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

Paul Borchick

(412) 736-9105 (Cell)
(412) 831-4414 (Office)
Email: paulborchick@consolenergy.com

Ron Bowersox

(724) 726-8987 (Home)
(724) 479-8692 (Office)
Email: umwarbowersox@yahoo.com

August 19, 2008

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

RE: Bucyrus 482D Unitrac with a Deutz BF4L 2011 78Hp engine and a DBT Management System emissions control package request for Alternate Emissions Test Procedure for Sections 217-A and 218-A.

Dear Mr. Sbaffoni:

Article II-A of the Pennsylvania Bituminous Coal Mine Act (the act) provides for the use of diesel-powered equipment in underground bituminous coal mines. Section 224-A of the act created a Technical Advisory Committee ("TAC") for the purpose of advising the Department regarding implementation of Article II-A and evaluation of alternative technology or methods for meeting the requirements of Article II-A.

Background

On April 3, 2008, Bucyrus submitted a request to the Bureau of Mine Safety for an alternative test procedure for the five minute carbon monoxide (CO) tests required under Sections 217-A and 218-A of the act for the Bucyrus 482D Unitrac with a Deutz BF4L 2011 78Hp engine and a DBT Management System.

On April 23, 2008 the Director requested the TAC to advise the Department concerning Bucyrus's request for an alternate test procedure for CO tests required under Sections 217-A and 218-A of the Act. The engine and emission system was previously approved as a unit by the Department based upon the TAC's recommendation and assigned a BOTE-DEES Approval No. 8-08.

Investigation

The equipment became available for inspection in August 2008. On August 14, 2008 the TAC members traveled to the Bucyrus facilities to evaluate Bucyrus's request for the need for an alternate test procedure. Both 5 minute and 90 second tests were observed and the results recorded.

The 5 minute test was conducted first. Both the treated and raw readings were taken simultaneously using two ECOM units. The maximum transmission oil temperature recorded was 215 degrees F. The manufacturer stated that when two 5 minute tests were conducted back to back, the transmission oil temperature exceeded 250 degrees F, at which time damage is possible to the Dana 20000 transmission and C270 remote torque converter due to insufficient lubrication (Attachment 1). Based on the manufacturer's recommendation on possible transmission damage due to excessive transmission oil temperatures during the second 5 minute test, the TAC feels the need for the Alternate 90 Second CO Test Procedure was shown

The 90 second Alternate CO Test was conducted and the results recorded. Test results of both the required test and the alternate test confirm comparable results. (Attachment 2)

Recommendation

Although the diesel powered package can withstand the emissions tests as described in Sections 217-A and 218-A of Article II-A, we recommend approval of the attached Alternative Stall Test Procedure (Attachment 3).

Should the Director receive a request for temporary approval to use the 90 Second Alternate Test Procedure prior to the next scheduled TAC meeting on October 8, 2008, and the Director determines the need exists for such temporary approval, the TAC will recommend the Alternate Test may be used prior to permanent approval which will be recommended at the next TAC meeting.



Paul Borchick



Ron Bowersox



BUCYRUS
4041 Wurno Road
Pulaski, Virginia 24301, USA
Tel. (+1) 540.980.4530 · Fax (+1) 540.980.6211

April 23, 2008

Mike McCaffrey
Pennsylvania Department of Environmental Protection
Bureau of Deep Mine Safety
Attn: Mike McCaffrey
Fayette County Health Center
100 New Salem Road, Room 167

Salutation,

In conjunction with the ongoing APS ID 642320 diesel scoop investigation, we would like to request consideration for acceptance of the 90 second stall test.

The 482D Unatrac is equipped with a Dana 20000 transmission and C270 remote torque converter. The torque converter uses the sump of the transmission for make up oil lost during bypass at torque stall. The stall required during the full five minute test will result in normal transmission lubricant levels to exceed the 250 degree maximum manufacturers allowance provided as part of their design guidelines.

If I may answer any questions or be of any assistance, please feel free to contact me by phone at (540) 994-3819, or 540-729-6803. You may reach me by fax at (540) 994-3763, or by E-mail at jim.coe@us.bucyrus.com

Thank you.

