, was that it would be useful to compile data gathered during the TV-inspections into the system and introduce preventive maintenance routines to the utility. However, from a flood relief perspective, this component was not necessary.

The Vabas system is not in operation. The computer memory crashed and no back-up existed in Raciborz. Tekis AB has offered to travel from their office in Helsingborg to Raciborz and install their back-up copy and assist in starting up the system again. Although Tekis AB has proposed to do the work without charge, provided the municipality pays for the travel expenses, no favourable response to this proposal has been received. The demand for a functioning Vabas system within the municipal and water utility management in Raciborz appears limited.

Following the successful implementing of the flushing and repairs of important sections of the sewer system, the remaining substantial damage, and financing available within the Sida allocation for flood relief; a second stage of rehabilitation works was developed.

Based on a proposal for additional flushing, TV-inspection, renewal and rehabilitation of pipelines to a total budget of 14.4 million SEK, components for a total budget of 11 million SEK were accepted by Sida for financing. There is no record of any price assessment in the Sida files.

The second contract between PULS AB and the Municipality of Raciborz was signed in mid-September 1998, with the work to be completed before the end of April 1999. The work started immediately upon signing the contract and was carried out in three periods, the last during July-August 1999. The reason for late completion in relation to the contract has not been clarified.

The comments above as regards the model contract and liability is valid also for the second contract.

Contrary to the lack of verified reporting required for payment of the final payment of the previous contract, the final invoice for the second contract with Raciborz dated September 1, 1999 was accompanied by a Final Report of the same date. The Report, in English, was verified as accepted by the Raciborz municipal authority. As regards the last assignment, all formal requirements were fulfilled.

The work outlined in the Terms of Reference was carried out to the extent agreed upon, again with work performance and the end results to the full satisfaction of the municipal authorities.

4 Conclusions and Recommendations

4.1 Conclusions

The following conclusions are made as a result of the evaluation:

1. The emergency situation required an implementation strategy focusing on rapid deployment of resources to minimize the effects of the flooding. It was necessary and justified to disregard the normal process of project preparation in order to reduce and shorten the impact of the disaster as to restore water and wastewater services in the shortest possible period of time.

2. SWD and PULS AB responded to the call for assistance in very energetic and dedicated efforts to identify the needs and propose actions. The municipal authorities and water and wastewater utility organisations also testify of outstanding performances and achievements during implementation by dedicated individuals within their organisations. The co-operation with the municipalities and their water and wastewater utility organisations on the part of SWD/SWE and PULS AB appears to have been very good, while the experience of some of the sub-contractors has been more mixed.

3. The urgent requirements for relief efforts made it necessary to enter into negotiated procurement in the initial stage.

4. The priorities and general content of the assistance were confirmed by the relevant authorities, on a national as well as the local level in Poland. The local municipalities and their water and wastewater utility organisations were included in the planning and selection of the priority project components. On location they were engaged in the implementation to an extent that appears satisfactory. However, they were not part of the tendering and procurement procedures in respect of sub-contractors and suppliers. The technical specifications, tendering documentation as well as agreements between SWD/SWE and sub-contractors and suppliers was prepared in Swedish only, without involving the municipal authorities. Also reporting to Sida was made in Swedish with little documented reporting to the clients.

5. The creation of the consortium SWD/SWE combined the operational experience from the Swedish water and wastewater utilities and personal knowledge of the Polish water and wastewater market and resources within SWD, with the experience of procurement and project management within SWE.

6. The consultancy contractual model for the assignments was ill suited for the contractual obligations of both PULS AB and SWD/SWE. The terms of contract should have been based on conditions of contract covering implementation responsibility. Alternatively, in the case of SWD/SWE, the sub-contractors and suppliers should have been engaged based on contracts with the municipalities, limiting the role of SWD/SWE as consultants.

7. The procurement of sub-contractors and suppliers by SWD/SWE was in most cases appropriate, based on relevant technical specifications and competitive tendering procedures (unless the situation called for negotiated procurement). However, in some cases the pricing rather than other qualities appears to have been given undue focus.

8. Relevance of project components in relation to the overall objective of restoring (not enhancing) water and wastewater services as quickly as possible can for the sake of evaluation be classified in three categories:

8.1 Restoration to original service level. Such actions included:

- Flushing and cleaning of sewers in all three towns.
- Use of dehumidifiers for drying of school building in Raciborz.
- Rehabilitation of existing blowers in Nysa.

