

Case History

Rapid identification of norovirus contamination in Prague (capital city of Czech Republic) using BACTcontrol

Abstract

In May 2015, a large-scale drinking water contamination incident occurred in the Prague 6 (Dejvice) district, resulting in widespread gastroenterological illness and significant public and media attention. The contamination was ultimately linked to wastewater intrusion into a drinking water main during planned maintenance activities. This case study describes the incident, response measures, and investigation, with a particular focus on the role of rapid bioassays using the BACTcontrol system as a complementary screening tool to conventional microbiological and virological analyses. The case highlights the value of rapid biological effect-based monitoring for early decision support during acute drinking water quality incidents.

1. Introduction

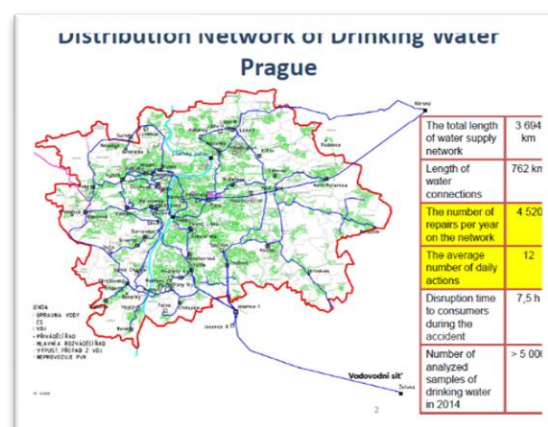
Urban drinking water distribution systems are complex infrastructures that are increasingly challenged by aging assets, undocumented pipe crossings, and high operational demands. Acute contamination events require rapid identification of affected areas to support timely operational decisions, protect public health, and maintain trust. Traditional microbiological and virological analyses, while essential, often require extended analysis times that may limit their usefulness during the early phase of a crisis.

In May 2015, Prague Waterworks (PVK) faced one of the most serious drinking water-related public health incidents in the Czech Republic. This paper presents a structured case study of the event and demonstrates how rapid bioassay screening using BACTcontrol supported the investigation and response.

2. Incident description

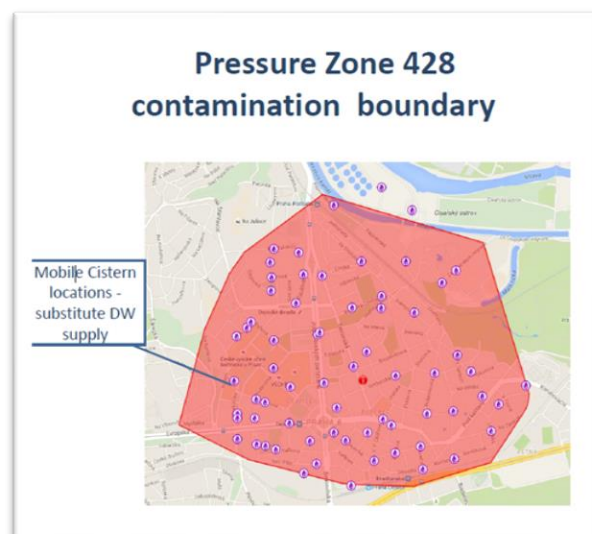
2.1 Location and context

The incident affected the Prague 6 – Dejvice district, an area characterized by high population density and the presence of critical institutions, including hospitals, universities, and several foreign embassies. The strategic and diplomatic importance of the area resulted in heightened media coverage and public concern.



2.2 Timeline of events

- **24 May 2015:** Health-care facilities reported an unusual increase in patients presenting with acute gastroenterological symptoms.
- **24–25 May 2015:** Prague Waterworks activated its crisis management procedures, shut down the suspected supply main, and initiated intensified flushing and disinfection of the affected pressure zone.
- **25–27 May 2015:** Extensive sampling and investigations were conducted across the distribution network to determine the source and extent of contamination.
- **28 May 2015:** Drinking water supply was restored following confirmation of acceptable microbiological and virological results.



3. Cause of contamination

The contamination was caused by a crack in a DN 500 drinking water main located approximately six meters underground. The water main passed beneath a major sewer trunk line transporting wastewater, including effluent from a hospital. This configuration was not documented in historical maps or original project documentation.

