








In the case of an accidental water pollution, it is imperative to inform the affected downstream riparians as quickly as possible about this situation. This is why the International Warning and Alarm Plan Elbe (IWAPE) in 1991 was one of the first documents adopted by the International Commission for the Protection of the Elbe River (ICPER) immediately after its foundation in 1990.




Structure: The main structure of IWAPE is constituted by five international main warning centres, one of them in the Czech Republic (Hradec Králové) and four in Germany (Dresden, Magdeburg, Potsdam and Hamburg). The messages are forwarded between the international main warning centres according to a pre-defined relay system.



 Hradec Králové (L1)
  Potsdam (H1)
  communication channels

 Dresden (E1)
  Hamburg (E3)
  river kilometer

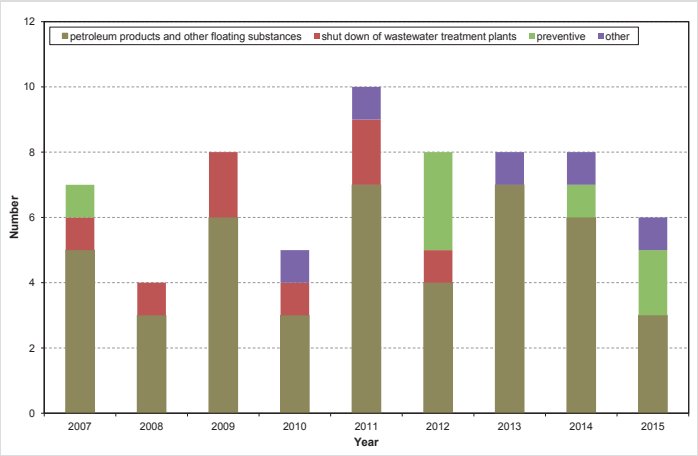
 Magdeburg (E2)

Source:  Federal Institute of Hydrology (BfG), Koblenz
 Czech Hydrometeorological Institute (ČHMÚ), Prague
 International Commission for the Protection of the Elbe River (ICPER), Magdeburg



The **International Warning and Alarm Plan Elbe (IWAPE)** is constantly revised taking into account new findings and experience. Therefore it has been revised four times since 1991 (in 1995, 2004, 2006 and 2012). In view of the evaluation results of the cyanide accident on 09 January 2006, where concentrated highly toxic cyanidic wastewater was released at the company Lučební závody Draslovka, a. s. Kolín (LZD), the IWAPE was revised in 2006 and the rules for sending messages were changed.

Since 2007 the number and the character of the messages have shown that the messages do not only refer to significant accidental pollution but also to events that could raise media or public interest. The most important objective of these messages is to forward correct information to the competent authorities in a timely manner, so as to prevent potential misunderstandings and the dissemination of biased information. The main reasons (69% of events) for sending a message were petroleum products and other floating substances. In seven cases a preventive message was sent (see figure), although it was obvious that it was not an accidental pollution (dust and other plant material).



Reasons for IWAPE messages in the period 2007 – 2015

Of the 64 events reported in the years 2007 – 2015 (none of them involved fish mortality) only 15 reached or exceeded water-risk-index 2 (according to Annex 5 of IWAPE), which is indicated as an IWAPE guideline. Accidents where this criterion is exceeded always need to be reported for preventative reasons. Apart from that, these 15 events comprise 8 cases of shutting down wastewater treatment plants (scheduled shutdown or shutdown due to flood or an operational disruption) which had no significant influence on the Elbe water quality. Of the remaining 7 events, 4 were reported by German main warning centres (Magdeburg and Hamburg) and 3 by the Czech main warning centre in Hradec Králové. In 6 cases petroleum products were involved, quantities between 1.5 and 6 m³ were released. In one case extinguishing water leaked into the river Bílina. An consequent, extraordinary monitoring of water quality in the Elbe river (measuring station Děčín) did not show any significant change of water quality.

Since 2007 there has been no serious accident significantly affecting the water quality of the Elbe river. The IWAPE guarantees that information on accidental water pollution is forwarded along the complete course of the river Elbe, which is of paramount importance when information from the Czech Republic is forwarded to the Federal Republic of Germany. That's why information of insignificant accidental water pollution

and potential pollution cases is carefully monitored in the Czech Elbe section near the Czech-German border profile and forwarded by the main warning centre in Hradec Králové with the help of IWAPE messages. This is demonstrated by the fact that 42 out of the total 64 reported events referred to the 45 km long Czech Elbe section between Ústí nad Labem and the Czech German border profile (or the tributaries running into the Elbe river in this section). These facts are reflected in a very large number of messages from the main warning centre in Hradec Králové (86% of all messages), taking into account, however, that the number of messages of the individual main warning centres on events with large accidental loads is comparable (see table).

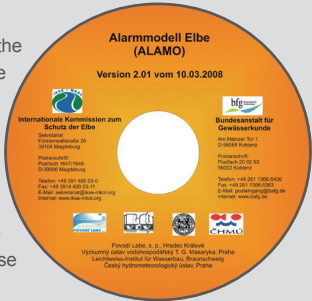
Number of messages from the individual main warning centres in the period of 2007 – 2015

| Main warning centre | Number of messages | Among them water-risk-index ≥2 |
|---------------------|--------------------|---|
| Hradec Králové | 55 | 11 (among those 8 cases of shutting down wastewater treatment plants) |
| Dresden | 3 | 0 |
| Magdeburg | 2 | 1 |
| Potsdam | 0 | 0 |
| Hamburg | 4 | 3 |

Elbe Alarm Model

In the year 2004 the **Elbe Alarm Model (ALAMO)** was integrated into the IWAPE. In March 2008 the new version of the model was completed. By the end of 2016 this model will be expanded to the tributaries Vltava and Saale.

