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OXIDES OF NITROGEN EMISSIONS FROM THE TESTING OF TF41-A-2B ENGINES AT NAS LEMOORE, CALIFORNIA

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Enclosure (1)

OXIDES OF NITROGEN EMISSIONS FROM THE TESTING OF TF41-A-2B ENGINES AT NAS LEMOORE, CALIFORNIA

STATEMENT "A" per Douglas Marable
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Naval Aviation Depot, Naval Air Station
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TELECON 4/25/90 VG

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OXIDES OF NITROGEN EMISSIONS FROM THE TESTING OF
TF41-A-2B ENGINES AT NAS LEMOORE, CALIFORNIA

AESO Report No. 1-88
November 1987

EXECUTIVE SUMMARY

Oxides of nitrogen (NO_x) are an air pollutant from the testing of gas turbine engines. Out-of-airframe engine testing is regulated by air pollution control agencies which require NO_x emissions data on applications for permits to construct and operate engine test facilities. Aside from continuous emissions monitoring, current methods of determining NO_x emissions from test cells depend on the availability of accurate records of engine operational data. This degree of record keeping is excessive given the difficult conditions under which engine testing is normally conducted. To avoid excessive record keeping, the Aircraft Environmental Support Office recommends a simple procedure for the determination of NO_x emissions. Its use depends only on accurate records of fuel usage for each engine test run.

The procedure involves the use of a correlation coefficient which relates the weight (pounds) of NO_x emissions to the weight (pounds) of fuel consumed during engine testing. The coefficient is characteristic of a given engine type, demonstrating little variation among individual engines. This report establishes a correlation coefficient for the TF41-A-2B engine based on actual emissions data and the run sheets from 27 engine tests conducted in test cells at NAS Lemoore, California. The correlation coefficient, equal to 0.01515 pounds of NO_x formed per pound of fuel consumed, determined NO_x emissions to within 1% of actual values. An analysis of the statistical validity of the coefficient supports its use as a reliable procedure.

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OXIDES OF NITROGEN EMISSIONS FROM THE TESTING OF TF41-A-2B ENGINES AT NAS LEMOORE, CALIFORNIA

AESO Report No. 1-88
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1. INTRODUCTION

Oxides of nitrogen (NO_x), a combination primarily of nitrogen oxide and nitrogen dioxide, are an air pollutant from the testing of gas turbine engines. Engine test cells therefore constitute a stationary source of NO_x emissions. Unless otherwise exempt, newly constructed or modified test cells must comply with federal New Source Performance Standards. (1) These standards were designed to regulate operations with continuous emissions, such as power plants and refineries. However, engine test cells are inactive for many days of the year, and are therefore not continuous emission sources.

The amount of NO_x formed during engine testing is part of the information required on applications to regulatory agencies for authority to construct and permission to operate test facilities. To assist NAS Lemoore in complying with local emissions regulations, the Aircraft Environmental Support Office (AESO) developed a procedure for determining NO_x emissions. The procedure establishes a correlation coefficient which relates the weight of NO_x emissions produced to the weight of fuel consumed during an engine test run. The correlation coefficient can be used to determine NO_x emissions over a specified compliance period, based only on values of fuel usage per engine test run.

This report establishes a correlation coefficient for the TF41-A-2B engine based on a sample of 27 engine tests conducted in test cells at NAS Lemoore, California. An analysis of the statistical validity of the coefficient is presented to support its use. AESO used a similar approach in an earlier report to establish a correlation coefficient for the F404-GE-400 engine. (2) The general approach is described in the next section.

2. EMISSION INDEXES AND ENGINE OPERATIONAL DATA

2.1 EMISSION INDEXES

An emission index relates the amount of a pollutant in the engine exhaust to the amount of fuel used. It is commonly expressed as pounds of exhaust constituent per 1,000 pounds of fuel consumed. This report considers only a single pollutant, oxides of nitrogen. The emission index for NO_x is calculated from measured concentrations of carbon monoxide, carbon dioxide, oxides of nitrogen and hydrocarbons in the engine exhaust.

The emission index for NO_x varies with engine power setting, being lowest at idle and highest at full power (military mode). In order to calculate the amount of NO_x formed at each power setting, an appropriate value of the emission index must be known. To establish these values, AESO evaluated the measured gaseous emissions data from 7 TF41-A-2B engine test reports. {3} Each test report provides values of the emission index for 6 power settings between idle and full power. Figure 1 shows a semi-logarithmic plot of emission index versus thrust for the reported gaseous emissions data. A simple curve fitting program was used to generate an exponential curve fit defined by the equation

$$y = ae^{bx} \tag{1}$$

where a and b are constants ($a = 2.02$ and $b = 1.76 \times 10^{-4}$) determined by the program, y is the emission index and x is the thrust in pounds. The coefficient of determination, r^2, for the resulting fit is 0.93301.

Only data corresponding to thrust values in the range from 4,000 to 15,000 pounds were used to generate the curve fit. The TF41-A-2B engine is rated at 15,000 pounds of thrust. Therefore regular engine testing above this limit was not conducted. As seen from Figure 1, the relationship between emission index and thrust is not exponential for thrust values between idle and 4,000 pounds. For this reason an average value of 1.6 was calculated as the emission index for idle. Equation (1) is then used to calculate the emission index for thrust settings within the specified range, for any TF41-A-2B engine.

2.2 ENGINE OPERATIONAL DATA

This section of the report describes the organization of the data in Tables 1 - 27. The TF41-A-2B engine run sheets on which these tables are based are included in Appendix A. Tables 1 - 9 contain engine data from test cells at NAS Lemoore. The tests were conducted from May through July of 1987. Tables 10 - 27 contain engine data from earlier tests also conducted in test cells at NAS Lemoore - testing occurred from August through November of 1985. The engine run sheets, on which these tables are based sometimes lacked thrust and fuel consumption values at idle and military operation. Estimated values are provided for these parameters. At idle the TF41-A-2B demonstrates an average thrust of 640 pounds and an average fuel flow rate of 1,050 pounds per hour. At military the average thrust is about 12,800 pounds, and the average fuel flow rate is 8,040 pounds per hour.

