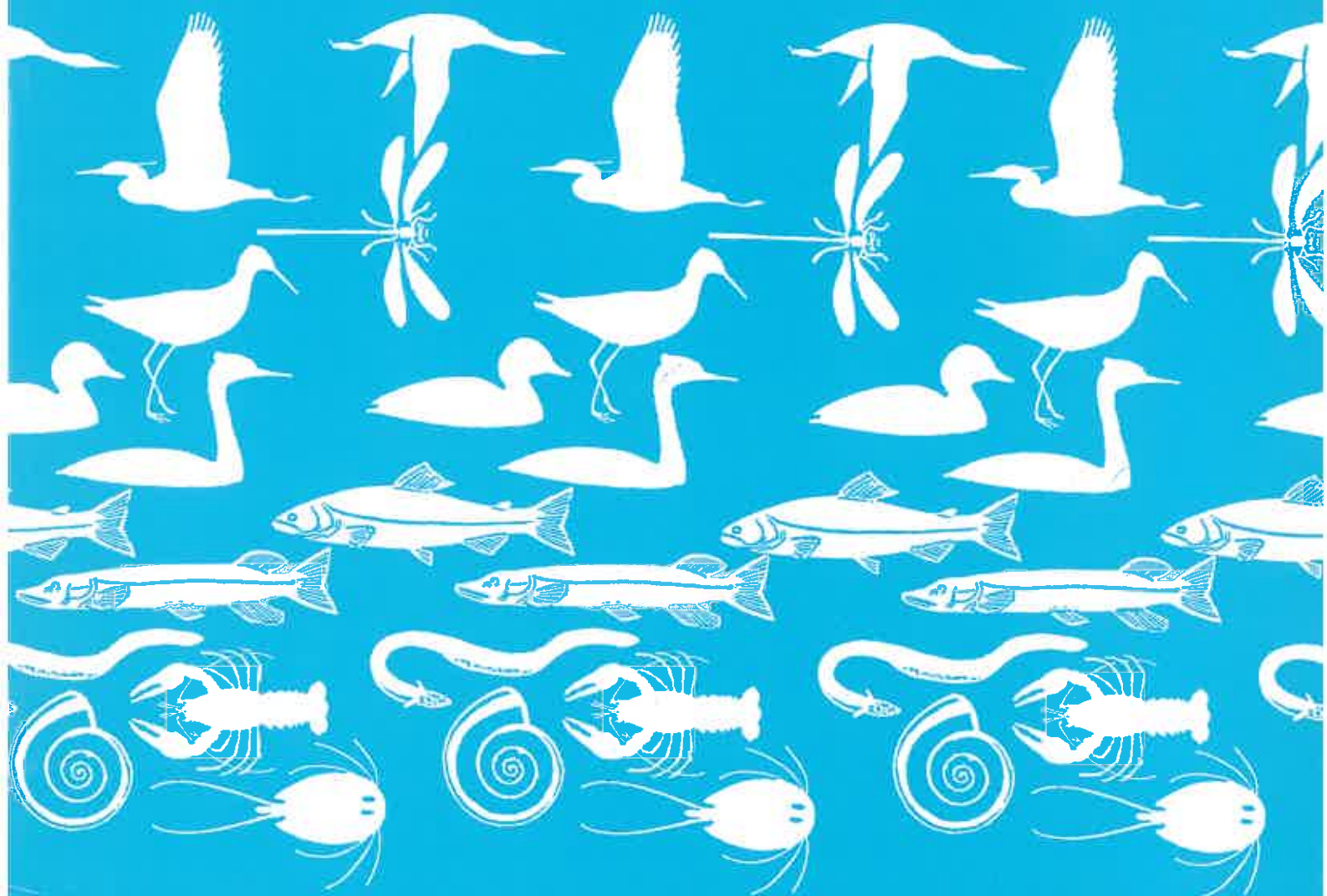


**INTERNATIONAL COMMISSION  
FOR THE PROTECTION OF THE RHINE AGAINST POLLUTION**



**«RHINE» ACTION PROGRAMME**

RHINE ACTION PROGRAMME

drawn up by the

International Commission  
for the Protection of the Rhine against Pollution

and approved by the  
8th Conference of Ministers  
on the Protection of the Rhine against Pollution,  
Strasbourg, 1 October 1987

Editor: Technisch-wissenschaftliches Sekretariat  
Postfach 309, D - 5400 Koblenz

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## Summary

This paper contains the IRC's proposals for the Rhine Action Programme, which is intended to achieve the following results by around the year 2000:

- higher species previously present in the Rhine (e.g. salmon) must be able to return there;
- the use of Rhine water for drinking water supplies must continue to be possible in the future;
- the sediment must not be polluted with harmful substances.

