Accident at Russia's Biggest Hydroelectric

Sayano-Shushenskaya – 2009 August 17

Objetive

This presentation aims to disseminate some technical and general aspects of the accident. A long and detailed work must be done in order to provide understanding about what happened, in order to help all Owners to prevent such accidents.

Note

This is a preliminary analysis made based only on pictures and films, done no longer than one week after the accident. Only hypotheses are formulated.

1- Main Characteristics

- Number of Units: 10
- Turbine Type: Francis (16 blades)
- Rated Power: 650 MW each
- Rated Discharge per Unit: 358,5 m^3/s
- Nominal Speed: 142,86 rpm
- Net Head: 194 m
- Operation Date: 1978
- Runner Weight: 156 ton
- Runner Diameter: 6,77 m

2 - Main Characteristics

One of the world's largest hydro-electric plants, its dam is 245 m (800 ft) high and stretches 1 km (0.6 miles) across the Yenisei river.

Opened in 1978, the station provides a quarter of RusHydro output and is a major power supplier to at least two smelters owned by United Company RUSAL, the world's largest aluminium producer.

The hydroelectric power station is located on the Yenisei River, near Sayanogorsk in Khakassia, Russia. Before the accident, it was the largest power plant in Russia and the sixth-largest hydroelectric plant in the world.

General View

Sayano-Shushenskaya hydro-electric power plant

The Accident – 2009 Aug 17

The accident

At 08:13 local time (00:13 GMT) on 17 August 2009, the station suffered a catastrophic "pressure surge" in turbine known as a water hammer. The sudden water pressure surge resulted in the ejection of turbine 2 with all equipment, a total weight some 900 tons, from its seat.

Turbines 7 and 9 also suffered from severe damage, while the turbine room roof fell on and damaged turbines 3, 4 and 5. Turbine 6, which was in scheduled repair at the time of accident, received only minor damage as it was the only one of the station's 10 turbines that did not receive electrical damage due to shorting of transformers, and it will be restarted as soon as possible.

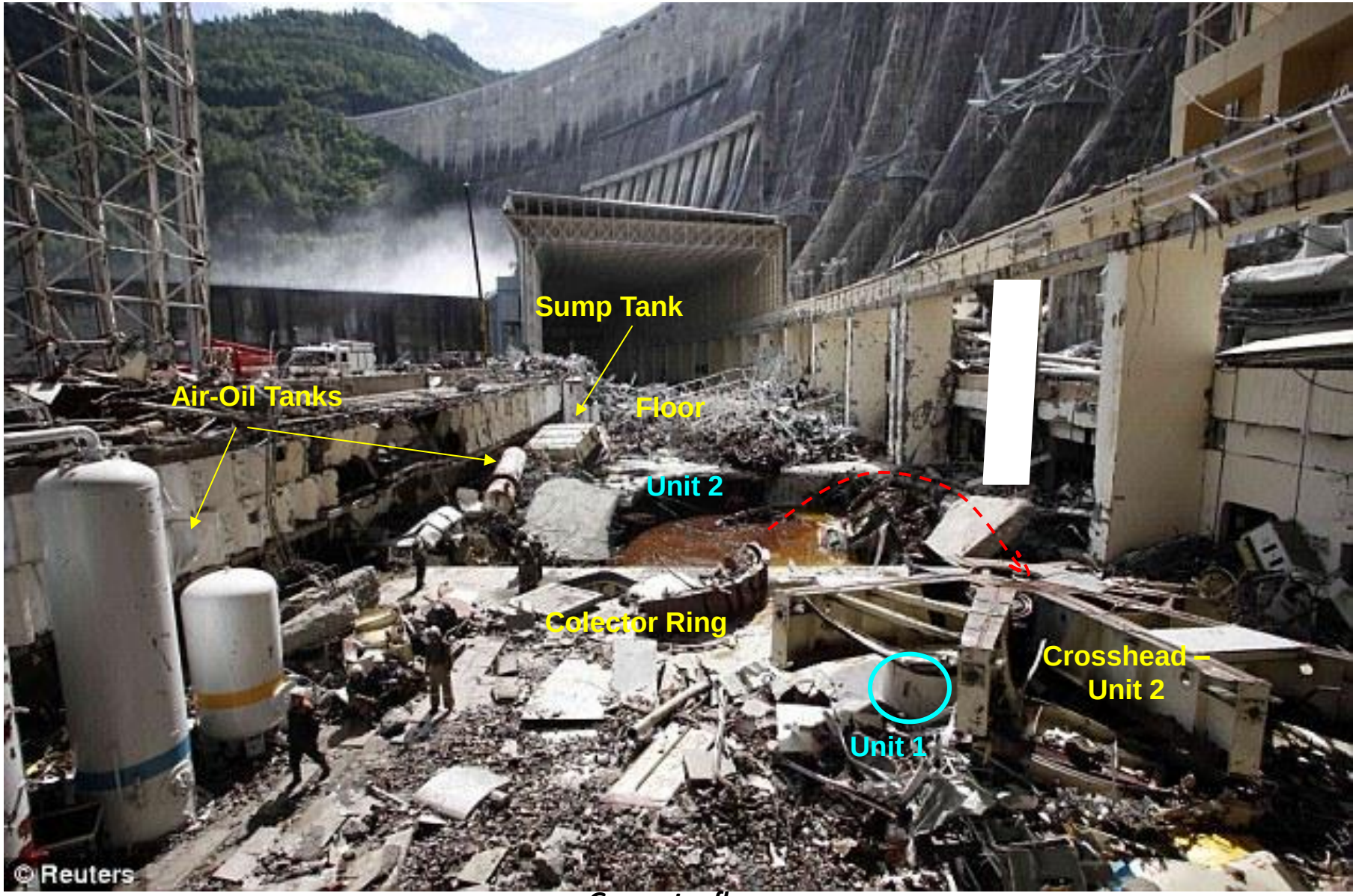
Water immediately flooded the engine and turbine rooms and caused a transformer explosion.

