Fermi National Accelerator Laboratory

Fermilab

Hazard Analysis

Work Package # 21102 - LN2 Dewar to Purifier Filling
Hazard Analysis - Form 2022-12206

Dates 28-MAR-2022 — 01-APR-2022
Managed By PPD — Particle Physics Division
Performed On Particle Physics Division
Authorizing Supervisor Allspach, Del (07201N) 630.840.3493
Project Name E1039
Prepared By Bohn, Jordan (36690N) 630.840.4686
Job Description This is for the filling of a cryogenic purifier using a LN2 dewar. To ensure it is done safely and no hazards are introduced.

Point of Contact Jordan Bohn

Pre-job Briefing Conducted by Jordan Bohn

Package Location

Type	Name	Building Manager	Org
Property	KTeV / NM4 [630]	Nelson, Leonard (05172N) 630.840.2564	PPD

Hazard Analysis

Check the MS Equipment Database for equipment you can use to complete your job: (MS Equipment DB)

Check out questions that should be used when job planning or conducting pre-job briefing: (Job Planning/Pre-Job Brief Questions)

Emergency Work

☑ Check this box to indicate this is emergency work that is required to be done immediately before electronic approvals can be obtained. (NOTE: Electronic approvals should still be obtained retroactively.)

Additional Details

Check the boxes next to all types of work and known hazards you may encounter on this job.

COVID-19 Protective Measures (Guidance Documents)

- ☐ Maintain 6 ft. or greater social distance when possible
- ☐ Surgical Mask or other Lab-approved Mask
- ☐ Face Shield
- ☐ Safety Glasses / Goggles
- ☐ Impervious Gloves
- ☐ Clean Surfaces Used
- ☐ Wash/Sanitize Hands
- ☐ Other Protective Measures Not Listed Above (List in Text Box below)

Close Proximity Work < 6 feet

- ☐ 1. Check this box to select the D/S personnel performing the close proximity work (check ALL that apply)
- ☐ 2. Check this box to select where the close proximity work will be performed (check ALL that apply).

Industrial Hazards

- ☐ Flammable Gas Areas
- ☐ Heat Stress / Cold Stress
- ☐ Structural Demolition
- ☐ Excavation
- ☐ Scaffold Erection
- ☐ Scaffold Use
- ☐ Ladder Use
- ☐ Steel Erection
- ☐ Fall Protection - Fall Exposures >4 feet (>6 feet for construction)
- ☐ Overhead Crane
- ☐ Powered Industrial Truck (e.g. forklift)
- ☐ Mobile Elevating Work Platform (MEWP) (e.g. Scissor Lift, Aerial Lift, Bucket Truck, etc.)
- ☐ Mobile Crane
- ☐ Critical Crane Lift
- ☐ Crane Personnel Basket
- ☐ Rotating Equipment
- ☐ High Pressure air/fluids
- ☐ Welding/Cutting/Brazing/Grinding
- ☐ Lead (Lead paint, moving bricks, cutting sheets, soldering)
- ☐ Chemical Use (cleaners, solvents, adhesives, etc.) - If checked attach or link SDS to the HA Upload Files Add Hyperlinks
- ☐ Lasers
- ☐ Non-ionizing radiation (RF, UV, magnets)
- ☐ Confined Space
- ☐ Ergonomics (overexertion, repetition, heavy lifting, awkward lifting, static posture)
- ☐ Silica (machining - concrete, asphalt, grout, mortar)

☐ Loud Noise (continuous, instantaneous)
☐ Asbestos (presumed or suspect building materials, e.g. tile, pipe insulation, roofing materials, etc.)
☐ Nanomaterial (1-100nm, ex. buffing solutions, surface material coating, 3d printing)
☐ Beryllium
☐ Potential Oxygen Deficiency - ODH 1 or ODH 2 Area
☐ Robotics

Electrical Hazards

☐ Manipulative Energized Work
☐ Diagnostic Energized Work (inc. LOTO verification)
☐ Working within 25 feet of 345kV overhead utilities
☐ Working within 10 feet of overhead utilities

Environmental Hazards

☐ Impact or release to surface, sanitary, or ground water
☐ Impact to new or existing air emission sources, including equipment/generators
☐ Generation of regulated waste (hazardous, special, universal)
☐ Use of refrigerants (NOTE: Refrigerant work must be performed by an EPA certified technician and coordinated through the FESS Refrigerant Manager.)
☐ Use of Oil (> 55 gal) or new oil filled equipment
☐ Release of a chemical or use of a new chemical
☐ Impact to a naturally sensitive area or historical site

