

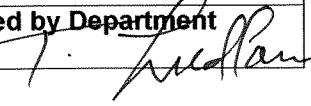


BROOKHAVEN NATIONAL LABORATORY PHYSICS DEPARTMENT		Number: PO-P-ATF-0005	Revision: 3.0
		Effective: April 12, 2010	Page 1 of 2
Subject: ATF Response to Modulator Malfunction		Prepared by: Vitaly Yakimenko	
Reviewed by ESH Coordinator: 	Approved by ATF Head: 	Approved by Department Chair: 	

ATF Response to Modulator Malfunction

Note: *The modulator PFN (pulse forming network) cabinets may be opened only by qualified persons trained in the hazards therein. Each capacitor in the cabinet can carry a potentially lethal amount of stored energy and an arc or fire could disconnect the automatic grounding equipment and prevent it from functioning.*

- 1) ATF modulators are monitored in the following ways:
 - a) The sound from the modulators is picked up by a microphone connected to the PA system.
 - b) Smoke detectors. Alarm panel is located within control room.
 - c) The RF wave forms inside the control room when ATF in operation.
 - d) Electron Beam when experiment is in operation.
 - e) A video monitoring system.
 - f) The modulator arc detection (under-voltage interlock).

- 2) Fire extinguishers and alarms are located throughout the ATF.

- 3) In the event of arcing in a modulator, all power to the modulators must be immediately removed by operating any of the “Modulator Electrical Emergency Stop” buttons located in the modulator area and control room. Immediately call a qualified modulator operator and proceed to steps 7, 8 and 9 below.

- 4) Modulator interlock fault other than Arc detector or Vacuum:
If the modulator stops operating due to an interlock other than an arc detector or vacuum a qualified modulator operator must be called it to investigate the cause before turning the modulator back on.
 1. If a person is authorized to open the PFN door they should visually inspect the PFN capacitors for smoke, flame or oil.
 2. If a person is not authorized then a person must remain with the modulator for a minimum of ten minutes to verify no smoke, flame or light from within.

- 5) Modulator Vacuum fault:
If there is a modulator vacuum fault the ATF operator must lower the RF power to the corresponding klystron, clear the fault and restart the modulator. Once the modulator is running the ATF operator may slowly increase the RF power back to its running level.

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6) Arc Detector fault:

If the modulator stops operating due to an Arc Detector fault:

- a) An authorized person must inspect the PFN capacitors for smoke, flame and oil.
 - i) After the PFN capacitors were inspected and no problem was found then the modulator may be restarted.
 - ii) If the Arc Detector trips a second time, the PFN capacitors must be inspected again for smoke, flame or oil by an authorized person. A qualified modulator operator must investigate the cause before restarting a third time.
 - b) If an authorized person is not available then a person must remain at the modulator for at least ten minutes to verify that there is no smoldering fire within the modulator. An authorized person will need to inspect the capacitors before restarting the modulator.
 - c) An ATF Qualified Modulator Operator list is posted on the modulator doors and in the ATF control room. These are the only persons authorized to work on the modulator.
- 7) If a modulator has been turned off due to evidence of malfunction a person must remain at the modulators for at least ten minutes to verify that there is no smoldering fire or similar problem. Immediately notify a modulator operator.
- 8) If there is evidence of a fire in the modulator (smoke, odor, or light), the following actions should be taken:
- a) Press a Modulator Emergency Stop if not already done.
 - b) Make a call to the BNL Fire Department (ext. 2222 or 911) even if the fire alarms have already sounded.
- 9) If fire or smoke appears to be dangerous, evacuate building and initiate the Local Emergency Plan for the ATF.