

**Sequence IVA Valve Train Wear Evaluation
Final Report Cover Sheet**

Form 1

VERSION *IVA VERSION 20030416*

CONDUCTED FOR

TSTSPON1

TSTSPON2

<i>LABVALID</i>	V = VALID
	I = INVALID

<i>TSTOIL</i>	NR = Non-reference oil
	RO = Reference oil

Test Number			
Test Stand	Number of Runs on Since Last Calibration Test		Laboratory Run Number
<i>STAND</i>	<i>STRUN</i>		
Lab Engine Number	<i>ENGINE</i>	Total Runs on Cylinder Head	<i>TOTHDRUN</i>
Lab Head Number	<i>HEADSN</i>	Lab Cam Number	<i>CAMNO</i>
Date Completed	<i>DTCOMP</i>	Completion Time	<i>EOTIME</i>
Oil Code	<i>OILCODE</i>	Fuel Batch	<i>FUELBTID</i>
Formulation/Stand Code	<i>FORM</i>		
Alternate Codes:	<i>ALTCODE1</i>	<i>ALTCODE2</i>	<i>ALTCODE3</i>

In my opinion this test <i>OPVALID</i> been conducted in a valid manner in accordance with the ASTM Research Report RR-D2-XXXX and the appropriate amendments through the Information Letter System. The remarks included in this report describe anomalies associated with this test.
--

SUBMITTED BY:

SUBLAB _____
Testing Laboratory

SUBSIGIM _____
Signature

SUBNAME _____
Typed Name

SUBTITLE _____
Title

Sequence IVA Valve Train Wear Evaluation

Form 2

Table of Contents

1.	Title / Validity Declaration Page	Form 1
2.	Table of Contents	Form 2
3.	Summary of Test Method	Form 3
4.	Results Summary	Form 4
5.	Camshaft Lobe Wear Table	Form 5
6.	Operational Data Summary	Form 6
7.	Used Oil Analysis	Form 7
8.	Engine Build Measurements	Form 8
9.	Special Maintenance Record	Form 9
10.	Cycle 5 Stage 2 to 1 Transition: Oil Gallery Temperature	Form 10
11.	Cycle 5 Stage 1 to 2 Transition: Oil Gallery Temperature	Form 11
12.	Cycle 5 Stage 2 to 1 Transition: Coolant Out Temperature	Form 12
13.	Cycle 5 Stage 1 to 2 Transition: Coolant Out Temperature	Form 13
14.	Cycle 5 Stage 2 to 1 Transition: Engine Torque	Form 14
15.	Cycle 5 Stage 1 to 2 Transition: Engine Torque	Form 15
16.	Cycle 5 Stage 2 to 1 Transition: Engine Speed	Form 16
17.	Cycle 5 Stage 1 to 2 Transition: Engine Speed	Form 17

Sequence IVA Valve Train Wear Evaluation

Form 3

Summary of Test Method

The Sequence IVA engine valve train wear test is a fired engine-dynamometer lubricant test which evaluates the ability of a test lubricant to reduce camshaft lobe wear. The test method is a low temperature cyclic test, with a total running duration of 100 hours.

A 1994 Nissan model KA24E water-cooled, 4 cycle, in-line cylinder, 2.4L engine is used as the test apparatus. The engine incorporates a single overhead cam (SOHC), three valves per cylinder (2 intake; 1 exhaust), and sliding follower valve train design. An engine short block is utilized for 12 tests; a cylinder head assembly for 6 tests; and the critical test parts (camshaft, rocker arms, rocker shafts) are replaced every test. A 95-minute break-in schedule is conducted whenever the long block or cylinder head is replaced (before tests 1 and 7).

The Sequence IVA test is a flush and run type of lubricant test. Each individual test consists of two 20-minute flushes, followed by the 100-hour cyclic test. The cyclic test is comprised of 100 hourly cycles. Each cycle consists of two stages. The idle speed Stage 1 duration is 50 minutes; the 1500 r/min stage 2 operates for 10 minutes. The stages of the test cycle are set at the following conditions:

Parameter	Units	Stage 1	Stage 2
Duration	min	50	10
Engine Speed	r/min	800	1500
Engine Torque	N•m	25	
Coolant Out Temperature	°C	50	55
Oil Cylinder Head Temperature	°C	49	59
Intake Air Temperature	°C	32	
Intake Air Pressure	kPa	0.050	
Intake Air Humidity	G/kg	11.5	
Exhaust Pressure	kPa absolute	103.5	
Coolant Flow	L/min	30	
Fresh Air Flow	SL/min	10	

Upon test completion, the camshaft is removed from the engine and measured for individual lobe wear at seven prescribed locations (nose; 14 degrees before and after the nose; 10 degrees before and after the nose; 4 degrees before and after the nose). For each lobe, the seven locations are summed to determine the lobe wear. Then the twelve lobes are averaged to compute the final test result.

