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

January 7, 2008

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

RE: Evaluation and approval of a Deutz BF4M 1013 FC 157 HP engine with an Engine
      Control Systems Model S-18 Silicon-Carbide Filter in a DBT Model 488D Un-A-Trac
      for the alternative 90 second test procedure for the 5 minute CO tests

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.

Background

On April 6, 2006, DBT America, Inc. submitted a request to the Bureau of Mine Safety (BMS) for evaluation and approval pursuant to Article II-A of the act of a Deutz BF4M 1013 FC 157HP engine (MSHA Approval No. 07-ENA040007-1) with an S 18 Silicon-Carbide Filter in a DBT Model 488D Un-A-Trac Diesel Scoop. Additionally, DBT America, Inc. requested an alternative test procedure for the five minute carbon monoxide (CO) tests required under Sections 217-A and 218-A of the act. In a letter dated November 20, 2007 Rosebud Mining requested temporary approval to use the scoop before the next regularly scheduled TAC meeting in January 2008.

On July 12, 2006 the Director of BMS requested the TAC to evaluate the diesel power package and to advise the Department regarding the TAC's recommendation as to whether the diesel power package meets the requirements of the act and for the TAC's recommendation on DBT's request for an alternate test procedure for CO testing.

The diesel power package includes the following items:

- Deutz BF4M 1013 FC 157HP engine (MSHA Approval No. 07-ENA040007-1)
- Emissions Control System – DBT Management System which includes:
    - Engine Control Systems Model- AZ29 Oxidation Catalyst
    - DBT / Cooling Systems 350177 heat exchanger
    - Engine Control Systems Model-S18 DPM filter (MSHA efficiency rating 85%)
    - CIC Model 804/D-IL-C4C Flame Arrestor

An investigation and evaluation was conducted on the DBT Model 488D scoop by the TAC and DEP on November 14, 2007 at the DBT facility in Pulaski, Va. The TAC made their recommendation for approval in a letter to the Director on November 21, 2007. The TAC also stated in this letter that the need for the alternate test procedure for CO testing was not identified during their investigation, so the 5 minute test, as required in Sections 217-A and 218-A of the act, was recommended.

In a letter to the Director on December 26, 2007 from Dave Sharkins of Rosebud Mining Company (Attachment 1), he requested the TAC further investigate the need for the alternate test procedure for the CO test. Supporting data was supplied to the TAC in a December 5, 2007 letter by Gene Davis, Diesel Consultant, to the TAC (Attachment 2).

Investigation

On November 14, 2007 the BMS and the TAC traveled to the DBT facilities in Pulaski, Va. to inspect the Un-a-trac. Emissions testing of the engine and after-treatment system were performed, as well as exhaust gas temperature monitoring and stall test procedure. Both the 5 minute and alternate 90 second CO tests were conducted. The results of the emission tests were comparable and showed the engine was performing within MSHA's approval specifications. The results of that test are included in Attachment 4.

In his letter to the TAC on December 5, 2007 there were several points identified by Mr. Davis that the TAC feels are justifiable and provide adequate proof of the need for the alternative 90 second test procedure. It should be noted that DBT did not identify any of these concerns during the investigation on November 14, 2007 and the TAC therefore had no reason to recommend the alternate test. Also during this test both 5 minute tests were conducted back to back with no cooling water on the transmission and the maximum transmission shut down temperature was not exceeded.

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 203-A of Article II-A of the Act without reducing or compromising the level of health or safety afforded by the Act.

Recommendation

Our recommendation is based on the data provided by DBT, our inspection of the DBT Model 488D Un-a-trac on November 14, 2007 and information provided by Gene Davis in his December 5, 2007 letter to the TAC.

The TAC has determined that the Deutz BF4M 1013 FC 157 HP engine with an Engine Control Systems Model S-18 Silicon-Carbide Filter for use in a DBT Model 488D Un-a-trac scoop satisfies the requirements of Section 203-A of Article II-A of the Pennsylvania Bituminous Coal Mine Act.

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 Test Procedure (Attachment 3). Test results of both the required test and the alternate test confirm comparable results and as such we recommend the use of the alternate test.

