

Dust Control at the Source (RP-3)

Year		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
-2	Planned Deliverable	An assessment of the need for research on the development of more effective dust control and mitigation measures on continuous miners for underground coal mining.	A comprehensive literature review focusing on previous research performed by USBM, NIOSH & MSHA and work performed by various university & industry research establishments.	Develop the test parameters and test program requirements for an extensive series of laboratory linear cutting tests using current technology bits and new cutting bits under development.	Perform linear cutting tests with existing bit technology to optimize cutting parameters to reduce dust generation at the source.
	Achieved	MSHA health & safety data base identified a significant health hazard due to air borne dust generated by continuous miners and Longwall shearers. Held discussions with coal mine operators who also identified dust generation as a major health and safety concern.	Previous work with commonly used cutting bits were reviewed and used as a basis to establish gaps in available data base and the requirements for further testing.	Based on previous work and discussions with mine operators and machine manufacturers, test parameters were developed to reduce dust at the source by optimization of cutting geometry.	Laboratory linear cutting testing was performed with commonly used bits and a new bit in coal measure rock with different cutting geometries including spacing, penetration and attack angle.
-1	Planned Deliverable	Analyze and evaluate all linear cutting test data to develop optimized cutterhead for field trials of a continuous miner.	Develop computer model of a continuous miner cutting drum for devising optimal bit lacing pattern with respect to dust.	Using the developed computer model and the linear cutting data, finalize drum design with input from the miner drum manufacturer. Hold meetings with mine operator and drum manufacturer to finalize design.	Fabricate new cutting drum and conduct field cutting tests at 20 Mile Coal Co., while taking detailed respirable dust data per MSHA guidelines.
	Achieved	Data analysis performed identifying most effective cutting geometry variable on the generation of respirable dust.	Computer model developed for continuous miners operating at target mine, 20 Mile Coal Co. Foidal Creek Mine.	Finalized suggested drum design specifications. Presented final drum design specifications to drum manufacturer. Met with 20 Mile Coal to present suggested drum lacing specifications.	Liaised between mine and drum manufacturer. Field tests delayed slightly due to mine production schedule and negotiations between mine and drum manufacturer.
0	Planned Deliverable	Acquire coal samples for further linear cutting test in support of longwall shearer dust reduction and develop linear cutting test matrix.	Laboratory linear cutting testing in coal in with commonly used longwall shearer bits while taking dust measurements to establish optimal cutting parameters.	Analyze and evaluate all linear cutting test data to develop optimized cutterhead for field trials of a longwall shearer.	Develop computer model for longwall shearer for devising optimal bit lacing pattern with respect to dust generation while ensuring acceptable production.
	Achieved	Samples were acquired from 20-mile Coal Mine. LCM test matrix developed	LCM tests commenced with various bit geometries and dust samples taken.	Data analysis continued and also a meeting held with DBT to discuss initial shearer	Computer model under development for use in drum design and layout
1	Planned Deliverable	Design longwall shearer drums, based upon linear cutting tests and computer modeling results as well as input from mine operator and drum manufacturer.	Design review and fabrication of new shearer drums. Finalize schedule for longwall shearer testing.	Base line dust testing of longwall shearer.	Test and evaluation of new longwall shearer drum with respect to respirable dust.
	Achieved	Shearer drum design has commenced in conjunction with DBT corp.	Drum design is in progress and field test plans are under discussion with RAG/DBT	At the direction of NIOSHH, additional design and field testing planned with continuous miners	Arrangements made with two UTAH underground coal mines to design, fabricate and test new drums. Design completed
2	Planned Deliverable	Analysis of longwall field data and comparison for validation and improvement of computer models.	Development of user interface for continuous miner and longwall shearer computer models so they may be run by mine operators and mining machinery manufactures.		Make computer models available to industry.
	Achieved				