

PC-9 Matrix Design Task Force

Status Report

To

ASTM Heavy Duty Engine Oil Classification Panel

Thursday September 20, 2000

Holiday Inn O'Hare

Chicago, IL

PC-9 Matrix Design Task Force Update

Final Formulations Matrix (9 Test Oils)

- ▶ Three Base Oils: One Group 1 and Two Group II
- ▶ Viscosity Grade: SAE 15W-40
- ▶ Technology: Three DI + VM Combinations

Base Oil →	1	2	3
Technology ↓			
X	X	X	X
Y	X	X	X
Z	X	X	X
Component Key			
Technology	X	Y	Z
Base Oil	1	2	3
Viscosity Grade	15W-40		

PC-9 Matrix Design Task Force Update

Final Formulations Matrix (9 Test Oils)

Code	Technology	Base Oil	Featured Oil for This Test
PC-9A	X	1	T-10/EGR
PC-9B	X	2	---
PC-9C	X	3	---
PC-9D	Y	1	---
PC-9E	Y	2	M11/EGR
PC-9F	Y	3	---
PC-9G	Z	1	---
PC-9H	Z	2	---
PC-9J	Z	3	1Q/EGR

PC-9 Matrix Design Task Force Update

PC-9 Test Matrices:

- Statistical Matrix Designs for:
M11/EGR, 1Q/EGR, T-10/EGR
 - Designed to Provide:
 - Precision/BOI along with Reference Oil/LTMS Data
- Number of Tests:
 - M11/EGR = 26
 - 1Q/EGR = 28
 - T-10/EGR = 28
- For Each Proposed Test Matrix
 - Cost Estimate Developed
 - Project Timeline Developed

PC-9 Matrix Design Task Force Update

Stand/Lab Test Capacity For PC-9 Matrix Project

Calibration Requirements For Each Lab:

First Stand = 3 Tests

Additional Stands = 2 Tests

	M11/EGR	1Q/EGR	T-10/EGR
Maximum Number of Stands	6	7	7
Number of Labs Participating	4	6	5
Test Prices Used	M-11/EGR	\$85,000	
For Project	1Q/EGR	\$60,000	
Cost Estimates	T-10/EGR	\$65,000	

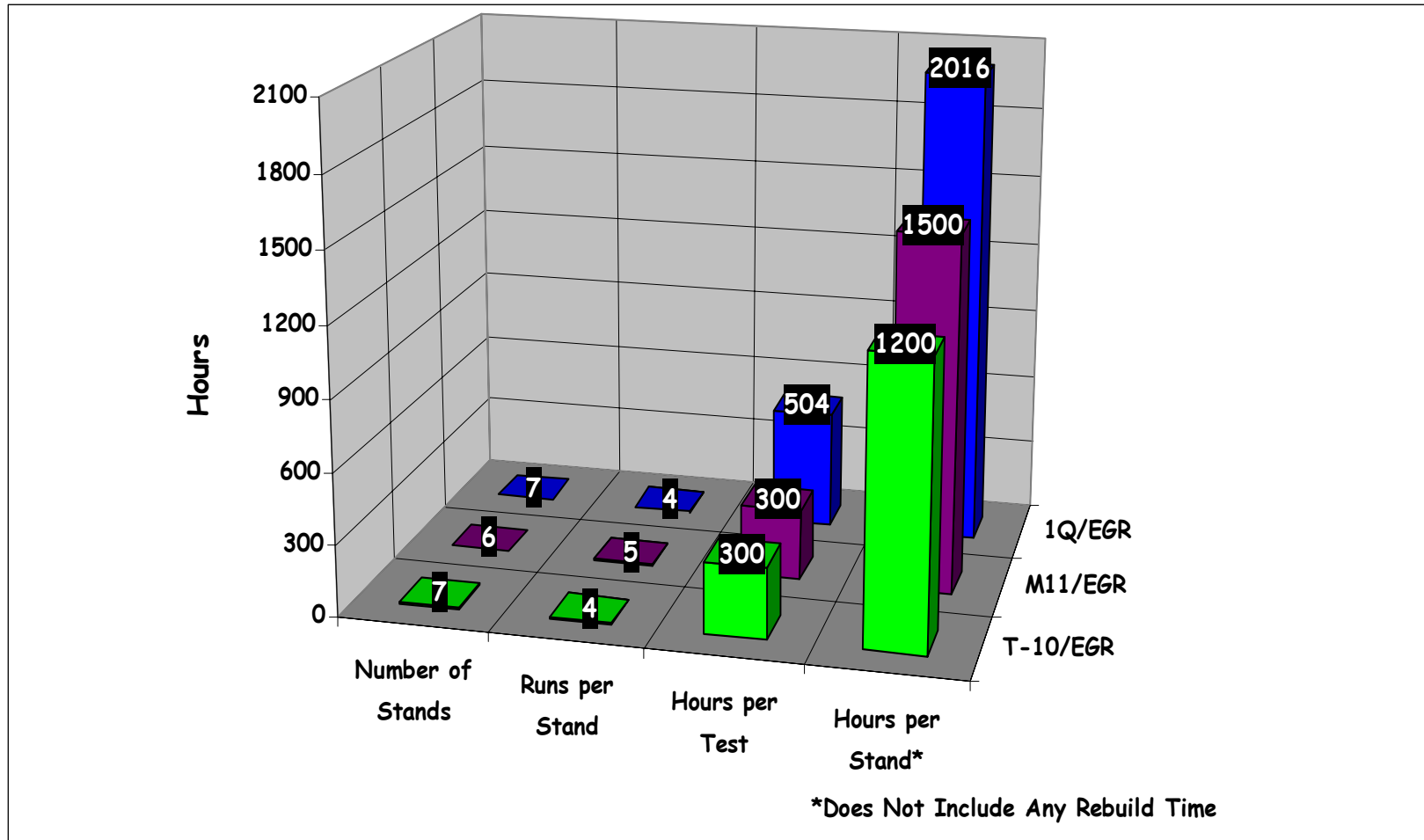
PC-9 Matrix Design Task Force Update

Test Matrix Design & Project Cost

PC-9 Test:	M11/EGR		1Q/EGR		T-10/EGR		Total Cost	
	# Tests	\$	# Tests	\$	# Tests	\$	# Tests	\$
Number of Tests:	26	2.210	28	1.680	28	1.820	82	5.710
Project Cost (Funding Group)	10	0.850	8	0.480	9	0.585	27	1.915
*Calibration Requirements: 3 Tests for First Stand, 2 Tests for Additional Stands in Each Laboratory								
				Test Prices Used	M11/EGR	\$85,000	4 / 6	
				For Matrix Project	1Q/EGR	\$60,000	6 / 7	
				Cost Estimates	T-10/EGR	\$65,000	5 / 7	

PC-9 Matrix Design Task Force Update

PC-9 Precision & BOI Matrix Running Time



PC-9 Matrix Design Task Force Update

Proposed Timeline:

- **PC-9 Formulations Matrix**

- **Technologies Selected**

April 11, 2000

[3 Technologies Have Been Selected by EMA and Are Available. Selected Base Oil Suppliers Have Acknowledged Their Agreement to Participate and Have Been Put in Contact With the Technology Sponsors in Order to Start the Necessary Blend Studies.]

- **Technologies Available**

September 7, 2000

- **Base Oils Available**

September 14, 2000

- **Blends Prepared (Available)**

October 30, 2000

- **PC-9 Matrix Testing**

- **Matrix Start**

November 10, 2000

- **Matrix Completion**

March 22, 2001

- **Data Evaluation Completed**

April 30, 2001