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THE GERMAN WATER AND SEWERAGE SECTOR: HOW WELL IT WORKS AND WHAT THIS MEANS FOR DEVELOPING COUNTRIES

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A report based on a study tour
prepared by

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Some basic facts about Germany

Population of Germany -- about 80 million

Population of former East Germany -- about 15 million

GDP/capita -- about $23,000 ($20,600 in purchasing power parity)

Exchange rate: 1.6 DM = 1 US $

Part I: Objective of, Audiences for, and Caveats about the Report

The World Bank annually lends about US$ 1 billion for water supply and sanitation projects in the developing world. In order to provide its borrowers with high-quality services, the Bank gives priority to ensuring that its staff are familiar with the best water supply practices throughout the world. To this end, in recent years World Bank staff have conducted "study tours" of England, France and Spain. Between October 10 and 15 of 1994, twenty World Bank staff members toured the German water industry. This report is a result of that tour.

By way of introduction to the report, three remarks are in order. First, the tour was an excellent learning experience for the staff involved. As with all learning experiences, this process is complete only once some effort has been made to systematize the impressions gained during the tour. This back-to-office report represents an attempt to complete that learning process for the World Bank participants.

Second, as always, it was not possible for most World Bank staff members interested in the water sector to participate in the tour. It was agreed that a formal back-to-office report would be an effective mechanism for sharing that which we learned with our colleagues who were unable to participate.

Third, our German hosts were extraordinarily generous in sharing their experiences with us. On several occasions they remarked that they would like this to be a two-way process.

Accordingly, one function of this report is to give some feedback to our hosts as a sign of respect for their openness and generosity with us [1].

At the outset, four major disclaimers about this report should be stated clearly.

First, in all countries the water sector is a product of a long and complex history, and deeply embedded in the particular cultural, political and social fabric of the society. In a week, albeit an intense and well-organized one, it was obviously not possible to visit a large "representative" number of operating entities. It is also obvious that outsiders can only scratch the surface of this complex reality under such circumstances. Furthermore, we have digested only a small proportion of the large amount of written information which was supplied to us. Accordingly it is certain that there will be many subtleties and complexities which we did not understand.

Second, this report makes no attempt to provide a detailed description of the structure and performance of the German water sector. (Annex 1 provides a summary list of the extensive information provided to us. The 1994 paper of the Ministry of the Environment, titled Water Resources Management in Germany, provides an excellent overview.)

Third, the interest of the World Bank is heavily in the institutional and financial aspects of the sector, and it was around these interests that the tour was organized. Accordingly, there will be relatively little commentary on important aspects of the industry (such as technology). Fourth, although there is a certain *weltanschauung* which characterizes the collective views of World Bank staff, there were, inevitably and appropriately, differences in the conclusions drawn by different team members. This report should, accordingly, be seen as one which reflects many of the views held by many of the members of the study team, not as a report with which all of the team members agree in every detail.

Part 2. A Brief Description of the Study Tour

The tour was organized and managed by Mr. Jürgen Krombach, who was formerly a senior official in the infrastructure sector of both the World Bank and KfW, with help from the German Technical and Scientific Society for Gas and Water (the DVGW). This combination of inside knowledge of, and commitment to, the client (the World Bank) and inside knowledge of the German industry meant that this tour was acclaimed by all participants as extremely well structured, organized and managed[2].

The tour included discussions with managers and officials from:

- the public utility in Wiesbaden in western Germany[3] , managed on the dominant "Stadtwerke" model (of a semi-autonomous municipal utility combining water, gas and public transport services);
- the public autonomous utility providing water and sewerage services to Berlin;
- a regional public water company providing water and sewerage
- services to the city of Halle in eastern Germany and some neighboring towns;
- the one long-standing (about 100 years old) German partially privately-owned provider of water, Gelsenwasser, which provides water in bulk to some municipalities and to private customers in the Gelsenkirchen area of the Ruhr;
- a recently-formed French/German consortium named Eurawasser (with Lyonnais des Eaux, the French utility company, and Thyssen, the German steel conglomerate as the partners), which has recently obtained a 30-year concession contract for providing water and sewerage services to the city of Rostock in eastern Germany;
- a private construction/consulting company, UTAG, in Halle, eastern Germany, which was previously the one of the state water companies in the GDR, but has been bought out by Thames Water PLC of the United Kingdom,
- the two branches of the professional association of German water and sewerage utilities (one, the DVGW, which focuses on technical and scientific aspects, and one, BGW, which focused on financial, institutional and political aspects);
- the association of German municipalities (the Deutscher Städtetag or DST);
- the German Association for Sewerage Technology (the ATV) the Federal Environment Ministry (BMU) with oversight responsibility for the water sector;
- the State Government Ministry for the Environment in the eastern German state of Brandenburg;
- WIBERA, a nationally operating auditing and management consulting company which specializes in water and sewerage (and other municipal and state activities);
- the river basin financing and management association for the industrialized Ruhr basin, the Ruhrverband;
- the major German foreign assistance agencies responsible for policy (the BMZ), capital projects (KfW[4]) and technical assistance (GTZ).

Part 3. Some Stylized Facts About The Institutional Structure of The Water and Sewerage Sectors in Germany

In western Germany water has long been a municipal responsibility. Services are provided through several models[5], including:

a) Municipality-owned enterprises, which are operated by the municipality within the framework of the general municipal administration;
b) Municipal enterprises, which are operated by the municipality as special property with independent bookkeeping (known as the "Stadtwerke" model);
c) Municipal societies, which are enterprises in the hands of the municipality, but operated under private law, and the
d) "Operator model", in which operating functions are transferred to a private entrepreneur, while legal responsibility remains with the municipality.

There are a total of about 7000 companies in the water and sewerage sector in Germany, with 1500 companies serving about 85% of the population. The most common arrangement for water supply is that services are provided by semi-autonomous municipal enterprises ("Stadtwerke", (b) above) which may be responsible for any or several public services (including water, gas, electricity and public transport). For sewerage the most common arrangement is direct management by the municipality ((a) above). Irrespective of the forms of service provision, customers often receive a single combined water and sewerage bill.

In the former GDR water and sewerage services were provided by regional companies known as WABs. Upon reunification, eastern German municipalities felt that they were "given back" the responsibility that was taken away from them under communism by the creation of the WABs. For the most part the WABs have been broken up, with most municipalities, even the very small ones, setting up municipal water and sewerage companies. There were 15 WABs in the GDR; there are about 600 municipal water companies now in eastern Germany.

New forms for service provision are emerging, especially in eastern Germany. This includes some effort at involving the private sector, in a variety of ways (including management contracts, lease contracts and concession contracts, and joint stock companies).

PART 4: Positive and Negative Features of the German Water Industry

We were positively impressed by many aspects (discussed in further detail in the sections that follow) of the German water industry. Customers are provided high-quality water and sewerage services. The industry is highly environmentally conscious, and has made a major contribution to the remarkable improvement in the quality of the aqua-tic environment in western Germany. We were impressed, too, by the simplicity of the national water tariff law (which decrees that user charges should cover the full costs of providing water services) and compliance with this law. And finally, although this was not the focus of the tour, we were impressed by the obvious technical quality of many of the water and sewerage works which we visited.

These are great achievements, of which the German water industry is appropriately proud. We were, however, also negatively impressed by a number of features of the German water and sewerage industry. These (also discussed in the sections that follow) include:

- insufficient attention to economic efficiency and costs;
- the absence of a discussion of the relative benefits and costs of high environmental standards;
- a lack of concern with the effects of high costs on consumers,
- the dominance of political factors, to the detriment of service standards and costs, in the restructuring of the industry in eastern Germany;
- a move, in certain river basins, from participatory to technocratic water resource management practices.

