



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF MINE SAFETY

949

December 6, 2013

Mr. James Price
Dana Mining of PA
308 Dents Run Road
Morgantown, WV 26501

Re: Temporary Approval – Diesel Rockduster Model DTD-4220

Dear Mr. Price:

This is in response to your letter dated December 5, 2013 requesting temporary approval for underground use of the Wilson Works Diesel Powered Rock Duster Model Number DTD-4220. The next Technical Advisory Meeting is scheduled for January 8, 2014 at which time the final approval for this equipment will be recommended by the TAC.

The TAC and the DEP traveled to Wilson Works, Inc. in Morgantown WV to evaluate this equipment. Subsequently, the TAC issued a recommendation dated October 29, 2013 to the Bureau recommending the approval of the equipment with the understanding that the General Specification Sheet (Attachment 1) be strictly adhered to.

Temporary approval is granted for this equipment to be used prior to the regular scheduled TAC meeting that is to be held on January 8, 2014.

Sincerely,

Joseph A. Scaffoni
Director
Bureau of Mine Safety

Enclosure

cc: Bowersox
Borchick

**Pennsylvania Technical Advisory Committee
On Diesel Powered Equipment**

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996
BUREAU OF MINE SAFETY
UNIONTOWN, PA
NOV 4 2013
RECEIVED

October 29, 2013

Joseph Sbaffoni, Director
Bureau of Mine Safety
Fayette County Health Center
100 New Salem Road, Room 167
Uniontown, Pa. 15401

RE: Rhomac Model DP 50 Diesel Hydraulic Power Pack utilizing a Deutz D2011 L03 1 diesel engine MSHA ID 07-ENA040011 rated at 48 HP@ 2800 RPM with a DCL International, Inc. Model DQ-1R05-21 diesel oxidation catalyst and an ENK Industrial Filter and Battery Co., Inc. Model 25-19205 washable disposable DPM filter (95% MSHA efficiency rating)

Dear Mr. Sbaffoni:

Chapter 4 of the "Bituminous Coal Mine Safety Act" (the Act) provides for the use of diesel-powered equipment in underground bituminous coal mines. Section 424 of the act created a Technical Advisory Committee ("TAC") for the purpose of advising the Department regarding implementation of Chapter 4 and evaluation of alternative technology or methods for meeting the requirements of Chapter 4.

Background

On July 17, 2013 Rhomac, Inc. submitted a request to the Bureau of Mine Safety (BMS) for approval for a Rhomac Model DP 50 Diesel Hydraulic Power Pack utilizing a Deutz D2011 L03 1 diesel engine MSHA ID 07-ENA040011 rated at 48 HP@ 2800 RPM with a DCL International, Inc. Model DQ-1R05-21 diesel oxidation catalyst and an ENK Industrial Filter and Battery Co., Inc. Model 25-19205 washable disposable DPM filter (95% MSHA efficiency rating).

On August 7, 2013 the Director of BMS requested the TAC to evaluate the Rhomac Model DP 50 Diesel Hydraulic Power Pack and to advise the Department regarding the TAC's recommendation as to whether the referenced equipment meets requirements of Section 403 of the Act.

The diesel power package includes the following items:

- Deutz D2011 L03 1 diesel engine MSHA ID 07-ENA040011 rated at 48 HP@ 2800 RPM
- Emissions Control System DST Management System
 - DCL International, Inc. Model DQ-1R05-21 diesel oxidation catalyst
 - ENK Industrial Filter and Battery Co., Inc. Model 25-19205 washable disposable DPM filter (95% MSHA efficiency rating)
 - Protectoseal Model 674 flame arrestor

More detailed information on the specifications of the diesel power package is included on the General Specification Sheet which is attached as Attachment 1.

Investigation

On October 21, 2013 the TAC and DEP traveled to Wilson Works, Inc. in Morgantown, WV to inspect the equipment when it became available. The TAC evaluated the engine and exhaust emissions package.

Emissions testing of the engine and after-treatment system were performed, as well as exhaust gas temperature monitoring and stall test procedure. Since this diesel unit is not capable of inducing an engine stall the same as a wheeled transportation unit, an alternate method was needed. The engine stall was achieved by bringing the engine up to operating temperature and then while at full throttle, close the valve to the point just below the release on the pop off valve. The stall procedure will be written and the valve will be identified for the operators and mechanics to consistently perform the stall test. The results of the emission tests showed the engine was performing within MSHA's approval specifications.

The exhaust was cooled by channeling the exhaust gas through a water tank to help cool the exhaust gases. This water tank will be equipped with a low level shut off sensor that would shut the engine off before the water level in the tank got too low to fully cover the exhaust port in the tank. It was agreed that part of the pre-op inspection of the hydraulic power pack would be to fill the water tank prior to use. Monitoring of the exhaust gas temperature produced a high exhaust gas temperature reading of 131° F, which is well below the 302° F allowed by Section 403 (b)(4) of the Act. The maximum surface temperature observed was 240° F on the exhaust manifold after conducting all CO testing. The maximum engine oil temperature was 210° F and the maximum engine coolant temperature was 210° F.