The first 4 columns of each table contain the engine operational parameters. These 4 parameters are: rpm, thrust, fuel flow, and time of operation at a specified power setting. For the purposes of this report, rpm is used only as a means of data identification. It is not used computationally. The rpm provides an indication of the relative power setting for each row of data in the tables, ranging from idle (7,000 rpm) to full power (12,800 rpm). Equation (1) and the remaining 3 parameters are then used to determine the entries in the next 3 columns; "Fuel use", "EI" and "Pounds of NO_x". Section 2.3 describes the calculations and summarizes the results.

2.3 CALCULATIONS AND SUMMARY OF RESULTS

2.3.1 CALCULATIONS

Tables 1 - 27 present TF41-A-2B engine test data and the resulting NO_x emissions. The amount of NO_x formed at each power setting is determined as follows. Each row of data in the table, identified by an rpm, corresponds to a power setting. By using the fixed emission index at idle (1.60) and equation (1) for all other power settings, this report calculates an emission index for each recorded thrust value. The fuel usage (pounds) is calculated by multiplying the fuel flow by the time, which must first be converted into hours. A division of the fuel usage by 1,000 (the emission index is for pounds per 1,000 pounds of fuel used) and multiplication by the emission index then gives the "pounds of NO_x" formed at that power setting. A summation of the NO_x emissions from all the power settings in a table gives the total NO_x emissions for that engine test.

Tables 1 - 27 conclude by calculating the total fuel consumption and the total NO_x emissions for the test. A division of the total pounds of NO_x by the total pounds of fuel used gives the pounds of NO_x formed per pound of fuel. This value is the correlation coefficient discussed in the introduction. Note that this parameter has a function similar to that of the emission index, although it is expressed somewhat differently.

2.3.2 COMPUTER PROGRAM

A FORTRAN program was used to perform the calculations and to generate the tables. The program documentation and coding appear in Appendix B. A catalog of environmental calculations, also available from AESO, describes how to use a small programmable calculator to establish emission indexes and to estimate the amounts of NO_x formed during engine testing. (4)

2.3.3 SUMMARY OF RESULTS

The results of Tables 1 - 27 are summarized in the first 4 columns of Table S1. Column 4 contains the correlation coefficient for the individual engine tests. The mean correlation coefficient for the entire sample is 0.01515 pounds of NO_x formed per pound of fuel consumed. The standard deviation for the sample, equal to 0.00137, quantifies the variability of the individual test results.

Column 5 of the same table contains the calculated amounts of NO_x emissions, which are derived from the mean correlation coefficient. The calculated amounts compare closely with the amounts determined from the emission indexes. Column 6 reports the percentage differences for the individual engine tests, which vary from -21.37% to +22.68%. However, the total calculated amount of NO_x emissions for the sample agrees to within less than 1% of the actual amount. Although individual engine tests may demonstrate significant percentage differences, use of the correlation coefficient to determine NO_x emissions produces reliable results for larger samples.

3. STATISTICAL ANALYSIS

The sample used to establish the correlation coefficient in the previous section is only a limited subset of all TF41-A-2B engine tests. However, it is desirable to infer from this sample about characteristics pertaining to the entire population. Statistical inference from a sample is useful only if that sample has been randomly chosen, and is representative of the population from which it was obtained. The 27 TF41-A-2B engine tests evaluated in this report were chosen because they were conducted during 2 arbitrarily established calendar intervals, one in 1985 and the other in 1987. The selection was therefore random, and the sample should be considered representative of the population.

To demonstrate that the use of the correlation coefficient is a statistically valid means of determining NO_x emissions, it is necessary to show that any apparent discrepancies between the actual and calculated amounts of NO_x are due only to random sampling error, and not to failure of the procedure. The 2 parameters of interest, actual and calculated NO_x emissions, are not independent of each other; they are paired through the procedure used to establish the correlation coefficient. The applicable statistical method is the t-test for paired observations, which is described in many standard texts on probability and statistics. (5) An extension of the t-test for paired observations is recognized by the Environmental Protection Agency as a method for certifying NO_x monitoring equipment. (6)

Table S2 presents the results of the statistical analysis, and provides a brief outline of the equations used in the calculation procedure. The first 3 columns of the table duplicate information from Table S1, while the next 2 columns report the intermediate results. The important statistical parameters are then summarized at the bottom of the table.

The values in column 4 are the differences between the actual and the calculated amounts of NO_x for each engine test. The estimated standard deviation, a value which describes the variability among these differences, is used to derive a standard error for the mean of differences. The standard error quantifies how well the mean difference for the sample estimates the mean difference for the population, which is usually zero. From the estimated standard error, and an appropriate t-value, confidence limits for the sample mean difference can be determined.

95% confidence limits, based on a two-tailed test, are appropriate. The expected confidence interval for the sample mean difference is then 1.66 ± 5.40. The absolute magnitude of this confidence interval determines the relative accuracy, which describes how closely the proposed procedure compares to the reference method (calculation of NO_x emissions based on the emission indexes). The relative accuracy determined from this statistical analysis is 3.79%. This means that one can be 95% confident that the correlation coefficient will determine NO_x emissions which are within 3.79% of emissions calculated by using the emission indexes.

4. CONCLUSIONS

The rate at which the testing of TF41-A-2B engines produces NO_x emissions can be expressed as a correlation coefficient. This coefficient can then be used to determine the amount of NO_x emissions formed during any engine test, based only on records of fuel consumption. The correlation coefficient for the TF41-A-2B engine is 0.01515 pounds of NO_x formed per pound of fuel consumed. An analysis of the statistical validity of the coefficient supports its use.

5. REFERENCES

1. Code of Federal Regulations, Title 40, Part 60, "Subpart GG - Standards of Performance for Stationary Gas Turbines," Washington DC, July, 1985.

2. Aircraft Environmental Support Office, "Emissions of Nitrogen Oxides from the Testing of F404-GE-400 Engines at Naval Air Station, Lemoore, California," AESO Report No. 4-85, July, 1985.