Sequence IVA Valve Train Wear Evaluation

Form 4 Results Summary

Laboratory: <i>LAB</i>	Test Number: <i>STAND - STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Laboratory Oil	<i>LABOCODE</i>	Fuel Batch	<i>FUELBTID</i>	SAE Grade	<i>SAEVISC</i>
Date Started	<i>DTSTRT</i>	Date Completed	<i>DTCOMP</i>	Test Length	<i>TESTLEN</i>
Time Started	<i>STRTIME</i>	Time Completed	<i>EOTTIME</i>	TMC Oil Code ^A	<i>IND</i>
Lab Engine	<i>ENGINE</i>				
Cam Lot Number	<i>CAMLOT</i>	Head Lot	<i>HEADLOT</i>	Rocker Arm Lot	<i>RARMLOT</i>

Average Camshaft Wear

Original Unit Result, μm	<i>ACW</i>
Transformed Result	<i>TACW</i>
Industry Correction Factor	<i>ACWCF</i>
Corrected Transformed Result	<i>ACWCOR</i>
Severity Adjustment (non-reference oil tests only)	<i>ACWSA</i>
Final Transformed Result	<i>TACWFNL</i>
Final Original Unit Result, μm	<i>ACWFNL</i>

Additional Camshaft Lobe Wear Measurements

Intake Lobe	Maximum, μm	<i>MCWI</i>
	Average, μm	<i>ACWI</i>
Exhaust Lobe	Maximum, μm	<i>MCWE</i>
	Average, μm	<i>ACWE</i>
Nose	Maximum, μm	<i>MNW</i>
	Average, μm	<i>ANW</i>

Additional Information

Total Oil Consumption @ EOT, g	<i>OILCON</i>
Fuel Dilution @ EOT, %	<i>FUELH100</i>
Fuel Consumption @ EOT, kg	<i>FUELCON</i>
Fe by ICP @ EOT, ppm	<i>FEWMH100</i>
Corrected Blowby, L/min @ hour 5	<i>BLWBH005</i>
Corrected Blowby, L/min @ hour 100	<i>BLWBH100</i>

Most Recent Reference Oil Test History^B

Test Number	<i>RSTAND - RSTRUN -</i>		
Oilcode	<i>ROILCODE</i>		
Date	<i>RDTCOMP</i>	TMC Oil Code	<i>RIND</i>
Final Average Camshaft Wear, μm	<i>RACWFNL</i>		

^A Reference Oil Tests Only

^B Non-reference Oil Tests Only

Sequence IVA Valve Train Wear Evaluation

Form 5

Camshaft Lobe Wear

Laboratory: <i>LAB</i>	Test Number: <i>STAND - STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

