



Committee D-2 ON PETROLEUM PRODUCTS AND LUBRICANTS

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Reply to: Michael S. Griggs
The Lubrizol Corporation
29400 Lakeland Boulevard
Wickliffe, OH 44092-2298

July 13, 2000

To: Members of the Single Cylinder Oil Test Engine (SCOTE) Surveillance
Panel and guest attending the July 12, 2000 meeting.

Enclosed are the minutes of the SCOTE Surveillance panel meeting held in San
Antonio, Texas. Please forward any corrections or additions to my attention.

Michael S. Griggs
Secretary, SCOTE Surveillance Panel

MEETING MINUTES

SINGLE CYLINDER DIESEL SURVEILLANCE PANEL

**HELD JULY 12, 2000
PERKINELMER
SAN ANTONIO, TEXAS**

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ACTION ITEMS

1. Issue TMC Information letter regarding reporting of loss of side clearance in the 1M-PC, 1K/1N and 1P test reports- Scott Parke
2. Submit 1Q test reports to TMC so that 1Q data can be published on the internet (copy Al Hahn also)- 1Q labs
3. Send e-mail to labs to poll them on their 1M-PC liner inventory- Stacy Bond
4. Provide details on hardware and installation procedures to add a supplemental heat exchanger in the 1Q coolant suction line- Jim McCord
5. Include in TMC information letter, the use of Caterpillar's recommended 1P/1Q oil pump regulator dimension when installing a new pump- Scott Parke
6. Replace the production 1Q cooling jet with the 1Y401 cooling jet after tests currently in progress are completed- 1Q labs
7. Ensure that the 1Q EGR heat exchangers are cleaned before every test- 1Q labs
8. Ensure that modified CO2 analyzer calibrations and CO2 measurement frequencies are observed- 1Q labs
9. Change the 1Q inlet air manifold spec to 85C- 1Q labs

10. Plan on 1Q labs visits toward the end of August- Lab visitation team, 1Q labs

1.0 CALL TO ORDER AND MEMBERSHIP CHANGES

1.1 Chairman Stacy Bond opened the meeting at 8:30 am. The agenda is attachment 1.

2 Ron Buck (TEI), and Mike Zionitz (PerkinElmer) assumed panel membership. Jim McCord replaced Robert Stockwell for SWRI. Mike Zionitz is phasing in to ultimately replace Stacy Bond who will continue SCOTE Surveillance panel activities and chairmanship until the Cat 1Q test is balloted.

2.0 MEETING MINUTES

2. The meeting minutes for the April 13, 2000 meeting was approved.

2.2 The attendance list is attachment 2

2.3 Greg Hillman participated in this meeting via teleconference.

3.0 LOSS OF SIDE CLEARANCE REPORTING

3.1 Scott Parke provided background on a recent situation where a lab was seeking TMC assistance in accommodating the reporting of a negative number for loss of side clearance (LSC). Resolution was sought via a quick e-mail vote. Scott Parke commented that the solution was not as simple as changing LSC field size because the field needed to accommodate the word "stuck" (i.e. a character field).

3.2 A lengthy discussion ensued regarding LSC measurements, the LSC relationship to a stuck ring and various data dictionary/reporting issues. The panel ultimately agreed on the following for each test type:

1M-PC test- Leave the LSC field as a numeric field. Report zero when the LSC is less than zero. Do not write the word "stuck" in the LSC field. Delete note 1 on form 8 (instruction to write "stuck" in LSC field).

1K/1N test- Change LSC field to a character field so the word "stuck" can be accommodated. Do not report negative LSC values. The notes on the form stays the same.

1P test- Change LSC field to a character field so the word "stuck" can be accommodated. Write in less than 0.03 if the smallest feeler gauge cannot be inserted.

- 3.3 Scott Parke commented that he would issue a TMC Information Letter for each test area to address the agreed upon LSC reporting procedures.

4.0 OSOLETE TMC REFERENCE OILS

- 4.1 Scott Parke informed the panel that TMC would like to get rid of obsolete reference oils that never get used because of the cost to store them. He commented that surveillance panel approval was necessary to proceed.

- 4.2 The active oils not subject to inventory elimination include:

1P- 1004 and reblends
 1005 and reblends

1K/1N- 809 and reblends
 810 and reblends
 811 and reblends
 1004 (1N) and reblends

1M-PC 873 and reblends

TMC would like to get rid of any oils (includes PC-7 oils) other than the above.