Issue 1: Costs, efficiency and incentives

Item 1.1: High costs to consumers

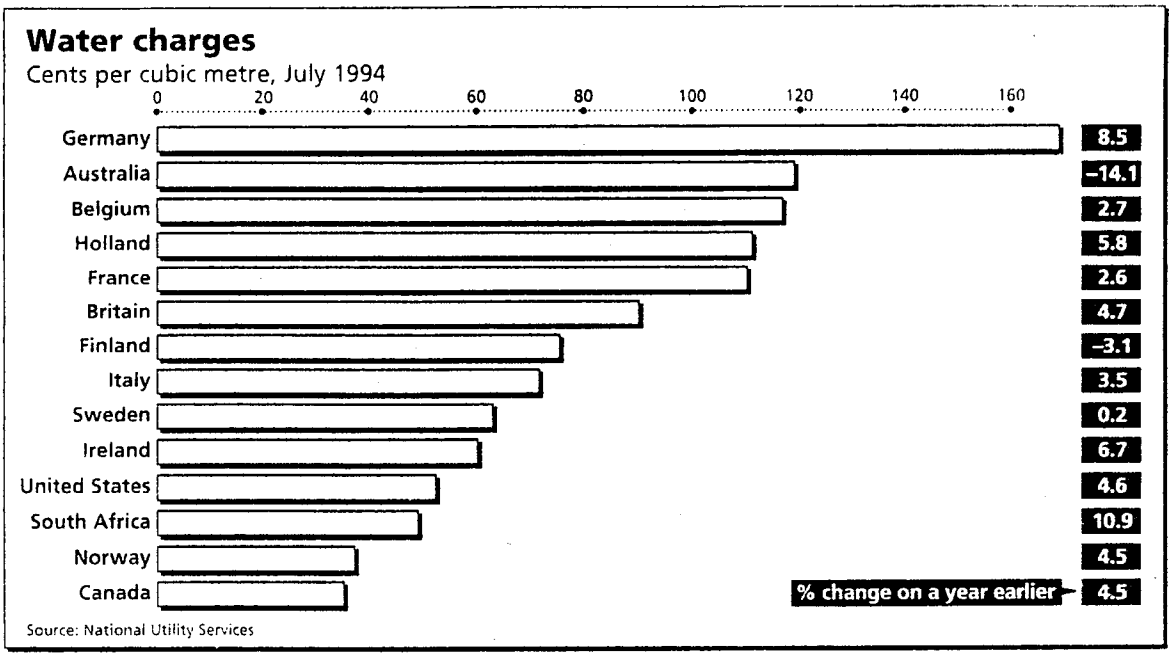
The German water industry is a very high cost provider of services to consumers. As shown in Figure 1 below (reproduced from The Economist) shows that:

- the price of water in Germany is much higher than the cost of all other European and North American countries (twice that in Britain and three times that in the US, for example); and
- German water prices are increasing faster than prices in any other European or North American country.

The cost of sewerage services is similarly very high by international standards. The result is that the average combined water and sewerage tariff is DM 6 (US$ 3.50) per cubic meter. For a family of four, this amounts to an average annual bill of US $700. In some parts of eastern Germany, costs are much higher still, reaching a level of DM 15 per cubic meter, which means an annual bill for a family of four of about US$ 1,500, or over 3% of disposable income[6].

There are two proximate causes for these very high tariffs, namely the insufficient attention to costs, and the high environmental standards. Underlying these causes is a complex set of attitudinal, structural, financial and political-economic problems (in our view!) with the German water industry. Much of our attention on the tour was focused on understanding these problems. Much of the rest of the report will be an exploration of these factors.

Figure 1. The cost of water: An international comparison of levels and rates of increase[7]



Item 1.2: Tariffs, Pricing and Economic Regulation

The basic tariff law governing water supply and sewerage services is simple and sound -- tariffs are set at the municipal level, and by Federal law are set so that the costs of service are covered. The implementation of this sound tariff law has had dramatic effects on both consumers and suppliers in the East since reunification. Since 1989 the average eastern German family has seen water and sewerage tariffs increase by an average of about 20 times (from a nominal DM 0.30 per cubic meter).

There have been two consequences for households. First, they have sharply curtailed their use of water (with average consumption in the East dropping from an estimated 300 to 400 liters per capita per day[8] to about 105 liters per capita per day). Second, this conservation of water notwithstanding, average water and sewerage bills in the East have risen by about 800%.

For suppliers in eastern Germany there have been consequences, too. Overall demand has dropped dramatically, as a result both of changed household behavior, and as a result of the decline in industrial production. As a consequence most eastern German water suppliers have very substantial excess production capacity.

Many German municipalities (and the water and sewerage services) are audited annually by WIBERA, an accounting and consulting firm founded in 1930 by the DST and now partially owned (49%) by Coopers and Lybrand. An interesting feature of the WIBERA audits is that they are designed to not only certify accounts, but also to pass judgment on the efficiency of the water and sewerage operations, and indicate what actions can be taken to improve efficiency.

WIBERA's overall approach seems sound, namely to use indicators[9] to assess the level of investment and operations costs. We came away, however, with several concerns. First,

WIBERA does not appear to use some internationally-accepted indicators (such as the number of employees per thousand connections) which would (as described elsewhere in this report) highlight some of the causes for the high costs. Second and more fundamental is the standard by which efficiency is judged. We understood that the data used for "benchmarking" were exclusively based on German experience and inferred that utilities were pushed to reform only if their costs were high relative to other German utilities. The upshot, as we understood it, is that the review process pushes utilities to be "on the German production frontier", but does not push them to be on the (much lower cost) "international production frontier".

However, it is relevant to note that Germany has also been a pioneer in the use of market instruments for the pollution control. In the industrialized Ruhr basin, the Water Association (Ruhrverband) gets all of its revenues from fees -- 15% from water abstraction fees and 85% from pollution fees. The Ruhrverband now uses peak load pricing, and other sophisticated pollution pricing methods.

Item 1.3: Structural issues

Until recently the water and sewerage industry in most industrialized countries has been a self-satisfied one, not given to looking critically at its own structure and performance. This has changed markedly in several OECD countries (with the United Kingdom and Australia as striking recent examples) but has not yet changed (with some striking but limited exceptions) in Germany. This is illustrated well when one examines the process of reforming the eastern German water and sewerage industry after reunification. It would appear that the guiding philosophy was simply to make "them" (the East) look like "us", (the West). There turned out to be several very important shortcomings, shortcomings deriving from the lack of self-criticism in the western German industry.

First it is relevant to note that the structure of the western German industry (see Part 3 above) deviates in important ways from that which is generally acknowledged to be efficient, transparent and accountable. For instance, the clean and dirty sides of the water cycle are managed independently in most western municipalities -- water supply is usually managed with other public utilities in a semi-autonomous municipal company, while wastewater services are managed by a department of the municipal government. In the past western German municipalities have also been the recipients of large state subsidies for capital costs[10].

These factors lead to some surprising facts (which became apparent during the study tour). In Berlin, for example, prior to reunification there was a West Berlin Water Company and an East Berlin Water and Sewerage Company, each of which served approximately equal number of people. A priori we expected that the number of employees in the West Berlin company would be much lower than in the East, both because of (expected) higher productivity and because the company in the West covered only water. To our great surprise we learned that the numbers of employees were roughly equal, suggesting much lower productivity in the West than the East!

The uncritical adoption of the western model in eastern Germany has had other unfortunate consequences in the East. The regional water companies in the East (the WABs) have been disbanded as a vestige of communism. The result has been the proliferation of thousands of small, uneconomical municipal companies which provide poor quality services at very high costs.

Item 1.4: Private sector involvement

(a) In western Germany at present

The role of the private sector is very limited in the water and sewerage sector in western Germany. An important exception to this general rule is the Gelsenwasser company, which operates bulk supplies and distributes to some customers in the Gelsenkirchen area of North Rhine/Westphalia. Founded by a consortium of local municipalities and industrial enterprises in the 19th century, this is a joint stock company, with 22% of its shares directly publicly owned (by local municipalities) with an additional 28% indirectly publicly owned (by public sector industries in the area).