During planned maintenance, one of the two supply mains serving the pressure zone was temporarily taken out of service and later reconnected. Following reconnection, wastewater infiltrated the drinking water main through the crack at an estimated rate of approximately 0.2 L/s. The infiltration resulted in contamination with noroviruses, leading to rapid transmission of illness among consumers.



4. Public health impact and response

4.1 Health impact

- Approximately 500 individuals sought medical attention
- Emergency services transported around 150 patients for treatment
- Numerous additional cases were reported without formal medical consultation

4.2 Operational Response

Prague Waterworks implemented emergency measures including:

- Immediate shutdown of the affected pipeline
- Increased chlorination and large-scale flushing
- Deployment of approximately 80 mobile drinking water cisterns
- Public communication via SMS alerts, radio announcements, police loudspeakers, and printed notices

Despite rapid action, the virological nature of the contamination meant that standard flushing procedures were insufficient, necessitating prolonged restrictions until confirmatory test results were obtained.

5. Role of Rapid Bioassays and BACTcontrol

5.1 Deployment during the crisis

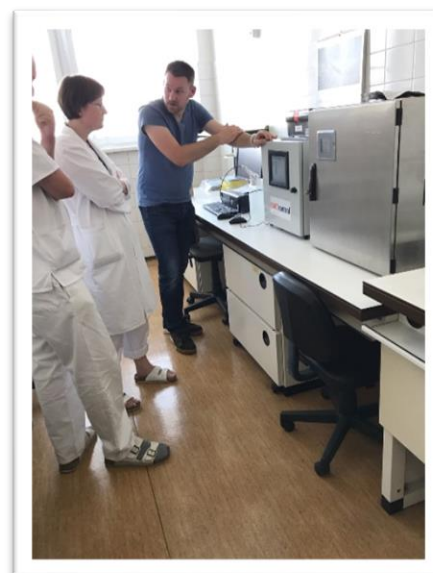
During the initial phase of the incident, the spatial origin and extent of contamination were unclear. Drinking water samples were therefore collected from multiple locations across Prague, covering different parts of the distribution network.

To support rapid screening, a BACTcontrol analyser was installed at the customer's laboratory by the local distributor. An application specialist provided on-site assistance to ensure rapid and reliable start-up under emergency conditions.

5.2 Contribution to the investigation

BACTcontrol was used as a rapid biological screening tool to:

- Detect biologically active fecal contamination (*E.coli* and coliform bacteria) in drinking water samples
- Compare samples from different locations to distinguish affected and non-affected areas
- Support prioritization of follow-up sampling, flushing, and targeted inspections



While confirmatory microbiological and virological analyses remained essential, rapid bioassay results provided early insight during the critical first hours and days of the crisis. This information supported faster narrowing of the contamination zone and contributed to identifying the wastewater intrusion point.

6. Technical box: what does BACTcontrol measure?

BACTcontrol is an automated rapid bioassay system that measures the biological (fecal) activity of microorganisms in water samples.

BACTcontrol does not replace standard microbiological or virological identification methods. Instead, it functions as a complementary early-warning and screening tool, particularly valuable for rapid spatial comparison and trend analysis during emergency situations.

7. Lessons Learned

The Prague 2015 incident highlighted several critical lessons:

- Undocumented infrastructure configurations pose significant risks during maintenance activities
- Viral contamination may not be adequately addressed by standard flushing and bacteriological indicators alone
- Rapid, effect-based screening tools like the BACTcontrol can provide valuable early decision support during crises

Following the incident, Prague Waterworks implemented enhanced risk categorization for repairs, introduced faster microbiological testing methods with the BACTcontrol on various locations, and improved emergency preparedness and monitoring procedures.

8. Conclusions

This case study demonstrates the importance of integrating rapid bioassay screening into drinking water emergency response strategies. During the Prague 2015 contamination event, BACTcontrol supported early situational awareness and helped guide targeted investigation efforts. In complex urban water systems, rapid biological effect-based monitoring can significantly enhance resilience and public health protection when used alongside conventional analytical methods.