8.2 Restoration to a higher service level or quality than before the flooding. Such components included:

- Rehabilitation of sewers and water mains.
- Stationary chlorination units in the village of Morowo.
- 5 new pumps in Nysa.
- ICA system in Klodzko.
- Screens, grit chamber and biological treatment in Klodzko.
- Pumps and refurbishing of pumping stations in Klodzko.

8.3 Components with no or little relevance to the flood relief:

- Computerised planning system in Raciborz.
- Mobile chlorination units and generating sets in Raciborz and Nysa. (Intended to be of significant value. However, the units became operational too late due to insufficient training).

The components in 8.1 were in full compliance with the objective of the financing and were also carried out within or even faster than the time allocated.

The components in 8.2, representing the major cost of the assistance, addressed problems in the existing water and wastewater utilities, caused by the flooding. In each case justification for restoring to a higher standard than the pre-flood condition exists, although in some cases the level of ambition went beyond the original intention of the assistance. However, given the circumstances, the increased standard has had significant environmental value in respect of the major components. The implementation of some components took longer time than planned, in one case the time spent in the project was unacceptable.

The components in 8.3 represents in the case of the computerised planning system a component of no relevance to the emergency situation, and in the case of the mobile chlorinators, a failure in implementation.

9. Two components are not operational and run considerable risk of not being sustainable:

- The computerised planning system in Raciborz. As the system has no significant value in relation to the function of equipment or works related to the Sida financed assistance, no action from Sida is called for.
- The ICA system for the water wells in Klodzko represents a significant value and is of operational importance to the water supply system. As a minimum, the contractual obligations of the supplier and of SWD/SWE need to be enforced.

10. In relation to the initial urgency, the project preparation, negotiations, contracts and management of the contracts and confirmation of financing in 1997, are by and large justified. Also the renewed engagement with a second implementation contract by PULS AB in Raciborz appears logical

and well conceived. However, in respect of the second SWD/SWE engagement in each of the three towns, the lack of formal decision within Sida, no confirmation of financing between Sida and the municipalities, no contract or addenda to contract between SWD/SWE and the municipalities; all gives reason to express a considerable concern. The concern is not reduced by the fact that at that time, over a year after the flooding, there had been ample time to safeguard a minimum level of formal approvals and contracting.

11. SWD/SWE delivered a Final Report in Swedish and without approval by their three clients to Sida, whom despite that there should have been a report for each contract, in English and approved by respective client, nevertheless accepted the report and concluded the projects completed. Apart from this rather irregular management, a concern is the considerable obligations of SWD/SWE remaining in the Klodzko project. This includes:

- ICA system: Transformator AB is obliged under the conditions of their agreement with SWD/SWE to provide service at four occasions during the guarantee period, perform a guarantee inspection in mid-March 2002, until which time SWD/SWE should retain a bank guarantee from Transformator AB (the existence of the guarantee to be confirmed) and manage their attendance to their obligations during the guarantee period and attend the guarantee inspection. SWD/SWE is responsible for the Tranformator obligations in relation to the municipality.

- Biological treatment components in the sewage treatment plant. Goodtech MRAB Sweden AB is obliged under their agreement with SWD/SWE to carry out guarantee inspections in at least two occasions, in March 2001 and March 2003. SWD/SWE retains a bank guarantee from the sub-contractor during this time and is responsible to manage any guarantee issue called upon during the guarantee period and attend the guarantee inspections. SWD/SWE is responsible for the Goodtech MRAB Sweden AB obligations in relation to the municipality.

- 2 pumping station and the grit chamber components. Miljömontage I Kalmar AB is obliged under their agreement with SWD/SWE to carry out a guarantee inspection in October 2001. SWD/SWE retains a bank guarantee from the sub-contractor during this time and would in normal circumstances be responsible to manage any guarantee issue called upon during the guarantee period and attend the guarantee inspection. However, as these components are not included in a contract between SWD/SWE and the municipality, there seems to be no obligation upon SWD/SWE in this respect. On the other hand, there is no obligation between Miljömontage I Kalmar AB and the municipality neither. An unusual situation created by the lack of contractual arrangement between SWD/SWE and their Client (commented upon under item 10 above).

