



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

83A

BUREAU OF MINE SAFETY

June 18, 2012

Mr. Kevin Bartholow  
Irwin Car and Equipment  
P O Box 56  
Blairsville, PA 15717

RE: Irwin Car and Equipment Model DH610PC Diesel 15 Man Personnel Carrier utilizing a Cummins QSB 4.5 diesel engine (MSHA ID 07-ENA07006 – Part 7) 130HP @2500RPM with a DST emissions control system using a DST Model M30 DPM filter (96% efficient) and a DST Model M113-210-02 diesel oxidation catalyst.

Dear Mr. Bartholow:

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.

On June 14, 2012, you submitted a letter to the Bureau requesting use of a 15-Man Diesel Personnel Carrier for Irwin Car No. No. 11-19193. Enclosed is the TAC’s report on their findings for this piece of equipment. All of their findings must be adhered to in regards to use of this equipment.

The TAC is recommending temporary approval to use this equipment prior to the next scheduled TAC meeting on July 11, 2012, at which time permanent approval will be recommended.

If you have any questions on this request, please contact me at [jsbaffoni@pa.gov](mailto:jsbaffoni@pa.gov) or at 724-439-7469.

Sincerely,

Joseph A. Sbaffoni  
Director  
Bureau of Mine Safety

cc: Bowersox  
Borchick

Enclosure(s)

JAS/cd

bcc: Antoon  
Gaida  
Elias (web)  
Dunn/TAC file

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

**Paul Borchick**

(412) 736-9105 (Cell)  
(724) 485-4414 (Office)  
Email: paulborchick@consolenergy.com

**Ron Bowersox**

(724) 726-8987 (Home)  
(724) 479-8692 (Office)  
Email: [amwarbowersox@yahoo.com](mailto:amwarbowersox@yahoo.com)

June 14, 2012

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

RE: Irwin Car and Equipment Model DH610PC Diesel 15 Man Personnel Carrier utilizing a Cummins QSB 4.5 diesel engine (MSHA ID 07-ENA07006 - Part 7) 130HP @ 2500 RPM with a DST emissions control system using an DST Model M30 DPM filter (96% efficient) and a DST Model M113-210-02 diesel oxidation catalyst.

Dear Mr. Scaffoni:

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 May 22, 2012 Irwin Car and Equipment submitted a request for evaluation of their Model DH610PC Diesel 15 Man Personnel Carrier utilizing a Cummins QSB 4.5 diesel engine (MSHA ID 07-ENA07006 - Part 7) 130HP @ 2500 RPM with a DST emissions control system using an DST Model M30 DPM filter (96% efficient) and a DST Model M113-210-02 diesel oxidation catalyst.

On June 6, 2012 the Director of BMS requested the TAC to evaluate the Irwin Car and Equipment Model DH610PC Personnel Carrier engine and emission package 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 engine and emissions control package has not been previously approved under Section 403 of the Act.

The diesel power package includes the following items:

- Cummins Cummins QSB 4.5 diesel engine (MSHA ID 07-ENA07006 - Part 7) 130HP @ 2500 RPM
- DST emissions control system:
  - DST Model M30 DPM filter (96% efficient)
  - DST Model M113-210-02 diesel oxidation catalyst
  - DST Model M150-301-01 heat exchanger

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 June 14, 2012 the TAC and DEP traveled to Irwin Car and Equipment in Blairsville, PA 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. The results of the emission tests showed the engine was performing within MSHA's approval specifications.

Monitoring of the exhaust gas temperature produced a high exhaust gas temperature reading of 190° F, which is well below the 302° F allowed by Section 403 (b)(4) of the Act. The maximum surface temperature observed 285° F on the exhaust manifold, which is below the 302° F allowed by Section 403 (b)(3) of the Act. The maximum engine coolant temperature observed was 190° F, and the maximum engine oil temperature observed was 113° F.

The after-treatment system is fitted with a DST Model M30 DPM filter. The filter is rated by MSHA at a 96 % efficiency rating. The engine and filter extrapolations show that the diesel power package will result in an average ambient concentration of .055 mg/m<sup>3</sup> of diesel particulate matter when diluted by 100% of the MSHA approval plate ventilation rate for this engine, which is well below the 0.12 mg/m<sup>3</sup> requirement of Section 403 (a)(1) the Act. (Attachment 2)

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 Irwin Car and Equipment, the results of the tests conducted on June 14, 2012, as well as the data acquired and observations made during our investigation. The TAC has determined that the Cummins QSB 4.5 diesel engine (MSHA ID 07-ENA07006 - Part 7) 130HP @ 2500 RPM with a DST emissions control system using an DST Model M30 DPM filter (96% efficient) and a DST Model M113-210-02 diesel oxidation catalyst 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.

This recommendation is provided with the understanding that the General Specification Sheet (Attachment 1) be strictly adhered to.

Irwin Car and Equipment and CONSOL Energy submitted a request on June 14, 2012 to use this equipment prior to the next scheduled TAC meeting. The TAC recommends temporary approval until the next regular scheduled TAC meeting on July 11, 2012 at which time permanent approval will be recommended.

