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Pennsylvania Technical Advisory Committee
On Diesel Powered Equipment

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September 22, 2006

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

RE: Brookville Equipment Corporation Daimler Chrysler OM904LA 174HP Diesel Power Package

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 June 9, 2006, Brookville Equipment Corporation (Brookville) submitted a request to the Bureau of Deep Mine Safety (BDMS") for evaluation and approval pursuant to Article II-A of the act of a Daimler Chrysler OM904LA 174HP engine (MSHA Approval No.7E-B098) with a M30 DST Management System in a Model 25T174D Locomotive. Additionally, Brookville requested an alternative test procedure for the five minute carbon monoxide (CO) tests required under Sections 217-A and 218-A of the act. On June 13, 2006, the Director of BDMS 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 subsection 203-A(3) of the act and for the TAC's recommendation on Brookville's request for an alternate test procedure for CO testing. The TAC was unable to begin its investigation until August 2006, because the equipment was not available until then.

The diesel power package includes the following items:

- Daimler Chrysler OM904LA 174HP turbo charged diesel engine (MSHA Certification No.7E-B098)
- Emissions Control System – DST Management System which includes:
  - Syncat Corporation M113-210-02 Oxidation Catalyst
  - Dry Systems Technologies M115-105-01 heat exchanger
  - Fleet Guard M 30 particulate filter (MSHA efficiency rating 98.5%)

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 August 8, 2006, the TAC and DEP representatives traveled to the Brookville facilities to inspect the diesel equipment package. On that date, 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 that testing are included in Attachment 2.

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 204° F, which is well below the 302° F allowed by Section 203-A (b)(4) of Article II-A. It is our belief that the heat exchanger will maintain the exhaust gas temperature well below the required 302 ° F.

The after-treatment system is fitted with a Fleet Guard M 30 disposable filter. The filter is rated by MSHA at a 98.5% efficiency rating, which meets the requirements of Section 203-A (b)(1) of Article II-A. The engine and filter extrapolations show that the diesel power package will result in an average ambient concentration of .021 mg/m^3 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/m^3 requirement of Section 203-A (a)(1) Article II-A.

On August 8, 2006, measurements of the surface temperature of the exhaust components and the charge air circuit of the diesel engine exceeded the 302 degree Fahrenheit limit for significant external surface temperatures of Section 203-A (b)(3) of Article II-A. Subsequently, the thickness of the HTI coating on the exhaust components was increased from 3/8" to 3/4" and an Advanced Thermo Products (ATP) thermal blanket was installed on the charge air circuit. On September 22, 2006, the TAC traveled to Consol Energy's Bailey Mine and inspected the equipment again for the purpose of observing the HTI coating and the ATP thermal blanket and measuring engine surface temperatures. On that date significant external surface temperatures were less than 302 degrees Fahrenheit.

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.

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). 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.

Recommendation

Our recommendation is based upon the data supplied by Brookville, the results of the tests conducted on June 8, 2006, the engine surface temperature measurements conducted on September 22, 2006, as well as the data acquired and observations made during our investigation. The TAC has determined that the Daimler Chrysler OM904LA 174HP engine (MSHA Approval No.7E-B098) with a M30 DST Management System meets all requirements of Section 203-A of Article II-A of the Pennsylvania Bituminous Coal Mine 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. As discussed above, we are also recommending approval of an alternate test procedure for Sections 217-A and 218-A of the act.

