NATIONAL HIGH MAGNETIC FIELD LABORATORY

NHMFL

FLORIDA STATE UNIVERSITY

SAFETY PROCEDURE

SP-16

TITLE: MAGNET CELL SAFETY PROCEDURE

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1.0 TITLE: MAGNET CELL SAFETY PROCEDURE SP-16

This document outlines safety practices that must be followed by everyone conducting experiments in the high magnetic field facility.

2.0 PURPOSE

This procedure defines specific requirements for the protection of personnel from work place hazards when working with in the resistive and superconducting magnet research cells.

3.0 SCOPE

This document applies to all personnel working on or with equipment or systems that are under the control of the NHMFL. This Safety Procedure is to be used by all personnel (employees, contractors, vendors, or users) at the NHMFL.

4.0 RESPONSIBILITIES

4.1 Personal safety in the workplace is the primary responsibility of every employee and user.

4.2 Users of this facility are responsible to ensure they have read and understand the requirements of this procedure.

4.3 All users shall adhere to the safety rules presented in this procedure.

4.4 All NHMFL personnel, contractors, or vendors entering an operating research cell must ensure they have read and understand these safety rules.

4.5 All personnel must acknowledge, by signature, they have read and understand this procedure. Forms are available in the Control Room.

5.0 MAGNET CELL SAFETY PROCEDURE

5.1 General

Your footwear must provide secure footing on stairs and ladders and some protection of your feet from spilled liquids. Bare feet and open toed shoes, such as sandals, are not allowed in the cell area, machine shop, or other areas of the OPMD building.

Equipment must be arranged in the cell neatly with reasonable working space.

Cables should be out of the way so people don't trip on them or catch them with moving equipment. The experimenters are responsible for the cleanliness of the cell during an experiment and for returning all equipment and supplies to their proper places after finishing.

Gas bottles must be in the wall mounts. If the wall mounts are not convenient, ask the Control Room or Operations personnel to help you do what you want.

There shall be one person in the cell whenever the power supplies are turned on and control has been transferred to the cell. Control room personnel are instructed to immediately remove control from the cell and ramp the magnet down if a cell is left unattended**.** It is best to have two persons present and participating in the experiments. Two people make fewer mistakes, solve problems quicker, do experimental procedures quicker, and generally make more efficient use of magnet time. This becomes especially important after normal business hours when Operations staff are less available. If you need an extra person temporarily to help with an operation or if you need to leave the cell and cannot ramp the magnet down, call the Control Room. Someone will come to the cell as soon as she/he is available.

The experimenter is responsible for the safety of everyone, other than Operations staff, who is in the cell during a magnet run. The experimenter should warn anyone entering the cell that the field is on and can direct anyone who is not a member of the Operations staff to leave the cell. A plastic barrier chain should be across the cell entrance when there is current in the magnet.

5.2 Emergencies

There is a red "Emergency Off" push button located on the wall, eye level, near the exit in each cell. It will shut off electric power to **all** the magnets in use if it is pressed. In case of an emergency hit this button as you rapidly but calmly exit the cell.

Other safety circuits detect magnet and cell faults and shut off power to the magnets in milliseconds. Most cell emergencies are over in less time than most humans take to react. Do not panic, you may injure yourself or others.

Be alert to abnormal noises or conditions. Contact the Control Room if you become alerted to anything you feel is abnormal.

In the case of physical injury contact the Control Room immediately.

5.3 Electrical Hazards

The magnets are powered by one or more ungrounded 500 volt, 20,000 amp power supplies. There are exposed electrical conductors in each cell. These are located at the points where the green, water cooled, power supply cables terminate at the magnet housing and in the overhead behind the magnets, above the platform, against the wall. Be aware of where these exposed conductors are and make sure that neither you nor anything else comes in contact with this power source. Contact could lead to severe damage to the experimental equipment or sample, not to

mention the experimenter. The power supplies probably will not be damaged.

The magnet housing is connected to the magnet through the cooling water. The magnet housing is grounded to the facility grounding grid. However, the sample tube of the housing is insulated from the magnet housing and floats electrically. The sample tube should be treated as if there could be a 500 volt potential at any time. To be as safe as possible, the magnet housing should also be treated as if there could be a 500 volt potential at any time.

5.4 Platform Access

High pressure water is in the magnet housing and in the connected pipes. For this and reasons above do not spend long periods of time on top of the magnet unless necessary. Please inform the control room if you absolutely must be up on the magnet platform when there is current in the magnet.

Do not enter the area around the magnet under the platform. There are many ways to injure yourself there and no good reason to go in. If you drop something down there, contact the Control Room to get someone to retrieve it.

5.5 Magnetic Fields

Be aware that strong magnetic fields exist around the magnet. Lines at the 10G and 100G level are drawn on the floor of the cell. Credit and ATM cards should be kept behind the 100G line.

Steel, iron or other magnetic objects should be fastened down or kept behind the 10G line. Be very sure that screwdrivers, wrenches and other hand tools are not left around the magnet.

Be especially aware of compressed gas cylinders.

Steel chairs are **NOT** allowed in the cells under any circumstances.

Personnel who have pace makers are not allowed in the high field research areas.

5.6 Communication

Continuous contact between the experimenters and the Control Room must be maintained over the intercommunication system during operation of the magnet.

The experimenter can start the communication by pressing and releasing the Call Button on the speaker cabinet and saying, for example, "Cell five calling the Control Room." Do not press the Call Button after the Control Room has answered, just speak in a fairly loud voice directly into the speaker cabinet. If you can't reach the Control Room via the intercom, dial 4-4416 on the telephone.

5.7 Handling of Cryogenic Liquids

Face masks and gloves are provided in each cell.

Gloves **must** be used when inserting and removing the transfer siphon from the

dewar. Doing so prevents freezing your skin. It also reduces the probability of damaging the siphon so that it will be available for your next transfer.

Eye protection (face shields, goggles, or eye glasses) is available in each cell and is optional for use while in the cell. Eye protection should be used when transferring cryogenic fluids.

Body length protective aprons are available for use as desired. Contact the Control Room if an apron is desired.

More people are injured with liquid nitrogen than liquid helium because it is more commonly handled directly. Wear gloves when you might touch cold metal tubing.

NO open toed sandals are allowed. Foot wear must cover the toes