



## The Rhine - 30 years after Sandoz

### Background information for the press conference on 13 October 2016

#### 1. Sandoz fire: 1 November 1986

Some months after the Chernobyl nuclear accident (26 April 1986), one of the greatest man-made chemical disasters in Europe occurred - this time the Rhine was concerned. Alarm sirens woke up the inhabitants of Basel who, due to a curfew, were confined to their homes. Pictures of dark clouds of smoke over Basel, of burning warehouses and of a Rhine which had turned blood-red made their way around the world.

Unhindered, enormous amounts of fire-fighting water used for fighting a serious fire in the Swiss chemical plant Sandoz near Basel flowed into the Rhine. The chemicals dissolved in the fire-fighting water led to fish death along more than 400 km (from Basel to the Loreley). In particular eels, but also other fish species and fish feeding animals died. The water intake from the Rhine for drinking water supply had to be stopped.

The chronology of the fire until the adoption of the "Rhine Action Programme" is listed below:

1 November 1986 Warehouse 956 of the Sandoz chemical plant in Schweizerhalle near Basel (Switzerland) burns down.

Content of the warehouse:

1,200 tons of pesticides, solvents and other toxic chemicals.  
10,000 - 20,000 m<sup>3</sup> fire-fighting water polluted with some 30 t of pesticides / insecticides and 200 kg of mercury compounds flow into the Rhine.

Great amounts of persistent, organic pollutants sieve into the groundwater

3 November 1986	Sandoz issues first information on the toxic discharge for the waterworks along the Rhine. Between 9 and 18 November, the raw water intake for drinking water production was stopped.
5 November 1986	According to an information of the spokesman of the Ministry of Environment of Baden-Wuerttemberg, "About 150,000 eels have already died in the Upper Rhine. That represents the extinction of the species". So far, the water pollution covers 400 river kilometres. Along the Middle and the Lower Rhine the waterworks begin to stop their water intake.
7 November 1986	After water supply (riverbank filtrate) was stopped, some 25,000 inhabitants of a small town on the Middle Rhine were supplied by drinking water storage trucks.
10 November 1986	In Düsseldorf, breweries temporarily stop their beer production.
<b>12 November 1986</b>	<b>1. Meeting of the ministers in charge in the Rhine bordering countries</b>
13 November 1986	First Sandoz press conference on the issue. Sandoz admits to have underestimated the storage risk.
18 November 1986	First Sandoz report on the fact that the warehouse had also contained 1.9 tons of the highly toxic insecticide endosulfan.  Beginning removal of polluted sludge. The soil is cleaned with special vacuum cleaners in order to prevent it being washed away with the next flood.
<b>19 December 1986</b>	<b>2nd meeting of the ministers in charge in the Rhine bordering countries</b>
<b>1 October 1987</b>	<b>3rd meeting of the ministers in charge in the Rhine bordering countries and adoption of the "Rhine Action Programme" the ICPR had drafted and which aimed at distinctly and sustainably improving water quality.</b>

## **2. International consequences of the Sandoz warehouse fire**

The fire at Sandoz is one of the greatest environmental disasters in Middle Europe. At the same time it is the starting point for tremendous water protection efforts.

### **1987**

11 months after the fire, the ministers adopted the ambitious "Rhine Action Programme" in Strasbourg and confided its coordination and success control upon the ICPR.

By 2000, the following targets were to be achieved:

- Species that had vanished - e.g. salmon – should return to the Rhine.
- Rhine water should remain apt for drinking water supply
- Reduction of the pollutant content of river sediments

This was the first programme to include numerical and thus verifiable targets, e.g. the plain request to reduce the pollutant inputs of some 40 substances by 50 %, of heavy metals by 70 % between 1985 and 1995.

### **1988**

In 1988, after launching the "Rhine Action Programme", the ministers in charge of the Rhine published a list of measures in Bonn, aimed at securing industrial plants and reducing accidents. These measures concerned:

- the stocking of dangerous substances
- the construction of retention basins for fire-fighting water
- warning and alarm centres and their systems

Furthermore, the Rhine ministers adopted "Minimal requirements for municipal discharges" in order to further reduce the chronic pollution of the river with wastewater.

Before the Sandoz warehouse fire, polluted fire-fighting water would flow into the Rhine and its tributaries, as there were no retention systems for fire-fighting water. In order to prevent such pollution, the ICPR drafted **Recommendations on the Prevention of Accidents and Security of industrial Plants**. As an example, fire prevention concepts avoid the spreading of fire and prevent consequential damage by retaining the fire-fighting agent. All containers to be filled with hazardous substances must be provided with overfill protection and pipelines transporting substances hazardous to water must be leak-proof, durable and clearly marked. Industrial plants must provide for sealing systems with collection basins. Substances which may react with one another in a dangerous manner, e.g. explosive substances or large amounts of burnable materials must be stored separately. But it is also important that during transshipment and filling the freight from ships, lorries or trains into warehouses or the other way around, hazardous substances may not get into waters.