- 4.3 Stacy Bond expressed concern about eliminating these oils due to their potential as 1Q discrimination oils. He suggested to at least retain the PC-7 oils. When asked about the quantity of these oils, Scott Parke estimated the quantity to be around 300 gallons.

5.0 SHARING OF 1Q RESULTS

- 5.1 Stacy Bond asked the panel about sharing 1Q data on the internet. The panel agreed that it would be helpful.

- 5.2 Weighted individual ratings and oil consumption data for each 36 hour period needs to be submitted to the TMC. Operational data would continue to be shared internally.

6.0 1M-PC LINERS

- 6.1 Al Hahn commented that eventually, a procedure will be needed to introduce the new 1M-PC liners. He also mentioned that the Caterpillar inventory was essentially depleted, however, there appears to be quite a few liners remaining within the industry. Stacy Bond recalled that an earlier inventory estimate allowed testing through the remainder of the year.

Stacy Bond commented that he would poll the labs via e-mail on their liner inventory and usage rate.

7.0 1Q TASK FORCE

- 7.1 Stacy Bond proposed that the panel form a 1Q Task Force with Mike Ziaontz as chairman. He commented that the Surveillance panel would continue to address more global issues and that he would continue to chair the panel.

Following some discussion on how the task force would interface with the surveillance panel, it was evident that the task force would experience delays in seeking the surveillance panel's approval for action items. The panel ultimately agreed to leave the surveillance panel structure intact, however, Mike Ziaontz would take the lead role for PerkinElmer on 1Q issues. Stacy Bond commented that he still be in the picture until the 1Q was balloted.

8.0 1Q LAB VISIT

- 8.1 The afternoon before the surveillance panel meeting, both PerkinElmer and SWRI labs were visited to review their Cat 1Q installations.
- 8.2 Some minor compliance issues were noted, however, a few of these issues were driven by operational necessity which ultimately led the panel to adopt these changes to improve the test (e.g. supplemental coolant heat exchanger allowed, NPT fitting at water pump allowed, etc.)

The panel agreed to conduct the remaining lab visits towards the end of August.

9.0 1Q PROCEDURE REVIEW

9. Prior to beginning the detailed 1Q procedure review, the panel gave Ben Weber a round of applause (in his absence) for his exceptional effort in getting the 1P procedure adopted as a standard.
- 9.2 The remainder of the meeting was devoted to a detailed page by page review of the 1P standard to make revisions for the 1Q procedure rewrite.

Part of the 1Q procedure review involved assembling numerous tables, sketches, schematics, etc. The majority of these items have been previously published in prior meeting minutes. Exceptions include attachment 3 which shows Caterpillars recommended oil flushing hardware and attachment 4 which shows modified test operating conditions for air to orifice temperature, inlet air manifold temperature,

exhaust barrel pressure and EGR heat exchanger coolant flow rate. Those desiring a complete set of meeting handouts should contact Stacy Bond.

Scott Parke agreed to provide Ben Weber with a copy of the marked up 1P procedure. Ben Weber will begin writing the 1Q procedure.

Several immediate action items developed during the procedure review
They are:

The Sierra mass flow meter is to be calibrated to the following specs- T= 60C, P=292 kPa, Humidity = 17.8 g/kg and flow = 300 kg/hr

2. The use of a ¾" NPT fitting at the engine coolant pump outlet for the hose to the auxiliary coolant pump inlet is an allowable option.
3. A throttling valve is an acceptable alternative to the bypass valve for the auxiliary coolant pump.
4. The use of the 1Y 4021 gaskets on the 1P/1Q oil pump is mandatory, however, the specified dimension of 43.7 mm is now a recommended dimension when installing a new oil pump.
5. Oil sampling will be preceded with a 30 ml purge.
6. Labs who have installed production 1Q cooling nozzles should install the 1Y 4011 cooling nozzle at the first opportunity.
7. CO2 sampling frequency is as follows:

Within 1st hour check CO2
1-24 hours, check every four hours
25-504 hours, check every 8 hours

Perform span gas check within 2 hours of each CO2 measurement.
8. Stacy Bond recommended disconnecting the crankshaft speed/timing sensor after timing initialization to prevent inadvertent engine shutdown due to ECM memory overload.
9. Air to orifice temperature range is 45-60 C.
10. Control Inlet air manifold temperature to 85 C.
- 1 Exhaust barrel pressure range is 300-306 kPa.