Stanley Geary

Ron Bowersox

ATTACHMENT 1

BROOKVILLE EQUIPMENT CORP.
MODEL 25T174D
Diesel 25 Ton Locomotive

General Specifications of the Diesel-Powered Equipment Package

Engine Manufacturer		Daimler Chrysler		
Engine Model		OM904LA		
Horsepower		174 HP		
Rated Speed		2200 RPM		
Manufacturer's Recommended Exhaust Back-pressure (InH2O)		40.8 Inches Water Gauge		
Maximum Exhaust Out Temperature		1166 deg F		
MSHA Engine Approval		**MSHA Part 7**		
MSHA Certification No.		7E-B098		
Rated Speed		2200 RPM		
Rated Horsepower		174 HP		
Exhaust GAS Flow (SCFM)		1077 CFM		
ISO 8178-1 Average DPM (gr/hr)		8.50 gr/hr		
Average Ambient DPM Level (mg/m3)		0.021 mg/m3		
MSHA Ventilation Rate (CFM)		7,500 CFM (Part 7)	CFM (Part 32)	
Pa. State Ventilation Rate (CFM)				
Emissions Control System		**DST Management System**		
Fuel Injection Pump	Make	Bosch		
	P/N	0280746902		
Oxidation Catalyst	Make	Syncat Corp.		
	P/N	M113-210-02		
Heat Exchanger	Make	Dry Systems Technologies		
	P/N	M115-105-01		
DPM Filter	Make	Fleetguard	Model	M 30
	P/N	M 30	Filter Size	16 x 12 in Diameter
	Air Rating (CFM)	2100 CFM	Filter Length	20 in
	Surface Area (in3)	42,231 in3		
	Efficiency			98.5%
	Recommended Exhaust Back-Pressure			25 Inches Water Gauge

ATTACHMENT 2

0:27:03	14.6	1	630	34	664	0	0	4.7	83	80.3	99.8	3.28
0:27:13	13.6	221	429	30	459	0	0	5.4	84	80.3	99.8	2.84
0:27:23	9.2	261	595	30	625	0	0	8.7	84	80.4	99.9	1.78
0:27:33	8.8	144	562	28	590	0	0	8.9	84	80.5	99.9	1.72
0:27:43	8.7	78	565	29	594	0	0	9	84	80.5	99.9	1.71
0:27:53	8.6	49	572	30	602	0	0	9.1	84	80.5	99.9	1.69
0:28:03	8.6	37	576	32	608	0	0	9.1	84	80.5	99.9	1.69
0:28:13	8.6	34	579	33	612	0	0	9.1	83	80.3	99.9	1.69
0:28:23	8.6	31	582	33	615	0	0	9.1	84	80.5	99.9	1.69
0:28:33	8.6	29	576	34	610	0	0	9.1	84	80.6	99.9	1.69
0:28:43	8.6	28	580	34	614	0	0	9.1	84	80.7	99.9	1.69
0:28:53	8.5	28	583	34	617	0	0	9.2	84	80.7	99.9	1.68
0:29:03	8.5	29	586	34	620	0	0	9.2	84	80.5	99.9	1.68
0:29:13	8.5	29	587	34	621	0	0	9.2	84	80.6	99.9	1.68
0:29:23	8.4	29	588	35	623	0	0	9.2	84	80.4	99.9	1.67
0:29:33	8.4	30	590	35	625	0	0	9.2	83	80.3	99.9	1.67
0:29:43	8.4	30	594	35	629	0	0	9.2	84	80.4	99.9	1.67
0:29:53	8.4	31	597	35	632	0	0	9.2	84	80.5	99.9	1.67
0:30:03	8.3	30	598	35	633	0	0	9.3	84	80.7	99.9	1.65
0:30:13	8.4	31	596	35	631	0	0	9.2	84	81	99.9	1.67
0:30:23	8.3	31	600	35	635	0	0	9.3	84	81.1	99.9	1.65
0:30:33	9.7	32	509	35	544	0	0	8.3	84	81.1	99.9	1.86
0:30:43	13.7	25	596	42	638	0	0	5.4	84	81.3	99.8	2.88
0:30:53	14.4	15	582	42	624	0	0	4.8	84	81.2	99.8	3.18
0:31:03	14.4	10	582	38	620	0	0	4.8	84	81.3	99.8	3.18
0:31:13	17.4	10	216	30	246	0	0	2.6	83	81.3	99.8	5.83
0:31:23	16.6	6	303	32	335	0	0	3.2	83	81.3	99.8	4.77
0:31:33	16.4	3	307	36	343	0	0	3.4	84	81.3	99.7	4.57
0:31:43	16.4	2	308	39	347	0	0	3.4	83	81.4	99.8	4.57
0:31:53	16.4	1	309	42	351	0	0	3.4	84	80.9	99.7	4.57
0:32:03	16.4	1	307	44	351	0	0	3.4	84	80.7	99.7	4.57
0:32:13	16.4	0	306	46	352	0	0	3.4	84	80.3	99.7	4.57
0:32:23	16.5	0	307	48	355	0	0	3.3	84	80.7	99.7	4.67
0:32:33	16.5	1	310	49	359	0	0	3.3	84	79.5	99.7	4.67
0:32:43	16.5	0	312	49	361	0	0	3.3	84	79.9	99.7	4.67
0:32:53	16.5	0	314	49	363	0	0	3.3	84	80.3	99.7	4.67
0:33:03	16.5	0	317	49	366	0	0	3.3	84	80.7	99.7	4.67
0:33:13	16.5	0	320	49	369	0	0	3.3	84	80.8	99.7	4.67
0:33:23	16.5	0	325	48	373	0	0	3.3	84	80.9	99.7	4.67
0:33:33	16.5	0	327	47	374	0	0	3.3	84	80.9	99.7	4.67
0:33:43	16.5	0	328	46	374	0	0	3.3	84	80.9	99.7	4.67