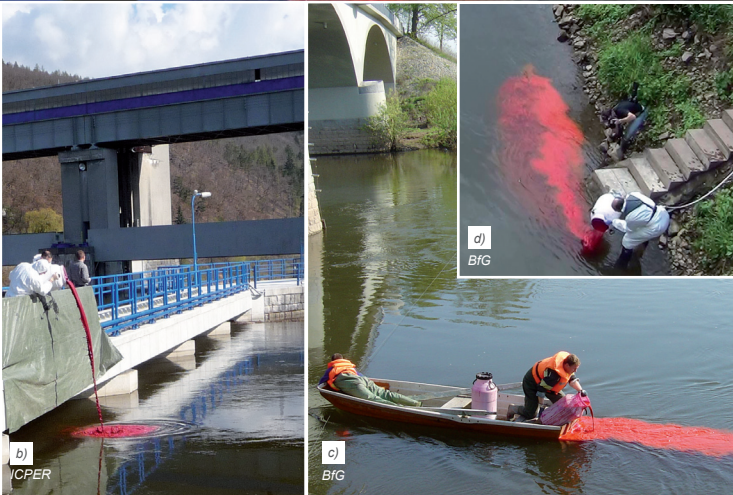
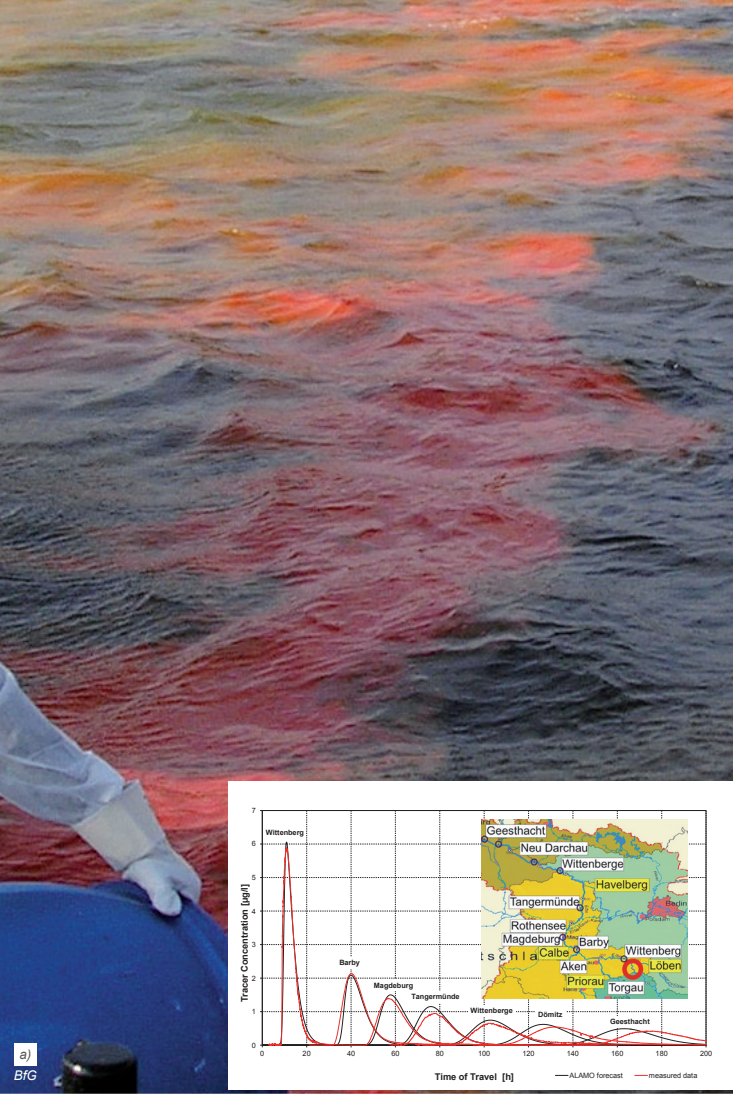
The **ALAMO** is a forecasting model for the spread of pollutant waves in the Elbe. In case of accidental water pollution, this model can forecast the arrival time, the duration as well as the maximum concentration of a pollutant wave at Elbe profiles downstream of the place of the accident. The forecast allows the affected downstream riparians to take timely measures in order to avoid or minimise consequential losses.



The most important outputs of the model are:

- the maximum pollutant concentration in the longitudinal profile of the Elbe,
- the pollutant concentration for various profiles over time,
- the graphic display of the movement of the pollutant waves.

The transport speed of the pollutant waves is heavily influenced by the current runoff. The transport of the pollutant waves along the complete route contemplated by the ALAMO (approx. 830 km – from the town of Němčice up to Geesthacht Weir) at average low water runoff takes more than 40 days. It is reduced to 14 days in the case of medium runoff and to only 7 days in the case of medium flood runoff. That's why it is very important that the calculations are based on topical runoff data using the internet and that several tracer tests are performed in order to calibrate the model.



Introducing the tracer dye sulforhodamine G
a) on 06 October 2004 near Mauken, tracer test in the Mauken – Geesthacht section
b) on 17 April 2013 near Vrané, tracer test at the Vltava
c) on 02 May 2005 near Němčice, tracer test in the Němčice – Písa section
d) on 13 August 2013 near Naumburg-Henne, tracer test at the Saale