World Bank staff were particularly interested in Gelsenwasser for two reasons. First, to understand how a partially private sector company would perform relative to the dominant stadtwerke model in western Germany. And second because of the World Bank's interest in having more private companies compete for business in the international water market.

With respect to its operations in Germany, Gelsenwasser's culture is, according to its own management, not strikingly different from the culture of the other, public, water companies in Germany. More specifically, Gelsenwasser's operations show few signs of close attention to cost minimization. For example, Gelsenwasser management insists that the level of unaccounted-for water is only 1%. Back-of-the-envelope calculations suggest (as would be expected with such a level of unaccounted-for-water) that the company is spending a lot (around DM 20) to save a cubic meter of water, when its revenue per cubic meter is around DM 6.

In the past, Gelsenwasser's board of directors have insisted that its mandate is to give a good service in its service area and not to expand. Accordingly in close to one hundred years of operation, Gelsenwasser continues to serve only the communities it originally served. In recent years there has been a partial change of heart in the board and management of the company and some interest has been shown in foreign operations. Accordingly, Gelsenwasser has bid on at least one contract in Eastern Europe (where it was given a sharp lesson in the realities of competing for "others'" markets!) What does appear possible for Gelsenwasser, and what Gelsenwasser management is interested in, is relatively low-risk operations (such as the management contracts which Mexico City has recently given to foreign operators[11], as a first getting-to-know-each-other step on the road to greater private sector involvement).

Gelsenwasser has some factors in its favor in terms of international competition. It has a long and mature relationship (like the French companies, and unlike the UK private water companies) with local government. It has a highly-trained work force. It indicated that it has prospective financial partners in the German financial sector who would be interested in the international water business. And it would, presumably, have the assistance of the German government in penetrating foreign markets. It also has several obvious liabilities, the most important of which are the fact that it has not competed (either in its own service area or in the service areas of others) for contracts, and its quasi-public culture.

Finally, in recent years there has been some experimentation with affermage-type contracts (known, see Part 3 above, as the "operator's model" in Germany) for sewerage plant management in Lower Saxony[12]. The Environment Ministry (and others) report efficiency increases of the order of 10% to 25% [13].

(b) In eastern Germany at present

The "cutting edge" with respect to private sector participation in the German water industry is in

eastern, not western Germany, for several reasons. First, because when everything is changing it is possible to innovate. Second, because on the demand side eastern German municipalities face enormous difficulties in raising the formidable amounts of capital necessary to re-build their infrastructure. Third, on the supply side, because the private companies can rely on high levels of technical skills among the labor force and "only" have to add the critical managerial ingredient. Fourth, because there are large efficiency gains to be had. And fifth, still on the supply side, because tariffs are high and because there is a culture of collecting and paying bills.

The pathbreaking involvement of the private sector in the German water industry is in the eastern German city of Rostock, which two years ago signed a concession contract for 25 years for water and sewerage services with Eurawasser. Eurawasser is a consortium owned in more or less equal shares by Lyonnaise des Eaux and Thyssen, a western German heavy industry conglomerate. Eurawasser will invest DM 450 million for investments in Rostock, and another estimated DM 450 million for rehabilitation.

The Rostock contract is a major topic of conversation throughout the German water industry. During the study tour we heard complaints about questionable business practices. Some of these complaints were consistent with the widely-publicized speculation in the European press about the involvement of some French water companies in local government corruption in France[14] and abroad[15]. Some of the complaints, however, seemed to stem from a lack of familiarity with the fundamentals of private sector participation in the sector.

Contract negotiations in Rostock were protracted, difficult and costly, as is inevitable given that this is the first contract of this sort in Germany, and with a foreign concessionaire at that. Finally the contract is now in effect, with both sides expressing satisfaction with initial results.

(c) In the future

Despite the thinness of current private sector involvement in the water and sewerage sector in Germany today, this situation looks certain to change, for several reasons. First, there is a growing awareness of the impossibility of meeting the investment targets required to meet EU standards (see discussion under Issue 2.2 below) through public sector financing alone. Second, an understanding of the inefficiency of current practices is starting to emerge, as are concerns about high and ever-increasing tariffs. Third, initial efforts at involving the private sector (such as those in Lower Saxony) are bearing fruit. Fourth, the principle of greater private sector involvement is being promoted by the Ministry of the Environment, and federal laws are being prepared which would "level the playing field" by eliminating the tax advantages which public sector service providers currently enjoy.

There are also supply-side factors. In addition to Eurawasser (Lyonnaise des Eaux/Thyssen), other private companies are active. Compagnie Generale des Eaux (allied with the German construction firm Kruger) and UTAG (the former GDR state water consulting and contracting company, now a wholly-owned subsidiary of Thames Water) are actively marketing their services, particularly in eastern Germany.

Item 1.5: Insufficient cost consciousness in the industry

We were struck forcibly and repeatedly by what we perceived to be insufficient cost-consciousness in the German water industry, as revealed in a variety of ways.

Take the example of unaccounted-for water (a pervasive problem in the developing country utilities with which World Bank staff work). Staff of the utilities we visited reported, with considerable pride, very low levels (between 1% and 5%) of unaccounted-for water[16]. As reported earlier, the predominant attitude is a simple "less is better", rather than one based on an assessment of costs and benefits.

A second example relates to the level of wastewater service and the technologies used, particularly in low-density rural areas. We observed rural systems in eastern Germany being installed with large diameter, very high quality, lined vitrified clay sewerage pipes. We were told that this was a standard quality of service, and that all people should have it, irrespective of the costs involved. The major exception to this attitude was that of the private companies in eastern Germany. In the Eurawasser concession contract for Rostock, for instance, the concessionaire had examined the relative costs of different options in different settings and had concluded that the least-cost option would be to maintain septic tanks (which would be emptied by the concessionaire) in low-density areas. (Under the terms of the concession contract, the concessionaire is paid a flat rate per family served, and thus has an incentive to determine the least-cost option.)

A third example relates to productivity, as measured by employee-connection ratios. Typical figures, both in the companies we visited and, apparently more broadly in the industry, were all over 10 per 1,000 connections, in water-only companies. (A recent World Bank review of utilities in developing countries[17] shows that "sixty percent of utilities with water and sewerage services have less that 4 employees per thousand connections, and only 20% have more than 7 employees per thousand connections.") The Berlin Water Company, which indicated that its personnel costs were less than those for the industry as a whole, has 30 employees per thousand connections (water and sewerage). Officials in the companies were generally not aware of what productivity ratios might reasonably be. (Interestingly, the leader of the Civil Service Union (ÖTV) is quoted[18] as "conceding that privatization would cost at least 30% of the current jobs.")

A fourth example is that of the overriding of cost considerations by political considerations in the disbanding of the WABs in eastern Germany, and their replacement by hundreds of uneconomical, small municipal systems. Assessments done by the financial management and accounting firm, WIBERA, showed that costs for regional schemes in eastern Germany would be of the order of 30%-50% of the unit costs of individual municipal schemes.

Insufficient attention to costs on behalf of the public water companies is easy to understand -- there is little incentive for the municipal companies to reduce costs. Consumers appear not to be involved in the rate-setting process. Furthermore, the attention of the mandatory auditors appears to be primarily with certifying that the books are in order and that tariffs cover the full costs. On the other hand the incentive (so familiar to the World Bank in its work in developing countries) of public agencies to employ too many people is evident even in Germany. (In this context, there is an interesting discussion of the prospects for privatization in the journal of the German Water Quality Association: "Public bureaucrats lose their influence on promotion and access possibilities each time one of their own publicly-owned departments or enterprises is privatized. Consequently they are generally against privatization. A mayor from Hesse said: 'You don't think I became mayor just to sit here with 12 Charlies once everything's been privatized!' "[19])

In the same review, Professor Eberhard Hamer from the Small Business Institute in Hannover, asserts that "aspects of power and influence

(are) decisive, rather than economic considerations" and that "in the old days the town had belonged to the townsfolk -- today Germany is experiencing a new municipal feudalism in the assets sector which had virtually misused the taxes paid by the inhabitants for municipal investments in assets."