0:33:53	16.5	0	329	45	374	0	0	3.3	84	80.8	99.7	4.67
0:34:03	16.5	0	334	45	379	0	0	3.3	84	80.7	99.7	4.67
0:34:13	16.5	0	336	44	380	0	0	3.3	84	80.4	99.7	4.67
0:34:23	16.5	0	340	43	383	0	0	3.3	84	80.5	99.7	4.67
0:34:33	16.5	0	342	42	384	0	0	3.3	84	80.5	99.7	4.67
0:34:43	16.5	0	342	41	383	0	0	3.3	84	80.6	99.7	4.67
0:34:53	16.5	0	342	40	382	0	0	3.3	84	80.5	99.7	4.67
0:35:03	16.5	0	348	39	387	0	0	3.3	84	80.6	99.7	4.67
0:35:13	16.5	0	352	38	390	0	0	3.3	84	80.5	99.7	4.67
0:35:23	16.5	0	351	37	388	0	0	3.3	84	80.6	99.7	4.67

ATTACHMENT 3

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.

#2006-08-08 11:26:06#

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	20	0	1	0	1	0	0	0.7	101	80.9	92.1	21	
0:00:12	20	0	1	0	1	0	0	0.7	102	79.9	91.3	21	
0:00:22	20	0	1	0	1	0	0	0.7	102	79.4	90.9	21	
0:00:32	20	0	1	0	1	0	0	0.7	102	79.1	90.9	21	
0:00:42	19.9	0	0	0	0	0	0	0.8	102	78.7	91.8	19.09	
0:00:52	20	0	0	0	0	0	0	0.7	102	78.7	90.9	21	
0:01:02	20.1	0	0	0	0	0	0	0.7	102	78.7	89.9	23.33	
0:01:12	20.1	0	1	0	1	0	0	0.7	103	78.6	89.5	23.33	
0:01:22	20	0	1	0	1	0	0	0.7	103	78.7	90.6	21	
0:01:33	20	1	1	0	1	0	0	0.7	103	78.4	90.2	21	start test
0:01:42	20	1	1	0	1	0	0	0.7	104	78	89.8	21	
0:01:52	20	1	1	0	1	0	0	0.7	104	77.7	89.8	21	
0:02:02	20	0	1	0	1	0	0	0.7	104	77.8	89.8	21	
0:02:13	20	0	1	0	1	0	0	0.7	104	77.6	89.8	21	
0:02:22	20	0	1	0	1	0	0	0.7	104	77.7	89.8	21	
0:02:32	20	0	1	0	1	0	0	0.7	105	77.4	88.9	21	
0:02:42	20.3	0	1	0	1	0	0	0.5	105	77.2	84.2	30	
0:02:52	19.7	0	1	0	1	0	0	1	106	77.3	91.2	16.15	
0:03:02	19.8	0	1	0	1	0	0	0.9	106	77.5	90.8	17.5	
0:03:12	19.8	0	1	0	1	0	0	0.9	106	77.7	90.8	17.5	
0:03:22	19.9	0	1	0	1	0	0	0.8	106	77.8	90	19.09	
0:03:32	19.9	0	1	0	1	0	0	0.8	107	78	89.6	19.09	
0:03:42	19.9	0	1	0	1	0	0	0.8	107	78.1	89.6	19.09	
0:03:53	19.9	1	1	0	1	0	0	0.8	107	78	89.6	19.09	
0:04:03	19.9	0	1	0	1	0	0	0.8	105	77.8	90.3	19.09	
0:04:12	19.9	0	1	0	1	0	0	0.8	104	77.8	90.7	19.09	
0:04:22	19.9	0	1	0	1	0	0	0.8	100	77.7	92.1	19.09	
0:04:32	20	0	1	0	1	0	0	0.7	98	77.8	92.1	21	
0:04:42	19.9	0	1	0	1	0	0	0.8	98	77.8	92.8	19.09	
0:04:53	19.9	0	1	0	1	0	0	0.8	98	77.8	92.8	19.09	start
0:05:02	20	0	1	0	1	0	0	0.7	98	77.7	92.1	21	
0:05:12	20	0	1	0	1	0	0	0.7	97	77.7	92.5	21	
0:05:22	20	0	1	0	1	0	0	0.7	96	77.6	92.9	21	
0:05:33	20	0	1	0	1	0	0	0.7	95	77.5	93.3	21	5min raw
0:05:42	20	0	1	0	1	0	0	0.7	95	77.5	93.3	21	
0:05:52	20	0	1	0	1	0	0	0.7	94	77.6	93.7	21	
0:06:02	20	0	1	0	1	0	0	0.7	93	77.5	94.1	21	
0:06:13	20	0	1	0	1	0	0	0.7	93	77.5	94.1	21	
0:06:22	20	0	1	0	1	0	0	0.7	92	77.5	94.5	21	

