

From: Jason Hart [mailto:jason.hart@nautilus-intl.com]

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To: zzMSHA-Standards - Comments to Fed Reg Group

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Cc: tania.levinsky@nautilus-intl.com; sandra.martinez@nautilus-intl.com

Subject: Proximity Detection Systems RIN 1219-AB65

Attention: RIN 1219-AB65

MSHA email address: zzMSHA-Comments@dol.gov

Reference: Page-4 Proximity Detection Systems

1. In 'Tramming-Mode' Nautilus uses a 'Warning' followed by a 'CM-Disable' signal which disables the Tram and Boom-Swing functions. Operators sometimes like to deliberately activate the proximity 'Warning' to reassure them that the system is functioning correctly and to visually check and confirm the distance between them and the RCCM.

A similar 'warning' in Mining-Mode is not practical because of the many different zones that are required. Adding a warning zone to each Mining-Mode zone would make the system unnecessarily complicated.

2. Nautilus spent a long time testing other methods of detection and while some of them could be made to function, they were not fundamentally reliable. We found that magnetic fields were the most reliable and the most practical.

3. In 2004 Nautilus designed a special hand-held wireless unit, the Little-Genius (LG) to monitor and record the status of the Proximity System. This turned out to be a very useful instrument and over several years it has helped to identify quite a few difficult problems. It is one of the primary reasons that the Coal-Buddy System is so reliable today.

However, even when a system is very reliable, problems can still be caused by people who are unfamiliar with the system and with the best intentions in the world may end up causing a real problem. This was a major roadblock to the long term reliability of the system.

The LG allowed us to seal the electronic unit inside the XP-Box before installing it inside the RCCM. The LG shows the status of the Proximity-Box, the Magnetic Field Radiators and their cables and all PWD's. It also reports the status of the radio communications between the Proximity-Box, PWD's and the LG.

4. Two contacts in series are used to enable/disable the RCCM. Both of these contacts are monitored and checked and if a problem is detected the system will automatically disable the RCCM and turn off the green light on the machine. When the green light on the RCCM is off the operator knows the system should be disabled and he can visually check to make sure the RCCM has stopped tramming. There is a red light built into the top of the every miner's PWD which will also show him the status of the Proximity System therefore the miner has a third source of information.

5. A Little-Genius is supplied with every system and can be used by anyone. No technical qualifications are required and it only take a few minutes to learn how to use it. The LG was

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designed to be used by two different groups of people; those who want to know the status of the system ie. if it is working, how well it is working and if it isn't working exactly what is wrong with it. The system will show any fault that has been detected as soon as the unit is powered up. Because the LG is so easy to use and only takes a few minutes, a mine supervisor can schedule a test at any time that is convenient for him.

The second group consists of Installers, Supervisors and trouble-shooters who are authorized to change the system parameters, not just inspect them. They must know several Security Access Codes, how to enter them and how to use them.

6. Nautilus has had various proximity system problems over the past 4 years but they were genuine problems and warnings, not nuisance alarms.

7. MSHA, WVTF and NIOSH have spent years studying these problems, we do not have the coal-mining experience to be able to offer any help in this area.

8. Nautilus has followed the guidelines of WVTF document dated 7/16/09 and we have spent the last six months complying with all of the specifications and requirements. There are currently 11 different safety-zones each with an adjustable parameter that needs to be entered into the system and we are considering adding 4 more.

The LG makes this potentially complicated procedure very simple, it identifies and displays each zone parameter in the correct order so the Supervisor only has to walk from the front to the rear of the RCCM once, stopping for a few seconds at each zone to enter the new setting. It takes about 2 minutes to change and confirm all 11 parameter settings.

The LG also shows the ID # of each person's PWD and it's status. Since all PWD's are identical (except for the ID #) any person carrying any PWD can become a Supervisor, Operator/Helper or a Visitor it depends on what the person carrying the PWD knows and how he uses it.

Security Access Codes prevent unauthorized and untrained persons from accidentally changing the safety-zone parameters.

9. If required a Supervisor could easily use the LG to change the Coal-Buddy System operation so that it would not allow a maintenance person to perform unnecessary dangerous tasks. For example: prevent him from starting the cutter while he was on or too close to the RCCM. Different tasks could be pre-programmed and listed in menu form and selected by the supervisor to suit a particular maintenance task.

10. Nautilus has provided an emergency-override touch-pad on top of the PWD. This function can easily be eliminated if it is no longer required.