Inadequate attention to costs at the utility level is compounded by counterproductive incentives where subsidies are available (as they have been in the past in the West and as they are at present in the East). In Brandenburg, for example, the subsidies for investments in the sewerage sector increase sharply[20] as investment costs per capita increase, "so that tariffs don't get too high".

Issue 2. Environmental standards and regulation

Item 2.1: Water and wastewater standards

(a) The "up" side

Germany has a long history as a world leader in water quality management. The most famous examples are the Ruhrverband and other water associations of North Rhine/Westphalia (described in more detail under Item 3.2 below), which have successfully managed small, heavily-industrialized, heavily-populated and heavily-polluted river basins since the early part of this century.

For the water professionals on the study tour (many of whom had been taught about the Ruhrverband in university) it was a surprise that this attention on wastewater management was not universal in Germany until quite recently. We were surprised, for instance, that Wiesbaden, a major city on the Rhine River, did not treat its sewage until 1977!

In recent decades, however, Germany has made extraordinary progress in improving the aquatic quality of its environment. To give a sense of the achievement, consider the changes in the quality of the Rhine at the German-Dutch border over the past twenty years:

- the dissolved oxygen content of the Rhine has increased from just over 4 to over 9;
- the number of species living on or in the bottom of the Rhine tripled; and
- the levels of heavy metals in the sediments have declined by a factor of between 5 and 20.

We were impressed by the high level of environmental awareness of providers, regulators and consumers alike and by the volume and quality of information provided to the public on water-related environmental issues. It is apparent that this high level of awareness has had a significant role (along with the very high prices) in the admirably low consumption of water in Germany. Per capita domestic consumption is about 140 lcd, (compared to about 300 lcd in the United States). We were similarly impressed by the dramatic drops in eastern Germany since reunification -- typically from an average consumption of 300 - 400 lcd in the late 1980s to about 105 lcd today!

And we were impressed by the innovative schemes which some water utilities have developed for catchment management. Gelsenwasser, in particular, has an imaginative and cost-effective scheme for working with farmers in developing ecologically sound, profitable land use practices in the catchment area.

(b) The "down" side

There is, however, a down-side to these impressive environmental achievements.

A fundamental factor in Germany (and elsewhere in Europe) has been the rise of the European Union. Although nominally committed to the principle of "subsidiarity" ("maybe the most contentious abstract noun to have entered European politics since 1789"[21]), in the environmental area Brussels has opted for Europe-wide, undifferentiated standards[22].

Furthermore, Brussels has constantly ratcheted up mandatory water quality standards, virtually without consideration for the costs that have to be borne if the standards are to be met. In the words of an economist/politician who participated as European parliamentarian and Brussels bureaucrat in setting environmental standards for the European Union, "if we had told people what these standards would cost, the standards would never have been passed, so we simply agreed not to discuss costs"![23] .

The political economy of this is, of course, complex, with many interests served by such a process. The most obvious and visible beneficiaries are the environmental groups, who legitimately argue for an explicit, uniquely high weight to the environment and who are generally satisfied with the results. Less visible and less forthright is the strong lobby of consultants, contractors, operators and professionals who benefit greatly from the enormous sums of money dedicated to the environment. In the word of a technical manager of one of the most prominent German Water Associations, "I have been working in this business for 35 years. For the first 20 years the benefits and costs of every proposal were closely debated. Since the advent of strict and very high standards 15 years ago, we have been awash with money and have been able to build whatever we wish -- there have been no limits." When asked directly about costs, these groups (in Germany and elsewhere in Europe) invariably agree that costs should be taken into account, but they seldom express this opinion forcefully in the policy arena.

Item 2.2: Financing of Wastewater Services

During the 1980s, accompanying the imposition of stringent water and wastewater standards, an average of about DM 10 billion were invested annually in western Germany in wastewater facilities, with about 25% of this invested in treatment plants and about 75% in sewers. In the 1990s it might be expected that annual investments would have increased substantially, with the addition of 15 million East Germans and the much lower level of environmental quality in the East. Although pollution charges have increased sharply in recent years (an average of over 17% a year[24] for the North Rhine/Westphalia Water Associations, for instance), just the opposite has happened -- investments in wastewater declined to DM 8.3 in 1992 and to just DM 6.6 in 1993 (with almost half of this invested in eastern Germany).

The principal explanation for this decline is a dramatic change in the budgetary situation at all levels of government. In the past large subsidies were available; today reductions in public expenditures are a fact of life at all levels. In part this is related to the combination of the recession and the massive "social transfers" ($100 billion a year, amounting to over 5% of GDP) made to the East in recent years. But it appears that the problem runs much deeper -- the title of a recent volume of the journal of the Association of German Municipalities tells the story: "The crash of German municipal finances". All signs point to the subsidies of the past never returning.

To complicate the matter further, enormous investments are required to meet EU standards. Consider the following examples:

- In Duisburg in the Ruhrverband, re-equipping the two-year old treatment plant to meet the new nutrient (nitrate and phosphorus) standards will require investments of DM 200 million (for a plant treating a population of about 200,000 people) and will increase the sewage treatment cost from DM 3.6 to DM 9.6 per cubic meter .
- In Emscher Basin in North Rhine-Westphalia, the Water Association has to invest DM 10 billion for drainage services for about 2.5 million people -- average investment levels of DM 16,000 for a family of 4!

- Berlin alone estimates that it needs over DM 12 billion of investment to bring services up to European standards.
- The State of Brandenburg estimates that wastewater investment requirements over the next ten years amount to DM 6,000 per capita.
- The number frequently cited for the country as a whole (interestingly based on little more than a back-of-the-envelope calculation[25]) is DM 200 billion for western Germany (DM 2,500 per capita) and DM 100 billion for eastern Germany (DM 6,700 per capita).

How is German society trying to square this circle? In several ways, few of them realistic, in our view. From the municipalities one hears a constant plea for a return to the "good old days" when subsidies were plentiful. One also sees an inexorable rise in the pollution charges levied on industry and consumers, with a dawning realization that there is a limit to this process. (A widely-used figure for "the social limit" is DM 10 per cubic meter, a figure which is already being paid by some, and which would be the average water and sewerage tariff in about 5 years if recent tariff increases are maintained!) There is also a move to financing from commercial banks. While there is considerable scope for private financing, some utilities are already running up against debt/equity limits. And, irrespective of the source of financing, the "tariff barrier" will soon be a reality.

What is becoming increasingly clear, however, is that there is, in fact, no way out of the escalating costs driven by the very high environmental standards. More efficiency would certainly help, but would be a one-time gain of perhaps 30% which would not get the industry out of the spiral. Slowly, too, the focus is inevitably shifting, albeit obliquely so far, to the issue of the standards themselves. "Obliquely" because rather than raise the issue of the viability of the standards themselves, the tactic is (as it is in other European countries) to request extensions in the deadlines set for meeting the standards. And here, again, the tactic is not to do, in the words of one prominent German commentator[26], the "terrifying arithmetic" (DM 300 billion/DM 6.6 billion a year = 45 years to compliance with current standards!)

Throughout the study tour we were surprised at the compliance of German municipalities in what often appeared to be an unconditional acceptance of the standards which they had to meet, and noted the contrast of this attitude with that prevalent in the United States where local authorities are increasingly questioning so-called "unfunded federal environmental mandates" and increasingly winning these battles in the courts[27] and in state and federal legislatures[28].

