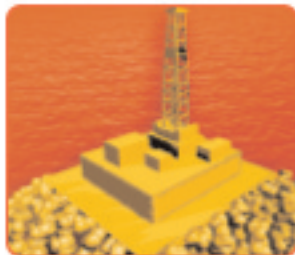




ENERGY

Big Oil's Icy Challenge

It's the **biggest** petroleum discovery of the past three decades: 13 billion barrels of crude in the Kashagan oil field under the Caspian Sea. The only trick is extracting it from beneath the shallow waters. That requires a string of man-made islands, an amphibious vehicle that makes a Hummer look like a Mini Cooper, and a filtration system that renders human waste almost drinkable. Here's a drill-down into how oil-giant consortium Agip KCO is tackling one of the industry's most challenging projects ever. —**Matthew Yeomans**



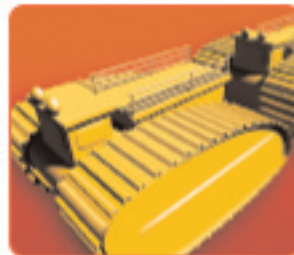
MAN-MADE ISLANDS

In winter, high winds turn thick layers of ice into floating mounds 100 feet high and 1,500 feet wide. Standard drilling platforms would be crushed by these frozen waves, so Agip is installing 281 oil wells on 17 impervious artificial islands made from steel and 400,000 tons of sand and gravel.



BY-PRODUCT DISPOSAL SYSTEM

To minimize the chances of environmental disaster, Agip is employing advanced drilling techniques to avoid spills. It's also collecting sulphur cuttings, a by-product of the drilling process, on the artificial islands, then shipping them to the mainland, where they are made inert and stored.



AMPHIBIOUS ESCAPE VEHICLE

To allow a rig's crew to escape if a drill hits a pocket of lethal hydrogen sulphide (H_2S) gas, Agip commissioned a Canadian company to build Arktos, the first amphibious tracked escape vehicle. It seats 50, has its own oxygen supply, and can hit 10 knots in water, or rumble over ice to reach the mainland.



WATER FILTERS

To dispose of the human waste created by a rig's 80 workers, Agip uses a system pioneered on nuclear-powered subs. It centrifuges and burns the sewage, adds bacteria, and forces the remaining water through a bioreactor. The result: distilled water clean enough for laundry and bathroom facilities.