



Control of Non-Indigenous Invasive Species in Ship's Ballast with Ozone



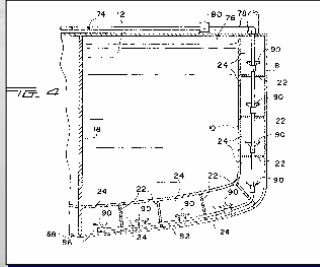
Testing of the Ozone System



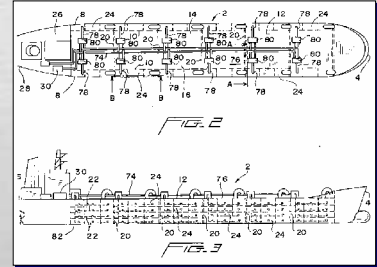
BUG BUSTERS

Simon Lisiecki
Neil Dunn
Ewout Vanderwende
Roger Gale
Jack Robinson
John Thibault

Side view of ballast tank



Vessel plan view



The worldwide transfer of non-indigenous species (NIS) is having significant and unwanted ecological, economic and human health impacts. Roughly 400 marine and estuarine NIS are established in North America (i.e. Zebra Mussels). Shipping is the vector responsible for many of the known invasions.

The Port of Valdez is the single largest receiver of ballast in the U.S. On the basis of mounting regulatory pressure, BP Oil Shipping Company (USA) Inc., (BPOSC) took the initiative to combat this problem.

Ozone Ballast Water Treatment System Project

Ozone has been used by major municipal water systems, such as Los Angeles, use ozone in place of chlorine to treat water. BPOSC commissioned Nutech O3 to design and develop the world's first ballast water treatment system, and the SCX 2000 System was installed on the tank vessel *Tonsina*.

Test protocols to determine the efficacy of the equipment were developed, and the results will be available in December 2001.



Installing ozone generator on Tanker *Tonsina*

How the SCX 2000 Works

Ozone is produced by sending a stream of oxygen enriched air through an electrode. Within the electrode, a high voltage corona discharge is created (an electric arc). As the oxygen enriched air stream passes through the corona gap, a percentage of the air stream is converted into ozone, which is then piped into the ballast tanks and released into the ballast water via diffusers.

The ozone is distributed throughout the ship, to each of the 15 ballast tanks, through a system of 7,000 meters of stainless steel pipe. The ozone is distributed throughout the ballast tanks by a system of 1,200 stone diffusers.

The ozone interacts with chemicals that naturally occur in sea water to create iodine and hydrobromous acid. These chemicals kill all bacteria, viruses and NIS found in ballast water. Fortunately, these chemicals rapidly break down and revert to iodine and bromine, which are non-corrosive and safe to local aquatic wildlife, and poses no harm to the ship's crew.