

Research ship as clean as her whistle



Modifications aboard Australia's Marine National Facility research vessel, *Southern Surveyor*, illustrate how ships can be ingeniously adapted for environmentally efficient operations at sea.

This plucky boat is used to personality changes for a rugged life – she was originally built in 1971 as a North Sea trawler, and her next role, as an oilfield Dive Support Vessel, can't have been much easier.

But the extra alterations built in for the diving work made her an ideal candidate to go on to become Australia's multi-purpose marine research platform managed by CSIRO – a more regal role, befitting her long experience.

She has since performed tirelessly for over 15 years, thanks to a series of further capability upgrades. And although now at the end of her service life for CSIRO, these additions help to ensure the vessel meets or exceeds the environmental standards expected of researchers working in very sensitive marine areas for long periods.

For example, where many ships do not treat effluent and must discharge it more than 12 nautical miles from land, the treatment plant installed on *Southern Surveyor* in 2002 provides secondary treatment to the most stringent environmental standards.

The ship also operates a reverse osmosis water purification system, driven by the engines' spare shaft alternator power, giving great capacity for making virtually

endless fresh water when at sea.

Waste from on-board laboratories is either highly diluted to non-toxic standards or retained aboard for later safe disposal ashore. All chemicals are precisely counted on and off.

While at sea for long periods, ships accumulate large amounts of general garbage – much of which may go over the side on the open ocean. Not the case here; a detailed 'separate and save' process is employed. All plastic, paper, cardboard,



Deployment of an instrument from the *Southern Surveyor* that both samples sea water and measures conductivity (salinity), temperature and depth. Richard Arculus/ANU

metal and glass is sorted and stored for shore recycling, where it can be fed into the latest reuse processing technology. When operating in sensitive areas, wet and food waste is frozen and also transported ashore for appropriate disposal.

Captain Fred Stein, Director of Research Vessels at CSIRO Marine and Atmospheric Research who manages the operations of the ship, says, 'Meeting the best environmental standards possible is central to what we do on board the Marine National Facility. As investigators of the marine environment our researchers and crew appreciate the importance of leading by example.'

'There is no way that we could operate in the highly sensitive marine areas we do unless our operations are benign. We need to sail in close to reefs and move across marine parks. Keeping our impacts to a minimum both protects the environment and ensures we make the most accurate measurements possible.'

This policy extends to personal commitments on board. Every crew member and researcher is issued with a personal water bottle, drinking glass and coffee mug for the voyage. This cuts down on storage and ensures good hygiene when confined at sea – all without the need for disposable polystyrene, plastic or paper.

Even as the ship reaches her term for CSIRO, further modifications to ensure she excels at environmental standards are planned.

The ship is operated on clean-burning marine diesel rather than cheaper, heavy fuel oil and Captain Stein says a study is now being done to assess the benefits of systems to further reduce sulphur and nitrogen emissions from the ship's exhaust.

Meanwhile, the search for a replacement research vessel is already underway.

'We're now supporting multi-disciplinary teams that require multi-capable platforms operating sensitively, 24 hours a day for long periods.'

'The nature of the marine science being done is changing fast, so the current vessel is becoming increasingly outdated,' Captain Stein says.

'With researchers at CSIRO Energy Technology we are considering how fuel cell "clean technology" could be employed as the power source in a future vessel. We are determined to ensure that full advantage is taken of the cutting-edge technologies available today to minimise the environmental impact of tomorrow's research.'

● James Porteous