12. At the beginning of step 5 in the warm up, use a 14 Nm/min ramp.

1Q TIMELINE

10. Stacy Bond commented that discrimination oils are yet to be identified. Al Hahn mentioned that Cat was running 1Q on a CF-4 quality oil and that results should be available by the end of the week.

10.2 Stacy Bond modified the timeline as follows:

Oils available- 8/1/00

Run discrimination tests- 9/1/00

Analyze data- 9/15/00

Proof of concept- 10/1/00

10.3 Stacy Bond polled the panel on progress with running TMC 1005. To date, 4 tests have been completed (Cat, PerkinElmer, SWRI and Exxon Mobile). Three 1005 runs are in progress (Lubrizol- complete 8/8/00, PerkinElmer- complete 7/20/00 and Ethyl- complete 8/15/00).

10.4 Currently, there are 10 1Q test stands in the industry.

1 Lubrizol

1 Caterpillar

3 PerkinElmer

1 Exxon Mobile

3 SWRI

1 Ethyl

NEXT MEETING

The next meeting will be at the call of the chairman

FROM: Stacy Bond
Surveillance Panel Chairman

PLACE: PerkinElmer
5404 Bandera Road
San Antonio, TX 78238

DATE: July 12, 2000

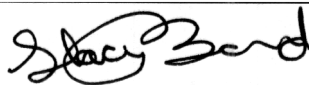

TIME: 8:30 pm to 5:00 pm

- I. Approve minutes from April 13, 2000 meeting
- II. Membership Changes
- III. 1K/1N/1P/1MPC Actions
- IV. 1Q DEVELOPMENT
 - a. 1Q Installation Requirements
 - b. 1Q Operational Requirements
 - c. Fuel Specification
 - d. Demonstration Matrix Design
 - f. Update 1Q Procedure - Bring your marked up copy of the 1P standard
 - e. Update timeline
- V. REVIEW ACTION ITEMS
- VI. SET NEXT MEETING

Please forward any additional agenda items to me.

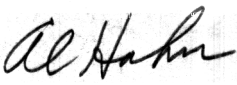


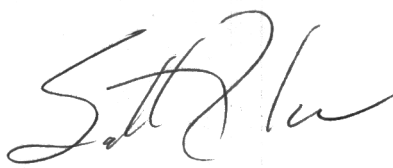
SCOTE SURVEILLANCE PANELAttendance Roster

*** Please indicate any corrections that should be made to members name, address, etc ***

Member	Status	Indicate Presence with Signature	Alternate
Name: Bond, Stacy Company: PerkinElmer Address: 5404 Bandera Road San Antonio, TX 78238 Phone: 210-523-4604 Fax: 210-523-4607	M		
Name: Carlson, Jon Lubrizol Corporation 4801 N.W. Loop 410, Ste. 430 San Antonio, TX 78229 Phone: 210-520-8013 Fax: 210-520-1983			
Name: Clark, Gil Specified Fuels Consultancy 117 E. Church St. Lake Orion, MI 48362 Phone: 248-693-6434 Fax: e-mail: sdclark63@juno.com			
Name: Cooper, Mark Company: Oronite Technology Group Address: Chevron Chemical Company 4502 Centerview Ste. 210 San Antonio, TX 78228 Phone: 210-731-5606 Fax: 210-731-5699			
Name: Fetterman, Pat Infineum, ussa L.P. PO Box 735 Linden, NJ 07036 Phone: 908-474-3099 Fax: 908-474-3363			
Name: Foerster, Ed Company: EG&G Automotive Research Address: 5404 Bandera Road San Antonio, TX 78238 Phone: 210-523-4607 Fax: 210-694-0892			
Name: Griggs, Mike Company: The Lubrizol Corporation Address: 29400 Lakeland Blvd. Wickliffe, OH 44092 Phone: 440-943-1200 Ext. 2905 Fax: 440-943-9013			
Name: Gutzwiller, Jim Company: Infineum Address: 4335 Piedras Dr., W. Suite 101 San Antonio, TX 78228 Phone: 210-732-8123 ext. 13 Fax: 210-732-8480			