3. Scott Environmental Technology, Inc., "Individual Engine Test & Model Summary Reports, Modification 6, Alameda Testing, USAF Contract No. F29601-75-C-0046," Prepared for : Air Force Civil Engineering Center, Tyndall Air Force Base, Florida, October 20, 1976.

4. Aircraft Environmental Support Office, "Environmental Calculations: A Handbook for the Use of Small Programmable Calculators to Determine the Effect of Aircraft on the Environment," AESO Report No. 8-86, May, 1987.

5. Klugh, Henry E., "Statistics: The Essentials for Research," 2nd ed., John Wiley & Sons, Inc., New York, 1974.

6. Code of Federal Regulations, Title 40, Part 60, "Appendix B - Performance Specification 2 - Specifications and Test Procedures for SO_2 and NO_x Continuous Emission Monitoring Systems in Stationary Sources," Washington DC, July, 1985.

TABLE S1. Summary of oxides of nitrogen emissions from the testing of TF41-A-2B engines at NAS Lemoore

Table	Pounds of NOx per test	Pounds of fuel used in test	Pounds of NOx per pound of fuel used in test	Pounds of NOx (calculated) (a)	% difference (b)
1	72.06	5099.4	0.01413	77.26	7.22
2	54.38	4087.2	0.01330	61.92	13.87
3	214.77	14579.0	0.01473	220.87	2.84
4	111.37	7038.3	0.01582	106.63	-4.26
5	42.03	2743.3	0.01532	41.56	-1.12
6	122.26	8096.9	0.01510	122.67	0.34
7	111.45	7739.3	0.01440	117.25	5.20
8	114.96	8019.2	0.01434	121.49	5.68
9	185.04	13081.0	0.01415	198.18	7.10
10	192.06	14427.7	0.01331	218.58	13.81
11	524.00	33635.1	0.01558	509.57	-2.75
12	473.31	30676.1	0.01543	464.74	-1.81
13	338.98	22433.6	0.01511	339.87	0.26
14	140.86	9630.8	0.01463	145.91	3.59
15	182.55	9474.5	0.01927	143.54	-21.37
16	165.47	10128.4	0.01634	153.45	-7.26
17	168.64	12132.5	0.01390	183.81	9.00
18	202.57	12454.8	0.01626	188.69	-6.85
19	122.77	7748.0	0.01584	117.38	-4.39
20	60.24	4878.1	0.01235	73.90	22.68
21	108.22	7446.8	0.01453	112.82	4.25
22	169.24	11738.5	0.01442	177.84	5.08
23	222.60	14510.3	0.01534	219.83	-1.24
24	211.86	12540.3	0.01689	189.99	-10.32
25	330.69	21292.3	0.01553	322.58	-2.45
26	173.44	10563.1	0.01642	160.03	-7.73
27	212.38	12734.2	0.01668	192.92	-9.16
totals	5028.20			4983.28	-0.89
		mean	0.01515		
		standard deviation	0.00137		

(a) Pounds of NOx (calculated) is determined by multiplying the pounds of fuel used in a given test by the mean correlation coefficient as established from the 27 actual test runs.

(b) $$\% \text{ difference} = \frac{\text{pounds of NOx (calc'd)} - \text{pounds of NOx (per test)}}{\text{pounds of NOx (per test)}} \times 100$$

TABLE 1. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141011)

Date: 7/ 7/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
12001	8810	5578	6	557.8	9.52	5.31
12187	9920	6346	6	634.6	11.58	7.35
12427	11380	7462	5	621.8	14.97	9.31
12645	12440	8343	6	834.3	18.04	15.05
11958	8420	5351	5	445.9	8.89	3.96
12230	10010	6483	5	540.2	11.76	6.35
12480	11460	7562	5	630.2	15.18	9.57
12694	12480	8345	6	834.5	18.17	15.16
Pounds of fuel used in test				5099.4		
Pounds of NOx per test						72.06

Pounds of NOx per pound of fuel used in test = 0.01413

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 2. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141505)

Date: 7/ 9/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11991	8550	5525	5	460.4	9.10	4.19
12192	9950	6410	5	534.2	11.64	6.22
12531	11480	7614	5	634.5	15.23	9.67
12786	12520	8557	5	713.1	18.29	13.05
12018	8550	5625	6	562.5	9.10	5.12
12225	10040	6525	5	543.7	11.82	6.43
12543	11470	7665	5	638.7	15.21	9.71
Pounds of fuel used in test				4087.2		
Pounds of NOx per test						54.38

Pounds of NOx per pound of fuel used in test = 0.01330

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 3. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141430)

Date: 6/23/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11712	8570	5281	5	440.1	9.13	4.02
11969	10010	6243	5	520.2	11.76	6.12
12334	11540	7280	5	606.7	15.40	9.34
12815	13450	9040	5	753.3	21.55	16.23
11739	8430	5246	5	437.2	8.91	3.89
12030	10060	6363	5	530.2	11.87	6.29
12308	11420	7375	5	614.6	15.07	9.26
12684	13310	8793	5	732.7	21.02	15.41
11895	8500	5381	6	538.1	9.02	4.85
12144	9970	6363	7	742.3	11.68	8.67
12435	11380	7415	7	865.1	14.97	12.95
12780	12960	8758	5	729.8	19.77	14.43
11954	8500	5409	8	721.2	9.02	6.50
12208	10020	6464	7	754.1	11.78	8.89
12472	11350	7418	8	989.1	14.89	14.73
12779	12880	8633	7	1007.2	19.49	19.63

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 3 (continued)

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
12016	8680	5545	6	554.5	9.31	5.16
12248	10160	6553	8	873.7	12.08	10.55
12522	11470	7550	7	880.8	15.21	13.40
12788	12730	8586	9	1287.9	18.98	24.45
Pounds of fuel used in test				14579.0		
Pounds of NOx per test						214.77

Pounds of NOx per pound of fuel used in test = 0.01473

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 4. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141011)