Paul Borchick

Ron Bowersox

ROSEBUD MINING COMPANY

December 26, 2007
Bureau of Mine Safety
Joseph A. Sbaffoni, Director
Fayette County Health Center
100 New Salem Road, Room 167
Uniontown, Pa. 15401

RE: Request the Technical Advisory Committee on Diesel Powered Equipment
January 9, 2008 meeting agenda to include our concerns of the five minute stall test of
the DBT Model 488D Serial No. 488-2735 temporary approved Diesel Scoop.

Dear Mr. Sbaffoni:

Rosebud Mining Company is requesting the Technical Advisory Committee on Diesel
Powered Equipment allow time during the January 9, 2008 meeting to discuss our interest
in using the enclosed Alternative Stall Test Procedure for Pa State Act 182, Article II-A
Diesel Powered Equipment Alternate Procedure, Section 217-A and 218-A for the Toms
Run Mine DBT Model 488D Serial No. 488-2735 temporary approved Diesel Scoop.
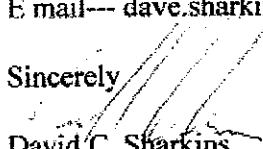
Enclosed is a letter for the TAC committee from our diesel consultant Gene Davis
addressing his concerns after observing the initial base line test of the scoop December 5,
2007 at the Toms Run Mine.

Also enclosed is the base line of the 488D, the 5 @ 1 minute ECOM printouts, 3 weekly
60, 75 and 90 second readings. Alternative Stall Test Procedure for Pa.

Appreciate a reply if I need to do something different to insure this issue is on the agenda
for the January 9, 2007 meeting.

Phone---- 724-543-7427
Cell------ 724-525-1551
Fax------- 412-291-1970
E mail--- dave.sharkins@rosebudmining.com

Sincerely

David C. Sharkins
Rosebud Mining Company

RECEIVED

DEC 3 1 2007

BUREAU OF MINE SAFETY

cc: Bowersov
Borchuk
martin
Bookshar
mccaffrey

ATTACHMENT 1

To: Paul Borchick   Ron Bowersox

December 5, 2007

Re: Request for recommendation by the Technical Advisory Committee on Diesel Powered Equipment (TAC).

Dear Sirs:

Rosebud Mining has recently purchased a diesel Powered Scoop from DBT inc. The OEM had previously applied for the alternate emissions test for this piece of equipment which was turned down by your committee. We are requesting your committee to revisit the request for the alternate emissions test.(a copy of the test procedure is attached to this request.) This request is being made for the following reasons:

- The equipment has recently undergone a 5 minute stall test for the purpose of establishing a baseline emission value. During that test the transmissions oil temperature increased to about 290° F. we believe this is temperature will be detrimental for the equipment transmission.

- The ambient temperature during testing was approximately 30° F and still the transmission temperature spiked to 290° F we do not believe we will be able to stall the torque converter for the required 5 minutes without an external cooler except during the coldest time of the year.

- It must also be noted that the OEM has stated that the temperature of 290 to 300°F should not hurt the equipment for the first 6 to 9 months. Rosebud Mining does not believe it reasonable to destroy the transmission to produce a 5 minute torque converter stall.

- We must also inject that Brookville Mining Equipment, which has many pieces of equipment approved with the alternate stall test restricts the transmission oil temperature to 240°F which is far below the temperature listed above.

- The 5 minute baseline emissions test produced an average CO reading of 80.4 ppm while we noted the 2 minute reading during this test was 80 ppm. We believe these CO reading prove that it is not necessary to stall the torque converter for 5 minutes. (A copy of the actual test is attached)

It is for the above listed reasons that we are requesting the TAC revisit the request for an alternate emissions test for the Rosebud DBT scoop.

Best Regards
Gene Davis

ATTACHMENT 2

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.