On 23 August 2009, authorities said 69 people were found dead while 6 people are still listed as missing. Efforts to pump flood water from the engine room and complete a search for the missing workmen are expected to take 3 to 8 days.

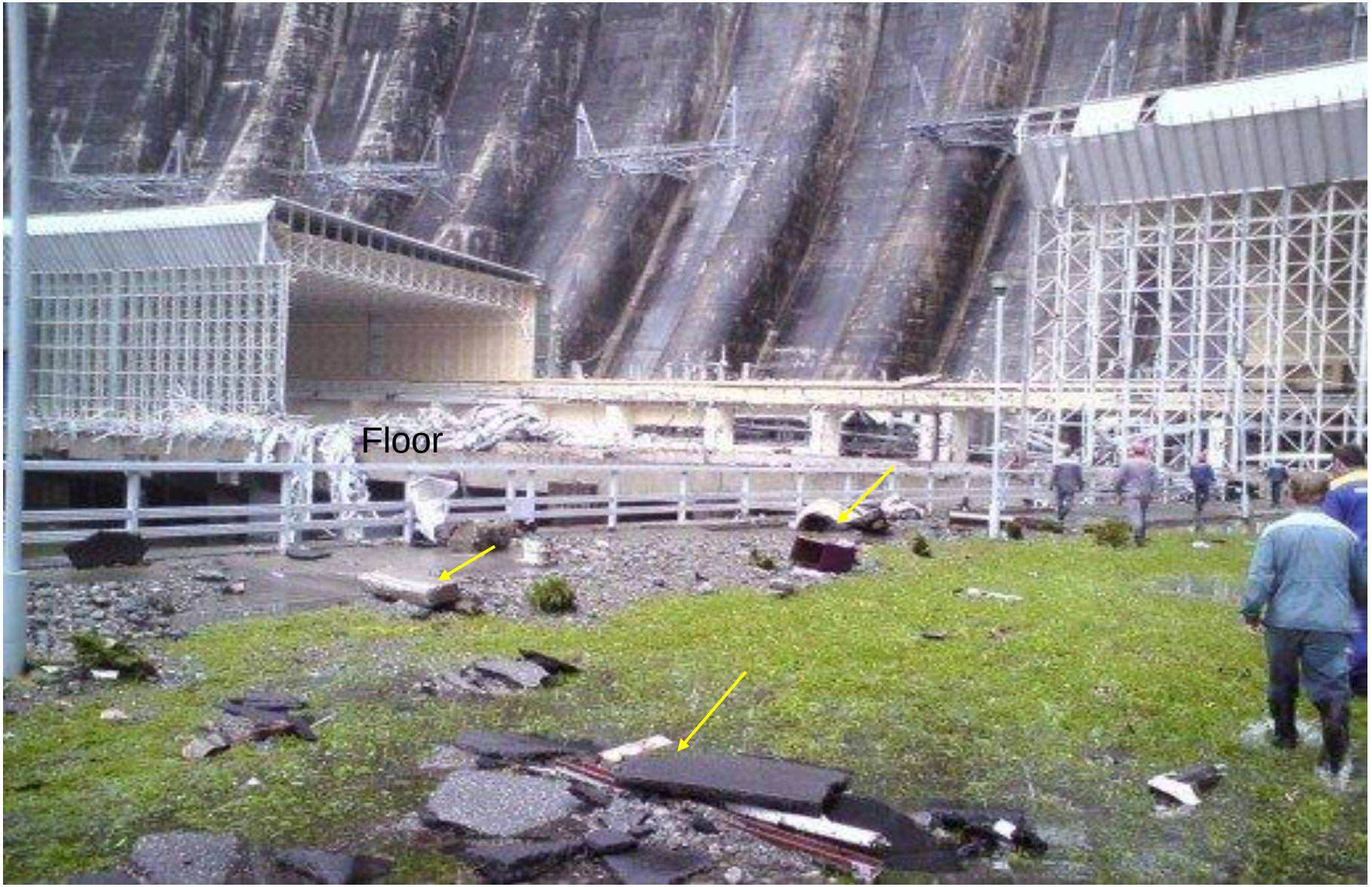
http://en.wikipedia.org/wiki/2009_Sayano%E2%80%93Shushenskaya_hydroelectric_power_station_accident

