

# A0PI SOLENOIDS POWER-ON ACCESS HAZARD ANALYSIS

POWER-ON ACCESS PURPOSE: Solenoid Magnets (SM) Test & Calibration.

ACCESS DATE/TIME: \_\_\_\_\_

ENCLOSURES BEING ACCESSED: A0 Photoinjector South Cave (A0PI Cave)

SUBJECT DEVICE: A0PI Solenoid Magnet Power Supplies: Main, Bucking, Secondary.

APPROVAL REQUIRED PER BDSP-05-0400: SSO or Designee

ACCESS COORDINATOR: \_\_\_\_\_ is responsible for ensuring adherence to the requirements of the hazard analysis.

UNEXPOSED OBSERVER: \_\_\_\_\_ will maintain possession of the A0PI Cave Key and remain outside the cave - unless required to enter the cave in order to warn entrants to evacuate. If possible the SM power supplies should be shut down before entering cave.

APPROVED ENTRANTS & JOBS TO BE PERFORMED:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

OTHER PERSONNEL SUPPORTING ACCESS:

- 1 Interlock Technician
- 1 RSO (or designee)
- 1 SSO (or designee)

ACCESS REQUIREMENTS:

**NOTE:** Due to "Two Person Rule," A minimum of 2 entrants is required.

**NOTE:** No one with a cardiac pacemaker shall be allowed in the cave while the Spectrometer Magnet is on, since even low-level magnet fields (~5G) can affect pacemaker function. The expected magnet fields of the Solenoid magnets at one foot are about 20 Gauss.

**NOTE:** This procedure is only valid when voltage < 15 VDC and amperage < 300 A. If either parameter is higher, the procedure must be stopped, the SM power locked off, and ES&H Dept. consulted.

**NOTE:** The following magnetic field strength exposure limits will be adhered to: Whole Body Exposure < 600 G (60 mT), Extremity Exposure < 6000 G (600 mT). If exposures above this are encountered, stop testing and contact the SSO before proceeding.

1. Complete a "**Jumper Request form**" and coordinate jumpering of SM interlock with BD/ES&H SSO. Complete "**Power-On Access Hazard Analysis**" and coordinate power on access with BD/ES&H SSO.

2. Obtain the A0PI Cave Enter-Reset-Permit **Key** (PAD146) & Configuration Control P.S. Lockout key (FPSL) (both keys are on the same key ring –tag #9181) from the **Main Control Room**. The unexposed observer must maintain the A0PI Cave Enter-Reset-Permit Key (PAD146) in his/her possession during the access in order to ensure that the cave cannot be interlocked and allow approved entrants to enter the cave during the Power-On access. The unexposed observer must maintain possession of this key in until the access is completed and the jumper is removed.
3. Each entrant shall ensure that the two RF modulators and all other interlocked supplies (excluding the SM power supplies) are off and **Configuration Controlled**. Each entrant shall ensure that the Configuration Control Key (FPSL) is placed in a job lock box. Each entrant shall perform **LOTO** on this **job lock box**. The unexposed observer shall perform **LOTO** on the **SM** power supplies (East wall Safety Switch 3 LOTOs all three solenoids).
4. Each entrant shall ensure that **exposed terminals** on the SM are **sufficiently covered**, or otherwise not easily accessible. Approved entrants must ensure that during the Power-On access, personnel and conductive objects cannot inadvertently contact energized conductors.
5. **RSO** shall Configuration Control the high voltage power supplies for the two RF modulators. This will prevent radiation production in the cave.
6. **SSO** shall inspect the SM, their power supplies, the Configuration Control lockouts, and the LOTO lockout.
7. **ES&H Interlock personnel** shall **jumper** the SM power supplies. After SM power supplies are jumpered, the cave may remain in open access as long as the LOTO locks are maintained on the SM power supplies. Once the LOTO locks are removed, the cave will then be in Power-On access mode and only approved entrants may enter.
8. Approved entrants shall **enter the cave** and securely **close the cave door** behind them to prevent unauthorized persons from entering the cave.
9. Approved entrants shall visually **search the cave** to ensure that no one other than approved entrants are inside. Escort unapproved personnel out of the cave and ensure that the cave door is again closed and secure.
10. Approved entrants shall **exit the cave**, securely **closing the door** behind them so that no one else can enter. Approved entrants shall instruct the unexposed observer to **remove his/her LOTO locks** from the **job lock box** and begin the powering and adjustment process. IF desired, the unexposed observer can control the SM power supplies while communicating with the approved entrants over the phone. The voltage and amperage of the SM should be maintained as low as possible for the access period. Nominal parameters are 15 VDC and 220 Amps.
11. Approved entrants shall **enter the cave** and securely **close the cave door** behind them to prevent unauthorized entrants from entering the cave.
12. Approved entrants shall **perform SM measurements**, taking necessary precautions to ensure that personnel and equipment do not contact exposed conductors of the energized magnet.
13. **If entrants must leave the cave** during the Power-On access, they must **securely close** the cave door when they leave so that no others can access the cave during their absence.
14. **When the Power-On access is completed** the **SM** power supplies shall be turn **off**. Then the approved entrants shall **Search & Secure** the cave, exit the cave (closing the door behind them), **make up** the cave **interlocks**. **Observe** that the jumpered interlock lights go **off**. Turn **on** the **SM** power supplies, and then **brake interlocks** (open the cave door). **Observe** that the SM power supplies trip **off**.

15. **BD/ES&H must then be informed that the Power-On access is over**, the SM interlock jumpers have been removed, and the SM interlocks have been tested. Remove LOTO locks and tags from the job lock box. Configuration Control the SM power supplies with their configuration control locks. At this point the cave can revert to open access. Return Configuration Control key to the A0PI Cave Enter-Reset-Permit key ring. Return these keys (Key tag 9181) to the MCR.
16. The **Access Coordinator** will contact the **RSO** for removal of the RSO padlocks.

SSO APPROVAL  
SIGNATURE :

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RSO SIGNATURE :

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INTERLOCK TECHNICIAN  
SIGNATURE :

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UNEXPOSED OBSERVER  
SIGNATURE :

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ENTRANT  
SIGNATURES :

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