The proposed measures, which have yet to be worked out in greater detail, are designed:

- to accelerate the reduction of permanent pollution from direct and diffuse discharges;
- to reduce the risk of accidents, and
- to improve hydrological and morphological conditions.

The action programme is in 3 phases:

### **A. Phase 1 (until 1989):** Further elaboration of the programme

1. Deepening of knowledge
2. Concrete definition of objectives
3. Establishment of a list of priority substances, sum parameters and biological parameters, and of the branches of industry concerned (by the end of 1987)
4. Compilation of national inventories of discharges
5. Prognosis concerning the feasible limitation of discharges
6. Assessment of the state of the Rhine by the IRC
7. Establishment of the minimum requirements for communal discharges
8. Elaboration of technical plans concerning the hydrological, biological and morphological conditions
9. Finalisation of the action programme for discharges resulting from accidents (by the end of June 1988)
10. An initial estimate at national level of the approximate total costs.

**B. Phase 2 (until 1995):** Implementation of the proposed measures

1. Application of the state of the art to industrial effluent containing priority substances
2. Implementation of measures according to the state of the art with a view to drastically reducing (by around 50%) the total quantity of discharges of priority substances between 1985 and 1995
3. Elaboration of a minimum-control programme for monitoring compliance by dischargers
4. Finalisation and implementation of the plans drawn up for hydrological, biological and morphological modifications
5. Implementation of the measures regarding the safety of industrial sites
6. Elaboration of a plan for the reduction of pollution from diffuse sources
7. Assessment of the practicability of a levy system for effluent
8. Evaluation of phases 1 and 2 and elaboration of supplementary measures.

**C. Phase 3 (by the year 2000):** Implementation of supplementary measures in the event that the measures planned for phases 1 and 2 fail to achieve the intended objective.

In order to achieve the chosen objectives, a new group needs to be created within the IRC to take charge of organisational matters. The group, to be known as the Rhine Action Programme Coordinating Group, will have the following tasks:

- to coordinate the activities to be carried out by the IRC working groups as part of the programme;
- to assess the national reports on the implementation of the action programme;
- to continue with the elaboration of the action programme in consultation with the President and the secretariat of the IRC and to report to the Commission.

The delegations must be represented on this coordinating group by the delegation leader or his deputy and by a senior expert.

Three additional staff will have to be appointed to the secretariat of the IRC at the very start of phase 1 in order to cope with the extra work associated with the action programme. The cost of employing these extra staff is estimated at DM 300,000 per year, to be borne jointly by the Contracting Parties according to the usual formula.

The financial resources and manpower required to set up and implement the action programme should be provided by the Contracting Parties as necessary and as they see fit.

## 1. Introduction

During the course of the last century there have been many changes along the Rhine from an ecological point of view. On the one hand, human activity in the Rhine basin and the canalisation of the river have considerably altered the hydrological and morphological conditions, while discharges of purified and non-purified communal and industrial effluent have severely impaired the quality of the river water.

Though the quality of Rhine water has improved in recent years thanks to the measures taken to clean it up, the consequences of the fire at Schweizerhalle on 1 November 1986 have shown just how vulnerable the ecosystem of the Rhine is and what risks it is exposed to.

Prompted by the need to improve the quality of Rhine water with greater speed and to reduce substantially the risk of pollution due to accidents, the competent Ministers of the Rhine riparian states and the representative of the European Communities made the following decisions:

1.1 The Ministers feel that by around the year 2000 the ecosystem of the Rhine must become a suitable habitat to allow the return to this great European river of higher species which were once present here and have since disappeared (such as the salmon).