Before the Accident

After the Accident

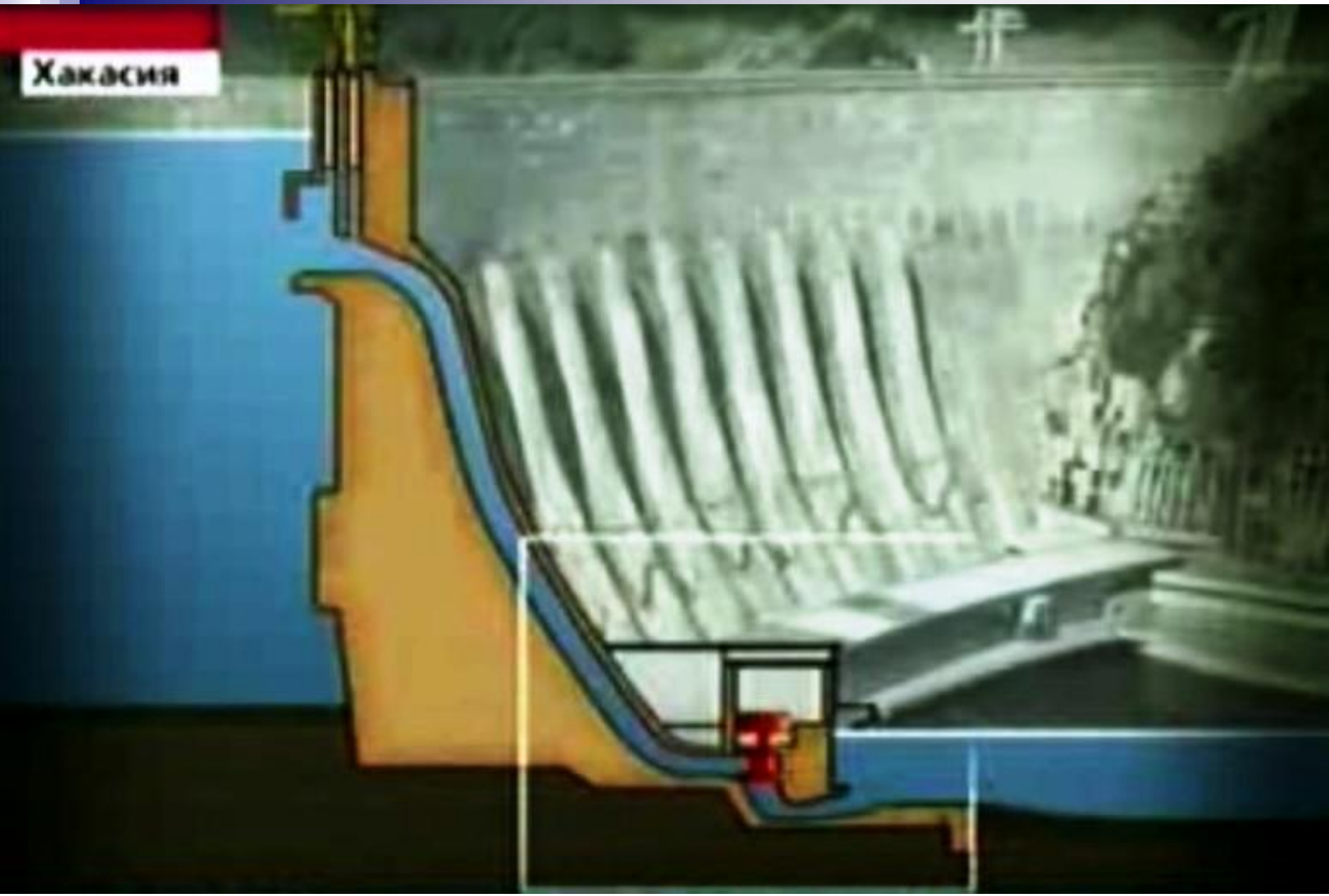


Generator floor



General View

General View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