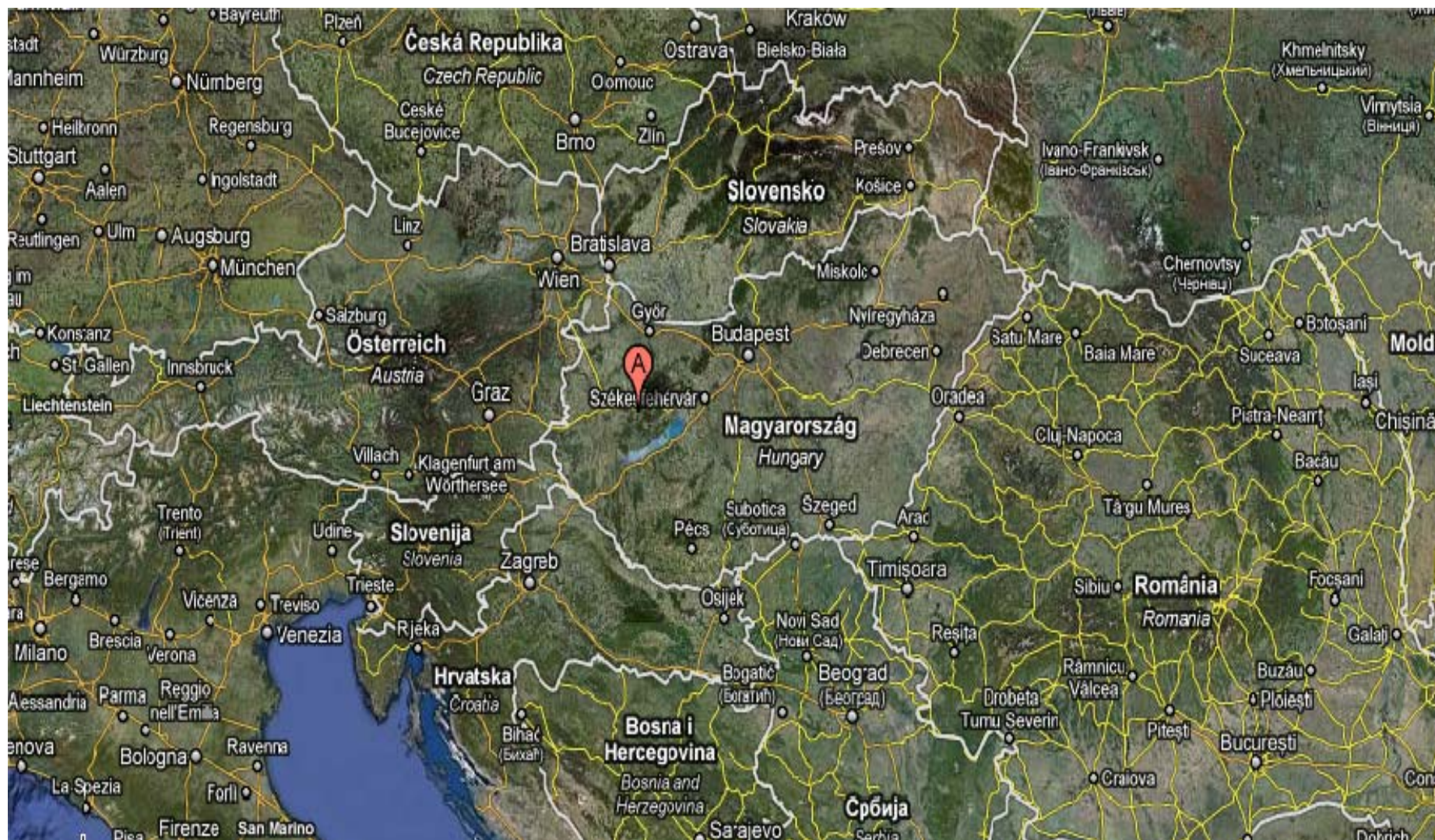


Ajka Alumina Plant Red Mud Dam Failure

- Hungary declared a state of emergency in three counties on Tuesday (4/10), a day after a discharge of red sludge from an alumina plant poured through nearby villages, killing nine people and injuring 120.
- The highly alkaline residue, produced during bauxite refining, poured through Kolontar and two other villages on Monday after being released out of a containment reservoir at the Ajkai Timfoldgyar Zrt plant, owned by MAL Zrt.
- The flood, estimated at about 700,000 cubic meters, swept cars off roads and damaged bridges and houses, forcing the evacuation of about 400 residents.
- MAL is indicating that it believes that the clay bed below the embankment slipped.

