



Booster High level RF

CLEANING REQUIREMENTS FOR ANODE POWER SUPPLY AC VCB CABINET

Purpose and Scope

The purpose of this procedure is to outline and detail the process of cleaning the Anode Power Supply AC VCB Cabinet internal equipment.

Both RF East and West Gallery Anode Power Supplies need to be cleaned and inspected annually. When working within the AC VCB cabinet one must ensure that the proper precautions have been taken to remove all stored energy to safely work on the equipment.

Performance of Maintenance Activities

This procedure is always performed by two trained employees due to the dangerous voltages that may be present.

All personnel who access or work within the described equipment must comply with the specific instructions and follow all Hazard Analysis procedures and related LOTO procedures defined in the document. In cases where unusual circumstances may require deviation from these instructions, the Department Head or his/her designee and all participating personnel shall discuss and agree upon an appropriate course of action.

For an overall view of this system, refer to the block diagram in Attachment 2.

Authorized Personnel

An Accelerator Division employee is authorized to perform this procedure if he/she understands all Hazard Analysis procedures, has the necessary knowledge, including current training, and is authorization to perform the following LOTO procedures:

- **Booster Anode Power Supply LOTO procedure (ADDP-EE-9933)**

Equipment

- Proper PPE per LOTO Procedures
- Ladder
- Cleaning supplies – including shop vac and air bottle
- Basic tools (wrenches, screwdrivers, pliers, etc.)

The Steps of LOTO Prior to Maintenance Activity

Shutdown Procedure:

The authorized employee shall shutdown or turn off the equipment or systems by using the normal shutdown procedure.

1. Place Anode Power Supply Control Panel in local mode. Disconnect all modulators from Anode Power Supply by using the Anode Power Supply Display Panel under **Subpage Switches**. Actuate the switches by pushing on the disconnect icon button for each Station. **Note:** The switches can only be connected/disconnected locally!
2. **Leave the Anode Power Supply Control Panel in local mode.**
3. **Lock Out/Tag Out:** The authorized employee shall isolate, relieve, restrain, and verify the sources of AC energy feeding the Anode Power supply using the **Booster Anode Power Supply LOTO procedure (ADDP-EE-9933)**.

The Steps for AC VCB Cabinet Maintenance Activity

1. If LOTO has been performed at an earlier date, verify that LOTO is still valid with all grounds and grounding hooks in place before entering the DC cabinet.
2. **FOR ENTRANCE INTO 13.8 KV VACUUM CONTACTOR CABINET**
 - a. In addition to the above requirements from for access to the DC cabinet
 - b. Facility Operations must be called and request that the duty electrician come out and open the S&C fused disconnect switch for the anode supply being worked on and physically remove the fuses from the disconnect to obtain 2 air gaps.
 - c. S&C fused disconnect switch is located in Booster East & West utility yard.
 - d. **Facility Operation's will verify for zero voltage and install hard ground shorts on the 13.8kV load side in the fused disconnect cabinet or the 13.8kV input to the vacuum circuit breaker in the APS AC cabinet.**
 - e. Caution: Confirm 3 phase capacitor on output of VCB (located in right hand cabinet about head high is discharged (use ground stick).

Cleaning

3. **Input AC Cabinet transformer Primary Bushings**
 - a. Ceramic transformer bushings
 - b. Clean and inspect flexible cables connecting VCB to transformer primary.
4. **Clean 13.8kV insulating bushing on bus work through the cabinets**
5. **Clean Ross Engineering VCB in right hand cabinet**
6. **Clean step-start and direct VCBs in left hand cabinet**

Returning Anode Power Supply into Service

1. If further maintenance is required within the Anode Power Supply or on any of the Booster RF Systems, leave DC cabinet in a LOTO'd configuration.
2. If no further maintenance is required within the Anode Power Supply or on the Booster RF systems within that gallery, follow the **Booster Anode Power Supply Lock Out/Tag Out Procedure, returning to Service section**. This must be performed by an authorized employee using the **Booster Anode Power Supply LOTO procedure (ADDP-EE-9933)**.