My understanding is that this feature could save a life if the miner is pinned against a rib for example and he needs to bypass or override the Proximity System to move the RCCM away from him.

However, the miner will be informed during training that any activation of the emergency-override pad will be logged, his ID# with the time, date and how long the emergency-override pad was activated will be recorded and stored. This information will be available to NIOSH at any time and they can take any action that is necessary.

11. Earlier Nautilus systems were disabled by RCCM's which used Variable Frequency Drives. For a short period, a capacitive filter was installed on the RCCM which cured the problem. The LG was used to analyze the VFD interference and a better solution was found which didn't require the use of any additional equipment and did not

require any changes to the RCCM wiring. This solution has worked very well for more than a year without any further problems.

To the best of our knowledge, Nautilus Proximity Systems do not adversely affect any other electronic devices.

12. This question seems to apply to mine operators.

13. This question is for MSHA, WVTF and NIOSH.

14. Nautilus has installed their Proximity Systems on many different types of underground mining equipment such as Cat R1300, R1600, R1700 and R2900 loaders, a Cat 988H Wheel-Loader, underground diamond drills, 50 ton Komatsu haul trucks, medium size 240 ton & larger 320 ton Komatsu 930E haul trucks and a haul-truck tire-handler for BHP. To date there has not been a serious injury or fatal accident reported on any equipment that was using a Nautilus Buddy System.

15. In all applications other than Nautilus Proximity Systems for underground coal applications, we always provide the radio control and the Proximity System integrated into one system whenever possible because it is safer, much less expensive and requires no changes to the existing wiring of the remotely controlled machine.

16. Nautilus has designed and manufactured multiple Buddy Proximity Systems for companies such as BHP, Newmont Mining and Goldcorp for many years. Goldcorp has 18 Buddy Proximity Systems at their Campbell Red Lake mine and so far they have not had any problems.

17. Nautilus has two advanced Proximity Detection Systems. The first which uses a magnetic field has already been discussed and is reasonably well known in several countries. The second system is probably not suitable for underground coal mines.

18. The Proximity Detection System that Massey and ICG have been using for the past year does not require a lot of training. The new system specified by the WVTF is a lot more complicated and will require more training.

Training for Supervisors and troubleshooters (electricians and technicians) will take approximately 8 hours. Operators and helpers will need about 4-6 hours to make sure they fully understand all aspects of the system. The others will find their PWD very simple to use and should require only 1-2 hours of training.

Miners who do not have a PWD and work near an RCCM will need to know that they will not be detected if they approach an RCCM which is fitted with a Proximity System and they will need to be trained to stay a safe distance away from the RCCM at all times. Since each Nautilus System will accept up to 255 miners there is no reason why they should not have a PWD.

19. I believe this question is for qualified trainers and mine safety personnel.

20. I believe this question is for mine operators.

21. Our experience so far shows that our dealer can install and 'calibrate' a Nautilus Proximity System on an RCCM in one midnight shift. Frequent calibration is unnecessary. Maintenance is limited to inspecting the Magnetic Field Radiator Protection Units after a 'roof-fall' occurs to see if any serious damage has been done. PWD's should also be regularly inspected for damage.

22. The expected useful life of a Nautilus Proximity System should be at least 10 years. Some of our radio control systems which are more than 20 years old are still used in daily operation.

The only problems we have had over the past year have been caused by roof-falls which damaged the M.F. Radiator Protection Units. Our dealer has added two 2" thick steel plates to each Protection Unit to reinforce the two existing 1" thick steel plates.

23. Nautilus does provide this feature as an optional extra. Nautilus believes that there are benefits to be derived from data logging and recording how the operator is using the Proximity System. One important example has already been shown in paragraph 10.

The data collected by the data logger identifies the PWD#, shows the operating mode (Tramming Mode or Mining-Mode), shows exactly when the RCCM was disabled, which safety-zone was activated and date stamps and records this information. This information may be very important in reconstructing what happened and why it happened if an accident occurs.

Nautilus provides enough information to let NIOSH know if the user turned on his PWD but did not wear it while he was working. Nautilus keeps the data on an SD card which can hold all data for at least 2 years before the card needs to be replaced.

24. This question is more appropriate for a mine operator.

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Jason Hart
President/CEO

Nautilus International
6866 Russell Ave.
Burnaby, BC
V5J 4R9 Canada
Ph: (604) 430-8316
Fx: (604) 430-1962



jason.hart@nautilus-intl.com
www.nautilus-intl.com