

APPENDIX Y

EXECUTIVE SUMMARY OF INVESTIGATION OF A DIGITAL VIDEO RECORDER (DVR)



November 17, 2011

MEMORANDUM FOR NORMAN G. PAGE
Accident Investigation Team Leader

FROM: JOHN P. FAINI 
Chief, Approval and Certification Center

SUBJECT: Executive Summary of Investigation of a Digital Video Recorder (DVR) Recovered from Performance Coal Company's Upper Big Branch – South Mine

The Approval and Certification Center (A&CC), as requested by Upper Big Branch Mine Accident Investigation Team Leader, Norman Page, conducted a laboratory investigation of a 3xLogic Vigil Model DVR-8WM-1000 Digital Video Recorder (DVR) recovered from a fatal mine explosion at the Upper Big Branch Mine-South on April 5, 2010.

The investigation began with a brief inspection of the DVR assigned the Exhibit Number PE-0004A. The time and date recorded by the internal clock of the DVR was displayed and observed over a period of approximately seven months. This time was compared to presumed accurate time clocks. The rate of change was calculated from this data; and used to extrapolate the DVR's time on April 5, 2010.

This DVR was essentially a personal computer using the Windows XP Embedded environment running specialized DVR software. The DVR featured an internal clock. The length of a time period measured by these clocks can deviate from the length of the same time period measured by more precise means; one second measured by the DVR can differ from one second as measured by the National Institute of Standards and Technology (NIST).

In laboratory environmental conditions, it was noted that the clock did, indeed, differ from that obtained from external sources. Given the tolerances of each time measurement, calculations were made to determine the minimum and maximum rates of drift of the instruments' internal clocks as compared to the time from external sources.

The hard drives in the DVR were scrutinized to find the file with the last recorded file time prior to an extended period of inactivity leading to approximately 10:00 PM on

April 5, 2010. The inactivity period would indicate that power was removed from the DVR. It was reported that power was removed from the DVR circuitry by the explosion and was not re-established until after 10:00 PM on April 5, 2010. The minimum and maximum drift rates were then used to correlate the time for that file time to presumed accurate time from external sources.

The latest file time was found to be 2:57:00 PM. It should be noted that this was the last file time to be recorded. Due to the method used by the DVR to write files to the disk, the power may have been lost at any time in the one minute period immediately following that time. If the drift was constant from April 5, 2010, until MSHA began taking measurements, the actual expected time and date for the over-range events is 3:01:34 PM to 3:02:50 PM.

