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C-A OPERATIONS PROCEDURES MANUAL

3.24 Procedures to be Implemented for Facility Fire Detection and Suppression System Problems and Failures

Text Pages 2 through 8

Attachments

Hand Processed Changes

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Approved: \_\_\_\_\_ *Signature on File* \_\_\_\_\_  
Collider-Accelerator Department Chairman Date

R. Karol

### **3.24 Procedures to be Implemented for Facility Fire Detection and Suppression System Problems and Failures**

#### **1. Purpose**

This procedure specifies actions to be taken by C-A personnel during operating or shutdown periods when problems arise with the fire detection and/or suppression system. The issues addressed are:

##### **1.1 Site Fire Alarm Failure**

1.1.1 Very infrequently the computer system that connects the building fire alarms to the Fire/Rescue (F/R) Group (Building 599), fails. This prevents fire alarms from being transmitted to F/R so they can respond. If this occurs, F/R will transmit this information to all Building Managers via e-mail/telephone calls/Plectron announcements, and to C-A Management via beepers. Actions to be implemented if this occurs are addressed.

##### **1.2 False Building Fire Alarms**

1.2.1 If a false alarm occurs, the F/R Group ensures that it was false and resets the alarms. If the alarm cannot be reset, the MCR Operations Coordinator (OC), during operations, or ESH Coordinator, during shutdown periods, shall only allow bypassing of the alarm under the conditions specified in this procedure.

##### **1.3 Impairment, Partial or Total Failure of a Fire Detection or Suppression System in an Accelerator or Building**

1.3.1 The C-A Accelerator Safety Envelopes (ASE), include requirements for the operability of installed fire detection and suppression systems. These requirements include Authorized Alternatives or compensatory actions that may be taken if a system is partially or totally out-of-service. The compensatory actions may be time limited, depending upon the specific ASE requirement. The ASE requirements are translated into C-A OPMs for use by operating personnel. This procedure gives specific guidance on the compensatory measures that are to be implemented while a specific fire detection or suppression system is inoperable.

#### **2. Responsibilities**

2.1 The Operations Coordinator (OC) is responsible for implementing this procedure while the MCR is staffed, and for following paragraph 2.3.1 of [C-A OPM 2.2 "Operating Practices"](#) when an Authorized Alternative is used.

- 2.2 The CAS Watch is responsible for implementing this procedure when the MCR is unstaffed, and the CAS Watch is stationed.
- 2.3 If the MCR is unstaffed, and the CAS watch is not stationed, the ESH Coordinator is responsible for implementing this procedure upon notification of the problem.
- 2.4 The advice of the BNL Fire Protection Engineer, Fire Chief or the Fire Captain may be obtained to clarify the requirements of this procedure or assist in their implementation.
- 2.5 BNL Plant Engineering (PE) Fire Alarm Electricians normally respond to Fire Alarm System bypasses, and/or repairs. During non-working hours, this is scheduled through the BNL Site Supervisor. The urgency of the response should be transmitted by MCR directly to the Site Supervisor. C-AD Management shall be informed if any unexpected delays occur. It should be noted that if a Fire Alarm Electrician is not available, any qualified Electrician might perform this work, including a C-AD Electrician under the supervision of an appropriate PE Supervisor.

### 3. **Prerequisites**

None

### 4. **Precautions**

- 4.1 The Accelerator Safety Envelope Parameters in C-A OPM's [2.5](#), [2.5.1](#), [2.5.2](#) and [2.5.3](#) shall be reviewed to assure that all requirements related to the accelerators and experiments are satisfied.