  
Paul Borchick

  
Ron Bowersox

**IRWIN CAR and EQUIPMENT**

Blairsville Operations  
P.O. Box 56 Blairsville, PA 15717  
Phone: 724-459-6847 Fax: 724-459-0793

June 14, 2012

Fayette County Health Center  
Bureau of Deep Mine Safety  
ATTN: Mr. Joseph Scaffoni  
100 New Salem Road, Room 167  
Uniontown, PA 15401

P 724-439-7469

SUBJECT: 15 Man Diesel Personnel Carrier New Approval Application  
Irwin Car Job# 11-19193  
APS ID: 781527


Dear Sir,

Irwin Car and Equipment and CONSOL Energy are requesting the use of this piece of equipment until the next quarterly meeting of the PA TAC committee, July 11, 2012. The unit has been inspected by Mr. Ron Bowersox, Mr. Paul Borchick and Mr. Steve Gaida.

Regards



Kevin Bartholow  
VP Locomotive Products  
Irwin Car and Equipment



Michael Rebarnick  
Consol Energy  
Enlow Fork

## General Specification Sheet

EQUIPMENT MANUFACTURER IRWIN CAR AND EQUIPMENT MODEL DH610PC DATE 6-14-12

<b>I. Engine</b>			
Manufacturer	CUMMINS	Particulate Index (PI)	8500
Manufacturer Address	3 ALPHA DRIVE PITTSBURGH, PA 15238		
Engine Model No.	QS84.5	Gaseous Ventilation Rate (CFM)	6000
Engine Serial No.	73239961	Raw DPM (gr/hr)	13.91(WEIGHTED)
HP/RPM (rated)	130/2500	MSHA Part 7 Approval #	07-ENA070006
Low Idle (RPM)	600	MSHA Part 7 Ventilation Rate (CFM)	6000
Max. Dirty Intake Air Restriction H <sup>2</sup> O	25	Type of Aspiration	TURBO CHARGED/AIR TO AIR CHARGE AIR COOLER
Max. Allowed Backpressure H <sup>2</sup> O	41	Turbocharger Boost (psi)	22
High Idle (RPM)	2695	Fuel Delivery System	HIGH PRESSURE COMMON RAIL
Water-jacketed components	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Engine Cooling via	FAN/RADIATOR

<b>II. Particulate Filter</b>			
Manufacturer	DRY SYSTEMS TECHNOLOGIES		
Manufacturer Address	8102 LEMONT ROAD, SUITE 700 WOODRIDGE, ILLINOIS 60517		
Model Number	M30	System Type	CATALYST/FILTER
MSHA Efficiency Rating	96%	MSHA Approved	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Treated DPM mg/m <sup>3</sup> when diluted w/100% Part 7 ventilation rate (show calc on separate sheet)	0.055		

<b>III. Catalyst</b>	
Manufacturer	DRY SYSTEMS TECHNOLOGIES
Manufacturer Address	8102 LEMONT ROAD, SUITE 700 WOODRIDGE, ILLINOIS 60517
System Name	DST EXHAUST TREATMENT SYSTEM
Model Number	DST-P/N M113-210-02

<b>IV. Flame Arrestor</b>			
Manufacturer	DRY SYSTEMS TECHNOLOGIES		
Manufacturer Address	8102 LEMONT ROAD, SUITE 700 WOODRIDGE, ILLINOIS 60517		
System Name	DST EXHAUST TREATMENT SYSTEM		
Model Number	DST-P/N M235-401-01	MESG	0.064

<b>V. Heat Exchanger</b>			
Manufacturer	DST	Model or Part #	DST-P/N M150-301-01

<b>VI. Fire Suppression System</b>			
Manufacturer	ANSUL	Model or Part #	CHECK FIRE SCN SYSTEM

## IRWIN CAR and EQUIPMENT

Blairsville Operations  
P.O. Box 56 Blairsville, PA 15717  
Phone: 724-459-6847 Fax: 724-459-0793

### AMBIENT DPM CALCULATION SHEET

ENGINE MODEL: CUMMINS QSB5.4  
MSHA NUMBER: 07-ENA070006 (130) IIP  
VENTILATION RATE: 6,000 CFM  
DPM (WEIGHTED): 13.91 g/hr  
FILTER: DST MODEL M30  
FILTER EFFICIENCY: 96%

#### CONVERT DPM FROM (grams/hr) to (mg/min)

$$(13.91 \text{ g/hr}) \times (1\text{hr}/60\text{min}) \times (1,000\text{mg/g}) = 231.83 \text{ mg/min}$$

#### CONVERT VENTILATION RATE FROM (CFM to in<sup>3</sup>/min)

$$(6,000 \text{ ft}^3/\text{min}) \times (0.028315 \text{ m}^3/1 \text{ ft}^3) = 169.89 \text{ in}^3/\text{min}$$

#### DIVIDE DPM (mg/min) by VENTILATION RATE (in<sup>3</sup>/min)

$$(231.83 \text{ mg/min}) \div (169.89 \text{ in}^3/\text{min}) = 1.365 \text{ mg/in}^3$$

#### SOLVE FOR AMBIENT DPM LEVEL at 96% FILTER EFFICIENCY

$$1.365 \text{ mg}^3 \times (100\% - 96\% \text{ Filter efficiency}) = \underline{0.055 \text{ mg/in}^3}$$

**PA MAXIMUM AMBIENT DPM LEVEL AT 96% EFFICIENCY: 0.12 mg/in<sup>3</sup>**