0:06:32	20	0	1	0	1	0	0	0.7	92	77.6	94.5	21
0:06:42	20	0	1	0	1	0	0	0.7	92	77.7	94.5	21
0:06:53	20.1	1	1	0	1	0	0	0.7	93	77.7	93.4	23.33
0:07:03	20.1	1	1	0	1	0	0	0.7	93	77.8	93.4	23.33
0:07:13	20.1	1	1	0	1	0	0	0.7	94	77.9	93	23.33
0:07:22	20.1	0	1	0	1	0	0	0.7	94	77.9	93	23.33
0:07:32	20.1	0	1	0	1	0	0	0.7	94	77.9	93	23.33
0:07:43	20.1	0	1	0	1	0	0	0.7	95	77.9	92.6	23.33
0:07:53	20.1	0	1	0	1	0	0	0.7	91	77.9	94.3	23.33
0:08:02	20.1	0	1	0	1	0	0	0.7	87	77.9	96.1	23.33
0:08:12	20.1	0	1	0	1	0	0	0.7	90	77.7	94.7	23.33
0:08:23	20.1	0	1	0	1	0	0	0.7	93	77.8	93.4	23.33
0:08:33	20.1	0	1	0	1	0	0	0.7	94	77.8	93	23.33
0:08:42	20.1	0	1	0	1	0	0	0.7	95	77.9	92.6	23.33
0:08:53	20.1	0	1	0	1	0	0	0.7	95	77.9	92.6	23.33
0:09:03	20.1	0	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:09:12	20.1	0	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:09:22	20.1	0	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:09:33	20.1	0	1	0	1	0	0	0.7	95	77.9	92.6	23.33
0:09:43	20.1	0	1	0	1	0	0	0.7	96	77.9	92.1	23.33
0:09:52	20.1	0	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:10:02	20.1	0	1	0	1	0	0	0.7	94	77.8	93	23.33
0:10:13	20.1	1	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:10:23	20.1	0	1	0	1	0	0	0.7	95	77.8	92.6	23.33
0:10:33	20.1	0	1	0	1	0	0	0.7	95	77.9	92.6	23.33
0:10:42	18.3	0	310	0	310	0	0	2	95	78	97.5	7.78
0:10:52	15.3	40	499	6	505	0	0	4.2	95	77.9	98.8	3.68
0:11:03	14.9	74	508	12	520	0	0	4.5	95	77.9	98.9	3.44
0:11:13	12.3	154	809	17	826	0	0	6.4	94	78	99.3	2.41
0:11:23	9.7	943	527	19	546	0	0	8.3	94	77.9	99.4	1.86
0:11:33	9.5	539	531	19	550	0	0	8.4	93	78.1	99.5	1.83
0:11:42	9.4	326	549	20	569	0	0	8.5	93	78.1	99.5	1.81
0:11:53	9.3	238	558	21	579	0	0	8.6	93	78.1	99.5	1.79
0:12:03	9.3	196	566	21	587	0	0	8.6	93	78.1	99.5	1.79
0:12:13	9.2	186	566	22	588	0	0	8.7	92	78.1	99.6	1.78
0:12:23	9.2	184	563	22	585	0	0	8.7	92	78.2	99.6	1.78
0:12:32	9.1	185	565	22	587	0	0	8.7	91	78.3	99.6	1.76
0:12:42	9	191	574	23	597	0	0	8.8	91	78.2	99.6	1.75
0:12:53	9	197	578	24	602	0	0	8.8	91	77.8	99.6	1.75
0:13:03	9	200	583	24	607	0	0	8.8	91	78	99.6	1.75
0:13:13	8.9	200	589	24	613	0	0	8.9	90	78.1	99.6	1.74