SCOTE SURVEILLANCE PANEL
Attendance Roster

*** Please indicate any corrections that should be made to members name, address, etc ***

Member	Status	Indicate Presence with Signature	Alternate
Name: Hahn, Al Company: Caterpillar, In-c./Tech Center Address: Bldg. L/P.O. 1875 Peoria, IL 61656-1875 Phone: 309-578-3617 Fax: 309-578-4232			
Name: Hillman, Gregory E. Company: AutoResearch Lab Inc. Address: 6735 S. Old Harlem Ave. Chicago, IL 60638 Phone: (708) 963-4262 Fax: (708) 563-0087			
Name: Hitchner, Tom Company: Exxon/Mobile R&E Address: 600 Billingsport Road Paulsboro, NJ 08066 Phone: 856-22-3012 Fax: 856-224-3628 <i>w.thomas_hitchner@email.mobil.com</i>			
Name: Lewis, John Company: Shell Research Limited Address: P.O. Box 1 Poole Lane INCE (Nr. Chester) Chester CH1 3 SH United Kingdom Phone: Fax: 011-44-151-373-5888			
Name: Knight, John Ron Buck Company: Test Engineering, Inc. Address: 12718 Cimarron Path San Antonio, TX 78249-3417 Phone: 210-690-1958 Fax: 210-690-1959 <i>rbuck@testeng.com</i>			
Name: Nycz, David S. Company: Caterpillar, Inc. Address: Box 610 Mossville, IL 61552-0610 Phone: 309-578-3003 Fax: 309-578-6457			
Name: Parke, Scott Company: ASTM/TMC Address: 6555 Penn Avenue Pittsburgh, PA 15206-4489 Phone: 412-365-1036 Fax: 412-365-1047			
Name: Rumford, Robert H. Company: Specified Fuels & Chemicals, LLC Address: 1201 South Sheldon Road Channelview, TX 77530-0429 Phone: 281-457-2768 Fax: 281-457-1469 e-mail: rhrumford@specified1.com			

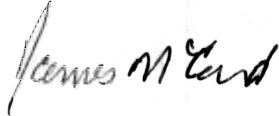

SCOTE SURVEILLANCE PANEL
Attendance Roster

*** Please indicate any corrections that should be made to members name, address, etc ***

Member	Status	Indicate Presence with Signature	Alternate
<p>Name: Schaus, Jerry Company: AutoResearch Laboratories, Inc. Address: 6735 S. Old Harlem Avenue Chicago, IL 60638 Phone: 708-563-4257 Fax: 708-563-0087</p>			
<p>Name: Stephen, Carl Company: Ashland, Inc. Address: 22nd Front Street Ashland, KY 41101 Phone: 606-329-5198 Fax: 606-329-3009</p>			
<p>Name: Sutherland, Mark Company: Ethyl Petroleum Additives, Inc. Address: 9901 IH 10 West Suite 800 San Antonio, TX 78230 Phone: 210-558-2818 Fax: 210-694-0892</p>			
<p>Name: Strigner, Paul Company: 31 Sequin Street Address: Ottawa, Ontario K1J6P2 CANADA Phone: Fax: MAIL</p>			
<p>Name: Weissman, Bob Company: Ethyl Petroleum Additives, Inc. Address: 500 Spring Street P.O. Box 2158 Richmond, VA 23219 Phone: 804-788-5340 Fax: 804-788-6358</p>		<p>✓ RTW</p>	

