

## HEALY INPUT TO AICC AGENDA

### Summary - SBI Ambient Seawater for Incubation

Utilized a system where a forward ballast tank (3-E-0-W – capacity 95K gallons, but filled to 80K to maintain proper trim) was filled with ambient salt water by one of two methods:

- a. During heavy ice conditions of 1<sup>st</sup> SBI phase an electrical submersible pump was rigged over the side from the 01 Deck Starboard (about 25 feet of freeboard) which pumped water at 150 gpm to the ballast tank. This could only be done while the ship was at a science station. It would take about 9 hours to fill the tank to 80,000 gallons using this method.
- b. For the minimal ice conditions of the 2<sup>nd</sup> phase the forward fire pump was used to pump water into the ballast tank when the ship was hove to or during open water transits. The fire pump would fill the tank at 1,000 gpm. It would normally take about one hour and 20 minutes to refill the tank.

Seawater was then provided to the incubators on the Foc'sle via two air operated pumps (taking suction from the tank's sounding tube) located in the Deck Machinery Room at the tank top level through two distribution manifolds (one port and one starboard) that were built by the ship's DCs and installed on the bow. A total flow rate of 35 gpm was available from each of the two distribution manifolds on the 01 level bow Foc'sle. Garden hoses (provided by the science parties) were used for the seawater supplies to the incubators.

The science party would measure the ambient seawater temperature, the incubator seawater feed temperature, and the incubator seawater outlet temperature to determine whether temps remained cold enough to replicate ambient conditions. When the ambient-incubator inlet temp difference exceeded one (1) degree C the scientists usually requested a "tank dump" which required the emptying of the 3-E-0-W tank via firemain and installed eductor. This could not be done during water work at science stations due to concerns about effects on the water column. The eductor would empty the tank at a rate of 565 gal/min.

On sunny days the hull would absorb solar energy and heat up usually resulting in the need to empty and refill the 3-E-0-W tank. During cloudy days a full ballast tank of cooling water was usually good for 12 hours before refilling the tank was necessary (this varied by scientist and status of science ops). However, note that this frequency could only be maintained when refilling via the No. 1 firepump in the minimal ice conditions of the summer mission.

Due to the cold temps in the tank, the air operated pumps would periodically freeze up. Engineering watchstanders were tasked with hourly rounds to check the pumps to ensure continuous flow was provided to the incubators. Oncoming Officers of the Deck would also check the pumps as part of their pre-watch round (once every 4 hours).

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HEALY's engineers expended 450 hours supporting the science seawater needs for SBI (both spring and summer phases).