0:13:23	8.9	204	589	24	613	0	0	8.9	90	78.3	99.6	1.74
0:13:33	12.1	332	811	25	836	0	0	6.5	90	78.4	99.4	2.36
0:13:43	14.4	463	580	26	606	0	0	4.8	90	78.8	99.3	3.18
0:13:53	16	240	356	24	380	0	0	3.7	89	78.7	99.2	4.2
0:14:03	15.9	154	403	22	425	0	0	3.7	89	78.7	99.2	4.12 finish baseline
0:14:12	15.9	137	410	21	431	0	0	3.7	89	78.5	99.2	4.12
0:14:22	15.9	127	413	21	434	0	0	3.7	88	78.5	99.3	4.12
0:14:32	16	123	414	21	435	0	0	3.7	88	78.5	99.3	4.2
0:14:43	16	121	417	21	438	0	0	3.7	88	78.6	99.3	4.2
0:14:53	16	120	422	22	444	0	0	3.7	87	78.5	99.4	4.2
0:15:03	16	120	421	23	444	0	0	3.7	87	78.4	99.3	4.2
0:15:13	16	120	423	23	446	0	0	3.7	87	78.4	99.3	4.2
0:15:22	16.8	119	199	22	221	0	0	3.1	87	78.4	99.2	5
0:15:32	16.6	65	331	29	360	0	0	3.2	87	78.4	99.2	4.77
0:15:42	16.5	31	339	34	373	0	0	3.3	86	78.4	99.3	4.67
0:15:53	16.5	13	344	37	381	0	0	3.3	87	78.5	99.3	4.67 start 5 minute
0:16:02	14.8	36	602	38	640	0	0	4.5	86	78.5	99.6	3.39
0:16:12	14.9	113	494	33	527	0	0	4.5	86	78.5	99.6	3.44
0:16:23	17	55	299	25	324	0	0	2.9	86	78.5	99.3	5.25
0:16:33	10	347	581	24	605	0	0	8.1	87	78.7	99.7	1.91
0:16:42	9.1	239	570	24	594	0	0	8.7	86	78.7	99.8	1.76
0:16:53	9	108	578	27	605	0	0	8.8	86	78.7	99.8	1.75
0:17:03	8.9	59	585	30	615	0	0	8.9	86	78.7	99.8	1.74
0:17:13	8.9	40	586	33	619	0	0	8.9	86	78.7	99.8	1.74
0:17:23	8.9	31	583	34	617	0	0	8.9	86	78.8	99.8	1.74
0:17:33	8.8	29	587	35	622	0	0	8.9	86	78.8	99.8	1.72
0:17:43	8.8	27	592	35	627	0	0	8.9	86	79	99.8	1.72
0:17:53	8.8	27	592	36	628	0	0	8.9	86	79	99.8	1.72
0:18:03	8.7	26	598	36	634	0	0	9	86	79.1	99.8	1.71
0:18:13	8.7	27	602	36	638	0	0	9	86	79.4	99.8	1.71
0:18:23	8.7	26	604	36	640	0	0	9	86	79.5	99.8	1.71
0:18:33	8.6	27	603	36	639	0	0	9.1	86	79.4	99.8	1.69
0:18:43	8.6	27	600	36	636	0	0	9.1	86	79.4	99.8	1.69
0:18:53	8.7	27	600	37	637	0	0	9	86	79.3	99.8	1.71
0:19:03	8.7	26	603	37	640	0	0	9	86	79	99.8	1.71
0:19:13	8.6	27	600	36	636	0	0	9.1	86	78.9	99.8	1.69
0:19:23	8.6	26	601	36	637	0	0	9.1	86	79.3	99.8	1.69
0:19:33	8.6	26	605	36	641	0	0	9.1	86	79.5	99.8	1.69
0:19:43	8.6	26	607	36	643	0	0	9.1	86	79.5	99.8	1.69
0:19:53	8.5	26	615	36	651	0	0	9.2	86	79.1	99.8	1.68
0:20:03	8.5	27	617	35	652	0	0	9.2	86	79.4	99.8	1.68