ATTACHMENT 3

Time(h:m:s)	O2(%)	CO(ppm)	NO(ppm)	NO2(ppm)	NOx(ppm)	SO2(ppm)	CxHy(%)	CO2(%)	T Gas(F)	T Amb(F)	ETA	Lambda	Comments:
0:00:02	17	118	325	30	355	0	0	2.9	70	62	99.2	5.25	
0:00:12	17	119	304	31	335	0	0	2.9	70	62.3	99.2	5.25	
0:00:22	17.1	118	297	32	329	0	0	2.9	70	62.3	99.2	5.38	begin 5 min raw
0:00:32	17.1	121	293	32	325	0	0	2.9	71	62	99.1	5.38	
0:00:42	10.8	310	414	35	449	0	0	7.5	70	62.2	99.7	2.06	
0:00:52	10.4	415	366	33	399	0	0	7.8	70	62.2	99.7	1.98	
0:01:02	10.5	231	401	30	431	0	0	7.7	70	62	99.7	2	
0:01:12	10.5	146	424	29	453	0	0	7.7	71	62.2	99.7	2	
0:01:22	10.5	104	440	29	469	0	0	7.7	70	62.3	99.7	2	
0:01:32	10.2	92	474	29	503	0	0	7.9	70	62.2	99.7	1.94	
0:01:42	10.3	85	474	30	504	0	0	7.8	70	62.2	99.7	1.96	
0:01:52	10.3	85	475	29	504	0	0	7.8	69	62.1	99.7	1.96	
0:02:02	10.3	81	475	29	504	0	0	7.8	70	62.3	99.7	1.96	
0:02:12	10.3	82	478	29	507	0	0	7.8	70	62.2	99.7	1.96	
0:02:22	10.3	82	478	29	507	0	0	7.8	70	62.1	99.7	1.96	
0:02:32	10.3	82	479	28	507	0	0	7.8	70	62.2	99.7	1.96	
0:02:42	10.4	82	478	28	506	0	0	7.8	70	62.2	99.7	1.98	
0:02:52	10.4	82	479	28	507	0	0	7.8	70	62.3	99.7	1.98	
0:03:02	10.4	82	481	28	509	0	0	7.8	70	62.2	99.7	1.98	
0:03:12	10.4	81	483	27	510	0	0	7.8	70	62.3	99.7	1.98	
0:03:22	10.4	81	485	27	512	0	0	7.8	70	62.3	99.7	1.98	
0:03:32	10.4	82	487	27	514	0	0	7.8	69	62.2	99.7	1.98	
0:03:42	10.4	82	488	27	515	0	0	7.8	70	62.2	99.7	1.98	
0:03:52	10.4	82	488	27	515	0	0	7.8	69	62.2	99.7	1.98	
0:04:02	10.4	82	489	26	515	0	0	7.8	69	62.3	99.7	1.98	
0:04:12	10.4	81	489	26	515	0	0	7.8	69	62.3	99.7	1.98	
0:04:22	10.4	81	489	26	515	0	0	7.8	69	62.3	99.7	1.98	
0:04:32	10.4	81	491	26	517	0	0	7.8	70	62.3	99.7	1.98	
0:04:42	10.4	81	491	26	517	0	0	7.8	69	62.4	99.7	1.98	
0:04:52	10.4	82	491	26	517	0	0	7.8	69	62.4	99.7	1.98	