Ajka Alumina Plant Red Mud Dam Failure

- The embankment walls are steep, being some 18m tall, and with a total base width of 65m. The embankment walls are constructed of a mixture of fly ash and slag from a local coal-fired power plant, a practice in use at Ajka since start-up in 1942. This material, while strong, is also brittle and will fail in a manner similar to concrete when subjected to shear forces.
- Residue is continuously discharged to the dam until full. Drying and consolidation of the residue does not occur until the dam has been retired. The current dam has been in operation since 2002.
- The region experienced an unusually wet summer, and the failure occurred after a period of further heavy rain and wind. This may have contributed to instability of the soil at the base of the embankment.



This one-meter resolution satellite image features a portion of Hungary's toxic sludge spill east of Kolontar, Hungary. The image was taken on Oct 7, 2010 and shows a close-up of the holding pond where the red mud pollution broke through wall. On the same day the image was captured authorities reported the spill had reached the Danube River, threatening to contaminate the waterway's ecosystem. The image was collected by the IKONOS satellite from 423 miles in space as it moved from north to south over Hungary at a speed of four miles per second.



01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 + ▶





© AP















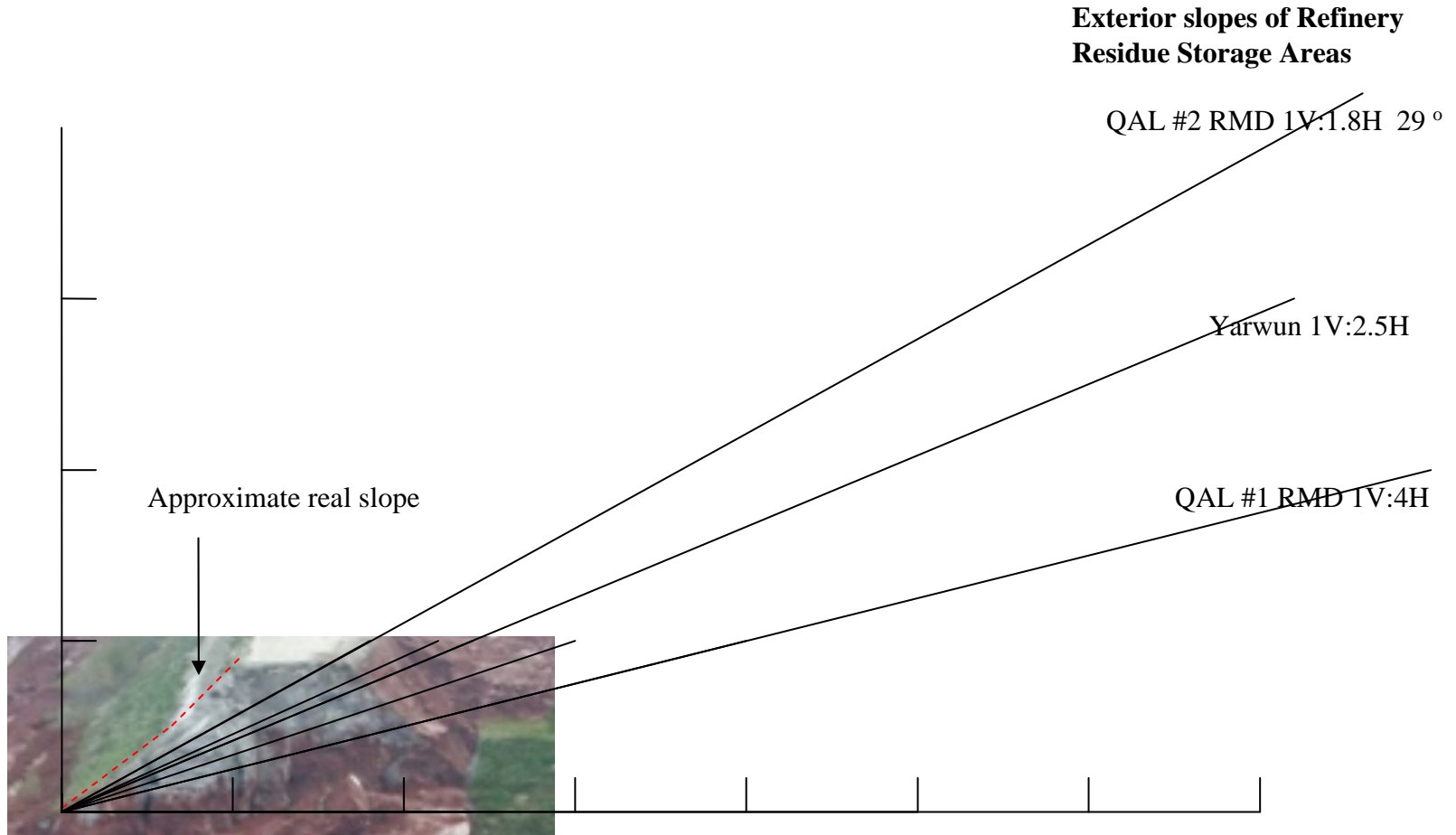




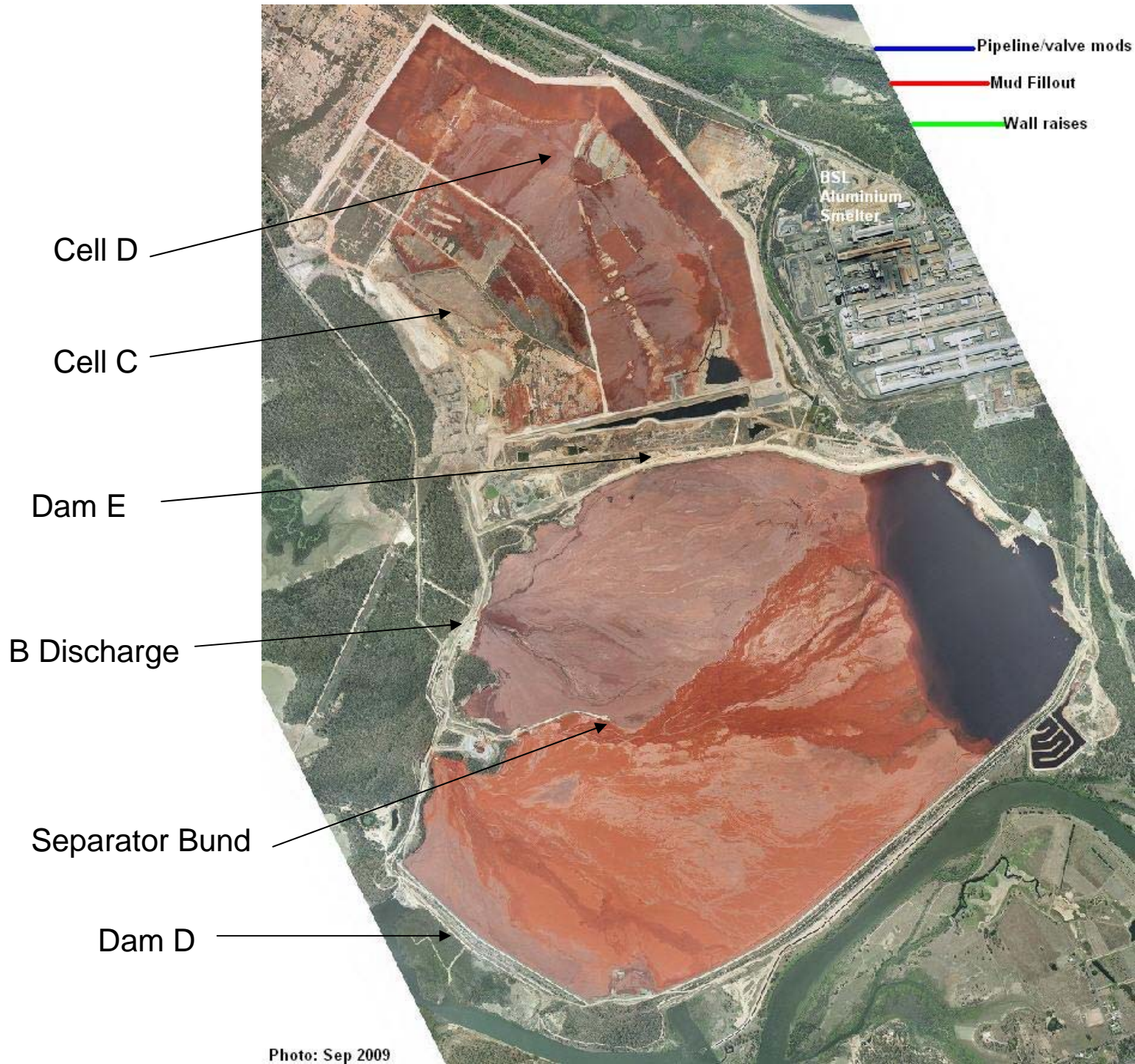
QAL

- Dams are designed and operated to ANCOLD guidelines
- Residue Storage
 - Currently Downstream Wall construction
 - Converting to Upstream Wall construction
 - Residue is neutralized using seawater.

Comparison of Wall Slopes



Approximate Cross-Section of Dam at Ajka Refinery Bauxite Residue Wall-based on photo taken at point of failure



Upstream Wall Construction

- Wall raised incrementally
- Mud inside dam conditioned to provide foundation support

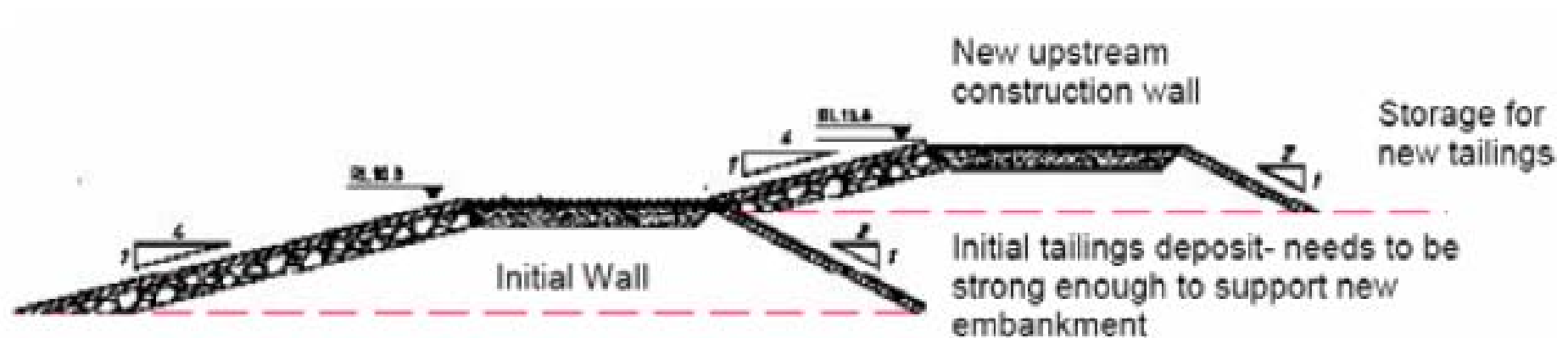


Figure 3. The Upstream Construction Technique

Proposed Arrangements After Connection of Dams 1 and 2