12. The selected project components have, with some small exceptions, been justified from a flood relief restorationpoint of view. The increased standard through some of the project components have been justified from an environmental perspective. The rehabilitation of sewers have prolonged the life expectancy of main conveyors and substantially reduced the immediate as well as the long-term leakage of untreated wastewater to the environment. Also the improved treatment standard of the Klodzko sewage treatment plant appears justified from an environmental perspective. The enhanced treatment performance was achieved at little extra cost, thus the component was cost-effective in an environmental perspective.

13. Of the total financing made available, 35 million SEK, about 32.5 million was actually disbursed.

4.2 Recommendations

The following recommendations are made as a result of the evaluation:

1. An emergency situation offsetting the normal routines and project preparation stages calls for a Sida emergency board, created for the occasion, with internal expertise and external resources as advisors, developing a strategy for priority assessments, procurement and monitoring routines applicable to the unique situation.

2. An independent advisor, engaged by the Sida emergency board should assist the receiving organisation in the role of Clients to the Swedish firms providing the assistance, in order to accomplish appropriate objectives, scope of work and project contents, resource allocations, budget and time frames; as well as relevant procurement and contracting procedures and models. This advisory capacity is also expected to be required at milestone events during the execution of the projects.

3. The quality of reporting and adherence to the contractual obligations by the Swedish firms needs to be monitored and enforced by Sida.

4. Turnkey obligations encompassing project management, design, supply and construction, well suited for rapid deployment of action orientated relief measures, should be based on appropriate contractual platforms, such as FIDIC Conditions of Contract for Design – Build and Turnkey ("the Orange Book"), or the newly published FIDIC Conditions of Contract for Plant and Design – Build for Electrical and Mechanical Plant, and for Building and Engineering Works, Designed by the Contractor.

5. The services and commitment of SWD/SWE needs to be prolonged to the extent and time corresponding to the obligations of their sub-contractors in the Klodzko project. The current situation in which the sub-contractors have valid obligations towards SWD/SWE as buyer, while SWD/SWE has finalised their projects is not an acceptable situation. A dialogue should be initiated in order to resolve this issue.

5 Lessons Learned

The flood relief assistance, with the objective of restoration of the water and wastewater services within a short period of time, as to minimize lasting long term effects, was carried out by one company specialised in pipeline cleaning and rehabilitation and one consortium combining operational know-how with experience in project management. The latter in turn procured sub-consultancy, contracting and supply of a number of systems and equipment. The single point responsibility in terms of the consortium taking care of project identification, management, procurement of design, implementation and supply enabled a rapid deployment of resources and subsequent implementation. The lesson learned is that this arrangement is suitable when urgent results are necessary.

The form of contract for the single point responsibility should not be on a consultancy basis. The contract should in such a case be as a turnkey assignment.

In situations such as the flood relief emergency assistance, normal routines within Sida in terms of requirements for institutional development, project feasibility study and other prerequisites of financing are not applicable. In order to manage such a unique situation, an emergency board should be created for the occasion, with internal and external resources for priority assessments, procurement and monitoring routines.

An independent advisor, engaged by the emergency board, should assist the receiving organisations (in this case the municipalities and their water and wastewater utility organisations), in their role as buyers of the Swedish services, providing advice in procurement and contracting, defining appropriate objectives, scope of work and project contents, as well as resource allocations, budget and time frames, monitoring and other issues in relation to the receiving organisation role as Client/Buyer.

Appendix 1

Terms of reference

Evaluation of projects related to the floodings in Poland, 1997. The projects concerned are:

– PULS AB	Decision no:		ÖST 301/97
– PULS AB	-"-	:	ÖST 310/98
– SWD/SWE Consortium	-"-	:	ÖST 291/97

1 BACKGROUND

In July 1997, Poland was afflicted by the worst flooding to hit Central and Eastern Europe for well over a hundred years. The heavy rains caused widespread damage and destruction to buildings, roads, railways, communications, other infrastructure and agricultural land. Of the six million people living in the area affected by the flood, almost one and a half million were directly hit by its consequences.

As a respond to demand from the Government Minister for Flood Relief in Poland, Sweden decided to allocate MSEK 125 for flood related projects. Of the MSEK 125, MSEK 35 were earmarked for environmental projects, to be handled by Sida.

