Overview of Polarized Target System

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Main Target Systems & Their Hazards

1. Dilution refrigerator – cools target material to 200 mK

   Hazards:

   • Cryogenics / ODH – probably minor

2. 7 T Superconducting Magnet – provides field for polarization

   Hazards:

   • Over pressure - (due to window failure) should be handled via proper pressure relief system design

   • Electrical – should be easily mitigated as this will be a turn key commercial system

   • Cryogenic / ODH – probably minor
3. Microwave (160 GHz) System - Provides the polarization

Hazards:

• Non-ionizing radiation

• Electrical – should be easily mitigated via well known methods

4. NMR RF system (MHz) – Measures polarization

Hazards:

• Electrical – should be easily mitigated via well known methods
5. Cryogenic Support – Supplies LN$_2$, LHe to the system and collects He gas boil off

Hazards:

- Cryogenic / ODH – detailed analysis is required but probably not a problem. The presence of LN$_2$ may require the installation of an ODM system. This will be particularly true if the target & Cryogenic system is fully enclosed inside shielding.

- Over Pressure – easily mitigated via standard relief values on dewars and transfer lines

6. Target Vacuum System – provides insulating vacuums for the target and magnet cryostats.

Hazards – No significant hazards
7. Other Comments:

- No significant amounts of flammable gases (~ 10 g of LiD and NH₃)

- Routine bracing of components should address seismic issues

- Makes use of a lot of the E158 infrastructure. Thus, a lot of the safety issues have already been addressed