### 5. **Procedures**

#### 5.1 **Site Fire Alarm Failure**

- 5.1.1 When notified of a failure in the site fire alarm system such that alarms are not transmitted from C-A facilities to Fire/Rescue, F/R will arrange with C-A staff for scheduled tours of the BNL site as specified by the Fire Captain. C-A watches may monitor facilities or F/R may provide patrols (Reference 7.6) depending upon the availability of personnel. However, C-A is responsible to ensure these patrols take place as required in the remainder of this procedure. Upon receipt of this type of failure, the following actions shall be taken:

5.1.1.1 When neither the MCR nor the CAS Watch are staffed, C-A ESHQ Division shall ensure that the C-A personnel are aware of this condition by sending an e-mail to affected C-A personnel (see 5.1.2), and informing C-A Management. They shall also contact other staffed C-A Control Rooms to inform them of the problem, and the required response to a building fire alarm as specified in 5.1.2. The ESH Coordinator, or designee, shall provide the F/R Group information on the status of the C-A complex, and discuss the areas where F/R should focus their tours while the site fire alarm system is out of service. Consider staffing the CAS Watch to take the actions specified in 5.1.2.2.

5.1.1.2 If the MCR is staffed, MCR shall take the actions specified above in 5.1.1.1.

5.1.1.3 If the MCR is unstaffed, and the CAS Watch is staffed, the CAS Watch shall take the actions specified in 5.1.1.1 above.

5.1.2 Information below shall be transmitted by personnel as specified in 5.1.1 above:

5.1.2.1 If a fire alarm system activates in your building, have a person assigned to call the firehouse (911 or 2222), and verify that the Fire/Rescue Group is aware of the alarm. The person should be one that is normally in the facility, such as a receptionist, secretary or facility manager. When a fire alarm goes off, call 2222 or 911 and say: "The fire alarm bells are ringing in Building XXX and I have no further information."

5.1.2.2 If staffed, CAS Watch shall tour the C-A complex at least every 2 hours to determine conditions in remote buildings.

5.1.2.3 When the site fire alarm system is restored, this information shall be transmitted to C-A personnel.

## 5.2 False Building Fire Alarms

5.2.1 If a false alarm occurs, the F/R Group ensures that it was false and resets the alarms. If the alarm cannot be reset, the MCR Coordinator (when MCR is staffed), or ESH Coordinator (during shutdown periods), shall only allow bypassing of the alarm when all of the following conditions are satisfied:

5.2.1.1 The F/R Group has concluded that the alarm was false.

5.2.1.2 Repairs would take more than 2 hours to accomplish, and there is a valid reason not to wait for the repairs to be completed (e.g., experimental program delay or work delay).

5.2.1.3 The BNL Fire Protection Engineer (or F/R Group Captain), and the Associate Chair for ESHQ, ESHQ Division Head, or ESH Coordinator, agree with the bypass, considering the following in the decision process:

5.2.1.3.1 The requirements of the C-A Complex OSL's including time limits, if applicable, for Authorized Alternatives or compensatory actions (OPM [2.5](#), [2.5.1](#), [2.5.2](#), and [2.5.3](#))

5.2.1.3.2 The risk of equipment loss along with the programmatic impact of not allowing the bypass.

5.2.1.3.3 Compensatory actions, which may include additional remote monitoring of the equipment in the area where the alarm is bypassed, increased walk-through of the affected area (if possible), etc.

5.2.1.3.4 Consider de-energizing equipment in the affected area, and/or prohibiting personnel into the area, while the alarm is bypassed.

5.2.1.4 As soon as practical, the bypassed alarm shall be restored to service. If entry to an area under control of the Access Controls System or the Particle Accelerator Safety System is required for repair, the C-A Maintenance Coordinator shall coordinate with BNL Plant Engineering regarding the earliest time to complete repairs. In all other areas, the Building Manager of the affected building shall coordinate the repair with Plant Engineering.

### 5.3 Partial or Total Failure of a Fire Detection or Suppression System in a Building or Accelerator

**Note:**

- 1) Track times of failure in the OC logbook when MCR is manned to ensure that time limits are not exceeded.
- 2) If the failure is associated with the STAR or PHENIX detectors in the IR when flammable gas is in use, see [C-A-OPM 2.5.2](#), Sections 5.8.1.1, 5.8.1.2, 5.9.1.1, 5.9.1.4, for required authorized alternatives and time limitations.

5.3.1 Accelerator Operating and Affected Area Not Accessible due to Beam Operations

5.3.1.1 Within 2 hours of discovery of the failure, obtain Department Chair or designee approval to continue operations for up to 80 more hours.