7-point Measurement Method

Position	Cylinder	Lobe Number	14° BTC Wear, μm	10° BTC Wear, μm	4° BTC Wear, μm	0° (Nose) Wear, μm	4° ATC Wear, μm	10° ATC Wear, μm	14° ATC Wear, μm	Lobe Wear, μm	
Intake	1	1	W14B01	W10B01	W04B01	WN01	W04A01	W10A01	W14A01	CAMW01	
		3	W14B03	W10B03	W04B03	WN03	W04A03	W10A03	W14A03	CAMW03	
	2	4	W14B04	W10B04	W04B04	WN04	W04A04	W10A04	W14A04	CAMW04	
		6	W14B06	W10B06	W04B06	WN06	W04A06	W10A06	W14A06	CAMW06	
	3	7	W14B07	W10B07	W04B07	WN07	W04A07	W10A07	W14A07	CAMW07	
		9	W14B09	W10B09	W04B09	WN09	W04A09	W10A09	W14A09	CAMW09	
	4	10	W14B10	W10B10	W04B10	WN10	W04A10	W10A10	W14A10	CAMW10	
		12	W14B12	W10B12	W04B12	WN12	W04A12	W10A12	W14A12	CAMW12	
	Maximum Average		MW14BI	MW10BI	MW04BI	MWNI	MW04AI	MW10AI	MW14AI	MCWI	
			AW14BI	AW10BI	AW04BI	AWN1	AW04AI	AW10AI	AW14AI	ACWI	
	Exhaust	1	2	W14B02	W10B02	W04B02	WN02	W04A02	W10A02	W14A02	CAMW02
			5	W14B05	W10B05	W04B05	WN05	W04A05	W10A05	W14A05	CAMW05
3		8	W14B08	W10B08	W04B08	WN08	W04A08	W10A08	W14A08	CAMW08	
		11	W14B11	W10B11	W04B11	WN11	W04A11	W10A11	W14A11	CAMW11	
Maximum Average			MW14BE	MW10BE	MW04BE	MWNE	MW04AE	MW10AE	MW14AE	MCWE	
			AW14BE	AW10BE	AW04BE	AWNE	AW04AE	AW10AE	AW14AE	ACWE	
Overall Maximum Overall Average			MW14B	MW10B	MW04B	MNW	MW04A	MW10A	MW14A	MCW	
			AW14B	AW10B	AW04B	ANW	AW04A	AW10A	AW14A	ACW	

Sequence IVA Valve Train Wear Evaluation

Form 6

Operational Summary

Laboratory: <i>LAB</i>	Test Number: <i>STAND - STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Parameter	Units	QI Limit	EOT QI	Target		Average		Samples ^A	BQD ^B	Over/Under Range ^C
Speed	r/min	0.000	<i>QRPM</i>	800	1500	<i>ARPM1</i>	<i>ARPM2</i>	<i>NRPM</i>	<i>BRPM</i>	<i>ORPM</i>
Torque	N-m	0.000	<i>QTORQUE</i>	25.0		<i>ATORQUE1</i>	<i>ATORQUE2</i>	<i>NTORQUE</i>	<i>BTORQUE</i>	<i>OTORQUE</i>
Coolant Out Temperature	°C	0.000	<i>QCOLOUT</i>	50.0	55.0	<i>ACOLOUT1</i>	<i>ACOLOUT2</i>	<i>NCOLOUT</i>	<i>BCOLOUT</i>	<i>OCOLOUT</i>
Humidity	g/kg	0.000	<i>QHUMID</i>	11.5		<i>AHUMID</i>		<i>NHUMID</i>	<i>BHUMID</i>	<i>OHUMID</i>
Intake Air Temperature	°C	0.000	<i>QINAIPT</i>	32		<i>AINAIPT</i>		<i>NINAIPT</i>	<i>BINAIPT</i>	<i>OINAIPT</i>
Intake Air Pressure	kPa	0.000	<i>QINAIPT</i>	0.05		<i>AINAIPT</i>		<i>NINAIPT</i>	<i>BINAIPT</i>	<i>OINAIPT</i>
Exhaust Pressure, absolute	kPa	0.000	<i>QEXHGBK</i>	103.5		<i>AEXHGBK</i>		<i>NEXHGBK</i>	<i>BEXHGBK</i>	<i>OEXHGBK</i>
Engine Coolant Flow	L/min	0.000	<i>QCOLFRT</i>	30		<i>ACOLFRT</i>		<i>NCOLFRT</i>	<i>BCOLFRT</i>	<i>OCOLFRT</i>
Oil Cylinder Head Temperature	°C	0.000	<i>QCYLOT</i>	49.0	59.0	<i>ACYLOT1</i>	<i>ACYLOT2</i>	<i>NCYLOT</i>	<i>BCYLOT</i>	<i>OCYLOT</i>
Rocker Cover Fresh Air Flow	SL/min	0.000	<i>QFAF</i>	10.0		<i>AFAF</i>		<i>NFAF</i>	<i>BFAF</i>	<i>OFAF</i>
Parameter	Units	Typical Values								
Oil Sump Temperature	°C	49 – 54		57 – 65		<i>ASUMPT1</i>	<i>ASUMPT2</i>			
Oil Gallery Temperature	°C	46.5 – 50.5		58.5 – 61.5		<i>AOILT1</i>	<i>AOILT2</i>			
Coolant In Temperature	°C	44 – 46		49 – 50		<i>ACOLIN1</i>	<i>ACOLIN2</i>			
Exhaust Gas Temperature	°C	306 – 332		414 – 434		<i>AEXHT1</i>	<i>AEXHT2</i>			
Fuel Rail Temperature	°C	15 – 30		15 – 30		<i>AFUEL1</i>	<i>AFUEL2</i>			
Oil Gallery Pressure	°C	99.5 – 145.5		210.5 – 280.5		<i>AOILPRS1</i>	<i>AOILPRS2</i>			
Oil Cylinder Head Pressure	kPa	30 – 60		50 – 90		<i>ACYLOPR1</i>	<i>ACYLOPR2</i>			
Fuel Pressure	kPa	230 – 380		230 – 380		<i>AFUELPR1</i>	<i>AFUELPR2</i>			
Manifold Vacuum	kPa	57.7 – 59.9		63.8 – 65.8		<i>AIMNVAC1</i>	<i>AIMNVAC2</i>			
Air-to-Fuel Ratio	-	14.1 – 14.7		14.1 – 14.7		<i>AAFR1</i>	<i>AAFR2</i>			
Crankcase Pressure	kPa	-0.1 – -0.4		-0.1 – -0.4		<i>ACCASEP1</i>	<i>ACCASEP2</i>			
Fuel Flow	kg/h	1.2 – 1.4		2.0 – 2.2		<i>AFUELRT1</i>	<i>AFUELRT2</i>			
Ignition Timing	°BTDC	9 – 11		22 – 26		<i>ASPKTM1</i>	<i>ASPKTM2</i>			
Ambient Temperature	°C	20 – 45		20 – 45		<i>AAMBAT1</i>	<i>AAMBAT2</i>			
Rocker Cover Gas Temperature	°C	47 – 49		52 – 55		<i>ARACGT1</i>	<i>ARACGT2</i>			
Rocker Cover Coolant Flow	L/min	3.0 – 4.5		3.0 – 4.5		<i>ARACFLO1</i>	<i>ARACFLO2</i>			