Date: 5/21/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11743	8630	5959	8	794.5	9.23	7.33
11979	10130	6639	8	885.2	12.01	10.63
12218	11500	7723	7	901.0	15.29	13.78
12596	13270	8847	9	1327.1	20.88	27.70
11738	8550	5356	7	624.9	9.10	5.68
12022	10170	6449	6	644.9	12.10	7.80
12274	11580	7475	6	747.5	15.51	11.59
12811	14090	9542	7	1113.2	24.12	26.85
Pounds of fuel used in test				7038.3		
Pounds of NOx per test						111.37

Pounds of NOx per pound of fuel used in test = 0.01582

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 5. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 142542)

Date: 6/16/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11804	8430	5320	5	443.3	8.91	3.95
12124	10320	6586	6	658.6	12.42	8.18
12364	11500	7483	5	623.6	15.29	9.53
12686	13030	8724	7	1017.8	20.01	20.37
Pounds of fuel used in test				2743.3		
Pounds of NOx per test						42.03

Pounds of NOx per pound of fuel used in test = 0.01532

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 6. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141483)

Date: 6/18/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11707	8760	5479	5	456.6	9.44	4.31
11993	10160	6398	5	533.2	12.08	6.44
12258	11410	7313	6	731.3	15.05	11.00
12651	13210	8852	5	737.7	20.66	15.24
11707	8470	5310	6	531.0	8.97	4.76
12028	10020	6381	7	744.5	11.78	8.77
12319	11340	7357	6	735.7	14.86	10.94
12742	13380	8962	6	896.2	21.28	19.08
11772	8630	5530	6	553.0	9.23	5.10
12055	10040	6371	5	530.9	11.82	6.28
12344	11510	7441	6	744.1	15.32	11.40
12767	13300	9028	6	902.8	20.99	18.95
Pounds of fuel used in test				8096.9		
Pounds of NOx per test						122.26

Pounds of NOx per pound of fuel used in test = 0.01510

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 7. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141931)

Date: 6/24/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11905	8670	5651	5	470.9	9.29	4.38
12097	10010	6426	5	535.5	11.76	6.30
12348	11410	7389	6	738.9	15.05	11.12
12697	13050	8827	5	735.6	20.08	14.77
11945	8580	5555	5	462.9	9.14	4.23
12185	10020	6608	5	550.7	11.78	6.49
12461	11520	7537	6	753.7	15.34	11.56
12620	12300	8200	6	820.0	17.60	14.43
11925	8570	5459	7	636.9	9.13	5.81
12177	10070	6551	5	545.9	11.89	6.49
12438	11550	7668	5	639.0	15.42	9.86
12644	12690	8493	6	849.3	18.85	16.01
Pounds of fuel used in test				7739.3		
Pounds of NOx per test						111.45

Pounds of NOx per pound of fuel used in test = 0.01440

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 8. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141619)

Date: 7/10/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11945	8740	5630	5	469.2	9.41	4.41
12160	10000	6500	6	650.0	11.74	7.63
12467	11460	7561	6	756.1	15.18	11.48
12618	12220	8165	6	816.5	17.35	14.17
11931	8660	5491	6	549.1	9.27	5.09
12108	10000	6520	5	543.3	11.74	6.38
12469	11520	7589	7	885.4	15.34	13.58
12712	12570	8486	6	848.6	18.46	15.66
11945	8520	5465	5	455.4	9.05	4.12
12239	10180	6663	5	555.2	12.12	6.73
12506	11590	7653	5	637.7	15.53	9.91
12733	12590	8526	6	852.6	18.52	15.79
Pounds of fuel used in test				8019.2		
Pounds of NOx per test						114.96

Pounds of NOx per pound of fuel used in test = 0.01434

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 9. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141359)

Date: 7/15/1987

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11849	8450	5271	7	615.0	8.94	5.50
12183	10040	6390	7	745.5	11.82	8.81
12490	11350	7410	6	741.0	14.89	11.03
12708	12350	8230	8	1097.3	17.76	19.48
11930	8500	5400	6	540.0	9.02	4.87
12165	9990	6375	7	743.7	11.72	8.72
12485	11470	7485	7	873.2	15.21	13.28
12646	12100	8020	7	935.7	16.99	15.90
11975	8550	5440	7	634.7	9.10	5.77
12230	10020	6503	7	758.7	11.78	8.94
12525	11450	7545	8	1006.0	15.15	15.25
12760	12550	8435	7	984.1	18.39	18.10
11985	8540	5430	7	633.5	9.08	5.75
12250	9950	6420	6	642.0	11.64	7.47
12545	11450	7515	8	1002.0	15.15	15.18
12790	12610	8465	8	1128.7	18.59	20.98
Pounds of fuel used in test				13081.0		
Pounds of NOx per test						185.04

Pounds of NOx per pound of fuel used in test = 0.01415

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 10. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141252)

Date: 8/ 2/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	150	2625.0	2.26	5.93
11450	8762	5478	5	456.5	9.44	4.31
11798	10585	6762	5	563.5	13.01	7.33
12009	11826	7531	12	1506.2	16.19	24.39
12272	13091	8553	5	712.7	20.23	14.42
11318	8304	5152	5	429.3	8.71	3.74
11492	9320	5814	5	484.5	10.42	5.05
11763	10741	6791	10	1131.8	13.38	15.14
12116	12612	8161	7	952.1	18.59	17.70
11355	8572	5320	6	532.0	9.13	4.86
11643	10201	6421	6	642.1	12.16	7.81
11972	11865	7634	6	763.4	16.30	12.45
12101	12545	8130	7	948.5	18.38	17.43
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				14427.7		
Pounds of NOx per test						192.06

Pounds of NOx per pound of fuel used in test = 0.01331

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 11. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141298)