0:05:02	10.4	82	494	26	520	0	0	7.8	70	62.3	99.7	1.98	
0:05:12	10.4	82	494	26	520	0	0	7.8	70	62.3	99.7	1.98	
0:05:22	10.4	83	494	26	520	0	0	7.8	70	62.3	99.7	1.98	
0:05:32	10.4	83	494	26	520	0	0	7.8	70	62.3	99.7	1.98	end
0:05:42	10.4	82	495	25	520	0	0	7.8	69	62.4	99.8	1.98	
0:05:52	12.2	81	518	24	542	0	0	6.5	70	62.6	99.7	2.39	
0:06:02	15.6	85	466	25	491	0	0	4	70	62.6	99.5	3.89	
0:06:12	13.9	106	402	25	427	0	0	5.2	70	62.3	99.6	2.96	
0:06:22	14.2	101	401	24	425	0	0	5	70	62.4	99.6	3.09	
0:06:32	14.2	97	410	24	434	0	0	5	70	62.6	99.6	3.09	
0:06:42	14.2	98	421	25	446	0	0	5	70	62.6	99.6	3.09	
0:06:52	14.2	101	419	26	445	0	0	5	70	62.8	99.6	3.09	
0:07:02	14.2	106	415	26	441	0	0	5	70	62.8	99.6	3.09	
0:07:12	14.2	112	413	28	441	0	0	5	70	62.7	99.6	3.09	
0:07:22	15.3	121	405	29	434	0	0	4.2	70	62.7	99.5	3.68	
0:07:32	15.7	126	404	30	434	0	0	3.9	70	62.4	99.4	3.96	
0:07:42	17.2	103	237	71	308	0	0	2.8	70	62.5	99.3	5.53	
0:07:52	17	51	229	91	320	0	0	2.9	71	62.6	99.2	5.25	
0:08:02	17	26	218	101	319	0	0	2.9	71	62.5	99.2	5.25	
0:08:12	17	15	207	108	315	0	0	2.9	71	62.8	99.2	5.25	
0:08:22	17	11	195	114	309	0	0	2.9	70	62.8	99.3	5.25	
0:08:32	17	5	187	121	308	0	0	2.9	71	62.8	99.2	5.25	
0:08:42	17	4	176	126	302	0	0	2.9	71	62.7	99.2	5.25	
0:08:52	17	4	168	131	299	0	0	2.9	70	62.8	99.3	5.25	
0:09:02	17	4	161	134	295	0	0	2.9	70	62.8	99.3	5.25	
0:09:12	17	3	154	140	294	0	0	2.9	70	62.6	99.3	5.25	
0:09:22	17.1	2	147	143	290	0	0	2.9	70	62.9	99.3	5.38	
0:09:32	17.1	2	141	146	287	0	0	2.9	71	62.8	99.2	5.38	
0:09:42	17.2	0	134	146	280	0	0	2.8	70	62.8	99.3	5.53	
0:09:52	16.9	2	146	151	297	0	0	3	70	62.7	99.3	5.12	
0:10:02	17.2	0	129	150	279	0	0	2.8	70	63	99.3	5.53	
0:10:12	17.2	1	128	150	278	0	0	2.8	70	62.8	99.3	5.53	
0:10:22	17.2	0	126	151	277	0	0	2.8	70	63	99.3	5.53	