Controlled Parameters

Non-controlled Parameters

^A Total number of data points taken as determined from test length and sampling rate

^B Number of Bad Quality Data points not used in the calculation of statistical measures

^C Number of points clipped by over or under range limits of the statistical measures

Sequence IVA Valve Train Wear Evaluation

Form 7 Used Oil Analysis

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i> - <i>STRUN</i> -	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Chemical Analysis of 0, 25, 50, 75, & 100-hour Used Engine Oil Samples

ASTM Method	Analysis Description	Units	<i>TST_HNEW</i>	<i>TST_H025</i>	<i>TST_H050</i>	<i>TST_H075</i>	<i>TST_H100</i>
D445	Kinematic Viscosity @ 40°C	cSt	<i>V040HNEW</i>				<i>V040H100</i>
D3525-M	Fuel Dilution, Gasoline	%					
D5185 (ICP)	Iron by ICP	ppm		<i>FEWMH025</i>	<i>FEWMH050</i>	<i>FEWMH075</i>	<i>FEWMH100</i>
D5185 (ICP)	Copper by ICP	ppm		<i>CUWMH025</i>	<i>CUWMH050</i>	<i>CUWMH075</i>	<i>CUWMH100</i>

Sequence IVA Valve Train Wear Evaluation

Form 8

Camshaft Bore/Journal Measurements

Laboratory: <i>LAB</i>	Test Number: <i>STAND - STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Camshaft Bearing Bore Diameter (mm)