### **1989**

In 1989, in Brussels, the ministers reacted on the 1988 North Sea catastrophe, when huge carpets of algae caused by large amounts of nutrients from wastewater smothered the sea. The ministers then added the protection of the North Sea to the targets of the Rhine Action Programme and adopted an addendum to the list of priority substances of the Rhine Action Programme. The target was fixed that until 1995, discharges of all substances of this list should be reduced by 50 %. In addition, they charged the ICPR to draft an Ecological Master Plan for the Rhine. Above all, this Master Plan addressed the riverbed, the banks, alluvial areas, oxbow lakes and lateral waters and the restoration of the target species salmon.

### **1994**

As water quality continuously improved due to these coordinated measures, in 1994 in Bern, Rhine ministers rather concentrated on the ecology of the Rhine and - after the Earth Summit in Rio in 1992 - on sustainable development and aimed at using the Rhine and its landscape in a socially compatible and eco-friendly manner. Under the impression of the great flood of the Rhine in 1993, "More room for the Rhine", the protection of alluvial areas and the network of biotopes became a new target.

### **1998**

After the great floods of the Rhine in 1993 and 1995, and based on the declaration of ministers in 1995, the ICPR drafted an Action Plan on Floods aimed at protecting the population against damages and creating more room for the river. The Action Plan on Floods was adopted in Rotterdam in 1998. The ICPR was charged to draft a new programme on the sustainable development of the Rhine for the period after 2000. A new Rhine Convention included ecology, water quality, flood prevention and the protection of surface-near groundwater in alluvial areas.

## **2001**

In **2001**, in Strasbourg the Rhine ministers adopted the **Programme on the sustainable development, "Rhine 2020" as first programme with integrated water management** combining all aspects of water management and related to surface and groundwater.

### Evaluation

A consequence of the Rhine Action Programme was that requirements concerning municipal and industrial wastewater treatment plants became distinctly stricter and a third treatment stage was introduced to eliminate phosphorous and nitrates. The first balance drawn in 1992 already indicated considerable pollutant reductions three years ahead of the politically decided deadline. The reduction targets set were over-accomplished. Earlier and at percentages far above those planned, the discharges of industrial and urban origin were massively reduced or no longer detectable in 2000. For most substances the results fell short of the target values. At the same time, due to improved chemical water quality, the entire ecosystem was enhanced and flora and fauna were strengthened.

The targets were clearly defined. The salmon proved to be the right crowd puller. The competent Rhine ministers continuously supported these efforts. In all Rhine bordering countries, the authorities, industry and municipalities positively cooperated to implement their decisions. Regular reports were issued on progress and shortcomings. The tremendous loss of image of the Western European chemical industry along the Rhine resulting from the Sandoz accident had to be compensated. Therefore, there was political willingness to provide the required public means for implementing the programme and enforcing the strict recommendations upon economy.

The representatives of the different states are involved in dedicated and trusting cooperation. More than 150 experts cooperate on the common specification of targets, on coordination and success control.

The ICPR secretariat coordinated their meetings, informed the public and established new contacts with non-government organisations from the sectors of economy, municipalities and nature protection. Thus, a river commission became a focal point for modern water protection. The ICPR was an example for other river commissions founded in the nineties: 1990 the Elbe Commission, 1994 the Commissions for the Danube and for Meuse and Scheldt and 1996 the Odra Commission.

All Rhine bordering countries, federal states, municipalities and companies joined forces and implemented the rehabilitation measures. The costs for implementing the Rhine Action Programme between 1989 and 1995 were estimated to some 13 billion €, 9 billion € of which went into the improvement of wastewater treatment plants.

Largely, the Rhine Action Programme left the choice of measures up to the Rhine bordering countries. The public interest in environment protection and the mutual confidence of the Rhine bordering countries which had been re-established in Western Europe enhanced this course of action.

## **3. Surveillance of waters along the Rhine and in its catchment**

The ICPR activities began with international coordination of monitoring programmes. Today, 9 main and 47 subsidiary monitoring stations from the Alps to the North Sea continuously monitor the water quality for more than 100 substances. Since 2015 and based on a special ICPR assay, several micro-pollutants, above all pharmaceuticals are also monitored. Monitoring of water, suspended matter and in biota (fish) is today done

on the long term (to detect improvements and eventually also deteriorations) as well as within a narrow time frame (aimed at detecting sudden pollution events). The international main monitoring stations at Weil am Rhein and Bimmen/Lobith are operated and financed in cooperation of two states: Since 1994, the monitoring station at Weil am Rhein on the German-Swiss border is being operated by Switzerland and the German federal state Baden-Wuerttemberg, and since 2001, Bimmen-Lobith is being operated by the German federal state North Rhine Westphalia and the Netherlands. Formerly, surveillance was only done directly at the frontier, today it is the common resource Rhine which is being monitored.