0:20:13	8.5	27	616	35	651	0	0	9.2	86	79.5	99.8	1.68
0:20:23	8.5	27	616	35	651	0	0	9.2	86	79.6	99.8	1.68
0:20:33	8.5	27	616	35	651	0	0	9.2	86	79.8	99.8	1.68
0:20:43	8.5	27	619	34	653	0	0	9.2	86	79.7	99.8	1.68
0:20:53	8.4	28	619	34	653	0	0	9.2	85	79.8	99.8	1.67
0:21:03	8.4	28	619	34	653	0	0	9.2	85	79.9	99.8	1.67
0:21:13	8.4	28	619	34	653	0	0	9.2	85	79.9	99.8	1.67
0:21:23	8.5	27	621	34	655	0	0	9.2	85	80	99.8	1.68
0:21:33	10.8	26	769	36	805	0	0	7.5	86	80	99.8	2.06
0:21:43	12.1	17	649	41	690	0	0	6.5	85	80.1	99.8	2.36
0:21:53	15.8	11	435	41	476	0	0	3.8	85	80.1	99.6	4.04
0:22:03	16.4	8	358	42	400	0	0	3.4	85	80	99.6	4.57
0:22:13	14.5	5	592	46	638	0	0	4.8	85	80.1	99.7	3.23
0:22:23	14.5	5	555	41	596	0	0	4.8	85	80.1	99.7	3.23
0:22:33	14.6	5	560	36	596	0	0	4.7	85	80.4	99.7	3.28
0:22:43	17.3	6	241	28	269	0	0	2.7	85	80.4	99.4	5.68
0:22:53	16.5	4	310	30	340	0	0	3.3	85	80.4	99.6	4.67
0:23:03	16.4	3	314	34	348	0	0	3.4	85	80.3	99.6	4.57
0:23:13	16.4	2	313	37	350	0	0	3.4	84	80.3	99.7	4.57
0:23:23	16.4	2	313	39	352	0	0	3.4	84	80.3	99.7	4.57
0:23:33	16.4	2	310	41	351	0	0	3.4	84	80.3	99.7	4.57
0:23:43	16.4	1	310	43	353	0	0	3.4	84	80.3	99.7	4.57
0:23:53	16.4	1	311	44	355	0	0	3.4	84	80.2	99.7	4.57
0:24:03	16.4	1	312	45	357	0	0	3.4	84	80.2	99.7	4.57
0:24:13	16.4	1	313	46	359	0	0	3.4	84	80.3	99.7	4.57
0:24:23	16.5	1	315	46	361	0	0	3.3	84	80.3	99.7	4.67
0:24:33	16.5	1	320	46	366	0	0	3.3	84	80.2	99.7	4.67
0:24:43	16.5	0	323	46	369	0	0	3.3	84	80.2	99.7	4.67
0:24:53	16.5	0	326	46	372	0	0	3.3	84	80.2	99.7	4.67
0:25:03	16.5	1	327	45	372	0	0	3.3	84	80.3	99.7	4.67
0:25:13	16.5	1	331	44	375	0	0	3.3	84	80.3	99.7	4.67
0:25:23	16.5	0	332	44	376	0	0	3.3	84	80.3	99.7	4.67
0:25:33	16.5	0	335	43	378	0	0	3.3	84	80.3	99.7	4.67
0:25:43	16.5	0	338	42	380	0	0	3.3	84	80.3	99.7	4.67
0:25:53	16.5	0	339	41	380	0	0	3.3	84	80.3	99.7	4.67
0:26:03	16.5	0	343	40	383	0	0	3.3	84	80.4	99.7	4.67
0:26:13	16.5	0	345	39	384	0	0	3.3	83	80.2	99.7	4.67
0:26:23	16.5	0	348	38	386	0	0	3.3	83	80.2	99.7	4.67
0:26:33	16.5	0	350	37	387	0	0	3.3	83	80.3	99.7	4.67
0:26:43	16.5	0	352	36	388	0	0	3.3	83	80.3	99.7	4.67 90 second treated
0:26:53	16.5	0	355	35	390	0	0	3.3	83	80.3	99.7	4.67