Date: 8/12/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	220	3850.0	2.26	8.70
11449	8760	5531	8	737.5	9.44	6.96
11726	10396	6519	9	977.8	12.59	12.31
11941	11442	7299	14	1703.1	15.13	25.77
12221	12786	8402	7	980.2	19.17	18.79
11476	8953	5599	7	653.2	9.77	6.38
11725	10301	6483	7	756.3	12.38	9.36
12012	11809	7541	8	1005.5	16.14	16.23
12346	13594	8905	8	1187.3	22.10	26.24
11405	8691	5426	6	542.6	9.33	5.06
11849	10948	7010	6	701.0	13.87	9.72
12020	11841	7616	6	761.6	16.23	12.36
12520	14412	9688	6	968.8	25.52	24.73
11446	8895	5553	6	555.3	9.67	5.37
11694	10247	6419	6	641.9	12.26	7.87
12023	11851	7646	12	1529.2	16.26	24.87

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 11 (continued)

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
12219	12922	8425	8	1123.3	19.64	22.06
11422	8699	5391	6	539.1	9.34	5.03
11693	10256	6423	6	642.3	12.28	7.89
12010	11824	7565	6	756.5	16.19	12.24
12516	14339	9624	6	962.4	25.20	24.25
12800[b]	12800	8040	90	12060.0	19.22	231.78
Pounds of fuel used in test				33635.1		
Pounds of NOx per test						524.00

Pounds of NOx per pound of fuel used in test = 0.01558

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 12. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141234)

Date: 10/ 5/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	140	2450.0	2.26	5.54
11479	8767	5338	8	711.7	9.45	6.73
11765	10346	6375	8	850.0	12.48	10.61
12069	11910	7511	14	1752.6	16.43	28.80
11589	9278	5727	8	763.6	10.34	7.90
11901	10776	6870	8	916.0	13.46	12.33
12203	12449	8039	7	937.9	18.07	16.95
12568	14234	9506	9	1425.9	24.74	35.27
11518	8894	5426	8	723.5	9.66	6.99
11757	10248	6358	8	847.7	12.26	10.40
12020	11598	7336	12	1467.2	15.55	22.82
12350	13216	8599	8	1146.5	20.68	23.71
11539	8964	5495	8	732.7	9.78	7.17
11787	10465	6411	8	854.8	12.74	10.89
12017	11644	7285	8	971.3	15.68	15.23
12425	13563	8877	8	1183.6	21.98	26.02

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 12 (continued)

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11610	8784	5532	5	461.0	9.48	4.37
11843	10289	6499	5	541.6	12.35	6.69
12156	11770	7665	11	1405.2	16.03	22.53
11538	8603	5400	5	450.0	9.18	4.13
11800	10230	6483	5	540.2	12.23	6.61
12113	11940	7779	10	1296.5	16.52	21.42
12371	13356	8765	6	876.5	21.19	18.58
12800[b]	12800	8040	55	7370.0	19.22	141.64
Pounds of fuel used in test				30676.1		
Pounds of NOx per test						473.31

Pounds of NOx per pound of fuel used in test = 0.01543

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 13. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141494)

Date: 9/10/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	175	3062.5	2.26	6.92
11617	8958	5455	5	454.6	9.77	4.44
11844	10264	6438	5	536.5	12.30	6.60
12089	11850	7383	9	1107.4	16.26	18.01
12541	14120	9281	6	928.1	24.25	22.50
11603	8901	5442	6	544.2	9.68	5.27
11833	10459	6492	6	649.2	12.73	8.26
12083	11848	7408	7	864.3	16.25	14.05
12522	14047	9225	7	1076.2	23.94	25.76
11613	8957	5521	6	552.1	9.77	5.40
11883	10751	6685	7	779.9	13.40	10.45
12101	11983	7570	7	883.2	16.64	14.70
11588	8971	5484	5	457.0	9.80	4.48
11766	10298	6318	5	526.5	12.37	6.51
12042	11869	7494	5	624.5	16.31	10.19
12386	13573	8812	5	734.3	22.02	16.17

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 13 (continued)

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11536	8747	5317	5	443.1	9.42	4.17
11786	10309	6408	5	534.0	12.40	6.62
12067	11887	7494	6	749.4	16.37	12.26
12429	13738	8965	6	896.5	22.67	20.32
12800[b]	12800	8040	45	6030.0	19.22	115.89
Pounds of fuel used in test				22433.6		
Pounds of NOx per test						338.98

Pounds of NOx per pound of fuel used in test = 0.01511

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 14. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141477)

Date: 8/26/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	40	700.0	2.26	1.58
11524	8697	5383	6	538.3	9.33	5.03
11744	10226	6354	6	635.4	12.22	7.76
12022	11764	7474	12	1494.8	16.02	23.94
12333	13393	8731	7	1018.6	21.33	21.73
11359	8688	5457	10	909.5	9.32	8.48
11726	10167	6311	10	1051.8	12.09	12.72
12063	11933	7634	10	1272.3	16.50	20.99
12800[b]	12800	8040	15	2010.0	19.22	38.63
Pounds of fuel used in test				9630.8		
Pounds of NOx per test						140.86

Pounds of NOx per pound of fuel used in test = 0.01463

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 15. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141357)

Date: 9/16/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	60	1050.0	2.26	2.37
11607	8940	5579	5	464.9	9.74	4.53
11767	10275	6453	5	537.7	12.32	6.63
12079	11943	7613	10	1268.8	16.53	20.97
12391	13557	8809	6	880.9	21.96	19.34
11582	8857	5551	5	462.6	9.60	4.44
11843	10530	6644	5	553.7	12.89	7.14
12061	11963	7653	5	637.7	16.59	10.58
12492	19142	9381	6	938.1	58.68	55.05
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				9474.5		
Pounds of NOx per test						182.55

Pounds of NOx per pound of fuel used in test = 0.01927

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 16. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141551)

Date: 8/20/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	70	1225.0	2.26	2.77
11564	8744	5385	4	359.0	9.41	3.38
11801	10250	6391	4	426.1	12.27	5.23
12078	11803	7479	9	1121.8	16.13	18.09
12497	13822	9139	6	913.9	23.01	21.03
11545	8691	5358	5	446.5	9.33	4.16
11796	10329	6387	5	532.2	12.44	6.62
12088	11831	7540	5	628.3	16.21	10.18
12603	14587	9647	7	1125.5	26.32	29.63
12800[b]	12800	8040	25	3350.0	19.22	64.38
Pounds of fuel used in test				10128.4		
Pounds of NOx per test						165.47

