1 Dipole

The Charybdis dipole magnet will be used to to precess the neutron spin. The overall dimensions are approximately 1.5-m tall, 2.3-m wide, and 1.7-m long. Charybdis weighs 38 tons. With a 8.25-in gap, the aperture is 8.25-in high $\times$ 0.56-m wide. The gap length is 1.22-m along z. Each of the magnet's two coils has a resistance of about 0.51 Ω. The magnet requires a series current of 450 A to achieve the maximum field of about 1.9 T. In practice, the magnet is wired in parallel (total resistance of about 0.255 Ω) for a maximum supply current of about 900 A and a maximum supply voltage of about 230 V. The magnet will be operated at lower supply currents (less than $\sim$530 A). These operating parameters are within the capability of the Hall C SOS-D1 power supply. Charybdis is water-cooled, requiring 40 gpm at 160 psi. The specific hazards associated with the dipole include:

- magnetic field hazard
- electrical hazard
- Low Conductivity Water(LCW): high pressure water hazard
- fire hazard

The same safety procedures will be followed as described in the ESAD for the Hall C Base Equipment, Chapter 2.6 Magnets and Magnet Power Supplies.

1.1 Magnetic Field Hazard

Calculations and measurements indicate that the magnetic field will be $\sim$100 Gauss at a distance of 1 m from the magnet for a 8.25-in gap with no field clamps. After the magnet is installed and connected to its power supply and cooling water, an area surrounding the magnet will be roped off and signs posted to warn of the presence of magnetic fields. There will also be a red beacon that will be lit when the magnet is energized. There are specific situations requiring personnel in the vicinity of the magnet while it is energized; for example, during the installation phase of the experiment, the field of the dipole will be measured with a Hall probe over the range of currents used during the experiment. A Temporary Operational Safety Procedure (TOSP) will be followed for this task. The field will be monitored with a Hall probe at the center of the magnet.

1.2 Electrical Hazard

The most significant electrical hazard directly associated with the magnet is at its power terminals which will be covered with a plexiglas insulator to prevent contact. Any work on the magnet power supply or power terminals must be done in accordance with the electrical safety chapter in the JLAB EH&S manual.

1.3 LCW Hazard

The LCW supply poses a hazard to personnel exposed to a stream of water at 160 psi. The hoses are rated to 600 psi.

1.4 Fire hazard

There is a potential fire hazard if there is a short in one of the coils or if the cooling water is not sufficient. The hall is equiped with a VESDA (Very Early Smoke Detector Alarm) smoke detection system for early warning of a fire.