1.2 They therefore instruct the IRC, if necessary with the help of experts, to draw up a proposal for the formulation of an action programme, including an estimate of the costs involved, and to submit this proposal to the next Conference of Ministers of the Rhine riparian states.

An ad hoc group was consequently set up by the IRC to implement this task (appendix A).

The proposals for the formulation of a Rhine Action Programme drawn up by this group under the chairmanship of the President of the IRC, Dr R. Pedroli, are set out in this report.

## 2. Definition of the objectives

### 2.1 General

At the Conference of Ministers held in Rotterdam on 19 December 1986 the following objectives, to be achieved by around the year 2000, were formulated with regard to the Rhine:

- By around the year 2000 the ecosystem of the Rhine must become a suitable habitat to allow the return to this great European river of higher species once found here which have since disappeared, such as the salmon.
- The use of Rhine water for drinking water supplies must continue to be possible in the future.
- The pollution of the Rhine by harmful substances must be further reduced, partly with a view to reducing substantially the pollution of the river sediment by toxic substances so that it can once again be used as filling material on the land and in the sea.

These objectives must be achieved by means of the action programme.

This will require an improvement in:

- the physical, chemical and biological state of the Rhine and
- the biological potential of the Rhine, which will have to be achieved by means of measures to return the river to its natural state.

The physical, chemical and biological conditions associated with the desired quality of the Rhine relate to the following components:

- the water with its physical and biological characteristics and the substances dissolved in it;
- suspended matter with adsorbed substances and the river sediment, and
- organisms and the pollutants accumulating within them.



Improving the biological potential of the Rhine relates in the first instance to the hydrological and morphological conditions which will determine the return of higher species to the river. It is these higher species which have fallen victim to the damage inflicted on the ecosystem of the Rhine over the last century.

Given the situation as it is at present, the objectives can be achieved in the following way:

- by determining what measures should be taken to encourage the favourable development of the ecosystem to a level at which higher species can thrive;
- by identifying the problems associated with the provision of drinking water and determining what measures should be taken to protect drinking water supplies in the future;
- by ascertaining what measures should be taken to limit pollution of the sediment.

## 2.2 Identification of problem substances

The principal harmful substances that are discharged into the Rhine can be characterised as follows:

- firstly, inorganic and organic substances with a dangerous effect;
- secondly, other readily biodegradable substances which affect the oxygen balance;
- substances which are not readily biodegradable;
- nutrients;
- inorganic substances, such as chlorides.

Besides these substances, attention should also be given to thermal pollution of the Rhine.

The action programme is designed first and foremost to reduce the input of dangerous substances, but the need to limit other problem substances should not be ignored.

Which substances are to be given priority will be determined on the basis of the list drawn up by the IRC's chemical working group, possibly supplemented by other substances found in the Rhine or by parameters of relevance to the programme's

objectives, such as sum parameters and biological parameters (appendix B).

### **2.3 Identification of the principal sources of pollution for inclusion in a quantitative inventory**

These harmful substances may enter the Rhine either in regular discharges or as the result of an accident and originate from:

- industrial sites
- communal effluent
- agriculture
- energy production
- storage and transport of dangerous substances
- mining activities
- diffuse and non-identified sources.

#### **2.3.1 Regular discharges**

National inventories of discharges should be drawn up on the basis of the list of priority substances, discharges of which into the Rhine must be limited (appendices C and D).

To enable the IRC to judge the quality of Rhine water along the entire length of the river and to follow the progress being made in the activities of the various Governments, all the necessary elements of the national inventories should be made available to it.

With regard to the programmes for the reduction of discharges, a distinction needs to be made between:

- discharges *associated with production*, and
- *diffuse discharges*.

Discharges associated with production means effluent originating from certain production processes in industry which is discharged into a private purification plant or else a communal effluent treatment plant.

Diffuse discharges means pollution resulting from other uses of priority substances in industry (i.e. other than in production processes) or private households (e.g. household

chemicals and solvents) or from their use in agriculture for instance (e.g. manure and pesticides). This category also includes pollutants entering the water via the atmosphere.