Bore Gauge Set: 33.000mm

Diameter (Standard): 33.000 – 33.025mm

Bore Number	X		V		Y		Maximum Run-out	
	F	R	F	R	F	R	F	R
1	<i>CBFX001</i>	<i>CBRX001</i>	<i>CBFV001</i>	<i>CBRV001</i>	<i>CBFY001</i>	<i>CBRY001</i>	<i>XCBF001</i>	<i>XCBR001</i>
2	<i>CBFX002</i>	<i>CBRX002</i>	<i>CBFV002</i>	<i>CBRV002</i>	<i>CBFY002</i>	<i>CBRY002</i>	<i>XCBF002</i>	<i>XCBR002</i>
3	<i>CBFX003</i>	<i>CBRX003</i>	<i>CBFV003</i>	<i>CBRV003</i>	<i>CBFY003</i>	<i>CBRY003</i>	<i>XCBF003</i>	<i>XCBR003</i>
4	<i>CBFX004</i>	<i>CBRX004</i>	<i>XCBF004</i>	<i>XCBR004</i>	<i>CBFV004</i>	<i>CBRV004</i>	<i>CBFY004</i>	<i>CBRY004</i>
5	<i>CBFX005</i>	<i>CBRX005</i>	<i>CBFV005</i>	<i>CBRV005</i>	<i>CBFY005</i>	<i>CBRY005</i>	<i>XCBF005</i>	<i>XCBR005</i>

Camshaft Bearing Journal Diameter (mm)

Diameter (Standard): 32.935 – 32.955mm

Clearance (Limit): 0.120mm

Bore Number	V		H		Run-out		Clearance @ V	
	F	R	F	R	F	R	F	R
1	<i>CJFV001</i>	<i>CJRV001</i>	<i>CJFH001</i>	<i>CJRH001</i>	<i>XCJF001</i>	<i>XCJR001</i>	<i>CCF001</i>	<i>CCR001</i>
2	<i>CJFV002</i>	<i>CJRV002</i>	<i>CJFH002</i>	<i>CJRH002</i>	<i>XCJF002</i>	<i>XCJR002</i>	<i>CCF002</i>	<i>CCR002</i>
3	<i>CJFV003</i>	<i>CJRV003</i>	<i>CJFH003</i>	<i>CJRH003</i>	<i>XCJF003</i>	<i>XCJR003</i>	<i>CCF003</i>	<i>CCR003</i>
4	<i>CJFV004</i>	<i>CJRV004</i>	<i>CJFH004</i>	<i>CJRH004</i>	<i>XCJF004</i>	<i>XCJR004</i>	<i>CCF004</i>	<i>CCR004</i>
5	<i>CJFV005</i>	<i>CJRV005</i>	<i>CJFH005</i>	<i>CJRH005</i>	<i>XCJF005</i>	<i>XCJR005</i>	<i>CCF005</i>	<i>CCR005</i>

Note: Calculate camshaft bearing clearance @ vertical bore diameter

Camshaft End Play, mm	<i>CAMENDP</i>	End Play (Limit): 0.20mm
------------------------------	----------------	--------------------------

Camshaft Sprocket Run-out, mm	<i>CAMSROUT</i>	Run-out (Limit): 0.12mm
--------------------------------------	-----------------	-------------------------

Camshaft Run-out (bend), mm	<i>CAMBEND</i>	Run-out (Limit): 0.02mm
------------------------------------	----------------	-------------------------

Cylinder Compression, kPa

Cylinder Number	1	2	3	4
Before Test	<i>COMP1</i>	<i>COMP2</i>	<i>COMP3</i>	<i>COMP4</i>

Sequence IVA Valve Train Wear Evaluation

Form 9

Special Maintenance Record

Laboratory: <i>LAB</i>	Test Number: <i>STAND -STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Number of Downtime Occurrences			<i>DWNOCR</i>
Test Hours	Date	Down Time	Reasons
<i>DOWNR001</i>	<i>DDATR001</i>	<i>DTIMR001</i>	<i>DREAR001</i>
<i>DOWNR002</i>	<i>DDATR002</i>	<i>DTIMR002</i>	<i>DREAR002</i>
<i>DOWNR003</i>	<i>DDATR003</i>	<i>DTIMR003</i>	<i>DREAR003</i>
<i>DOWNR004</i>	<i>DDATR004</i>	<i>DTIMR004</i>	<i>DREAR004</i>
<i>DOWNR005</i>	<i>DDATR005</i>	<i>DTIMR005</i>	<i>DREAR005</i>
<i>DOWNR006</i>	<i>DDATR006</i>	<i>DTIMR006</i>	<i>DREAR006</i>
<i>DOWNR007</i>	<i>DDATR007</i>	<i>DTIMR007</i>	<i>DREAR007</i>
<i>DOWNR008</i>	<i>DDATR008</i>	<i>DTIMR008</i>	<i>DREAR008</i>
<i>DOWNR009</i>	<i>DDATR009</i>	<i>DTIMR009</i>	<i>DREAR009</i>
<i>DOWNR010</i>	<i>DDATR010</i>	<i>DTIMR010</i>	<i>DREAR010</i>
<i>DOWNR011</i>	<i>DDATR011</i>	<i>DTIMR011</i>	<i>DREAR011</i>
<i>DOWNR012</i>	<i>DDATR012</i>	<i>DTIMR012</i>	<i>DREAR012</i>
<i>DOWNR013</i>	<i>DDATR013</i>	<i>DTIMR013</i>	<i>DREAR013</i>
<i>DOWNR014</i>	<i>DDATR014</i>	<i>DTIMR014</i>	<i>DREAR014</i>
<i>DOWNR015</i>	<i>DDATR015</i>	<i>DTIMR015</i>	<i>DREAR015</i>
		<i>TOTLDOWN</i>	Total Downtime