ATTACHMENT 4-1

Time(h:m:s)	O2(%)	CO(ppm)	NO(ppm)	NO2(ppm)	NOx(ppm)	SO2(ppm)	CxHy(%)	CO2(%)	T Gas(F)	T Amb(F)	ETA	Lambda	Comments:
0:10:32	17.2	0	125	151	276	0	0	2.8	70	62.9	99.3	5.53	
0:10:42	17.2	0	124	151	275	0	0	2.8	70	62.8	99.3	5.53	
0:10:52	17.2	0	125	151	276	0	0	2.8	70	63	99.3	5.53	
0:11:02	17.2	0	129	151	280	0	0	2.8	70	62.9	99.3	5.53	
0:11:12	17.2	0	131	152	283	0	0	2.8	70	62.7	99.3	5.53	
0:11:22	17.2	1	133	151	284	0	0	2.8	70	62.8	99.3	5.53	
Time(h:m:s)	O2(%)	CO(ppm)	NO(ppm)	NO2(ppm)	NOx(ppm)	SO2(ppm)	CxHy(%)	CO2(%)	T Gas(F)	T Amb(F)	ETA	Lambda	Comments:
0:11:32	17.1	0	135	150	285	0	0	2.9	70	62.9	99.3	5.38	start 5 min clean
0:11:42	17.1	0	139	150	289	0	0	2.9	70	62.8	99.3	5.38	
0:11:52	13.7	0	344	156	500	0	0	5.4	71	63.1	99.6	2.88	
0:12:02	10.6	0	378	119	497	0	0	7.6	70	62.9	99.7	2.02	
0:12:12	10.6	0	346	119	465	0	0	7.6	70	63.2	99.7	2.02	
0:12:22	10.6	1	340	132	472	0	0	7.6	70	63	99.7	2.02	
0:12:32	10.2	0	359	138	497	0	0	7.9	70	63	99.7	1.94	
0:12:42	10.2	0	374	139	513	0	0	7.9	70	62.9	99.7	1.94	
0:12:52	10.2	0	383	136	519	0	0	7.9	70	63	99.7	1.94	
0:13:02	10.3	0	391	132	523	0	0	7.8	70	63	99.7	1.96	
0:13:12	10.3	0	396	127	523	0	0	7.8	70	63	99.7	1.96	
0:13:22	10.3	0	399	125	524	0	0	7.8	70	63	99.7	1.96	
0:13:32	10.3	0	402	123	525	0	0	7.8	70	62.7	99.7	1.96	
0:13:42	10.3	0	407	120	527	0	0	7.8	70	62.8	99.7	1.96	
0:13:52	10.3	0	413	117	530	0	0	7.8	70	62.9	99.7	1.96	
0:14:02	10.3	0	416	115	531	0	0	7.8	70	63	99.7	1.96	
0:14:12	10.3	1	422	112	534	0	0	7.8	70	63	99.7	1.96	
0:14:22	10.4	0	424	111	535	0	0	7.8	70	62.9	99.7	1.98	
0:14:32	10.4	1	426	108	534	0	0	7.8	70	63.1	99.7	1.98	
0:14:42	10.4	0	429	107	536	0	0	7.8	70	63.2	99.7	1.98	
0:14:52	10.4	0	432	105	537	0	0	7.8	70	63.2	99.7	1.98	
0:15:02	10.4	1	434	103	537	0	0	7.8	70	63.2	99.7	1.98	
0:15:12	10.4	1	436	102	538	0	0	7.8	70	63.3	99.7	1.98	
0:15:22	10.4	0	440	100	540	0	0	7.8	70	62.9	99.7	1.98	
0:15:32	10.4	0	442	100	542	0	0	7.8	70	62.8	99.7	1.98	
0:15:42	10.4	0	442	98	540	0	0	7.8	70	63.1	99.7	1.98	
0:15:52	10.4	1	443	96	539	0	0	7.8	70	63.2	99.7	1.98	
0:16:02	10.4	0	445	95	540	0	0	7.8	70	63.2	99.7	1.98	