Radiation Safety

☐ Posted Radiological Area (Radiation Area, HRA, Contamination, Airborne)
☐ Radioactive Material, Ionizing Radiation, Radiation Sources, RGDs, RAW systems, Exhaust Systems, Beamline Components - including targets & absorbers
☐ Area working in >= 100 mrem/hr
☐ Worker receiving >= 50 mrem for the job

General Hazards

☐ Traffic Control
☐ Working above others
☐ Biological Hazards
☑ Other Hazards not listed here? Enter them in the text box below.

Liquid Nitrogen

Check the boxes next to all types of PPE and Controls you will need for this job.

Personal Protective Equipment (PPE)

- ☐ Hardhat
- ☐ Bump cap
- ☐ Steel-toed boots
- ☐ Steel-toed shoes
- ☐ Gloves - leather
- ☐ Gloves - chemical
- ☐ Gloves - electrical
- ☐ High visibility clothing
- ☑ Gloves - Cryogenic
- ☐ Gloves - Nitrile
- ☐ Safety Glasses
- ☐ Safety goggles
- ☐ Safety goggles - chemical
- ☑ Safety goggles - impact/face shield
- ☐ Welding goggles/helmet
- ☐ Fall Protection
- ☐ Respirators (air purifying), cartridge
- ☐ Respirators - supplied air
- ☐ Long Sleeve Shirts
- ☐ Long Pants without Cuffs
- ☐ Arm - cut protection
- ☐ Leg - cut protection
- ☐ Apron - Cryogenic
- ☐ Whole body - electrical
- ☐ Whole body - Dust, chemical, heat
- ☐ Tyvek Coveralls
- ☐ Tyvek Boot Covers
- ☐ Earmuffs (enter noise reduction rating (NRR) in text box below)
- ☐ Ear Plugs (enter noise reduction rating (NRR) in text box below)
- ☐ Other PPE not listed here? Enter them in the text box below.

Controls

- ☐ Danger tape & signage
- ☐ Orange Construction Fence / Snow Fence
- ☐ Barricades - solid
- ☐ Barricades - soft (caution tape)
- ☐ Soil/erosion control
- ☐ Road Closure
- ☐ Site dust control
- ☐ Other Controls not listed here? Enter them in the text box below.

Hazard / Mitigation

Step #	Critical Step	Process Step	Hazard Details	Mitigation Details
1	No	Cryogenic Training	Exposure to cryogenics	Personnel need to have general cryogenic safety training (FN000115) when handling cryogens. Large portable liquefied gas dewar handling training (FN000475) is required for moving any 160L/240L dewars. Use proper PPE for cryogenics.
2	No	Connecting dewar and vent lines to purifier	Accidental exposure to cryogens. Release of cryogens.	Ensure the line going from the dewar to the purifier has all fittings leak tight. Line should be insulated. Vent line should also have leak tight connections and be insulated. A check valve must be attached to end of vent line to prevent back flow of air. Vent line needs to be secured to railing.
3	No	Monitor purifier pressure	Possible over pressure of vessel and lifting of relief valves. Release of cryogens.	Purifier LN2 space pressure should be continuously monitored to ensure pressure does not increase beyond 10psig. Relief valves lift at 15psig. This is monitored via PTA_T in the PLC
4	No	Monitor Liquid Level of Purifier	Over filling of purifier	The liquid level of the purifier LN2 space should be continuously monitored. This is monitored via the PLC.
5	No	Close portable dewar valve when filling is complete.	Over filling of purifier. over pressurizing of purifier.	Ensure that the portable dewars isolation valve is completely closed when done filling.
6	No	Clean any condensation	Slipping/falling	Any condensation that has accumulated should be wiped up to prevent slipping and falling.

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Approved: ~~Point of Contact~~ Del Allgood

Pre-job Briefing Conducted by Jordan Bohn

The tasks have been reviewed in the work area where they will be performed, and the workers on this crew have been through required training.

NAME and ID (Please Print)	Signature	Date
Dustin Keller		3/30/22
Ishara Fernando		3/30/22
Wheeler Allred		3/30/22
Ernesto Diaz		3/30/22
Wibodha Bandara		3/30/22
Kenichi Nakano		3/30/22