



The development of a hot-water drill to access sub-glacial Lake Ellsworth

David Blake

British Antarctic Survey, Technology and Engineering, Cambridge, United Kingdom (dmb1@bas.ac.uk, 01223 351730)

THE DEVELOPMENT OF A HOT-WATER DRILL TO ACCESS SUB-GLACIAL LAKE ELLSWORTH

Access to Sub-Glacial Lake Ellsworth (SLE) is scheduled for the 2012/13 Antarctic summer season. A hot water drill is being developed to produce an initial hole diameter of 36 centimetres to enable an instrumented probe to enter the lake. The design of the drill will build on previous concepts and developments used by the British Antarctic Survey (BAS) for hot water drilling in Antarctica.

SLE is to the south of the Ellsworth Mountains and with a ground transportation route to a blue ice runway at Patriot Hills. For the drilling programme at SLE, all equipment, materials and fuel will be carried from South America to Patriot Hills via airborne heavy lift. With a maximum aircraft load of 17 tonnes, attention to the maximum size of components and the overall weight is necessary to ensure materials can be transported by air. The drilling hose at over 3200 metres and the winch will be the largest component needed to be transported as one item.

A procedure has been produced and will be adopted to ensure all of the components are cleaned before they are used at SLE. Biological filtering will be employed to remove viruses and product from the water supply. The electrical supply, pumps and ancillary items will be housed in a field camp adjacent to the access hole. Sufficient fuel is to be provided in 205 litre drums to support the field site and enable two separate accesses of the lake. The drill is being developed and assembled at BAS in Cambridge and will be tested before delivery to SLE.

David Blake

dmb1@bas.ac.uk