0:16:12	10.5	1	446	94	540	0	0	7.7	70	63.2	99.7	2	
0:16:22	10.4	0	447	93	540	0	0	7.8	71	63.2	99.7	1.98	
0:16:32	10.4	2	449	92	541	0	0	7.8	70	63	99.7	1.98	
0:16:42	10.4	1	449	92	541	0	0	7.8	71	63.1	99.7	1.98	
0:16:52	10.4	0	452	91	543	0	0	7.8	70	62.9	99.7	1.98	end
0:17:02	10.4	2	454	90	544	0	0	7.8	70	62.9	99.7	1.98	
0:17:12	12.5	2	441	87	528	0	0	6.2	70	63.2	99.7	2.47	
0:17:22	15.7	1	411	84	495	0	0	3.9	70	63.2	99.5	3.96	
0:17:32	16.2	1	409	84	493	0	0	3.5	71	63.1	99.3	4.38	
0:17:42	16.4	2	405	85	490	0	0	3.4	71	63.3	99.3	4.57	
0:17:52	16.6	2	390	88	478	0	0	3.2	71	63.5	99.3	4.77	
0:18:02	15.9	1	392	95	487	0	0	3.7	72	63.4	99.3	4.12	
0:18:12	14.4	2	323	111	434	0	0	4.8	70	63.3	99.6	3.18	
0:18:22	14.4	2	287	127	414	0	0	4.8	71	63.3	99.5	3.18	
0:18:32	14.8	2	275	140	415	0	0	4.5	71	63.4	99.5	3.39	
0:18:42	14.1	2	291	150	441	0	0	5.1	71	63.5	99.5	3.04	
0:18:52	14.2	1	266	153	419	0	0	5	71	63.3	99.6	3.09	
0:19:02	14.3	1	261	159	420	0	0	4.9	71	63.4	99.6	3.13	
0:19:12	14.4	0	258	164	422	0	0	4.8	70	63.2	99.6	3.18	
0:19:22	14.5	0	255	167	422	0	0	4.8	71	63.6	99.6	3.23	
0:19:32	14.6	1	251	168	419	0	0	4.7	71	63.4	99.5	3.28	
0:19:42	14.8	0	248	169	417	0	0	4.5	71	63.4	99.5	3.39	
0:19:52	14.6	0	252	172	424	0	0	4.7	71	63.5	99.6	3.28	
0:20:02	14.8	0	248	172	420	0	0	4.5	71	63.6	99.6	3.39	
0:20:12	15	0	244	173	417	0	0	4.4	71	63.3	99.5	3.5	
0:20:22	15.4	0	232	175	407	0	0	4.1	71	63.4	99.4	3.75	
0:20:32	15.7	0	226	176	402	0	0	3.9	72	63.7	99.4	3.96	
0:20:42	16.1	0	211	175	386	0	0	3.6	71	63.7	99.4	4.29	
0:20:52	16.7	0	193	182	375	0	0	3.2	71	63.5	99.3	4.88	
0:21:02	14.9	0	256	172	428	0	0	4.5	71	63.5	99.5	3.44	
0:21:12	15.1	0	263	155	418	0	0	4.3	71	63.7	99.6	3.56	
0:21:22	15.3	0	268	153	421	0	0	4.2	71	63.2	99.4	3.68	
0:21:32	15.5	0	259	153	412	0	0	4	71	63.8	99.5	3.82	
0:21:42	15.7	0	249	155	404	0	0	3.9	71	63.6	99.5	3.96	
0:21:52	15.8	0	299	144	443	0	0	3.8	72	63.6	99.4	4.04	
0:22:02	16	74	355	99	454	0	0	3.7	72	63.8	99.4	4.2	
0:22:12	16.2	133	363	76	439	0	0	3.5	71	63.8	99.4	4.38	
0:22:22	16.2	148	362	66	428	0	0	3.5	72	63.6	99.3	4.38	