Other Comments	
Number of Comment Lines	<i>TOTCOM</i>
<i>OCOMR001</i> <i>OCOMR002</i> <i>OCOMR003</i> <i>OCOMR004</i> <i>OCOMR005</i> <i>OCOMR006</i> <i>OCOMR007</i> <i>OCOMR008</i> <i>OCOMR009</i> <i>OCOMR010</i> <i>OCOMR011</i> <i>OCOMR012</i> <i>OCOMR013</i> <i>OCOMR014</i> <i>OCOMR015</i>	

Sequence IVA Valve Train Wear Evaluation

Form 9A

Special Maintenance Record

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i> - <i>STRUN</i> -	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Number of Downtime Occurrences			<i>DWNOCR</i>
Test Hours	Date	Down Time	Reasons
<i>DOWNR016</i>	<i>DDATR016</i>	<i>DTIMR016</i>	<i>DREAR016</i>
<i>DOWNR017</i>	<i>DDATR017</i>	<i>DTIMR017</i>	<i>DREAR017</i>
<i>DOWNR018</i>	<i>DDATR018</i>	<i>DTIMR018</i>	<i>DREAR018</i>
<i>DOWNR019</i>	<i>DDATR019</i>	<i>DTIMR019</i>	<i>DREAR019</i>
<i>DOWNR020</i>	<i>DDATR020</i>	<i>DTIMR020</i>	<i>DREAR020</i>
<i>DOWNR021</i>	<i>DDATR021</i>	<i>DTIMR021</i>	<i>DREAR021</i>
<i>DOWNR022</i>	<i>DDATR022</i>	<i>DTIMR022</i>	<i>DREAR022</i>
<i>DOWNR023</i>	<i>DDATR023</i>	<i>DTIMR023</i>	<i>DREAR023</i>
<i>DOWNR024</i>	<i>DDATR024</i>	<i>DTIMR024</i>	<i>DREAR024</i>
<i>DOWNR025</i>	<i>DDATR025</i>	<i>DTIMR025</i>	<i>DREAR025</i>
<i>DOWNR026</i>	<i>DDATR026</i>	<i>DTIMR026</i>	<i>DREAR026</i>
<i>DOWNR027</i>	<i>DDATR027</i>	<i>DTIMR027</i>	<i>DREAR027</i>
<i>DOWNR028</i>	<i>DDATR028</i>	<i>DTIMR028</i>	<i>DREAR028</i>
<i>DOWNR029</i>	<i>DDATR029</i>	<i>DTIMR029</i>	<i>DREAR029</i>
<i>DOWNR030</i>	<i>DDATR030</i>	<i>DTIMR030</i>	<i>DREAR030</i>
		<i>TOTLDOWN</i>	Total Downtime

Other Comments	
Number of Comment Lines	<i>TOTCOM</i>
<i>OCOMR016</i> <i>OCOMR017</i> <i>OCOMR018</i> <i>OCOMR019</i> <i>OCOMR020</i> <i>OCOMR021</i> <i>OCOMR022</i> <i>OCOMR023</i> <i>OCOMR024</i> <i>OCOMR025</i> <i>OCOMR026</i> <i>OCOMR027</i> <i>OCOMR028</i> <i>OCOMR029</i> <i>OCOMR030</i>	

Sequence IVA Valve Train Wear Evaluation

Form 9B

Special Maintenance Record

Laboratory: <i>LAB</i>	Test Number: <i>STAND - STRUN -</i>	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>		