Pounds of NOx per pound of fuel used in test = 0.01634

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 17. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141511)

Date: 8/ 5/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	100	1750.0	2.26	3.96
11632	8862	5467	7	637.8	9.61	6.13
11845	10210	6336	7	739.2	12.18	9.01
12005	11454	7137	13	1546.3	15.17	23.45
12193	12705	8045	7	938.6	18.90	17.74
11512	8140	5077	6	507.7	8.46	4.30
11695	9327	5772	6	577.2	10.43	6.02
11889	10575	6650	6	665.0	12.99	8.64
12042	11819	7506	6	750.6	16.17	12.14
12800[b]	12800	8040	30	4020.0	19.22	77.26
Pounds of fuel used in test				12132.5		
Pounds of NOx per test						168.64

Pounds of NOx per pound of fuel used in test = 0.01390

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 18. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141612)

Date: 8/ 6/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	55	962.5	2.26	2.18
11518	8793	5405	7	630.6	9.49	5.99
11811	10406	6541	7	763.1	12.61	9.62
12096	11998	7573	14	1767.0	16.69	29.49
12453	13677	8955	7	1044.7	22.43	23.43
11537	8796	5439	6	543.9	9.50	5.17
11836	10603	6640	7	774.7	13.06	10.11
12108	12075	7641	7	891.5	16.92	15.08
12481	13805	9058	7	1056.8	22.94	24.24
12800[b]	12800	8040	30	4020.0	19.22	77.26
Pounds of fuel used in test				12454.8		
Pounds of NOx per test						202.57

Pounds of NOx per pound of fuel used in test = 0.01626

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 19. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141630)

Date: 8/24/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	30	525.0	2.26	1.19
11547	8710	5376	5	448.0	9.36	4.19
11782	10276	6430	5	535.8	12.33	6.60
12054	11839	7535	9	1130.2	16.23	18.34
12502	14027	9364	5	780.3	23.85	18.61
11546	8765	5405	5	450.4	9.45	4.26
11779	10280	6451	5	537.6	12.33	6.63
12149	12206	7927	5	660.6	17.31	11.44
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				7748.0		
Pounds of NOx per test						122.77

Pounds of NOx per pound of fuel used in test = 0.01584

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 20. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141952)

Date: 8/ 2/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000 [a]	640	1050	60	1050.0	2.26	2.37
11420	8687	5407	5	450.6	9.32	4.20
11584	9808	6112	5	509.3	11.35	5.78
11743	10722	6728	8	897.1	13.33	11.96
11966	11802	7573	5	631.1	16.12	10.17
12800 [b]	12800	8040	10	1340.0	19.22	25.75
Pounds of fuel used in test				4878.1		
Pounds of NOx per test						60.24

Pounds of NOx per pound of fuel used in test = 0.01235

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 21. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141952)

Date: 8/13/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	50	875.0	2.26	1.98
11414	8562	5366	6	536.6	9.12	4.89
11678	9855	6251	7	729.3	11.45	8.35
11925	10974	7060	14	1647.3	13.94	22.96
12267	12717	8388	7	978.6	18.94	18.53
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				7446.8		
Pounds of NOx per test						108.22

Pounds of NOx per pound of fuel used in test = 0.01453

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 22. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141952)

Date: 9/23/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	75	1312.5	2.26	2.97
11403	8458	5257	5	438.1	8.95	3.92
11646	9764	6150	5	512.5	11.26	5.77
11890	10942	6941	10	1156.8	13.86	16.03
12242	12689	8230	5	685.8	18.85	12.93
11561	9338	5842	9	876.3	10.45	9.16
11766	10266	6534	9	980.1	12.30	12.06
11979	11382	7242	9	1086.3	14.97	16.27
12800[b]	12800	8040	35	4690.0	19.22	90.14
Pounds of fuel used in test				11738.5		
Pounds of NOx per test						169.24

Pounds of NOx per pound of fuel used in test = 0.01442

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 23. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 141952)

Date: 9/27/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	120	2100.0	2.26	4.75
11480	8739	5480	5	456.7	9.40	4.29
11787	10353	6447	5	537.2	12.49	6.71
12105	11847	7468	9	1120.2	16.25	18.20
12578	14175	9353	7	1091.2	24.48	26.71
11483	8775	5424	5	452.0	9.46	4.28
11776	10269	6365	5	530.4	12.31	6.53
12075	11752	7417	12	1483.4	15.98	23.71
12404	13181	8569	7	999.7	20.55	20.55
11466	8689	5417	6	541.7	9.32	5.05
11767	10264	6371	6	637.1	12.30	7.84
12090	11810	7461	6	746.1	16.15	12.05
12686	14693	9725	7	1134.6	26.82	30.43
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				14510.3		
Pounds of NOx per test						222.60

Pounds of NOx per pound of fuel used in test = 0.01534

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 24. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 142563)

Date: 8/15/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
11428	8802	5411	5	450.9	9.51	4.29
11804	10360	6568	5	547.3	12.51	6.85
12037	11922	7548	10	1258.0	16.47	20.72
12518	14378	9553	6	955.3	25.37	24.24
11512	8753	5365	5	447.1	9.43	4.21
11790	10351	6523	7	761.0	12.49	9.50
12067	11946	7622	7	889.2	16.54	14.71
12555	14536	9625	6	962.5	26.09	25.11
11527	8743	5435	5	452.9	9.41	4.26
11782	10457	6531	6	653.1	12.72	8.31
12046	11876	7597	12	1519.4	16.33	24.82
12342	13393	8764	5	730.3	21.33	15.58
11553	9023	5521	6	552.1	9.89	5.46
11775	10384	6527	6	652.7	12.56	8.20
12046	11930	7614	6	761.4	16.49	12.56
12492	14143	9470	6	947.0	24.34	23.05
Pounds of fuel used in test				12540.3		
Pounds of NOx per test						211.86

Pounds of NOx per pound of fuel used in test = 0.01689

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 25. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 142563)

