

**Review of the Bread Crumb Wireless LAN by Rajant Corporation for Functionality with
WV Legislative Rule Title 56, Series 4 Emergency Rules Governing
Protective Clothing and Equipment**

July 9, 2007

After the evaluation of the documentation submitted the technical reviewers agree that the manufacturer and their representatives, Rajant Corporation, presented sufficient proof of functionality such as the Bread Crumb Wireless LAN would allow WV underground mining permit holders to meet parts of their requirements for emergency communications and tracking outlined in the West Virginia Emergency Rule Governing Protective Clothing And Equipment, §56-4-8 and these products should be included in the Director’s listing of approved devices.

WV 56-4 Requirement	Functionality Confirmed
<p>9.5. The Director shall require providers seeking approval submit documentation certified by a licensed West Virginia professional engineer that the product has been tested for functionality in West Virginia underground mines, that the product has been or is in the process of being approved as intrinsically safe by MSHA and other criteria as the Director determines, a description of the process used in making that determination and a certification in the following form: “I, the undersigned, hereby certify that this product, to the best of my knowledge and belief, meets or exceeds all requirements set forth in W. Va. CSR Title 56 Series 4-9, that the product has been tested for functionality in West Virginia underground mines, that the product has been or is in the process of being approved as intrinsically safe by MSHA and other criteria as the Director determines.”</p>	<p>A certified letter was provided from Todd Beavan PE, attesting to the validity of the results presented.</p> <p>Proof of active review of Bread Crumb Wireless LANs for applicable electrical safety by the Mine Safety and Health Administration was provided.</p> <p>Operator compliance with communication and tracking requirements will be dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.</p>
<p>9.11. In developing the communication/tracking plan and any revisions, the operator shall take into consideration the needs for emergency communications and tracking/locating resulting for accidents as described at W. Va. Code Chapter 22A Article 2-66(a), physical features of the particular mine, emergency plans, existing communication infrastructure, communications required under W. Va. Code Chapter 22A Article 1-35(k) and 2-42 and W. Va. CSR Title 36 Series 2-2 and 5-2, advances in communication/tracking technologies and any other aspect of the particular mine the operator deems relevant to the development of the communication/tracking plan.</p>	<p>Rajant Corporation presented installation and operational flexibility such that the Bread Crumb Wireless LAN could be adapted by operators to meet various underground mining schemes utilized in West Virginia.</p> <p>Rajant Corporation presented flexibility in their system such that the Bread Crumb Wireless LAN could be upgraded by operators as technology advances.</p> <p>Rajant Corporation presented sufficient technical expertise to aid operators in adapting the Bread Crumb Wireless LAN to their unique mining conditions and integration with other systems.</p>
<p>9.13.1. A communication center monitored at all times during which one or more miners are underground.</p>	<p>Rajant Corporation demonstrated that the Bread Crumb Wireless LAN features provide a means for operators to monitor communication and tracking from a central</p>

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	location.
9.13.2. Knowing the location of all miners immediately prior to an event by tracking/locating device in the escape-ways, normal work assignments, or notification of the communication center;	<p>Rajant Corporation presented documentation that the Bread Crumb Wireless LAN provides the ability for installation such that an operator could know the location of miners prior to an event. Operator compliance with communication and tracking requirements will be dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.</p> <p>Demonstrated specific performance is attached. Performance in conditions others than those attached have not been verified by the information presented and require additional submittals.</p>
9.13.3. Knowing the location of miners in the escape-ways after an event providing the tracking system is still functional;	Rajant Corporation presented documentation that the Bread Crumb Wireless LAN provided the ability for operators to develop installations that maximize the likelihood of survivability and provided a means of rapidly re-establishing tracking if lost.
9.13.4. Check-in and check-out with the communication center by miners prior to entrance and exit from bleeders and remote or seldom used areas of the mine (all times shall be logged);	Rajant Corporation presented documentation that an operator could institute a combination of administrative and technological means for knowing the location of a miner who is outside the coverage of the Bread Crumb Wireless LAN installation.
9.13.5. Allowing two way communications coverage in at least two separate air courses and at least one of which shall be an intake;	<p>Rajant Corporation presented documentation that an operator could deploy the Bread Crumb Wireless LAN alone or in conjunction with other systems such that two-way wireless communications would be achieved in two or more airways. Operator compliance with communication and tracking requirements will be dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.</p> <p>Demonstrated specific performance is attached. Performance in conditions others than those attached have not been verified by the information presented and require additional submittals.</p>
9.13.6. Maintaining communication/tracking after loss of outside power and maintain function both inby and outby of the accident event site with	Rajant Corporation presented documentation that an operator could install the Bread Crumb Wireless LAN in a manner such that:

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suitable supply of equipment for rapid reconnection;	<ul style="list-style-type: none"> • Bread Crumb Wireless LANs could provided backup battery power • Bread Crumb Wireless LANs could provide communication between those inby the event • Bread Crumb Wireless LANs could provide communication between those outby the event • Bread Crumb Wireless LANs could provide alternative communication routing to allow inby miners to communicate with the surface • Bread Crumb Wireless LANs could be deployed in a manner that maximizes survivability • Bread Crumb Wireless LANs could be deployed with a rapid reconnect capability <p>Note: Operator compliance with communication and tracking requirements will be dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.</p>
9.13.8. Allow for communication to surface at all required emergency shelters/chambers;	Rajant Corporation provided information that an operator could deploy the Bread Crumb Wireless LAN in a manner that would provide communication to the surface from emergency shelters/chambers. Operator compliance is dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.
9.13.9. All miners and likely emergency responders shall be trained in the use, limitations and inter-operability of all components of the communication and tracking/locating system. This shall be incorporated into ongoing required training. All training shall be recorded and made available upon request;	Rajant Corporation provided information indicating their ability to aid operators in developing and implementing necessary training.

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9.15.3. A statement regarding how the communications/ tracking system will be tested and maintained; and	Rajant Corporation provided information indicating their ability to aid in the training of operator staff or providing maintenance services. Operator compliance with communication and tracking requirements will be dependant upon individual communication and tracking devices not provided by Rajant Corporation. At this point no such devices have been approved by the WV OMHS&T.

Reviewers:

Randall Harris, Engineering Advisor to Director OMHS&T

Felicia Peng, Ph.D., Associate Professor, Department of Mining Engineering, West Virginia University

Keith Heasley, Ph.D., Associate Professor, Department of Mining Engineering, West Virginia University

Wahab Khair, Ph.D., Associate Professor, Department of Mining Engineering, West Virginia University