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Caterpillar Collaborates with Arch Coal To Prove Semi-Autonomous Dozers

Caterpillar announces the successful use of advanced automation technology to enhance dozer productivity and safety while driving down cost per ton. Beginning in late 2011, Caterpillar and Arch Coal's Thunder Basin Coal Company - Black Thunder mine partnered in the development and operation of Cat[®] MineStar[™] Command for dozing at the site near Wright, Wyoming. Command for dozing includes a semi-autonomous solution that enables one operator to operate multiple dozers from an office environment.

Black Thunder is currently running four Cat D11T dozers enabled with Command for dozing. The mine first used Command for dozing in reclamation and now utilizes the system in production overburden removal in advance of dragline operations. Since implementation at the site, the Command system has logged more than 25,000 hours of tele-remote and autonomous operation time and moved over 23 million loose cubic yards (LCY) of material. Wyoming Machinery Co., the regional Cat dealer, has been integral to the project by providing local technical resources for system installation and ongoing support.

A key benefit for Black Thunder's dozer operators is enhanced safety. The operator is located in an office remote from the machine, reducing the risk of injury from mounting and dismounting equipment and from ergonomic challenges presented during ripping applications.

Application of advanced technologies requires not only innovative systems, but integration with people and process. To take advantage of the automation benefits, the mine altered a portion of their production sequence so dozers could continue working in the cast overburden, taking advantage of the consistent and optimized operation. These benefits are magnified by dozers operating 24 / 7 at the mine. Black Thunder is also using Command for dozing to

reduce unit costs through increasing dozer utilization, increased process consistency (consistent process management), and increased execution of best practices.

Command for dozing is part of Caterpillar's vision for a fully autonomous mine. Today, Caterpillar offers Command for hauling, which enables autonomous operation of large mining trucks, and Command for underground, which enables semi-autonomous operation of LHDs. These automation technologies are working at multiple mines around the world. When fully commercialized, the automated dozer solution will join these leading mining machine automation systems.

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About Arch Coal

U.S.-based Arch Coal, Inc. is one of the world's top coal producers for the global steel and power generation industries, serving customers on five continents. Its network of mining complexes is the most diversified in the United States, spanning every major coal basin in the nation. The company controls more than 5 billion tons of high-quality metallurgical and thermal coal reserves, with access to all major railroads, inland waterways and a growing number of seaborne trade channels. Arch Coal's Thunder Basin Coal Company operates the Black Thunder and Coal Creek mines. For more information, visit archcoal.com.

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