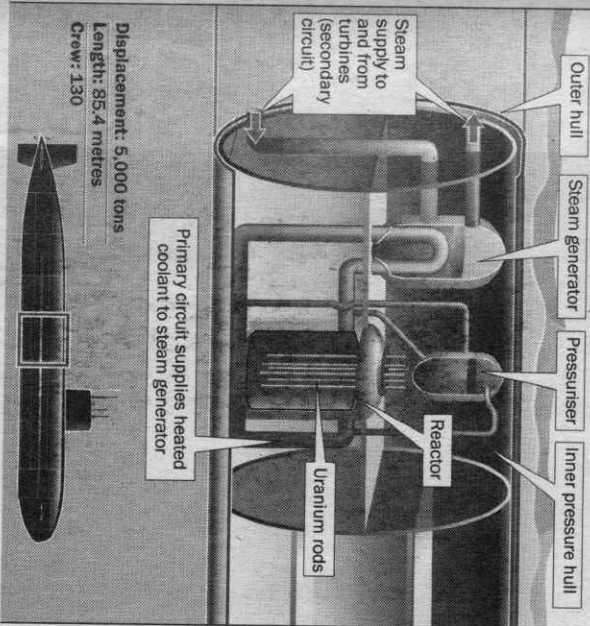


Submarine faults torpedoed strategy.

INSIDE HMS TIRELESS



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DEFECTS found in the Royal Navy's nuclear submarine fleet represent a significant setback for the Government because of the vessels' increasingly important role in post-Cold War military strategy.

The tactical submarines exemplify the flexible approach which was adopted by the Government in its Strategic Defence Review of 1998. All 12 boats are being fitted with Tomahawk land-attack cruise missiles.

HMS Splendid, a Swiftsure class submarine, was the first to be equipped with the American weapon and was deployed

to the Adriatic during the Nato bombing operation against Yugoslavia last year.

The missiles were fired at substantial military targets with a high degree of accuracy, and the submarine had to redeploy to the Mediterranean for replacement Tomahawks, which were stored on a support ship, half way through the campaign.

The rest of the submarine fleet is in the process of being adapted to take Tomahawks.

The other Swiftsure class boats are *HMS Sovereign*, *Superb*, *Seppie* and *Spartan*. The Trafalgar class subma-

times are *HMS Trafalgar*, *Turbulent*, *Tireless*, *Torbay*, *Trenchant*, *Talent* and *Triumph*.

The defect has arisen in pipework that runs from the pressure vessel around the nuclear reactor core.

The pipes are part of what is called the primary coolant circuit, which takes heat from the nuclear reactor to the boilers to drive the submarine's turbines. Sophisticated instruments can detect the tiniest leak in any part of the pipework.

An alert sailor on watch aboard *Tireless* spotted the

HMS Tireless arrives in Gibraltar in May after scalding steam leaking from a pipe forced her commander to abandon a Mediterranean exerci-



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first sign of a leak while the submarine was in an exercise in the Mediterranean in May.

The leak of scalding steam through a tiny hole in a section of welding forced the commander of the submarine to close down the reactor and head for Gibraltar.

The *Tireless*' experience led directly to the decision to recall all nuclear submarines.

The Royal Navy's submarine fleet became exclusively nuclear-powered under the last Conservative government, which decided that with the end of the Cold War and pressure to make savings in

defence spending, conventionally-powered diesel-electric boats could be scrapped.

These included four brand new Upholder class submarines, some of which had not even entered service. They were eventually sold to the Canadians.

The 5,000-tonne nuclear-powered boats are capable of continuous patrols at high underwater speed and can circumnavigate the globe without surfacing. Apart from Tomahawks, they are also armed with Sub-Harpoon long-range anti-ship missiles. A new generation of nucle-

ar-powered submarines has been ordered and is now beginning to take shape at BAE Systems' shipyard at Barrow-in-Furness, Cumbria. So far three of the new Astute class submarines have been ordered to replace the Swiftsure boats.

The oldest of the current fleet of submarines is *HMS Sovereign*, which was built in 1974. The most recent is the Trafalgar class *HMS Triumph*, built in 1991.

The Swiftsure class submarines and some of the Trafalgar class boats were involved in a previous defect

scare more than ten years when cracks were discovered in coolant circuit pipework on Polaris missile deterrence boats. All the nuclear powered boats were inspected and similar cracks were found on others.

The cracks posed a considerable engineering challenge to the Polaris submarine cause of the difficulty of gaining access to relevant sections of the boats.

The Navy's submarine has been reduced in number and under plans the 12-boat fleet is cut to 10.