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Time(h:m:s)	O2(%)	CO(ppm)	NO(ppm)	NO2(ppm)	NOx(ppm)	SO2(ppm)	CxHy(%)	CO2(%)	T Gas(F)	T Amb(F)	ETA	Lambda	Comments:
0:22:32	16.3	155	364	60	424	0	0	3.4	71	63.6	99.4	4.47	
0:22:42	17	156	335	56	391	0	0	2.9	72	63.6	99.2	5.25	
0:22:52	17.2	150	325	50	375	0	0	2.8	71	63.8	99.3	5.53	
0:23:02	17.2	132	328	47	375	0	0	2.8	71	63.8	99.3	5.53	start 90 sec raw
0:23:12	14.7	136	415	46	461	0	0	4.6	72	63.6	99.5	3.33	
0:23:22	10.6	393	423	44	467	0	0	7.6	72	63.8	99.7	2.02	
0:23:32	10.7	260	438	41	479	0	0	7.6	71	63.8	99.7	2.04	
0:23:42	10.6	152	460	40	500	0	0	7.6	71	63.8	99.7	2.02	
0:23:52	10.3	114	472	40	512	0	0	7.8	71	63.9	99.7	1.96	
0:24:02	10.3	94	478	39	517	0	0	7.8	71	63.8	99.7	1.96	
0:24:12	10.3	89	483	38	521	0	0	7.8	71	63.9	99.7	1.96	
0:24:22	10.3	83	485	38	523	0	0	7.8	71	63.9	99.7	1.96	
0:24:32	10.3	81	487	37	524	0	0	7.8	71	63.8	99.7	1.96	end
0:24:42	10.3	82	489	37	526	0	0	7.8	71	63.8	99.7	1.96	
0:24:52	11.6	82	520	36	556	0	0	6.9	71	63.7	99.7	2.23	
0:25:02	16	82	479	37	516	0	0	3.7	71	63.7	99.4	4.2	
0:25:12	16.1	94	472	37	509	0	0	3.6	71	64	99.4	4.29	
0:25:22	15.3	105	418	39	457	0	0	4.2	71	64.1	99.5	3.68	
0:25:32	15.8	121	424	39	463	0	0	3.8	71	64	99.4	4.04	
0:25:42	16.1	123	391	39	430	0	0	3.6	70	64	99.5	4.29	
0:25:52	18.8	121	192	30	222	0	0	1.6	71	64.1	98.7	9.55	
0:26:02	20.2	100	103	22	125	0	0	0.6	71	64.2	96.6	26.25	
0:26:12	20.6	68	64	15	79	0	0	0.3	72	64	92.1	52.5	
0:26:22	20.8	39	50	12	62	0	0	0	73	63.8	0	0	
0:26:32	20.8	18	44	9	53	0	0	0	74	64	0	0	
0:26:42	20.8	13	41	8	49	0	0	0	74	64	0	0	
0:26:52	20.9	7	36	7	43	0	0	0	75	64.1	0	0	
0:27:02	20.9	2	33	7	40	0	0	0	75	64.4	0	0	
0:27:12	20.9	1	31	6	37	0	0	0	75	64.1	0	0	
0:27:22	20.9	1	30	6	36	0	0	0	74	64.1	0	0	
0:27:32	20.9	1	27	5	32	0	0	0	74	64.1	0	0	
0:27:42	21	0	26	5	31	0	0	0	74	64	0	0	
0:27:52	21	0	25	4	29	0	0	0	74	63.9	0	0	
0:28:02	21	0	24	4	28	0	0	0	74	64	0	0	
0:28:12	21	0	22	4	26	0	0	0	74	64	0	0	
0:28:22	21	0	22	4	26	0	0	0	74	64	0	0	
0:28:32	21	0	21	4	25	0	0	0	74	64.1	0	0	
0:28:42	21	0	21	4	25	0	0	0	74	64.1	0	0	
0:28:52	21	0	21	4	25	0	0	0	74	64	0	0	
0:29:02	21	0	20	4	24	0	0	0	73	64	0	0	
0:29:12	21	0	20	4	24	0	0	0	74	64.2	0	0	
0:29:22	21	0	19	4	23	0	0	0	74	64.1	0	0	
0:29:32	21	0	19	4	23	0	0	0	74	64.2	0	0	
0:29:42	21	0	19	3	22	0	0	0	74	64.2	0	0	
0:29:52	20.9	0	18	4	22	0	0	0	74	64.1	0	0	
0:30:02	21	0	18	4	22	0	0	0	74	64.4	0	0	
0:30:12	21	0	18	4	22	0	0	0	74	64.4	0	0	
0:30:22	19.3	0	98	33	131	0	0	1.2	76	64.2	97.2	12.35	
0:30:32	18	0	103	108	211	0	0	2.2	76	64.3	98.4	7	start 90 sec clean
0:30:42	17.3	0	99	151	250	0	0	2.7	76	64.1	98.7	5.68	
0:30:52	10.9	63	317	145	462	0	0	7.4	76	64.2	99.6	2.08	
0:31:02	10.7	50	318	137	455	0	0	7.6	75	64.1	99.6	2.04	
0:31:12	10.7	22	321	147	468	0	0	7.6	75	64.2	99.6	2.04	
0:31:22	10.5	8	343	155	498	0	0	7.7	76	64.3	99.6	2	
0:31:32	10.3	1	358	156	514	0	0	7.8	75	64.3	99.6	1.96	
0:31:42	10.3	0	369	152	521	0	0	7.8	75	64.4	99.6	1.96	
0:31:52	10.3	0	377	148	525	0	0	7.8	75	64.2	99.6	1.96	
0:32:02	10.3	1	383	144	527	0	0	7.8	75	64.2	99.6	1.96	end
0:32:12	10.3	0	390	139	529	0	0	7.8	74	64.4	99.6	1.96	
0:32:22	13	0	374	132	506	0	0	5.9	75	64.1	99.4	2.63	
0:32:32	15.5	0	348	129	477	0	0	4	75	64.2	99.2	3.82	