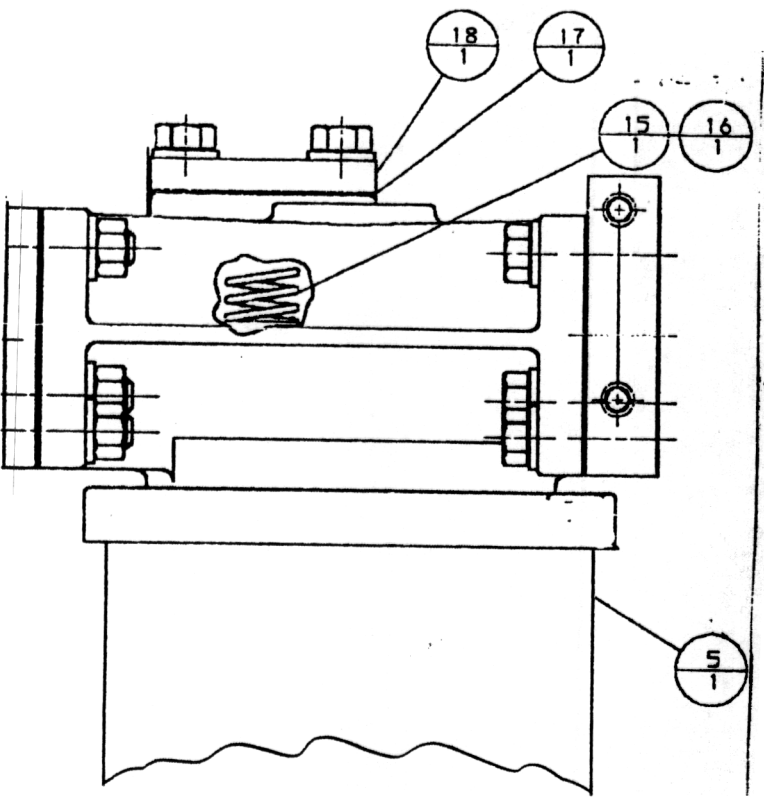
SCOTE SURVEILLANCE PANEL
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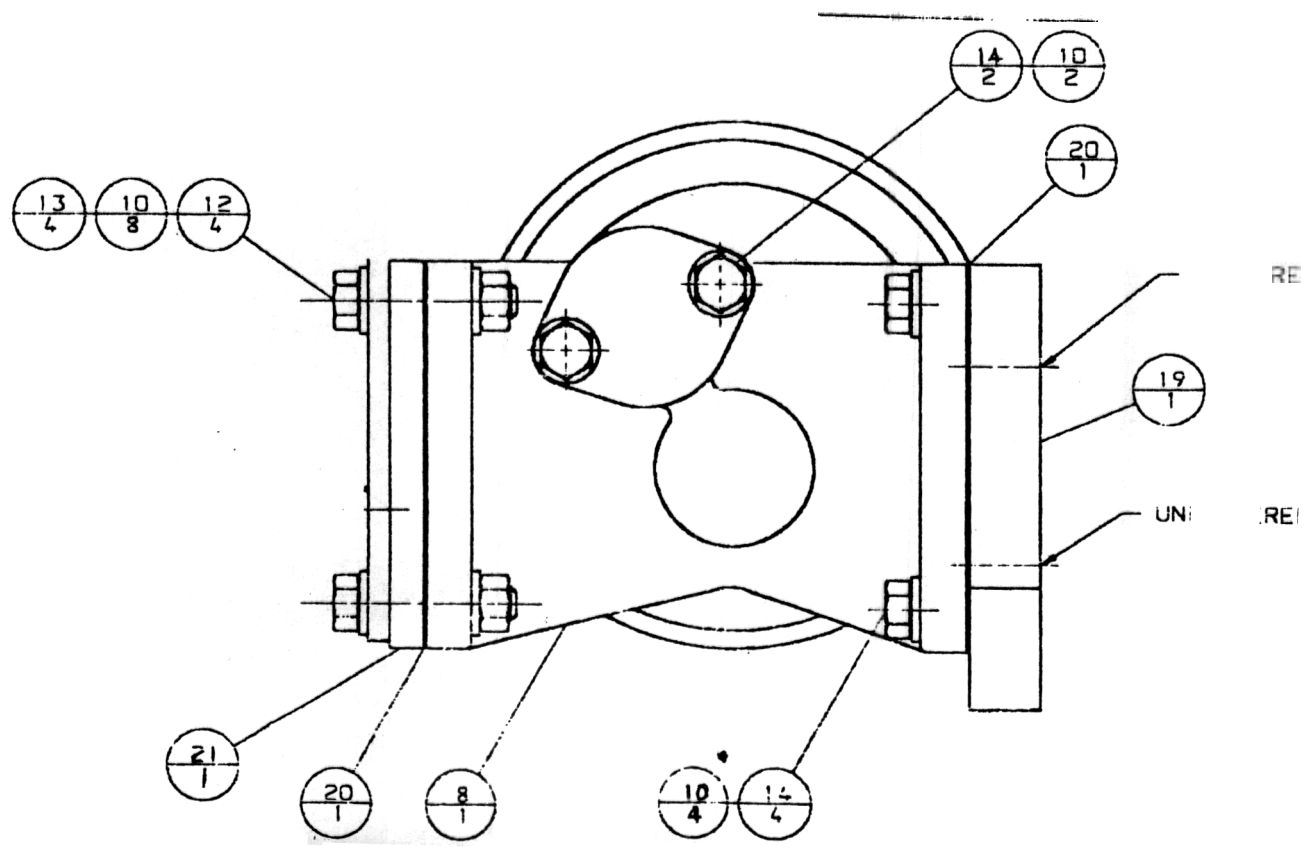
Member	Status	Indicate Presence with Signature	Alternate
Name: James McCord Company: SWRI Address: 6220 Culebra Rd. Phone: 210-522-3439 Fax:	✓		
Name: MICHAEL ZADOLITZ Company: ROCKWELL Address: 5404 BANDERA Phone: 210 647 9483 Fax:	✓		
Name: Company: Address: Phone: Fax:			
Name: Company: Address: Phone: Fax:			
Name: Company: Address: Phone: Fax:			
Name: Company: Address: Phone: Fax:			
Name: Company: Address: Phone: Fax:			
Name: Company: Address: Phone: Fax:			