The after-treatment system is fitted with an ENK Industrial Filter and Battery Co., Inc. Model 25-19205 washable disposable DPM filter (95% MSHA efficiency rating). The engine and filter extrapolations show that the diesel power package will result in an average ambient concentration of .072 mg/m³ of diesel particulate matter when diluted by 100% of the MSHA approval plate ventilation rate for this engine, which is well below the .12 mg/m³ requirement of Section 403 (a)(1) the Act. (Attachment 2)

The TAC and DEP had a concern with the location of the fire suppression actuator and also the audio and visual alarm since there is no operator station for this piece of equipment. Rhomac agreed to move the fire suppression actuator and provide a better audio and visual fire suppression alarm that can be seen from any location around the equipment. The TAC also asked Rhomac to better identify all the gages and valves for the operators. Rhomac will make the changes before delivery.

In addition to the testing that was conducted, our investigation and our observations confirmed that the diesel power package is capable of meeting all the requirements of Section 403 of the Act.

Recommendation


Our recommendation is based upon the data supplied by Rhomac, Inc., the results of the tests conducted on October 21, 2013, as well as the data acquired and observations made during our investigation. The TAC has determined that the Deutz D2011 L03 1 diesel engine MSHA ID 07-ENA040011 rated at 48 HP@ 2800 RPM with a DCL International, Inc. Model DQ-1R05-21 diesel oxidation catalyst and an ENK Industrial Filter and Battery Co., Inc. Model 25-19205 washable disposable DPM filter (95% MSHA efficiency rating) meets all requirements of Section 403 of Chapter 4 of the Pennsylvania Bituminous Coal Mine Safety Act. As such, we are recommending approval of the above described diesel power package with the following stipulations for the Rhomac Model DP 50 Hydraulic Power Pack. This recommendation is provided with the understanding that the General Specification Sheet (Attachment 1) be strictly adhered to.

Additional TAC stipulations for approval:

- The pre op check will include checking and filling the water tank prior to use.
- The written stall procedure and valve identification will be part of the 100 hour maintenance training.

Should the Director receive a request for temporary approval for use prior to the next TAC meeting, the TAC will recommend temporary approval until the next scheduled TAC meeting on January 8, 2014 at which time permanent approval will be recommended.


Paul Borchick


Ron Bowersox

General Specification Sheet

EQUIPMENT MANUFACTURER ROHMAC INC MODEL DP 50 DATE 06/28/13

I. Engine

Manufacturer	Deutz	Particulate Index (PI)	3000
Manufacturer Address	3883 Steve Reynolds Blvd Norcross, GA 30093		
Engine Model No.	D2011 L03 f	Gaseous Ventilation Rate (CFM)	2000
Engine Serial No.	TBD	Raw DPM (gr/hr)	4.89
HP/RPM (rated)	48 / 2800	MSHA Part 7 Approval #	07-ENA040011
Low Idle (RPM)	900	MSHA Part 7 Ventilation Rate (CFM)	2000
Max. Dirty Intake Air Restriction H ² O	22	Type of Aspiration	Natural
Max. Allowed Backpressure H ² O	26	Turbocharger Boost (psi)	N/A
High Idle (RPM)	3000	Fuel Delivery System	Direct Injection
Water-jacketed components	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Engine Cooling via	Integrated Oil Cooler

II. Particulate Filter

Manufacturer	ENK Industrial Filter & Battery Co., Inc.		
Manufacturer Address	1004 Hoke Ave., PO Box 1004, Dolomite, AL 35061		
Model Number	25-19205	System Type	Washable / Disposable Synthetic
MSHA Efficiency Rating	95	MSHA Approved	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Treated DPM mg/m ³ when diluted w/100% Part 7 ventilation rate (show calc on separate sheet)	0.072		

III. Catalyst

Manufacturer	DCL International Inc.		
Manufacturer Address	2 41 Bradwick Dr. Concord ON L4K 1K5 Canada		
System Name	MINE-X Catalytic Converter		
Model Number	DQ-1R05-21		

IV. Flame Arrestor

Manufacturer	Protectoseal		
Manufacturer Address	225 W. Foster Avenue, Bensenville, IL 60106		
System Name	End-of-Line Circular Plate Flame Arrestor		
Model Number	674	MESG	0.025"

V. Heat Exchanger

Manufacturer	ROHMAC INC	Model or Part #	DEC 4032
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VI. Fire Suppression System

Manufacturer	ANSUL	Model or Part #	Checkfire SCN
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DPM Calculation Sheet

Engine Deutz D2011 L03 I
 MSHA Approval 07-ENA040011
 Ventilation Rate 2000 cfm
 DPM Emissions 4.89 g/hr
 Filter Type ENK Synthetic Linen
 Filter Efficiency 95 %

DPM Unit Conversion

$$\frac{\text{g/hr}}{4.89} \times \frac{\text{hr/min}}{60} \times \frac{\text{mg/g}}{1000} = 81.5 \text{ mg/min}$$

Ventilation Rate Unit Conversion

$$\frac{\text{cfm}}{2000} \times \frac{\text{m}^3/\text{ft}^3}{0.02832} = 56.63 \text{ m}^3/\text{min}$$

DPM Reduction Calculation

$$\frac{\text{mg/min}}{81.5} \times \frac{\text{min/m}^3}{56.63} \times \frac{\text{DOC eff}}{100} = 0.07196 \text{ mg/m}^3$$

Total Diluted DPM Emissions 0.07196 mg/m³
