

# Battle to stop Japan's nuclear plant leaks

Attempts to stop up to 300 tonnes of highly radioactive groundwater flowing into the Pacific every day include creating an underground ice wall to surround the crippled Fukushima nuclear plant

**1 GROUND FREEZING:** Shafts drilled one metre apart down to bedrock around perimeter of reactor buildings and turbine halls. Pipework to carry coolant inserted

**Brine:** Calcium chloride brine, chilled to  $-30^{\circ}\text{C}$ , pumped down centre of freeze pipe

**Distribution manifold:** Links freeze pipes to refrigeration unit

Brine returns to refrigeration unit

**Downpipe**  
Diameter: 85mm  
Length: 30m

**2 SILICATE "WALL":** Underground barrier near No. 1 reactor – made by hardening ground with injections of sodium silicate – fails in August when water flows over top of wall

**3 SILT FENCES:** Isolate power plant intake canals from inner harbour. When one fence is temporarily opened in June, levels of radioactive caesium 137 jump by 20 times

**4 SEAWALL:** Plant operator **Tepco** building gigantic impermeable seawall to protect ocean from radioactive groundwater. Target date for completion is March 2015

**5 TANK FARM:** Existing tanks can hold about 380,000 tonnes of radioactive water – currently at 320,000-tonne mark. Plan to increase capacity to 700,000 tonnes by 2015

**Mar 2011:** Following earthquake and tsunami, series of hydrogen explosions devastate plant. Three reactors melt down

**Ice wall:** Frozen ground is twice as strong as concrete. Subterranean wall will stop estimated 1,000 tonnes of groundwater that flow through site daily

**Tank farm**

**6 CONDUITS:** Radioactivity levels spiking in trenches that house pipes and cables leading to sea.

Water tested in conduit to No. 2 reactor contains 1.6 billion becquerels per litre\* of radioactive caesium 137, more than 17 million times safe limit of 90 becquerels per litre

\*Units used to measure radiation

**Freeze pipe:** Brine flows back to surface in annulus between downpipe and freeze pipe