NATIONAL HIGH MAGNETIC FIELD LABORATORY

NHMFL

FLORIDA STATE UNIVERSITY

SAFETY PROCEDURE

SP-

TITLE: LIQUID NITROGEN STORAGE TANK RUPTURE DISK OPERATION DRAFT

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1.0 PURPOSE

1.1 This is the safety procedure to be used by all job site personnel at the NHMFL.

1.2 This procedure is intended to establish policy and procedure at the NHMFL in the event that the liquid nitrogen storage tank pressure relief disk ruptures.

1.3 NHMFL's policy is to provide and maintain a safe and healthful working environment. The safety and health of employees and users are the inherent responsibilities of each employee, management, and all levels of supervision.

1.4 This procedure defines the specific reporting procedures and actions required by NHMFL personnel and users following over-pressurization and subsequent rupturing of the liquid nitrogen storage tank rupture disk.

2.0 SCOPE

2.1 This Safety Procedure will be used by all personnel at the NHMFL in order to protect NHMFL employees, users, and contractors who may be working in the vicinity of the liquid nitrogen storage tank.

2.2 This document applies to all personnel working on equipment or systems which are under the control of NHMFL

2.3 This procedure is to be used in conjunction with all other applicable operations or safety procedures

3.0 RESPONSIBILITIES

3.1 OPERATORS

3.1.1 The Control Room Operator is responsible for ensuring that the actions required by this safety procedure are followed.

3.1.2 The Control Room Operator may delegate this responsibility to designated NHMFL personnel stationed at the emergency site.

3.1.3 Personnel authorized to assume Control Room Operator responsibilities at the emergency site as the on scene supervisor include other Control Room Operators, Plant Operators, Control Room Supervisors, Facility Engineers, Operations Directors, and Facility Directors.

3.1.4 The Plant Operator is responsible for ensuring that the actions required by this safety procedure are followed during dewar filling operations.

3.1.5 Personnel who witnesses or notices operation of the liquid nitrogen storage tank rupture disk will ensure that the Control Room Operator is informed of the occurrence.

3.1.6 Personnel are responsible for observing all safety and occupational health precautions.

3.2 SUPERVISORS

3.2.1 Supervisors will ensure that safety and occupational precautions are observed in their work areas.

3.2.2 Supervisors will ensure that all employees under their authority understand and follow the guidelines presented in this procedure.

3.3 NHMFL

3.3.1 The NHMFL will ensure that all plant operators are provided with the proper tools, equipment, protective clothing, and training necessary for the safe implementation of this procedure

4.0 GENERAL INFORMATION AND PRECAUTIONSG

4.1 The liquid nitrogen storage tank is a pressurized vessel which is a component part of the helium recovery, purification, and liquefaction system. This storage tank is located external to the OP/MD operations plant, adjacent to the liquid helium recovery room.

4.2 The liquid nitrogen storage tank design includes an over-pressure rupture disk. If tank pressure increases, the rupture disk will relieve tank pressure to the atmosphere.

Actuation of the rupture disk occurs at 85±5 PSIG.

4.3 In the event that the rupture disk does relieve excessive internal liquid nitrogen storage tank pressure to the atmosphere; the immediate vicinity around the liquid nitrogen storage tank will have high nitrogen concentration levels and pose an asphyxiation threat to personnel that area.

4.4 Access to the evacuated area will not be allowed unless the buffer zone is relaxed by the on scene supervisor.

4.5 Never touch uninsulated pipes or vessels containing liquefied gas or the cold vapor issuing from it. Both can cause severe frostbite, and the skin may adhere to the cold surface.

4.6 Attempt to save the nitrogen inventory ***shall not be made***.

4.7 Manipulation of NHMFL plant equipment is not required since loss of liquid nitrogen only affects the operation efficiency of the liquid helium recover system.

4.8 The hazard is considered to be removed once the presence of the white, fog like cloud plume dissipates.

5.0 PROCEDURAL GUIDELINES

5.1 RUPTURE DISK OPERATION DISCOVERER

5.1.1 Rupture disk operation may be identified by increased background noise levels and condensation of air around the escaping gas as evidenced by the appearance of a visible white, fog like plume.

5.1.2 Inform all personnel in the immediate area of the hazard.

5.1.3 Report rupture disk operation to the Control Room Operator immediately. It is acceptable to inform the Control Room Operator via the Plant Operator.

5.2 CONTROL ROOM OPERATOR

5.2.1 Make the following statement over the plant paging system: “The facility liquid nitrogen storage tank rupture disk has operated, all personnel stay clear of the liquid nitrogen storage tank area".

5.2.2 Contact the Control Room Supervisor and Mechanical Facilities Engineer.

5.2.3 Direct the Plant Operator to ensure that personnel are evacuated from the emergency site and an acceptable buffer zone around the emergency site is created.

5.3 PLANT OPERATOR

5.3.1 Ensue that the Control Room Operator is aware of the existing problem.

5.3.2 Ensure the personnel in the vicinity around the liquid nitrogen storage tank evacuate the area to a safe location upwind of the escaping gas plume.

5.3.3 Create an acceptable buffer zone around the liquid nitrogen storage tank. The buffer zone boundaries may consist of rope, signs, or stationed personnel. The size of the buffer area (and distance from the liquid nitrogen storage tank) will be based on the magnitude of the rupture and the amount of gas released.

5.3.4 Shut the liquid nitrogen supply valve at the hybrid magnet station.

6.0 UNMANNED CONTROL ROOM GUIDELINES

6.1 There are times when the Control Room and Plant Operators will not be on the NHMFL site. Under these circumstances the individual identifying the liquid nitrogen storage tank rupture disk operation must perform the following:

6.1.1 Inform all personnel in the area of the hazard.

6.1.2 Evacuate personnel from the affected area.

6.1.3 Create a buffer zone around the affected area.

6.1.4 Locate and inform one of the following NHMFL personnel, at the site or at home, of the existing problem.

Control Room Supervisor
A Facility Engineer
A NHMFL Director

NAME	PHONE NUMBER
TOM SHEWAN	422-2329
JIM FERNER	386-4780
HERMAN GILL	562-7344
SEAN MANEY	894-1030
BRUCE BRANDT	893-5511

7.0 PROCEDURE REFERENCES

7.1 Liquid Cryogen's: Volume I Theory and Equipment

K. D. Williamson, Jr. and Frederick J. Edeskuty CRC Press, 1983.

7.2 Nitrogen Material Safety Data Sheet.

7.3 LINDE UNION CARBIDE Gas Safety Precautions Leaflet L-3499H, December 1988.

7.4 Process Systems International Systems Literature for the NHMFL Liquid Helium recovery, purification, and Storage System.