Finally there is some evidence (discussed further in the discussion on "participation" below) of the battle between standards and costs finally being joined in Germany, as it has been at the municipal level in the United States in recent years, and as facilitated by the economic regulator in the United Kingdom[29].

Issue 3. Participation

Item 3.1: How consumers are viewed by the industry

As indicated above, we were struck by insufficient (from our perspective) attention to the effects of the large and rising bills on consumers. This is a national problem, but has different implications in the West (where economic and social conditions are relatively favorable) and in the East (where incomes are lower, where unemployment is high and where there are massive investment requirements merely to "catch up"). The high and rapidly-increasing tariffs seemed an obvious issue to us. Time and again, however, officials explained

that water and sewerage bills constituted so small a portion of the expenses of a household that the levels and increases posed no serious problem. When pressed on whether consumers do, or might, react against the high prices, there were two standard answers. The first was that consumers would simply be told that it was necessary for the environment and that they would then "understand and pay". The second answer was that consumers could be made to compare the cost of water with the cost of other consumer items (beer was a favorite!) and thus be made to understand that the service was not costly. With few exceptions -- and they were notable exceptions -- officials never questioned whether there were fundamental underlying issues with the objectives and structure of the sector (as discussed earlier) which might have to be addressed.

There were two important and instructive exceptions to the general rule of little concern about what customers have to pay. Officials of the two private companies (Eurawasser and UTAG) we met with in eastern Germany were both well aware of, and concerned about, the rapid rise in prices, the incipient consumer reaction to these, and the structural underpinnings of these high prices.

After our visit we learned that concern with high and rapidly rising prices are, in fact, starting to emerge at the municipal level. In the State of Hesse, for instance, some municipalities, with the support of the Deutsche Städtetag (DST), are considering taking legal action against mandatory tertiary wastewater treatment (aiming at nitrate and phosphorus reductions), citing "an obvious discrepancy between costs and benefits of the measures (and) ... burdening the citizens with further costly investments" and citing the need to "analyze critically what some technocrats have come up with"[30].

Item 3.2: The decline of participation in water resources management: The Ruhrverband story

The Ruhr Basin Water Association (the "Ruhrverband") is the best-known river basin management system in the world -- it is worth recounting the essence of the Ruhrverband example[31] for the benefit of World Bank colleagues not familiar with it.

The story starts in the Ruhr Basin in the early part of the twentieth century. The underlying problem was that a small river (the Ruhr, a tributary of the Rhine) became the sewer for a massive concentration of industrial wastes in the most heavily industrialized and populated part of continental Europe. The Ruhrverband (Ruhr Water Association) was founded as a self-governing public body in 1913, on a few key underlying principles. The first principle was that all stakeholders (all users and polluters of water including communities, districts, and trade and industrial enterprises) would be members, and that policies would be made by a political body, the "Assembly of Associates", or "Water Parliament". The second principle was that the Ruhrverband would make extensive use of economic instruments (water charges and pollution fees) to finance the investments and other management activities of the Ruhrverband. An associated principle was that water quality objectives were the result of the simultaneous consideration of the benefits of various improvements, and the costs of achieving these. Finally, even in this small area, the Ruhrverband found it appropriate for muncipalities to retain major functions -- the Ruhrverband itself[32] is responsible for the "trunk infrastructure" (the design, construction, and operation of reservoirs and waste treatment facilities), while the communities are responsible for the "feeder infrastructure" (the distribution of water and the collection of wastewater).

The Ruhrverband was a resounding success, showing: (a) what fundamental principles underpin sound water resources management; and (b) how these principles were turned into a practical management approach in a severely water-stressed area with sophisticated institutional capacity. The model spread rapidly to neighboring industrial areas of the (present-day) state of North Rhine-Westphalia, with a total of 12 similar Water Associations formed.

Although the model was not replicated in the rest of Germany, the logic of the model was picked up by the French. In 1964 the French parliament passed a new water law. The key institutional innovation in France was the "River Basin Financing Agency", which was derived from, and faithful to, the Ruhrverband principles, appropriately adapted to the legal, cultural, and natural conditions of France[33].

The Ruhrverband functioned more or less along these lines until about the late 1970s, when the situation changed in a fundamental way. The most important proximate change has been the rise of the environmental movement in Germany and the resulting higher priority given to the environment at all levels. This has led to marked increases in environmental quality standards, both national and in the European Union. There have been major benefits from the resulting investments in water quality management, as exemplified by the data on the Rhine River given earlier. In this section it is germane to note only the effect of the high German and European standards on the participatory nature of the Ruhrverband. A central function of the Ruhrverband "water parliament" (that of balancing the benefits of environmental improvement with the costs incurred), has become redundant given the standards. The parliament has changed from a vigorous forum of debate to a rubber-stamp for the budget required to meet the legal requirements.

Part 5: Lessons for Developing Countries

Germany provides a fascinating mix of lessons for water resource management in developing countries.

The Positive

On the one hand, it is revealing to review the two fundamental principles which have, in recent years, emerged as the core of a new consensus (see Dublin[34], the UN Conference on Environment and Development[35], the OECD[36], the World Bank[37]) on managing water resources. The two principles are:

- the institutional principle -- water development and management should be based on a participatory approach involving users, planners and policy-makers at all levels, with decisions taken at the lowest appropriate level
- the instrument principle -- water has an economic value in all its competing uses and should be recognized as an economic good.

It can be readily seen that these two principles are, in fact, the principles which the Ruhrverband pioneered over 80 years ago! The enormous success of the approach, initially in the Ruhr and then in its adoption on a national scale (since 1964) in France[38] has provided the intellectual underpinning for many efforts which are now being undertaken in other developed and developing countries[39].

Germany also provides a model of important sub-components, such as how to price different components of effluents[40], and how to apply sophisticated but highly-relevant concepts such as peak-load pricing (as in the Ruhr). The German utilities also provide valuable models for training of skilled workers. And, finally, German experience provides an excellent model for developing public consciousness of the environment, and for translating this into water demand management programs.

The Negative

Recent German experience (and similar experiences in other industrialized countries) provides equally profound lessons on what not to do!

The Czech Prime Minister, Vaclav Klaus, has recently reviewed progress on economic reform in Eastern Europe[41]. He notes that, paradoxically, the reform process has been least satisfactory in that country -- the former German Democratic Republic -- where it has been possible to imagine solving problems by increased spending rather than by facing the problems fairly and squarely. So, too, it is with water resources management. The mirage of the industrialized country "buy-your-way-out-of-the-problem" approach is not only "not on" in developing countries, but potentially quite dangerous. Developing (and developed[42]) countries have no alternative but to give highest priority to the efficient use of limited resources and no alternative but to set standards sensibly and practically by simultaneously considering both benefits and costs and by remembering that the best is often the enemy of the good!

A second lesson from the recent eastern German experience is the danger of ignoring technical and financial realities when responding to the legitimate and appropriate demands for decentralization of political power.

A third lesson, one drawn from the low productivity of the publicly-run water companies is that incentives matter and accountability matter. Without an appropriate structure and set of incentives, public services, even in Germany, suffer from the common problems of political patronage and inefficiency.

Endnotes

[1]1 Our hosts were also provided some general information on the World Bank, and copies of the 1994 World Development Report on Infrastructure (in German).

[2] The post-tour evaluation showed that participants rated the value of the tour very highly. The evaluation summary is presented as Annex 2.

[3] The words "western Germany" and "eastern Germany" are used in this report as short-hand for "the previous Federal German Republic (FDR) " and "former German Democratic Republic (GDR)".

[4] After reunification, KfW's "domestic" lending increased sharply. In recent years, lending to the former GDR has grown to the point where this accounts for 90% of all new KfW lending.

[5] See, BMU, Water Resources Management in Germany, 1994

[6]Assumptions: Per capita income in eastern Germany of $15,000 ($23,000 in Germany as a whole), tax rate of 30%.