### **2.3.2 Discharges resulting from accidents**

Special attention should be given to the handling of dangerous substances which may directly or indirectly enter the water and to everything associated with this.

Insofar as any data are available, the so-called Seveso directive offers only a limited basis for the drafting of an action programme for the Rhine since the majority of substances discharged into the Rhine in the past three years as the result of an accident are not covered by the directive. Moreover, the critical quantities stated in the directive are based on toxicity to man and not on the ecological consequences for a freshwater system.

The measures to be taken and the schedule for discharges resulting from accidents must be finalised by the IRC by the end of June 1988 at the latest, using the national reports to be submitted as a result of the decisions taken by the Conference of Ministers in Rotterdam on the "safety of industrial sites".

## **2.4 Elaboration of programmes of measures**

### **Limitation of pollution**

Programmes of measures for limiting pollution must be elaborated for discharges associated with production and diffuse discharges, the aim being to bring about a substantial reduction in the total pollution of the Rhine by priority substances.

Measures to limit discharges of priority substances associated with production should in principle draw upon state-of-the-art technology, both with regard to effluent treatment methods and production methods, in order to limit outputs of substances which pollute the water (appendix E).

The state of the art will first be applied to the national programmes and a prognosis will be made of the extent to which discharges can feasibly be limited. The IRC will then harmonise the regulations and schedules.

The IRC will also put forward proposals for programmes for the reduction of pollutants from diffuse sources, based on the limitation of substances which enter the environment (e.g. in agriculture). This may even lead to a ban on the use of particular substances.

### **Control**

Besides preventive measures in the relevant municipalities and branches of industry, the success of the action programme is dependent on effective government supervision and on the control of all discharges of harmful substances by the discharger himself. In view of this, a uniform minimum-control programme must be drawn up by the IRC which will enable the Rhine riparian states to monitor the progress of the action programme, as regards both the dischargers and the quality of Rhine water. The IRC's minimum-control programme should be harmonised with any similar programme which may be set up by the European Communities.

### **Hydrological, biological and morphological improvements**

The chief aim of these supplementary measures is to create in the environment the conditions necessary to allow the return of the higher species to the Rhine basin. Although it is not yet clear what concrete steps need to be taken to create the right conditions, the following measures are a possibility:

- suitable spawning grounds of a sufficient size;
- clean, oxygen-rich nurseries in the upper reaches of rivers;
- the construction of fish ladders and locks to enable migrating species such as salmon to pass artificial obstacles in the river.

### **3. Implementation of the action programme**

#### **3.1 Schedule**

The objectives of the action programme must be achieved for the most part by the year 2000. This period can be subdivided into three phases to allow the results of each phase to be assessed in the light of the objectives; if necessary, policy can then be modified accordingly. The steps to be undertaken in each phase are not presented in chronological order; the years given merely indicate the year in which the relevant part of the action programme must have been completed. The following phases are suggested:

- A) phase 1: until 1989
- B) phase 2: until 1995
- C) phase 3: until 2000.

These phases are described in broad terms below. The details must be filled in at national level at a later stage and the measures subsequently harmonised by the IRC.

#### **Phase 1 (until 1989)**

- A.1 Acquiring more knowledge about the quality of the water, the ecosystems and the sediment.
- A.2 Establishment and concrete definition of the objectives for the entire programme along the length of the Rhine in the form of parameters, numerical values and local needs.
- A.3 Establishment by the IRC, by the end of 1987, of an initial list of substances, to which priority is to be given, together with sum parameters and biological parameters, and a list of the branches of industry concerned. A provisional list of substances can be found in appendix B. A list of the branches of industry concerned is given in appendix C. These lists will be updated throughout the duration of the action programme.

- A.4 Compilation of national inventories of discharges of priority substances and updating of the list of major dischargers according to the model in appendix D.
- A.5 The arrival at a prognosis, in the second half of 1988, based on the national programmes, of the extent to which the discharges named in appendix D can feasibly be limited by 1995, drawing on state-of-the-art technology (appendix E).
- A.6 To enable the IRC to judge the quality of Rhine water along the entire length of the river and to follow the progress being made in the activities of the various Governments, all the necessary elements of the national inventories and the national prognosis should be made available to it.
- A.7 Incorporation in the action programme of minimum requirements for communal discharges.
- A.8 Elaboration of technical plans regarding the hydrological, biological and morphological conditions.
- A.9 Finalisation of the measures and schedule for discharges resulting from accidents by the end of June 1988.
- A.10 Arrival at an initial estimate at national level of the total costs associated with the programmes described above.