Sincerely,

Jim Coe
Senior Mechanical Engineer

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ATTACHMENT 1

BUCYRUS DIESEL SCOOPEL MODEL 482D ENGINE: DEUTZ BF4L2011 78 HP
 5 MINUTE RAW TEST
 TEST DAT 8/14/2008

TIME	O2 %	CO ppm	NO ppm	NO2 ppm	NOX ppm	CO2 %	ENGINE TEMP	ENGINE OIL TEMP	ANSMISSI OIL TEMP	EXHAUST GAS TEMP	
0:00:00	8.8	244	473	25	498	8.9					
0:00:30	8.8	172	524	21	545	8.9	START	192	192	150	140
0:01:00	8.7	157	544	20	564	9					
0:01:30	8.7	158	555	20	575	9	END	215	215	210	120
0:02:00	8.9	155	574	20	594	8.9					
0:02:30	8.9	155	574	20	594	8.9					
0:03:00	8.9	155	576	20	596	8.9					
0:03:30	8.9	147	600	20	620	8.9					
0:04:00	8.9	146	600	20	620	8.9					
0:04:30	8.9	146	608	20	628	8.9					
0:05:00	9	143	622	19	641	8.8					
0:05:30	9	142	631	19	650	8.8					
0:06:00	9.1	142	652	19	671	8.7					

BUCYRUS DIESEL SCOOPEL MODEL 482D ENGINE: DEUTZ BF4L2011 78 HP
 5 MINUTE CLEAN TEST
 TEST DAT 8/14/2008

TIME	O2 %	CO ppm	NO ppm	NO2 ppm	NOX ppm	CO2 %	ENGINE TEMP	ENGINE OIL TEMP	ANSMISSI OIL TEMP	EXHAUST GAS TEMP	
0:00:00	8.8	122	535	19	554	8.9					
0:00:10	8.8	101	545	18	563	8.9					
0:00:20	8.8	87	552	17	569	8.9					
0:00:30	8.7	80	553	17	570	9	START	192	192	150	140
0:00:40	8.7	75	577	17	594	9					
0:00:50	8.8	71	587	18	605	8.9	END	215	215	210	120
0:01:00	8.8	69	594	19	613	8.9					
0:01:10	8.8	69	587	19	606	8.9					
0:01:20	8.8	69	596	19	615	8.9					
0:01:30	8.8	69	603	20	623	8.9					
0:01:40	8.8	69	595	20	615	8.9					
0:01:50	8.8	68	605	21	626	8.9					
0:02:00	8.9	67	616	21	637	8.9					
0:02:10	8.9	65	618	22	640	8.9					
0:02:20	8.9	65	628	22	650	8.9					
0:02:30	8.9	64	628	23	651	8.9					
0:02:40	8.9	64	627	23	650	8.9					
0:02:50	9	63	634	23	657	8.8					
0:03:00	9	62	636	24	660	8.8					
0:03:10	9	62	637	24	661	8.8					
0:03:20	9	62	640	24	664	8.8					
0:03:30	9	61	641	24	665	8.8					
0:03:40	9	60	641	24	665	8.8					
0:03:50	9	59	644	25	669	8.8					
0:04:00	9	59	648	25	673	8.8					
0:04:10	9	58	648	25	673	8.8					
0:04:20	9	57	654	25	679	8.8					
0:04:30	9.1	57	660	25	685	8.7					
0:04:40	9.1	57	671	26	697	8.7					
0:04:50	9.1	56	677	26	703	8.7					
0:05:00	9.2	56	684	27	711	8.7					
0:05:10	9.2	55	688	28	716	8.7					
0:05:20	12.2	55	673	28	701	6.5					
0:05:30	14.4	47	714	36	750	4.8					