OIL FLUSHING HDW

1R-0716 Filter / 2P4301 Base



ITEM	QTY	MEAS UNIT	PART NO.	NAME
PARTS LIST				
5	1		1R-0716	FILTER AS.
8	1		2P-4301	BASE AS.
10	17		5M-2894	WASHER
12	4		0S-1571	BOLT (3/8)
13	4		9S-8752	NUT
14	6		0S-1588	BOLT (3/8)
15	1		4N-8150	SPRING
16	1		9M-0853	PLUNGER
17	1		2P-3760	GASKET
18	1		2P-3761	COVER
19	1		9L-5611	COVER
20	2		2P-4305	GASKET
21	1		9N-5609	COVER



1Q/ EGR SCOTE Warm- Up And Operating Conditions

PARAMETER	UNITS	TOL	STEP 1 5 Min	STEP 2 5 Min	STEP 3 5 Min	STEP 4 10 Min	STEP 5 60 Min
Speed	RPM	+/- 3	1000	1000	1400	1800	1800
Power	kW		Idle	10	28	51	67
Torque	Nm	(a) +/- 5	-	100	175	270	355
Fuel Rate	g/ min	(b) +/- 1	-	45	95	192	240
B.S.F.C.	g/ kW-hr		-	-	220	220	220
Fuel Timing	BTC		13	13	13	13	13
Fuel Rack Pos.	mm		2.6	3.8	6	8.6	10.3
Humidity	g/kg	+/- 1.7		-	-	-	17.8
TEMPERATURES							
Fuel Into Head	DEG C	+/- 3	~31	~32	~33	~36	42
Coolant Into Jug				~55	101	101	101
Coolant From Head		+/- 3		57	105	105	105
Oil To Cooler				-	93	102	124
Oil Manifold		+/- 3		-	92	101	120
Oil Fr Extern. Heater				-	97	104	~110
Air To Orifice				55	60	60	85 45-60
Inlet Air Manifold		+/- 3		40	45	68	85 85
Exhaust Manifold			-120	300	430	590	645
EGR H/E - Exh To				48	249	390	515
- Exh From				45	80	135	230
- Coolant In				57	98	99	100
- Coolant Out				57	101	102	103
PRESSURES							
Fuel From Head	kPa	+/- 20	275	275	275	275	275
Coolant Into Jug		(c)	~44	~44	60	80	80
Oil Manifold		+/- 20	415	415	415	415	415
Air To Orifice (abs)				120	155	250	295
Inlet Air Barrel (abs)		+/- 1	120	120	155	250	292
Exhaust Barrel (abs)			-	120	155	250	300 300-306
EGR H/E - Exh From (abs)							301
- Water Out						150	100
Oil Filter Delta Pressure					30	36	44
Crankcase							~.2
FLOWS							
% EGR Flow							
Coolant	L/ min	+/- 3	~40	40	~55	65	65
Blowby	L/ min					~30	~30
Air	kg/ hr				165	230	325
EGR H/E Coolant Flow	L/min GPM				10.1	10.7	13.7 30
Oil Scale Cart Reading	Grams						
EMISSONS							
CO2 % Inlet Manif	%	+/- .05		-	-	-	1.55
CO2 % Exh Stack							10.4

Controlled

Note:

(a) Engine controlled to Torque Spec for Steps #2, #3, #4 and 5 minutes of Step #5

(b) Engine controlled to Fuel Rate for last 55 minutes of Step #5

(c) Air Pressure at coolant tower controlled to 35 kPa

Ramp Up Conditions Between Warm- Up Steps

Torque	At 5 minutes (beginning at step #2)	20 Nm/ min
Speed	At 10 minutes (beginning at step #3)	100 rpm/ min
Inlet Air Press	At 10 minutes (beginning at step #3)	12 kPa/ min
Exhaust Press	At 10 minutes (beginning at step #3)	12 kPa/ min
Inlet Air Temp	At 0 minutes (at start of test)	5 deg C/ min