Date: 8/15/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	180	3150.0	2.26	7.12
11501	8762	5379	6	537.9	9.44	5.08
11812	10558	6653	6	665.3	12.95	8.62
12056	11908	7605	11	1394.2	16.43	22.90
12525	14315	9538	7	1112.8	25.09	27.92
11520	8781	5403	6	540.3	9.47	5.12
11767	10397	6483	6	648.3	12.59	8.16
12071	11927	7673	6	767.3	16.48	12.65
12453	13975	9253	8	1233.7	23.63	29.16
11479	8745	5343	5	445.2	9.41	4.19
11762	10406	6480	5	540.0	12.61	6.81
12060	11992	7642	5	636.8	16.67	10.62
12584	14565	9775	6	977.5	26.22	25.63
11530	8899	5483	5	456.9	9.67	4.42
11762	10418	6516	5	543.0	12.64	6.86
12078	11980	7682	6	768.2	16.64	12.78

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 25 (continued)

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
12581	14525	9823	7	1146.0	26.04	29.84
11543	8935	5492	6	549.2	9.73	5.35
11780	10398	6546	6	654.6	12.59	8.24
12062	11970	7681	6	768.1	16.61	12.76
12438	13864	9230	7	1076.8	23.18	24.96
12800[b]	12800	8040	20	2680.0	19.22	51.51
Pounds of fuel used in test				21292.3		
Pounds of NOx per test						330.69

Pounds of NOx per pound of fuel used in test = 0.01553

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 26. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 142596)

Date: 10/21/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	75	1312.5	2.26	2.97
11483	8600	5360	5	446.7	9.18	4.10
11727	9891	6231	5	519.2	11.52	5.98
12056	11661	7401	10	1233.5	15.73	19.40
12545	14136	9402	5	783.5	24.31	19.05
11440	8500	5262	5	438.5	9.02	3.95
11706	9817	6171	5	514.2	11.37	5.85
12019	11440	7296	5	608.0	15.13	9.20
12741	15022	10177	8	1356.9	28.42	38.56
12800[b]	12800	8040	25	3350.0	19.22	64.38
Pounds of fuel used in test				10563.1		
Pounds of NOx per test						173.44

Pounds of NOx per pound of fuel used in test = 0.01642

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE 27. Emission of oxides of nitrogen from the testing of a TF41 engine at NAS Lemoore (Engine Serial Number: 142599)

Date: 11/15/1985

RPM	THRUST (lb)	FUEL FLOW (lb/hr)	TIME (MIN)	FUEL USE (lb)	EI	POUNDS NOx
7000[a]	640	1050	50	875.0	2.26	1.98
11556	8672	5557	7	648.3	9.29	6.03
11759	10182	6516	8	868.8	12.12	10.53
12077	11757	7711	12	1542.2	16.00	24.67
12485	13756	9314	7	1086.6	22.74	24.71
11556	8650	5403	5	450.2	9.26	4.17
11817	10279	6494	7	757.6	12.33	9.34
12090	11790	7610	7	887.8	16.09	14.28
12587	14218	9585	10	1597.5	24.67	39.41
12800[b]	12800	8040	30	4020.0	19.22	77.26
Pounds of fuel used in test				12734.2		
Pounds of NOx per test						212.38

Pounds of NOx per pound of fuel used in test = 0.01668

Emission index (EI) for NOx is expressed as pounds of NO_2 per 1000 pounds of fuel.

(a) An rpm of 7000 indicates that the engine is operating at idle. The corresponding thrust and fuel flow are estimated.
(b) An rpm of 12800 indicates that the engine is operating at military. The corresponding thrust and fuel flow are estimated.

TABLE S2. Statistical summary of emissions data for the TF41-A-2B engine

Table	Pounds of NOx per test	Pounds of NOx per test (calculated)	Difference d (a)	d^2
1	72.06	77.26	-5.20	27.04
2	54.38	61.92	-7.54	56.85
3	214.77	220.87	-6.10	37.21
4	111.37	106.63	4.74	22.47
5	42.03	41.56	0.47	0.22
6	122.26	122.67	-0.41	0.17
7	111.45	117.25	-5.80	33.64
8	114.96	121.49	-6.53	42.64
9	185.04	198.18	-13.14	172.66
10	192.06	218.58	-26.52	703.31
11	524.00	509.57	14.43	208.22
12	473.31	464.74	8.57	73.44
13	338.98	339.87	-0.89	0.79
14	140.86	145.91	-5.05	25.50
15	182.55	143.54	39.01	1521.78
16	165.47	153.45	12.02	144.48
17	168.64	183.81	-15.17	230.13
18	202.57	188.69	13.88	192.65
19	122.77	117.38	5.39	29.05
20	60.24	73.90	-13.66	186.60
21	108.22	112.82	-4.60	21.16
22	169.24	177.84	-8.60	73.96
23	222.60	219.83	2.77	7.67
24	211.86	189.99	21.87	478.30
25	330.69	322.58	8.11	65.77
26	173.44	160.03	13.41	179.83
27	212.38	192.92	19.46	378.69
totals	5028.20	4983.28	44.92	4914.25
means	186.23	184.57	1.66	

Estimated standard deviation = 13.64

Estimated standard error = 2.63

95% confidence limits = ± 5.40

Relative accuracy = 3.79%

(a) Difference = NOx (per test) - NOx (calc'd)

See notes i - iv.