The projects concerned should fulfill the following criterias:

- be given priority by the Government Minister for Flood Relief;
- be able to start within a short amount of time;
- concern sewage, waste and watersupply;
- where possible, include transfer of know-how.

Since the geographic area of greatest concern was southern Poland, the Sida-financed projects mentioned above, focused on the three cities; Raciborz, Nysa and Klodzko along the Odra river.

The decision taken by the Swedish Government regarding the flooding in Poland states that the Swedish support should be directed towards both acute relief and more long term projects. The aim was to minimize the lasting negative effects of the social and economic consequences of the flooding. The acute assistance given by Räddningsverket should be followed up by activities regarding restauration and rehabilitation, mainly in the water and sewage sector.

In the last days of July 1997, the flooding had caused immense damage on land fill, water- and wastewaterworks in southern Poland. At that time more than 300 000 cubic meters of non-purified water run out in the Odra river every day, causing severe chemical and bacteriological contamination. One of the water- and wastewaterworks badly hit, was the one in Klodzko, which normally treats 20 000 cubicmeters of wastewater every day.

2 PURPOSE

The purpose of the evaluation is to assess if the decisions and intentions of the Swedish Government and Sida, in relation to the flooding, were fulfilled in an efficient, professional and cost-effective way.

3 SCOPE OF WORK

The scope of work will include an evaluation of the Sida supported projects mentioned above, with emphasis on the following questions:

– Was the polish part included in planning and implementation in a satisfactory way?

– Was the cooperation between the polish and the swedish parts satisfactory?

– Regarding the acute situation – where the right priorities made to solve the most immediate water and sewage problems in an efficient way?

– Was it apropriate to give up normal decision routines for hiring of consultants and allocating funds, i.e. public procurement, with reference to an emergency situation – knowing now that the project took well over two years to be completed?

– Was the water and sewage system restored to the same standard as before the flooding or did the project end up raising the standard and modernizing old systems?

– Has the project been cost-effective from the restoration perspective?

– Has the project been cost-effective from an environmental perspective?

– Did the consultants handle invoicing and payments in a correct, efficient and professional way?

Regarding the SWD/SWE Consortium:

– Were the process for hiring of underconsultants and procurement of goods handled with professionalism, in concurrence and in a cost-effective manner?

– Was the method of two companies working in a consortium satisfactory for the outcome of the project?

The evaluation should also include an analysis of the sustainability of the investments from an economic/financial and environmental perspective?

4 METHOD OF WORK AND REPORTING

To collect the required material, the Consultant will:

1) review relevant project related documentation at Sida, PULS AB and the SWD/SWE Consortium;

2) interview the persons concerned;

3) visit the project sites in Raciborz, Nysa and Klodzko to interview the local personnel connected to the project and review any documentation necessary for the evaluation;

A draft report should be presented to Sida by July 15, 2000. Any comments on the draft from Sida, PULS AB or the SWD/SWE Consortium, should be given to the Consultant, before July 21. The report should be written in English and be outlined in accordance with Sida Evaluation Report – A Standardized Format (Annex A) with a comprehensive Newsletter Summary in accordance with the enclosed guidelines (Annex B). Furthermore, the Sida Evaluation Data Worksheet (Annex C) should be filled in and returned to Sida. After having received comments from PULS AB, the SWD/SWE Consortium and Sida the final report should be presented in two copies as well as in a diskette version, by July 31, 2000.

5 UNDERTAKINGS

The Consultant will be responsible for practical arrangements in conjunction with the mission to Poland.

The Consultant should be available for reporting and discussing the conclusions, when the evaluation is completed.

6 CONSULTANTS

For the task a person with experience of project management, the water and sewage sector and of cooperation with Eastern Europe will be required.

7 TIME PERIOD

The evaluation should be carried out during the spring/summer of 2000, for a maximum of 3 weeks. A draft report should be presented to Sida by July 15, 2000, and a final report by July 31, 2000.