**Phase 2 (until 1995)**

- B.1 Application of the state of the art to effluent containing priority substances in the relevant branches of industry in order permanently to reduce pollution of the Rhine by these substances.
- B.2 Implementation of measures, drawing upon state-of-the-art technology, with a view to reducing drastically (by around 50%) the total quantity of discharges of priority substances between 1985 and 1995. Considerable reductions in some priority substances have already been achieved in

recent years thanks to the use of state-of-the-art technology. A further reduction of 50% is not therefore feasible at this time. In the case of other priority substances, the use of state-of-the-art technology will permit reductions of more than 50%.

- B.3 Elaboration by the IRC of a minimum-control programme for monitoring compliance by dischargers.
- B.4 Finalisation and implementation of the plans drawn up in phase 1 regarding hydrological, biological and morphological modifications.
- B.5 Implementation of the measures regarding the safety of industrial sites, as referred to at A.9.
- B.6 Elaboration by the IRC of a draft inventory together with appropriate measures and a schedule for the reduction of pollution from diffuse sources.
- B.7 A study of the extent to which the introduction of levies on discharges of effluent containing dangerous substances would act as a practicable economic incentive for achieving the objectives of the action programme.
- B.8 Evaluation of the results of phases 1 and 2 and elaboration of supplementary measures to be put into action in phase 3.

**Phase 3 (by the year 2000)**

- C.1 In the event that the measures in phases 1 and 2 fail to achieve the desired objective, supplementary measures will have to be taken which may, if necessary, extend to prohibiting the use of dangerous substances.

The IRC will remain responsible for harmonising the limit values for emissions for the entire duration of the action programme.

### 3.2 Organisation

In order to achieve the chosen objectives, a new group needs to be created within the IRC to take charge of organisational matters. The method of operation, duties and composition of this group, to be known as the Rhine Action Programme Coordinating Group, are described in greater detail below.

#### 3.2.1 Method of operation

The coordinating group will:

- a) strive to ensure the greatest possible transparency of the data forwarded to the IRC on discharges of pollutants per country and per branch of industry, and
- b) follow a fixed schedule for the technical work regarding priority substances.

The group could be incorporated within the structure of the IRC as depicted in appendix F.

#### 3.2.2 Duties

The Rhine Action Programme Coordinating Group should have the following three duties:

- to coordinate the activities to be carried out by the IRC working groups as part of the action programme;
- to assess the national reports on the implementation of the action programme;
- to continue with the elaboration of the action programme in consultation with the President and the secretariat of the IRC and to report to the Commission which will pass the reports on to the Ministers.

#### 3.2.3 Composition

The delegations must be represented in this coordinating group by:

- the delegation leader or his deputy, and
- a senior national expert from each delegation.

Other experts may be called upon if necessary, for instance because of their specialist ecological or technical knowledge.



The group will be chaired by each of the delegation leaders or their deputies in turn.

Additional staff will have to be appointed to the secretariat of the IRC to assist the coordinating group. At least three extra staff should be appointed for phase 1 (1 graduate, 1 editor/translator and 1 secretary); staffing needs will then have to be reviewed again in the light of the activities to be carried out in phase 2 of the action programme.

### 3.3 Financial aspects

The financial aspects relate firstly to the costs of organising the project (setting up and coordinating the action programme) and secondly to the costs of the physical implementation of the measures to be taken under the action programme.

- a) The costs associated with organising the project relate to all the activities undertaken in connection with the work of the coordinating group, both at national level (participation in the group, national consultation, advice from national experts, etc.) and at international level (assistance provided by the IRC secretariat).

The financial resources and manpower required to set up and coordinate the action plan at national level should be provided by the Contracting Parties as necessary and as they see fit. The extent of these activities will very much depend on national procedures, making it difficult to calculate the total costs for each of the Contracting Parties.