BUCYRUS DIESEL SCOOPEL MODEL 482D ENGINE: DEUTZ BF4L2011 78 HP
 90 SECON RAW TEST
 TEST DAT 8/14/2008

TIME	O2 %	CO ppm	NO ppm	NO2 ppm	NOX ppm	CO2 %	ENGINE TEMP	ENGINE OIL TEMP	ANSMISSI OIL TEMP	EXHAUST GAS TEMP	
0:00:00	9	104	469	25	494	8.8					
0:00:15	8.8	193	517	25	542	8.9					
0:00:30	8.8	173	531	25	556	8.9					
0:00:45	8.8	170	533	24	557	8.9	START	150	196	180	150
0:01:00	8.9	166	552	24	576	8.9					
0:01:15	8.9	153	570	24	594	8.9	END	180	205	214	118
0:01:30	8.9	149	585	23	608	8.9					

BUCYRUS DIESEL SCOOPEL MODEL 482D ENGINE: DEUTZ BF4L2011 78 HP
 90 SECON CLEAN TEST
 TEST DAT 8/14/2008

TIME	O2 %	CO ppm	NO ppm	NO2 ppm	NOX ppm	CO2 %	ENGINE TEMP	ENGINE OIL TEMP	ANSMISSI OIL TEMP	EXHAUST GAS TEMP	
0:00:00	9	114	541	23	564	8.8					
0:00:10	8.8	83	530	22	552	8.9					
0:00:20	8.8	63	555	24	579	8.9					
0:00:30	8.8	56	569	26	595	8.9	START	150	196	180	150
0:00:40	8.8	53	577	27	604	8.9					
0:00:50	8.9	52	590	28	618	8.9	END	180	205	214	118
0:01:00	8.9	51	598	29	627	8.9					
0:01:10	8.9	51	610	30	640	8.9					
0:01:20	8.9	49	620	30	650	8.9					
0:01:30	8.9	48	620	31	651	8.9					

**ALTERNATIVE STALL TEST PROCEDURE FOR PA STATE ACT 182, ARTICLE II-A
DIESEL-POWERED EQUIPMENT**

ALTERNATE PROCEDURE, Section 217-A: (an alternative to items 8 through 14)

1. Place the equipment into an intake entry. Make sure no personnel are in front of or behind the equipment during test.
2. Set the brakes and chock the wheels.
3. Start the diesel engine and allow it to warm up to operating temperature.
4. Install the carbon monoxide CO sampling devices into the untreated exhaust gas port provided.
5. Allow CO sampling device to stabilize.
6. Put the transmission in high gear.
7. With brake still applied, put the engine at full throttle to induce converter stall for 90 seconds. Stop test immediately if any controls or indicators are not in their operating range, or if equipment moves while at stall.
8. Record three CO readings at 60, 75, and 90-second intervals during converter stall.
9. Return engine to low idle and put transmission in neutral. Allow the torque converter temperature to stabilize.
10. Take an average of the three readings.
11. Comply with record-keeping requirements pursuant to Section 214-A.

ALTERNATIVE PROCEDURE, Section 218-A: (an alternative to items 10-14)

1. Place the equipment into an intake entry. Make sure no personnel are in front of or behind the equipment during test.
2. Set the brakes and chock the wheels.
3. Start the diesel engine and allow it to warm up to operating temperature.
4. Install the carbon monoxide CO sampling device into the untreated exhaust gas port provided.
5. Allow CO sampling device to stabilize.
6. Put the transmission in high gear.
7. With brakes still applied, put the engine at full throttle to induce converter stall for 90 seconds. Stop test immediately if any controls or indicators are not in their operating range, or if equipment moves while at stall.
8. Record three CO readings at 60, 75, and 90-second intervals during converter stall.
9. Return engine to low idle and put transmission in neutral. Allow the torque converter temperature to stabilize.
10. Take an average of the three CO readings.
11. Install the carbon monoxide CO sampling device into the treated exhaust gas port provided.
12. Repeat steps (5) thru (10).
13. If CO reading for untreated exhaust gas is greater than twice the baseline established under 217-A(b), or if the CO reading for treated exhaust is greater than 100 ppm, the equipment has failed and must be serviced and retested before it is returned to regular service; and
14. Comply with record-keeping requirements pursuant to Section 214-A.