[7] The Economist, October 22, 1994

[8] These high consumption figures are consistent with those found in many Eastern European countries. There is, however, some uncertainty about the pre-unification figures. There were incentives in the GDR to overstate actual delivery, and there was relatively little metering and much reliance on estimates.

[9] Subsequent to our visit WIBERA graciously provided us with some of these indicators, on a confidential basis.

[10] Jochen Kühner and Blair Bower, "Water quality management in the Ruhr area of the Federal Republic of Germany, with special emphasis on charging systems", Resources for the Future, Washington DC, 1982.

[11] Carlos Casasús: "Privatizing the Mexican water industry", Journal of the American Water Works Association, March 1994, p 69-73.

[12]Michael Gellert, in "Privatization of public investments and services in Hesse", Korrespondenz Abwasser, 13/89, p 16

[13]The World Bank team did not visit these schemes.

[14] In the months preceding the tour, there had been widespread coverage in the European press and professional journals of these allegations. The essence of the allegations has been summarized as follows: "An opposition candidate for the European Parliament charged in the runup to elections early this month that 80% of the political corruption in France was caused by two large corporations. Though he didn't name the companies, the press concluded that the unnamed corrupters must be CGE and Lyonnaise. Their stock took a dive and lawsuits are threatened." ("Tally Eaux: French water giants think big, long and smart", Public Works Financing, June 1994, p 17-18.)

[15] See "French scandals -- plot thickens", Water Bulletin, 624, 30 Sept 1994, page 6.

[16] The unusually low levels appeared to be a result, in part, because of an unusually broad definition of what water is "accounted for".

[17] G. Yepes and A. Dianderas, "Performance indicators: Financial indicators and overview of service rates", Water and Sanitation Division, World Bank, 1994.

[18]Prof. Eberhardt Hamer, "Privatization of public investments and services in Hesse", Korrespondenz Abwasser, 13/89, p 16

[19]Prof. Eberhardt Hamer, "Privatization of public investments and services in Hesse", Korrespondenz Abwasser, 13/89, p 16

[20]When the estimated investment is 2000 DM per capita, the subsidy is 12.5%; when the estimated investment is 7000 DM per capita, the subsidy increases to 60%.

[21] Making Sense of Subsidiarity: How Much Centralization for Europe? The Centre for Economic Policy Research, London, 1993, page 1.

[22] Making Sense of Subsidiarity: How Much Centralization for Europe? The Centre for Economic Policy Research, London, 1993

[23] Personal communication, not on this study tour.

[24] Klaus R Imhoff, "Deutscher Gewaesserschutz im europaeischen Umfeld", GWA 6/94, pp 428-433.

[25] Klaus R Imhoff, "Deutscher Gewaesserschutz im europaeischen Umfeld", GWA 6/94, pp 428-433.

[26] Klaus R Imhoff, "Deutscher Gewaesserschutz im europaeischen Umfeld", GWA 6/94, pp 428-433.

[27] In recent years local governments in the US have increasingly revolted against what they describe as the irresponsibility of Congress in not considering the costs along with the benefits of environmental legislation. More and more vocally, mayors of US cities have questioned these "unfunded mandates", as they are known. Amongst the most celebrated cases in the US is one of particular relevance to this discussion, namely the refusal by the city of San Diego to comply with Federal standards for the secondary treatment of municipal wastewater. The case recently went to the US Court in California where the judge, in vivid language, described the Federal requirements as "wasteful, unrealistic and unworkable". The Federal Judge not only did not order San Diego to comply, but praised the city for taking the right stand, and lambasted the Federal Government for trying to force the city to make investments which were, in the opinion of the Court, "not in the public interest" (United States District Court, Southern District of California. United States of America versus City of San Diego, Memorandum Decision, 31 March 1994.

[28] See "Roiled waters: Water politics in the 1990s", Civil Engineering, July 1994, p 49-51. The issue of "unfunded mandates" is a central issue in the Republic Parties "Contract with America" and was a major issue in the November 1994 congressional elections in the United States.

[29] The Office of Water Services (OFWAT). The Cost of Quality. A strategic assessment of the prospects for future water bills, Birmingham, 1992, and "Water purity boils down to a question of price", Financial Times, April 17, 1993.

[30]"Städtetag: Klagen haben Aussicht auf Erfolg", ("Städtetag: Lawsuits have prospects of success"), Frankfurter Allgemeine Zeitung, Nov 5, 1994

[31]For more details, see Kneese, A.V. and B.T.Bower, Managing Water Quality: Economics, Technology, Institutions, Baltimore, Johns Hopkins University Press, Resources for the Future, 1968, pp 245-248

[32] Initially the RTV, the Ruhr River Dam Association, was responsible for the reservoirs; later the RTV was merged with the Ruhrverband.

[33]see Ivan Cheret, "Managing Water: The French Model", pp 80-92 in Valuing the Environment, ed. I. Serageldin and A. Steer, World Bank, Washington DC, 1994. and Government of France: "International Co-operation for Sustainable Water Resources Management: The French Experience", paper presented to OECD/DAC, May 1994, 6 pages.

[34] International Conference on Water and the Environment, "The Dublin Statement and Report on the Conference", Dublin, 1992.

[35] United Nations Conference on Environment and Development. 1992. Agenda 21, New York.

[36] OECD, Development Assistance Committee, "Water Resources Management: Implementing the New Consensus", Paris, May 1994.

[37] The World Bank, Water Resources Management Policy Paper, Washington DC 1993.

[38] Government of France: "International Co-operation for Sustainable Water Resources Management: The French Experience", paper presented to OECD/DAC, May 1994, 6 pages.

[39] Government of France: "International Co-operation for Sustainable Water Resources Management: The French Experience", paper presented to OECD/DAC, May 1994, 6 pages.

[40] Ministry of the Environment, Water Resources Management in Germany, 1994, Bonn.

[41]Vaclav Klaus, "Klaus on Europe: So far so good", pp 57-8, The Economist, September 10th, 1994.

[42] See "Water price clean-up?" a series in The New York Times, March 21-24, 1993 and "Cleaning the environment gets harder", The New York Times, January 5, 1995.

Annex 1

Documents provided by the collaborating German Host Organizations

Final List of Documents (including documents collected during theTour)