Appendix 2

List of Persons Interviewed

Name	Position	Organisation
Mr. Andrzej Markowiak	Mayor	Municipality of Raciborz
Mr. Michal Morzywolek	Director	Raciborz Water and Waste-water Utility
Mr. Janusz Sanocki	Mayor	Municipality of Nysa
Mr. Zdzislaw Konik	Director	Nysa Water and Waste-water Utility
Mr. Roman Lipski	Vice Mayor	Municipality of Klodzko
Mr. Waldemar Bicz	Director	Klodzko Water and Waste-water Utility
Mr. Krister Carlsson	Project Manager	PULS AB
Ms. Eva Kjellman	Software Specialist	Tekis AB
Mr. Jan Friberg	Project Leader	SWD/SWE Consortium
Ms. Marta Tendaj	Deputy Project Leader	SWD/SWE Consortium
Ms. Marianne Tegman	Head of Division	Sida

Appendix 3

List of Documentation

1. Sida Beslut 230-97. Beslutsdatum 970807.
2. Kontrakt Sida – PULS AB. Daterat 970812.
3. Projektförslag till översvämningsdrabbade städer i Polen. SWD 970815.
4. Flooding in Raciborz. Preliminary Study by PULS AB dated August 25, 1997.
5. Sida Beslut 249-97. Beslutsdatum 970905.
6. Contract Municipality of Raciborz – PULS AB signed 970916.
7. Contract Municipality of Raciborz – SWD/SWE, dated 971002.
8. Contract Municipality of Nysa – SWD/SWE, dated 971002.
9. Contract Municipality of Klodzko – SWD/SWE, dated 971002.
10. Sida Beslut 291/97. Beslutsdatum 971006.
11. Sida Beslut ÖST 301/97. Beslutsdatum 971014.
12. Beställningsprotokoll Spolning Klodzko. SWE – Power clean Syd AB 971024.
13. Avtal SWD – SWE, signerat 971205.
14. SWD Lägesrapporter 97–99.
15. PULS AB Progress Reports 97–99.
16. Klodzko WWTP. Preliminary Design of the Biological Treatment. Draft. VAI VA-Projekt AB 980109.
17. PULS AB/Raciborz Stad. Ansökan om bistånd (utökning) januari 1998.
18. Klodzko ICA for wells. Preliminary Design. VAI VA-Projekt AB 980212.
19. Klodzko Biosteg. Kompletterande Föreskrifter. VAI VA-Projekt 980401.
20. Klodzko Biosteg. Anbudsutvärdering 980520. Upphandlingsprotokoll 980527. SWE – Goodtech MRAB Sweden AB
21. Sida Beslut 310/98. Beslutsdatum 980618.
22. Klodzko Driftdatorsystem. Upphandlingsprotokoll 980622. SWE – Transformator AB.
23. Sida Beslut 420/98. Beslutsdatum 980908.
24. Contract Municipality of Raciborz – PULS AB signed 980917.
25. SWD förslag till nya åtgärder 981015.

26. Besiktningsutlåtande. Slutbesiktning av ombyggnad av biosteg i Klodzko. Stockholm Vatten AB 990325.

27. PULS AB Final Report 990901.

28. PULS AB Final Report 991201.

29. Utlåtande över slutbesiktning, ICA Klodzko. VAI VA-Projekt AB.000316.

30. Hjälp till översvämningsdrabbade städer i Polen. Slutrapport maj 2000. SWD/SWE.

31. Various correspondence PULS AB – Sida 1997–1999.

32. Various correspondence SWD/SWE – Sida 1997–2000.

Appendix 4

Illustrations

Klodzko: The wolf between the windows could finally drink when the flooding occurred. According to the local legend, the wolf would drink on a day with three sevens in the date. The flood wave reached the wolf on 7/7 1997.

Appendix 5

Abbreviations

BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
FIDIC	International Federation of Consulting Engineers
ICA	Instrumentation, Control and Automatic system
IGWP	The Polish water and wastewater association
N_{total}	total content of nitrogen
NH_4	ammonia nitrogen
PC/PLC	Personal Computer/Programmable Logic Controller
PEH	Polyethylene pipe
PLC	Programmable Logical Controller
SCADA	Supervisory Control and Data Acquisition
SEK	Swedish Krona
Sida	Swedish International Development Cooperation Agency
SS	Suspended Solids
STP	Sewage Treatment Plant
SWD	Swedish Water Development AB
SWE	Swedish Water Engineering (division within VAI VA-Projekt AB)
UN	United Nations
Vabas	Computer software for registration of network information

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Asia Department

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Birgitta Berggren, Patrik Jotun.
Department for central and Eastern Europe

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Department for Research Cooperation

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Ilari Karppi, Kaisa Lähteenmäki-Smith.
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