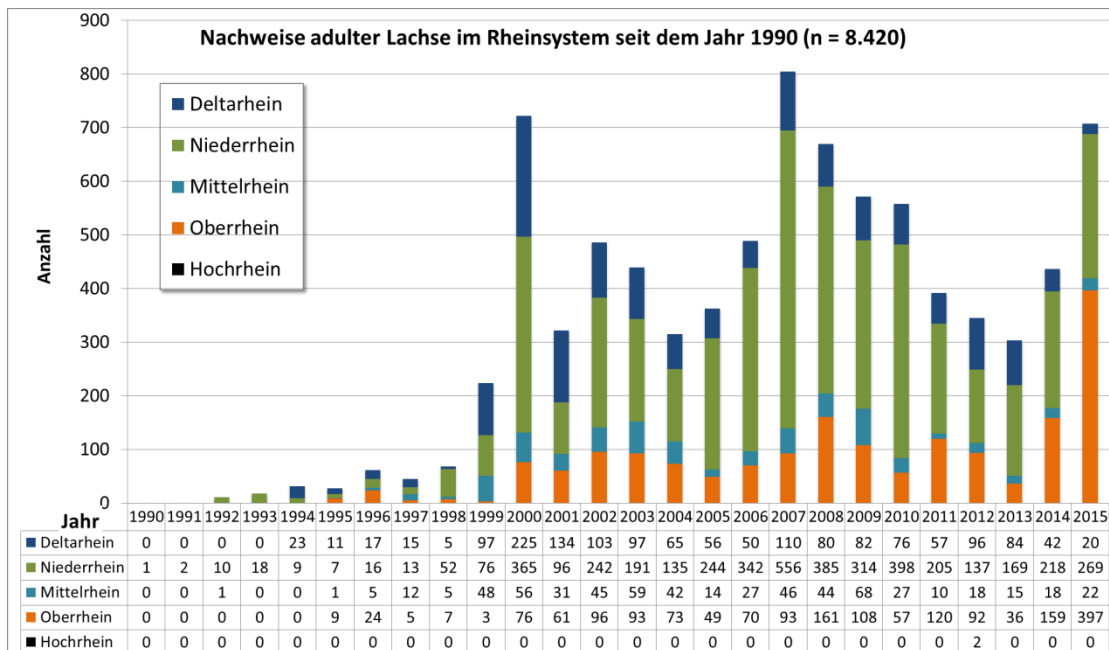
Every six years, joint comprehensive biological surveys of the fish fauna of the Rhine, of the macrozoobenthos, the phytobenthos, macrophytes and of plankton are carried out and analysed.

The ICPR has created mutual confidence of the states involved so that such common work has become normal.

#### **4. The ICPR programme "Rhine 2020" and EU legislation**

In 2001, the Rhine ministers adopted "Rhine 2020 - a Programme on the sustainable Development of the Rhine" leading to continued improvement and closely linking water quality, ecology, flood prevention and groundwater protection. In the EU states, the programme "Rhine 2020" is mainly conducted through the implementation of the EC Water Framework Directive, according to which all waters are to achieve the good status by 2015 and of the EC Floods Directive targeted at reducing adverse consequences of floods on human health, the environment, cultural heritage and economic activities. By the end of 2009 and 2015, the ICPR drafted the first two international management plans according to the Water Framework Directive for the river basin district Rhine. They assess the situation of the waters and polluting factors and compile joint solution approaches. The drafting of these management plans led to a more intensive exchange between the states concerning many technical aspects which continues.

So far, considerable success has been achieved within the implementation of the Master Plan Migratory Fish. 2015 was an excellent year for salmon. In 2015, the number of salmon migrating upstream at the Iffezheim fish passage was as high as never before (228 salmon, see figure). All the same, a stable, self-sustaining salmon population is far from being achieved and, so far, migratory fish cannot reach Basel, as there still are some impoundments on the southern Upper Rhine without any fish passages. Much remains to be done in this area.



**Figure: Identification of adult salmon in the Rhine system**

By the end of 2015, the ICPR drafted its first Flood Risk Management Plan for the international river basin district Rhine which also continues the measures within the Action Plan on Floods. This plan describes the management of flood risk decided by all states in the Rhine catchment. In this connection, measures aimed at creating more room for the river in order to reduce adverse consequences by modifying flood probability are of particular importance. It also gives the context for the development of an ICPR tool demonstrating and, all depending on the data, quantifying the effects of measures.

Switzerland has been a contracting party to the ICPR since the foundation of the ICPR in 1950 and, as a non EU member and based on national legislation, it supports the EU states in their implementation of EU directives in the Rhine catchment.

## Annex

**Photos of the Sandoz fire and its consequences** (source: Badische Zeitung/dapd)





Fire extinction and clean-up (source: Badische Zeitung/dapd)













Eight days after the fire (source: Badische Zeitung/dapd)



Consequences (source: Badische Zeitung/dapd)



The day after the fire (source: Badische Zeitung/dapd)





One week after the fire

(Source: Badische Zeitung/dapd)