Meeting/Date		Document				
No.	Organizat. Acronym	Number	Title	Date	Lan-guage	Type
1	**DVGW**	A-1	The DVGW in Brief	1993	E	Lfl
	Oct 10	A-2	DVGW - Portrait of the Association	1994	E	Inf
		A-3	DVGW - How to find us	1993	G/E	Lfl
2	**KfW**	B-1	KfW - Functions and Activities (F&A)	May 93	E	Bro
	Oct 10	B-2	KfW - Cooperation with Developing Countries	Feb 94	E	Bro
		B-3	KfW - Partner of Developing Countries & f. Economic Advisory Services to Countries of Central & Eastern Europe in Transition to Market Economy	Jul 93	E	Lfl
		B-4	KfW -Functions & Activities in the Field of Economic Advice given by the FR of Germany to Countries of Central & East.ern Europe and the New Independant States	Jul 93	E	Lfl
		B-5	KfW's Performance in 1993 to the Point (Advertisement/The Economist)	Jun 94	E	Repr
<2>	**< GTZ >**	C-1	GTZ - Your Partner in Development	Jan 94	E	Doc
		C-2	Division 414 (Water, Waste & Protection of Natural Resources)	1994	E	Info
		C-3	Community Participation & Hygiene Education in Water Supply & Sanitation (CPHE)	1990	E	Doc
3	**ESWE**	D-1	ESWE - Organization Plan	Jul'94+Oct/94	G+E	Chart
	Oct 10	D-2	*Wasser für Wiesbaden (Water for Wiesbaden)*	Jun 94	G	Pap
		D-3	Water for Wiesbaden (Dr.Berger)	Oct 94	E	Pap
		D-4	The ESWE-Laboratory and the ESWE-Institute for Water Research and Water Technology (Dr.Pilz)	Oct 94	E	Doc
<3>	**< TBA >**	E-1	< None >			
4	**BMU**	F-1	Germany - The Federal Environment Ministry (an information paper)	Apr 94	E	Doc
	Oct 11	F-2	Environmental Policy in Germany - Water Resources Management in Germany	Mar 94	E	Doc
		F-3	Die Gewässergütekarte der Bundesrepublik Deutschland (Surface Water Quality Map of Germany	1990	G	Map
		F-4	*TA-Siedlungsabfall (Technical Guidelines for Solid Waste Disposal)*	Jun 93	G	Doc
		F-5	*Privatwirtschaftliche Realisierung der Abwasserentsorgung - Mustervertrage (Private Sector Participation in Sewerage Systems - Model Contracts)* x	1993/94	G	Doc
		F-6	*Leitfaden zur Abwasserbeseitigung (Guidelines for Sewage Disposal)*	May 91	G	Doc
		F-7	*Jahresbericht der Wasserwirtschaft 1993 (Annual Report on Water Resources Management)*	Jul 94	G	Repr
		F-8	*Rheinbericht 1993 (River Rhine Report 1993)*	Jun 94	G	Doc
<4>	**< BMZ >**	G-1	German Development Policy : DAC-Memorandum of Germany (DAC-Annual Aid Review)	Dec 93	E	Doc
		G-2	The basic principles of Federal Government's Development Policy	1993	E	Doc
		G-3	Sector Paper: Water Supply and Sanitation Projects in Developing Countries	May 84	E	Doc
		G-4	*Gemeinsam für die eine Welt - Die Entwicklungspolitik der Bundesregierung (Together for the One World - The German Development Policy))* x	Jun 09	G	Doc
5	**BGW**	H-1	BGW - Constitution	Jun 92	E	Inf0
	Oct 11	H-2	BGW - Facts & Figures : Public Water Supply 1992	1993	E	Lfl
		H-3	Principles of Pricing for Drinking Water in Germany (R.Stadtfeld)	Jan 94	E	Pap
		H-4	The Public Water Supply 93/94	1994	E	Doc
		H-5	Organisation of Water Supply Companies in Germany	Oct 94	E	Pap
		H-6	The German Water Market - Who's Who in European Water (BGW/DVGW)	1994	E	Rep
		H-7	*Tarife '92/Wasser (Water Tariffs 1994)*	Mar 94	G	Doc
		H-9	*Abwassergebühren 1994 (Sewerage Tariffs 1994)*	Jan 94	G	Doc
		H-10	Abwassergebühren (BGW-Press Release)	Sep 94	G	Other

Meeting No.	Organizat. Acronym	Doc Number	Document Title	Date	Language	Type
6	**DST** Oct 11	I-1	DST (Association of Cities &Towns):Tasks-Organization-Members	1991	E	Lfl
		I-2	*Wasserwirtschaft in Deutschland aus kommunaler Sicht (Water Res. Manag. in Germany fr. the municipal Perspective)*	Oct 94	G	Pap
		I-3	*Gemeindefinanzbericht 1994: Talfahrt der städtischen Finanzen (1994 Municipal Finance Report: The Decline of the Municipal Financial Situation)*	Mar 94	G	Journ
7	**WIBERA** Oct 11	J-1	WIBERA - Solutions f. Business & Administration (Company Brief)	1994	E	Doc
		J-2	Competence and Environmental Management (Presentations to World Bank Group)	Oct 94	E	Doc
		J-3	Administrative Management	Oct 94	E	Lfl
		J-4	Environmental Management	Oct 94	E	Lfl
		J-5	Range of Consulting Services: Water-Waste Watrer-Waste-Sewage Sludge-Contaminated Sites- Environmental Audit	Oct 94	E	Inf
		J-6	*Wir über uns (We about us)*	Oct 92	G	Doc
		J-7	*Geschäftsbericht 1992 (Annual Report 1992)*	May 93	G	Doc
		J-8	*Bereiche-Leitung-Aufgaben-Arbeitsgebiete (Departments-Management-Tasks-Functions)*	1990-92	G	Info
8	**RV** Oct 12	K-1	RV - Tasks and Structure (Aufgaben und Organisation)	Jan 93	G+E	Lfl
		K-2	RV - The Bigge Dam	Jul 91	E	Lfl
		K-3	Water Resources Management in the Ruhr River Basin (Europ.Water Pollut. Control /No.1-93)	Jan 93	E	Repr
		K-4	Gewässerschutz - Anspruch und Verwirklichung (Water Protection - Pretension and Realisation)	Jan 94	G	Repr
		K-5	Deutscher Gewässerschutzim Europäischen Umfeld (German Water Pollution Control in the European Context)	Jun 94	G	Repr
		K-6	*Ruhrverbandsgesetz und Satzung für den Ruhrverband (RV Basic Law and By-Laws)*	Feb 90	G	Doc
		K-7	Veranlagungsrichtlinien (Regulations for Assessments of Contributions)	Dec 93	G	Doc
		K-8	*Jahresbericht 1993 (Annual Report 1993)*	1994	G	Doc
		K-9	*Ruhrwassergüte 1993 (Ruhr River Water Quality 1993)*	Aug 94	G	Doc
		K-10	Wastewater Treatment Works Duisburg-Kassierfeld	Oct 94	E	Lfl
		K-11	*Klärwerk Duisburg-Kassierfeld (Wastewater Treatment Works Duisburg Kassierfeld)*	Jul 94	G	Doc
		K-12	*1913-1988: 75 Jahre Ruhrverband/Ruhrtalsperrenverein (75 Years RV/RTV - A service for the Ruhr Region)*	1988	G	Book
<8>	**< ATV >**	L-1	ATV : German Association for Water Pollution Control (a short profile)	Jun 94	E	Info
		L-2	ATV-Standards / Wastewater - Waste)	Apr 94	E	Doc
		L-3	*ATV-Regelwerk & andere Veröffentlichungen (ATV-Standards & other Publications)*	Apr 94	G	Doc
		L-4	*Betriebsformen der kommunalen Abwasserbeseitigung (Alternatives of municipal sewerage system operations)*	Aug 94	G	Doc
		L-5	*Weitergehende Abwasserreinigung (Advanced Wastewater Treatment)*	Nov 91	G	Doc
		L-6	*ATV-Meisterschule (ATV Foreman Training)*	Aug 94	G	Lfl
		L-7	*ATV-Kläranlagen-Nachbarschaften helfen nicht nur Kosten sparen (ATV-Wasterwater Treatment Plant Neighbourhoods assist not only in cost savings)* x	Aug 94	G	Lfl
		L-8	*KA-Korrespondenz Abwasser (Wastewater Journal) - Special English Edition 1989*	Dec 89	E	Journ
		L-9	*KA-Korrespondenz Abwasser (Wastewater Journal) - September 1994 Edition*	Sep 94	G	Journ
		L-10	*KA-Korrespondenz Abwasser - Lieferverzeichnus 1994 (Consultants & Suppliers Catalogue)*	Dec 93	G/E/F	Doc
		L-11	*ATV-Jahresbericht 1993 (Annual Report 1993)*	Feb 94	G	Doc
		L-12	*ATV-Satzung (ATV By-Laws)*	Sep 90	G	Info
		L-13	*Leistungsvergleich kommunaler Kläranlagen 1992*	1993	G	Other
		L-14	*Organisationsformen der Abwassertechnik: Privatisierung (Organisation of Waste Water Services: Privatization)*	Okt 93	G	Doc
		L-15	*Abwasser im Klartext (Wastewater - in clear language)*	1993	G	Doc
		L-16	*Die Reise in die Unterwelt (A Journey into the Underground)*	Aug 93	G	Doc
		L-17	*Umfrageergebnisse über Abwassergebühren (Results of an enquiry into sewerage tariffs)*	1994 ?	G	Info
		L-18	Water Resources Management and water pollution control: National Case Studies from Germany (Bucksteeg)	1990 ?	E	Repr
		L-19	Total emissions fr.combined sewer overflow & wastewater treatment plants (A.Durchschlag et al)	Jun 91	E	Repr
		L-20	*Abfall-Brief (Solid Waste Info = supplement to KA*	Jul 94	G	Jour
		L-21	VpA-Mitgliederliste (Association of private Waste Water Dispolsal Companies: List of Members)	Aug 92	G	Oth
		L-22	VpA-Informationen (Confidential Infos to the VpA-Members)	Sep 92	G	Info
<8>	**< DZWA >**	M-1	DZWA-German Center f. International Training in Water & Waste Management (summary information)	1992	E	Lfl
		M-2	DZWA - 1994/95 Programme	1993	G+E	Info
		M-3	DZWA - 1992/93 programme	1991	E	Info