The international costs of employing extra staff in the secretariat in phase 1 of the programme is estimated at DM 300,000 per year, to be split jointly among the Contracting Parties according to the usual formula.

- b) The physical implementation of the measures in the action programme will entail costs in connection with the more extensive treatment of effluent, additional safety

measures, changes in production processes and the like in the industrial and communal sectors. An initial estimate of the costs cannot be made until the priority substances and discharges are known and a clearer picture has been established of the measures to be taken with regard to the principal discharges and the main branches of industry.

It should be possible to give an estimate of the cost of the measures to be taken as part of the proposed action programme some time in 1989.

**Mandate of the ad hoc Action Programme Group**

1. As a preparatory step the delegation leaders will set up an ad hoc group whose task it will be to formulate a proposal for a long-term action programme to be presented to the following Conference of Ministers.
2. In view of the above, the delegation leaders have studied the work of the McKinsey bureau, which has been commissioned by the Netherlands Government to carry out a preliminary study for this action programme.
3. The Netherlands delegation proposes that the ad hoc group should study the results of the work done by the McKinsey bureau.

Appendix B

**List of priority substances, other substances and parameters  
in the framework of the Rhine Action Programme**

- a. Substances from Annex I of the Convention for the Protection of the Rhine against Chemical Pollution, on which a decision must be taken by the IRC as a matter of urgency.

Aldrin, dieldrin, endrin and isodrin

Endosulphane

Chloronitrobenzenes

Trichlorobenzene

Hexachlorobenzene

Hexachlorobutadiene

Pentachlorophenol

Trichloroethene (trichloroethylene)

Tetrachloroethene (perchloroethylene)

Chloroanilines

Parathion

Benzene

1,1,1-trichloroethane

1,2-dichloroethane

- b. Substances from Annexes I and II of the Convention which have already been discussed by the IRC.

Mercury

Cadmium

Chromium

Copper

Nickel

Zinc

Lead

Carbon tetrachloride

Chloroform

PCB

c. Other substances

Phosphates

Ammonium

d. Sum parameters

AOX (Adsorbable organic halogen compounds)

e. Biological parameters by which the presence of priority substances can be ascertained.

Toxicity for fish

Toxicity for water fleas / inhibition of cholinesterase

Toxicity for bacteria

Toxicity for algae

Mutagenicity

**List of branches of industry in which state-of-the-art  
technology must be applied in the treatment of effluent under  
the Rhine Action Programme**

1. Organic chemistry
2. Inorganic chemistry
3. Petrochemicals, processing of mineral oils and  
regeneration of waste oil
4. Manufacture of cellulose, paper and cardboard
5. Metal manufacture and processing
6. Manufacture of dyes and paints
7. Manufacture and finishing of textiles
8. Manufacture and processing of leather, manufacture of  
leather fibres and fur dressing
9. Coking of coal, tar processing
10. Manufacture and processing of synthetic fibres, plastics,  
gum and rubber
11. Dry cleaning, cleaning of cleaning cloths
12. Manufacture of glass, glass fibres and mineral fibres

Specimen inventory of discharges  
of substances listed in appendix B

Section of the Rhine	Rough quantities	Actual quantities
<u>Upstream from Rekingen</u>	CH .....	
	D .....	
<u>Rekingen-Village Neuf</u>	CH .....	
	D .....	
Firm x		.....
Industry y		.....
Municipalities		.....
<u>Village Neuf-Seltz</u>	D .....	
	F .....	
Industry y		.....
Industry z		.....
Firm F		.....
Firm D <sup>1</sup>		.....
Firm D <sup>2</sup>		.....
<u>Seltz-Koblenz etc.</u>		

**State of the art**

The state of the art is defined as follows:

- 1) the best possible limitation of discharges using modern methods, installations and modes of operation;
- 2) the use of comparable methods, installations and modes of operation which have been tested and approved;
- 3) the practical applicability of the measures to be taken shall determine which methods, etc. are used;
- 4) harmful substances must not be transferred to other parts of the environment.



Organigram

