APPENDIX U-13

EXECUTIVE SUMMARY OF INVESTIGATION OF PORTABLE RADIOS

U.S. Department of Labor

Mine Safety and Health Administration
Approval and Certification Center
765 Technology Drive
Triadelphia, West Virginia 26059

November 18, 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 Portable Radios 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 portable radios recovered from a fatal mine explosion at the Upper Big Branch Mine-South on April 5, 2010.

The components received were:

- Exhibit Number A16, Radio #39.
- Exhibit Number A17, Radio #28.
- Exhibit Number A18, Radio #29.
- Exhibit Number B5B, Radio.
- Exhibit Number B-19-B, Radio #187.
- Exhibit Number B-20-A, Radio #181.
- Exhibit Number B-22-D, Radio #182.
- Exhibit Number B-26-A, Radio #188.
- Exhibit Number PE-0041, Radio #30.
- Exhibit Number PE-0042, Radio #32.
- Exhibit Number PE-0070, Battery for Radio.
- Exhibit Number PE-0079, Battery for Radio.
- Exhibit Number PE-0092, Radio w/o battery.
- Exhibit Number PE-0095, Radio #155.
- Exhibit Number PE-0176, Radio w/o battery.
- Exhibit Number PE-0187, Radio #162.
- Exhibit Number PE-0206, Radio.
- Exhibit Number PE-0215, Radio #134.
- Exhibit Number PE-0286, Radio frame and PCB.
- Exhibit Number PE-0299, Radio w/o battery.
- Exhibit Number PE-0340, Radio w/o battery.
- Exhibit Number PE-0349, Radio #230.

The investigation began with a preliminary inspection of all the exhibits. The preliminary inspection included decontamination of items that were considered hazardous material, documenting visual observations, and photographing as-received conditions of the components.

The next phase of the investigation included a detailed inspection of all the radios. The detailed inspection involved determining whether the radios could be energized and disassembling all the equipment to address any signs of arcing, sparking, and electrical heating internal to the equipment.

The inspection of the exhibits resulted, in part, in observation of the various settings of the radios. These are tabulated below. It should be noted that the settings were as-received at the A&CC; they may have been changed between the time of the accident and the time of receipt.

Exhibit Number	Radio Number	Channel	On/Off	Notes
A16	39	2	On	
A17	28	4	Off	
A18	29	1	On	
B5B	260	6	Off	Knob first noted in "on" position, but battery charge indicated that it was most likely 'off'
B19B	187	2	On	
B20A	181	2	On	
B22D	182	2	Off	
B-26-A	188	4	Off	
PE-0041	30	4	On	
PE-0042	32	7	On	
PE-0092	?	2	On	Handwritten "AM" and "(*illegible*)4" on front of radio.
PE-0095	155	5	On	

Exhibit Number	Radio Number	Channel	On/Off	Notes
PE-0176	?	1	?	Volume/on/off knob would not turn
PE-0187	162	1	Off	
PE-0206	?	7	Off	Channel selector knob missing
PE-0215	134	2	On	
PE-0286	?	?	?	Case, knobs and volume/on/off shaft missing
PE-0299	?	?	?	Knobs and volume/on/off shaft missing
PE-0340	274	2	On	
PE-0349	230	5	On	

There was a white dot on the push-to-talk button on several exhibits. The mine operator's representative indicated that this dot was placed by a technician after re-programming at the mine site.

Each complete exhibit that comprised a complete radio was tested to determine its functional status. The tests were conducted between radios with no base station. Two sets of tests were conducted: one set with the radios within approximately 20 feet of each other in a laboratory, and one set with the radios approximately 1 mile apart.

- The following radios were found to be functional: Exhibit Numbers A16, A17, A18, B19B, B20A, B22D, B26A, PE-0041, PE-0042, PE-0095, PE-0187, PE-0206, and PE-0215.

- The following radios were found to be non-functional: Exhibit Numbers B5B and PE-0349.

- The following exhibits represent the radios that were incomplete (did not include batteries, or were only batteries) and therefore were not tested: Exhibit Numbers PE-0070, PE-0079, PE-0092, PE-0176, PE-0286, PE-0299, and PE-0340.

Each exhibit was inspected and compared with the approval documentation. The voltage and short-circuit current available from each battery pack were measured. Additionally, each complete exhibit that comprised a complete radio was tested to determine if it was a thermal ignition hazard.

- As a result of these tests and evaluations, there was no evidence found that suggested the following exhibits caused an ignition: Exhibit Numbers A16, A17, A18, B5B, B19B, B20A, B22D, B26A, PE-0041, PE-0042, PE-0070, PE-0092, PE-0095, PE-0187, PE-0206, PE-0215, PE-0340, and PE-0349.

- There was no evidence that Exhibit Numbers PE-0079, PE-0176, PE-0286, and PE-0299 caused an ignition. However, due to missing components, a complete assessment of these exhibits was not possible.

The worst case parameters measured in the short-circuit current tests were simulated and a spark-ignition test using those parameters was conducted. There was no ignition of the methane-air test gas.