Meeting			Document			
No.	Organizat. Acronym	Doc Number	Title	Date	Lan-guage	Type
9	**GW**	N-1	GW- The blue-green environment company	1992	E	Lfl
	Oct 12	N-2	GW - Haltern Waterworks and the Haltern & Hullern Reservoirs	1992	E	Lfl
		N-3	1992 Annual Report (Excerpts) The Wall Street Transcript of	Sep 93	E	Repr
		N-4	*1993 Geschäftsbericht (1993 Annual Report)*	May 94	G	Doc
		N-4	Functions and Objectives of a Modern Water Supply System (Scherer: Presentation to WB Group)	Oct 94	E	Pap
		N-5	The Water Supply Industry caught in the conflict of interests between coal mining and agriculture	Mar 89	G/E	Repr
		N-6	The danger of the use of Total Herbicides to raw water resources for drinking water extraction	Mai 94	G/E	Repr
		N-7	The use of Plant Protection Agents in the catchment area of the Haltern Reservoir an their impact	1992	G/E	Repr
10	**BWB**	O-1	BWB - "Clear Water - Clear Information"	Dec 92	G+E	Doc
	Oct 13	O-2	*Alle Berliner Wasserwerke (All Water Works of Berlin)*	Sep 94	G	Doc
		O-3	*Wastewater Treatment Plant Ruhleben*	Dec 92	E	Info
		O-4	*1993 Geschäftsbericht (1993 Annual Report)*	Jun 94	G	Doc
		O-5	Museum im Wasserwerk (Museum in the Water Works)	1994	G	Lfl
11	**MUNR**	P-1	Organisationsplan September 1993 und März 1994 (Organizations Plan 9/93 & 3/94)	9/93 & 3/94	G	Chart
	Oct 13	P-2	Finanzierungshilfen 1994 f. d. Schutz d. Umwelt (Financial subsidies f. environmental protection)	Jul 94	G	Doc
		P-3	Natur und Landschaft in Brandenburg (Nature & Landscape in the State of Brandenburg)	1994	G	Doc
		P-4	Umweltbericht 1992 - Brandenburg (Report on the Environment 1992 - State of Brandenburg)	Dec 92	G	Doc
		P-5	MUNR - Umweltmaterialien: Gesetzliche Grundlagen, Daten zuj Brandenburg, Publikationen, Abwasserzielplanung, Kommunalisierung & Entflechtung von WV & AE, Potsdamer Proklamation, Brandenburger Umweltjournal (Various documents on environmental matters)	1993	G	Doc
12	**EURAWASSER**	Q-1	*Wasser-Abwasser/Information d. Eurawasser Rostock (Water-Wastewater Info)*	1993	G	Doc
	Oct 13	Q-2	EURAWASSER - Presentation of 13 Oct 94 (Dr.Schack)	Oct 94	E	Pap
		Q-3	*Erweiterung des Wasserwerks Rostock*	1994	G	Info
		Q-4	*Erweiterung der zentralen Kläranlage Rostock*	1994	G	Info
		Q-5	*Erfrischende Ideen: Trinkwasserversorgung & Abwasserentsorgung (Refreshing Ideas)*	1993	G	Info
		Q-6	Lyonaise des Eaux Dumez (various info material)	Apr 93	E	Info
13	**MIDEWA** Oct 14	R-1	MIDEWA - Company Profile	Jul 94	G+E	Info
<13>	**< UTAG >**	S-1	Mitteleutsche Wasser- und Umwelttechnik AG Halle / UTAG	1993	E	Doc
		S-2	Anything to do with Water (UTAG Presentation)	Oct 94	E	Info
		S-3	*UTAG-Consulting (References)*	1993	G	Info
		S-4	*UTAG-Consulting (Info about 7 branch offices)*	1993	G	Info
		S-5	*UTAG-Contracting (References)*	1993	G	Info
		S-6	*UTAG-Contracting (Info: Sludge Digester Leipzig)*	1993	G	Info
		S-7	Combined Biological Phosphorous & Nitrogen Removal	1993	E	Info
		S-8	*Kläranlage Warin (Sewage Treatment Plant - City of Warin)*	1993	G	Info
		S-9	Thames Water: Global Businesses	1993	E	Info
		S-10	Thames Water: Annual Report & Accounts 1994	Mar 94	E	Doc
14	**Leipzig**	T-1	Company Profile (Basic Information and Photographs)	Oct 94	E	Info
	Water Wks	T-2	Klärwerk Rosental (Sewage Treatment Plant Rosental)	1993	G	Doc
	Oct.14	T-3	Ökologische Landnutzung für unser Trinkwasser (Ecological Land Use for our Drinking Water Supply)	1993	G	
	Touristic	U-1	Today's Germany (information by federal states)		E	Info
	Infoe	U-2	Welcome to Germany (Topographical Map 1.1.000.000)		E	Map
		U-3	Deutschland/Germany (Road Map 1. 1.160.000 & List of Cities)		E	Map
		U-4	Travel Tips - Germany		E	Bkl
		U-5	City Infos (Wiesbaden, Bonn, Düsseldorf, Berlin)		E	Lfl
		U-6	Hotel Infos (RAMADA Wiesbaden, SAVOY Düsseldorf, CECILIENHOF Potsdam, INTERCONTI Leipzig)		E	Lfl

Type of Document: Lfl = Leaflet / Info = Information Paper / Bro = Brochure / Repr = Reprint (from Journal) / Doc = Document / Pap = Paper

= specifally prepared by the host organization for the visit

< > = representatives of this organisation particitpated in the respective meeting

Annex 2

PMD Training Division
Participants Course-end Evaluation Summary

Course Title: Water/Sanitation Study Tour to Germany

Date: 10/09/94 **No of Responses: 17**

Note: Mean responses are based on the number of responses to each question and not on the total number of respondents.

Reason for Training Participation

Attended course in order to enhance performance for:

current job	an identified future job	career development
17 (0 %)	0 (0%)	0 (0%)

Training Design (Very Much 6..5..4..3..2..1 Not at All)

	Mean Response
Relevance of course objectives/curriculum to current work responsibilities	5.71
Achievement of stated objectives of course	5.59
Satisfaction of training expectations	5.29
Likelihood of application of knowledge/skills acquired	5.41

Training delivery (6=excellent; 5=very good; 4=good; 3=average; 2=poor; 1=very poor)

	Mean Response
structure and organization of course	5.65
duration of course	5.29
course material	5.24
classroom facilities	5.50
instructor's knowledge of subject	5.18
instructor's presentation	5.18
pace of instruction	5.00

Overall Rating

Inclined to recommend course to a colleague?

Yes	No
17 (100%)	0 (0%)

Ranking of course relative to other training attended by respondents

excellent	very good	good	average	poor	very poor
12 (70.6%)	4 (23.5%)	1 (5.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Mean Response 5.65