5.3.1.2 Specific compensatory actions are as follows:

5.3.1.2.1 For Tandem, TTB and Linac - conduct 2-hour tours of the enclosed areas by visually inspecting through gates that allow inspection and by smelling for smoke.

5.3.1.2.2 For Switchyard and Target Caves - conduct 2-hour tours of the enclosed areas by visually inspecting through gates that allow inspection and by smelling for smoke. Note that the airflow is normally from the AGS to the switchyard and target caves so this may also detect smoke from the AGS.

5.3.1.2.3 For Booster, AGS, ATR and RHIC - conduct 2-hour tours of the enclosed areas by visually inspecting through gates that allow inspection and by smelling for smoke.

5.3.1.2.4 For RHIC IRs - conduct 2-hour tours of the enclosed areas by visually inspecting through gates that allow inspection and by smelling for smoke or post a full time Fire Watch who can verbally communicate with BNL F/R by radio or phone as specified in the particular ASE requirement.

5.3.1.2.5 For NSRL  
Conduct 2-hour tours of the enclosed areas by visually inspecting through gates and by smelling for smoke.

5.3.1.2.6 All Areas

5.3.1.2.6.1 If any equipment trips twice in an 8-hour period, a third reset is allowed only if the affected equipment is first visually inspected.

5.3.1.2.6.2 A visual inspection is required if magnet currents are abnormal (e.g. fluctuating, pulsing or out of expected range, etc.) or if the beam cannot be controlled as expected.

5.3.1.2.6.3 All high temperature alarms or trips of equipment (windings, cooling water, etc.) shall be visually investigated locally before restoring power to the affected equipment.

5.3.1.3 As soon as practical, the ESH Coordinator, ESHQ Division Head, or ESHQ Chair, shall inform the C-AD BAO Facility Representative of the decision to continue facility operation with an inoperable fire detection, and/or fire suppression, system.

5.3.2 Accelerator Support Buildings During Accelerator Operations

5.3.2.1 A tour of the building shall be conducted every two hours until the fire detection or suppression system is restored to service. If work is being conducted in the building a full time Fire Watch shall be posted as determined by the BNL Fire Protection Engineer, Fire Chief, Fire Captain, ESHQ Associate Chair, ESHQ Division Head or ESH Coordinator.

5.3.2.2 As soon as practical, the ESH Coordinator, ESHQ Division Head, or ESHQ Chair, shall inform the C-AD BAO Facility Representative of the decision to continue facility operation with an inoperable fire detection, and/or fire suppression, system.

5.3.3 Accelerator Shutdown

5.3.3.1 A tour of the building shall be conducted every two hours until the fire detection or suppression system is restored to service. If work is being conducted in the building a full time Fire Watch shall be posted as determined by the BNL Fire Protection Engineer, Fire Chief, Fire Captain, ESHQ Associate Chair, ESHQ Division Head or ESH Coordinator.

5.3.3.2 If the area is a posted High Radiation Area, entry to the area is not needed and tours of the enclosed areas shall be performed by visually inspecting through gates that allow inspection and by smelling for smoke.

5.3.3.3 If exhaust fans in the AGS, Linac, Booster or RHIC tunnel, or the NSRL beam line, are inoperable and required for personnel protection during an emergency, restore the fan operability within one hour, or empty the affected area of personnel until exhaust fans are returned to service.

6. Documentation

None

**7. References**

- 7.1 [C-A-OPM 2.5, Accelerator Safety Envelope Parameters for AGS, Booster, Linac and Associated Experimental Areas.](#)
- 7.2 [C-A-OPM 2.5.1, Accelerator Safety Envelope Parameters for C-A Tandem Van de Graaff.](#)
- 7.3 [C-A-OPM 2.5.2, RHIC Accelerator Safety Envelope Parameters.](#)
- 7.4 [C-A-OPM 2.5.3, BAF Accelerator Safety Envelope Parameters.](#)
- 7.5 [C-A-OPM 2.2, Operating Practices](#)
- 7.6 [Emergency Services Division Procedure FR-FPR-5.1.4, Compensatory Interim Fire Protection Measures.](#)

**8. Attachments**

None