

PHENIX Smoke Alarms Incident, 27-May-2016

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for the PHENIX Operations Crew

Chronology of Events on 5/27

On Friday, May 27, 2016 at 02:19, all power to the PHENIX experiment was crashed. The chronology of events leading up to this has been reconstructed from the alarm logs:

- **00:29** BNL Fire HSSD Low Level Smoke Zone 3 was detected. This is an alarm only of the facility smoke detector system that measures smoke levels with piping near the ceiling of the PHENIX IR. The PHENIX shift crew called x2222 and the fire captain responded there was a reading of 30% LFL and to monitor and continue.
- **01:42 to 02:03** A series of alarms from the PHENIX VESDA aspirating smoke detector system were reported to the PHENIX Control Room and MCR. These were Low/Mid Level smoke levels from the east and west carriages.
- **02:11** Data-taking stopped in PHENIX (all detectors ran fine up to this point)
- **02:12** The Muon Tracker North Low/Mid level smoke detector alarmed as well.
- **02:19** BNL Fire HSSD High Smoke Zone 3 went into alarm, causing alarm bells to sound. PHENIX Emergency Off was pressed, turning off power to the PHENIX detector systems and utility power in the IR.
- **02:34 to 02:41** Notifier smoke detectors in the TOF.E reported smoke, first sector 0, then 1.
- **02:41** The Inergen fire suppression system was activated by the TOF smoke detectors.

Additional information is that the smoke detectors in the racks did not report any smoke to the Notifier system. A visual inspection in the IR was done by the Fire Department and nothing was found.

Investigation and Recovery

An investigative procedure was agreed to with the Fire Protection Engineer and Fire Marshall, Joe Terranova, in a meeting at 11am on Friday.

- Reset the VESDA and Notifier smoke detectors. Due to residual particulates in the IR, this required bringing fans to clear the air inside the IR.
- BNL FD replaces the BNL Zone 3 head, which appears to be contaminated
- The PHENIX alarm panel was put into bypass to avoid spurious alarms while the IR is open
- Energize utility power
- Opened up East and West carriages
- Walked down the entire IR looking for evidence of smoke or fire damage, and hot spots using infrared camera
- Energize transformers one at a time, waiting ~10-15 minutes to isolate any causes, starting from the main lines that are a possible origins of the problem:
 - West Carriage
 - East Carriage
 - MUTR.N
- Bring up racks one at a time, energize systems inside.

The above steps were completed at around 8 PM on Friday, with no indications for the source of the smoke. As of Tuesday, May 31, 2016, there have been no indications of smoke on any of the three smoke detector systems, and the detector has been operating normally with all detector channels over the entire weekend (except the TOF.E HV is currently off until Inergen is installed).