Number of Downtime Occurrences			<i>DWNOCR</i>
Test Hours	Date	Down Time	Reasons
<i>DOWNR031</i>	<i>DDATR031</i>	<i>DTIMR031</i>	<i>DREAR031</i>
<i>DOWNR032</i>	<i>DDATR032</i>	<i>DTIMR032</i>	<i>DREAR032</i>
<i>DOWNR033</i>	<i>DDATR033</i>	<i>DTIMR033</i>	<i>DREAR033</i>
<i>DOWNR034</i>	<i>DDATR034</i>	<i>DTIMR034</i>	<i>DREAR034</i>
<i>DOWNR035</i>	<i>DDATR035</i>	<i>DTIMR035</i>	<i>DREAR035</i>
<i>DOWNR036</i>	<i>DDATR036</i>	<i>DTIMR036</i>	<i>DREAR036</i>
<i>DOWNR037</i>	<i>DDATR037</i>	<i>DTIMR037</i>	<i>DREAR037</i>
<i>DOWNR038</i>	<i>DDATR038</i>	<i>DTIMR038</i>	<i>DREAR038</i>
<i>DOWNR039</i>	<i>DDATR039</i>	<i>DTIMR039</i>	<i>DREAR039</i>
<i>DOWNR040</i>	<i>DDATR040</i>	<i>DTIMR040</i>	<i>DREAR040</i>
<i>DOWNR041</i>	<i>DDATR041</i>	<i>DTIMR041</i>	<i>DREAR041</i>
<i>DOWNR042</i>	<i>DDATR042</i>	<i>DTIMR042</i>	<i>DREAR042</i>
<i>DOWNR043</i>	<i>DDATR043</i>	<i>DTIMR043</i>	<i>DREAR043</i>
<i>DOWNR044</i>	<i>DDATR044</i>	<i>DTIMR044</i>	<i>DREAR044</i>
<i>DOWNR045</i>	<i>DDATR045</i>	<i>DTIMR045</i>	<i>DREAR045</i>
		<i>TOTLDOWN</i>	Total Downtime

Other Comments	
Number of Comment Lines	<i>TOTCOM</i>
<i>OCOMR031</i> <i>OCOMR032</i> <i>OCOMR033</i> <i>OCOMR034</i> <i>OCOMR035</i> <i>OCOMR036</i> <i>OCOMR037</i> <i>OCOMR038</i> <i>OCOMR039</i> <i>OCOMR040</i> <i>OCOMR041</i> <i>OCOMR042</i> <i>OCOMR043</i> <i>OCOMR044</i> <i>OCOMR045</i>	

Sequence IVA Valve Train Wear Evaluation

Form 10

Cycle 5 Stage 2 to 1 Transition: Oil Cylinder Head Temperature

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

OC2TOIIM

Cycle 5 Stage 1 to 2 Transition: Oil Cylinder Head Temperature

Sequence IVA Valve Train Wear Evaluation

Form 11

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

OCITO2IM

Cycle 5 Stage 2 to 1 Transition: Coolant Out Temperature

Sequence IVA Valve Train Wear Evaluation

Form 12

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

CO2TOIIM

Cycle 5 Stage 1 to 2 Transition: Coolant Out Temperature

Sequence IVA Valve Train Wear Evaluation

Form 13

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

COJTO2IM

Cycle 5 Stage 2 to 1 Transition: Engine Torque

Sequence IVA Valve Train Wear Evaluation

Form 14

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

ET2TO11M

Cycle 5 Stage 1 to 2 Transition: Engine Torque

Sequence IVA Valve Train Wear Evaluation

Form 15

Laboratory: LAB	Test Number: STAND	-STRUN	-	Oil Code: OILCODE
Formulation/Stand Code: FORM				

ET1TO2IM

Cycle 5 Stage 2 to 1 Transition: Engine Speed

Sequence IVA Valve Train Wear Evaluation

Form 16

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

ES2TOIIM

Cycle 5 Stage 1 to 2 Transition: Engine Speed

Sequence IVA Valve Train Wear Evaluation

Form 17

Laboratory: <i>LAB</i>	Test Number: <i>STAND</i>	- <i>STRUN</i>	-	Oil Code: <i>OILCODE</i>
Formulation/Stand Code: <i>FORM</i>				

ESITO2IM