TABLE S2. (continued)

Notes:

i. Estimated standard deviation:

$$S_d = \sqrt{\frac{\Sigma d^2 - (\Sigma d)^2/n}{n - 1}}$$

ii. Estimated standard error:

$$S_{\bar{d}} = \frac{S_d}{\sqrt{n}}$$

iii. 95% confidence limits (two-tailed test):

$$CC = t_{0.95}\, S_{\bar{d}} \qquad \text{where } t_{0.95} = 2.056 \text{ for } n = 27$$

iv. Relative accuracy:

$$RA = \frac{|\bar{d}| + |CC|}{\overline{RM}} \times 100$$

where $\overline{RM}$ is the average "reference method" value

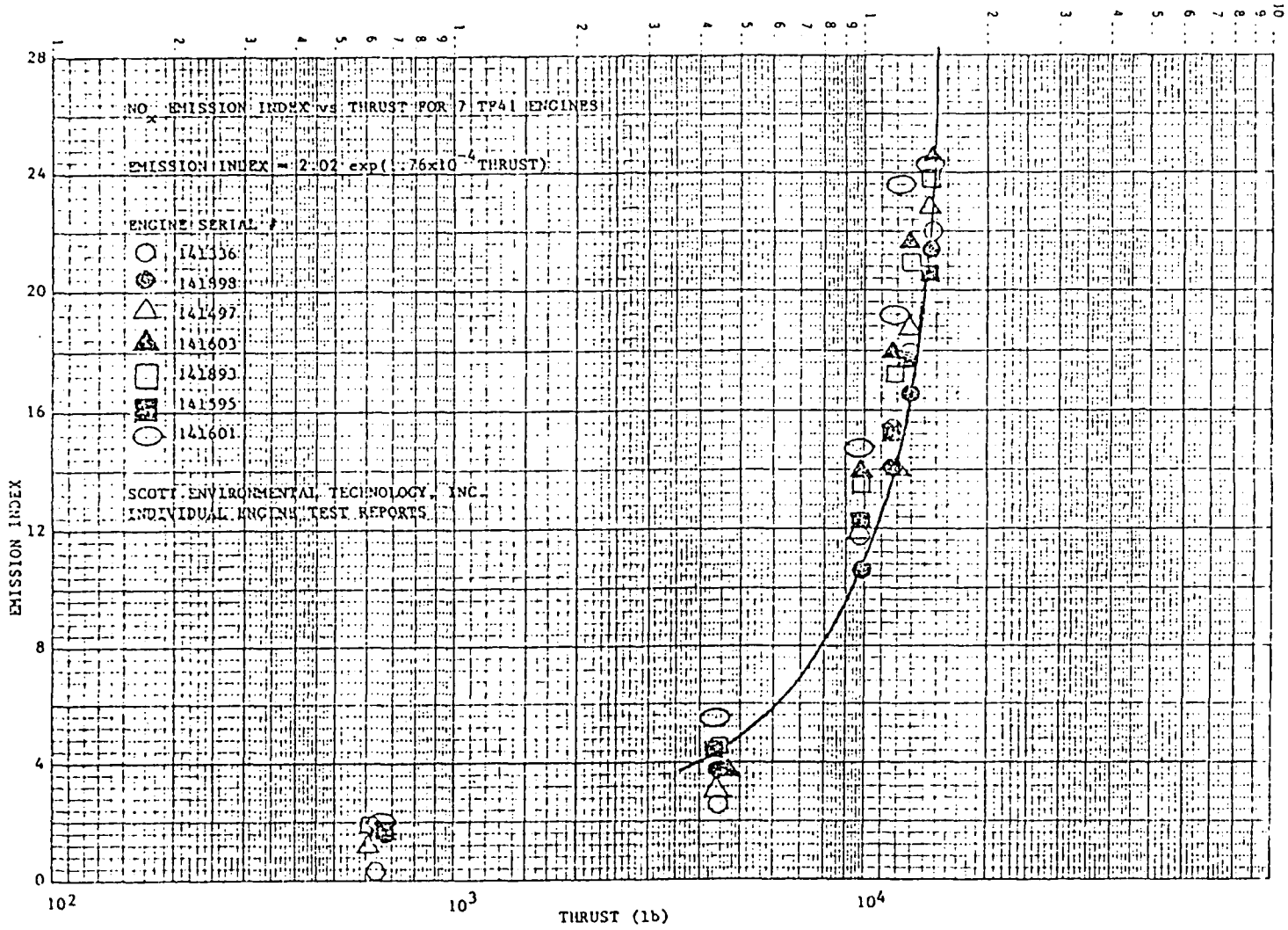

Figure 1. NO_x EMISSION INDEX vs THRUST FOR 7 TF41-A-2B ENGINES

APPENDIX A: Engine Operational Data (Run Sheets)

TF41-A-2B - NAS Lemoore, CA

THRUST	NH RPM	FUEL FLOW	TOTAL TIME	ENG. SER#
8 :10	12001	5578	6 Min	141011
9920	12187	6346	6	7-7-87
1' 380	12427	7462	5	
12440	12645	8343	6	
8 20	11958	5351	5	
10310	12230	6483	5	
11-160	12480	7562	5	
12 480	12694	8345	6 Min	
8550	11991	5525	5 Min	141505
7 50	12192	6410	5	7-9-87
11480	12531	7614	5	
12 520	12786	8557	5	
8550	12018	5625	6	
10040	12225	6525	5	
11 70	12543	7665	5 Min	
8740	11945	5630	5 Min	141619
10 00	12160	6500	6	7-10-87
11460	12467	7561	6	
12 120	12618	8165	6	
8660	11931	5491	6	
9 00	12108	6520	5	
11570	12469	7589	7	
12 70	12712	8486	6	
8 20	11945	5465	5	
10180	12239	6663	5	
11 90	12506	7653	5	
12590	12733	8526	6 Min	

THRUST	NH RPM	FUEL FLOW	TOTAL TIME	ENG SER#	
8570.	11712.	5281.	5 Min.	141430	6-23-87
10010	11969	6243	5 Min		
1540	12334	7280	5 Min		
13450	12815	9040	5 Min		
3430	11739	5246	5 Min		
10060	12030	6363	5 Min		
11420	12308	7375	5 Min		
13310	12684	8793	5 Min		
8500	11895	5381	6 Min		
770	12144	6363	7 Min		
11380	12435	7415	7 Min		
13960	12780	8758	5 Min		
8500	11954	5409	8 Min		
10020	12208	6464	7 Min		
11350	12472	7418	8 Min		
12880	12779	8633	7 Min		
6680	12016	5545	6 Min		
10160	12248	6553	8 Min		
11470	12522	7550	7 Min		
12730	12788	8586	9 Min		
8630	11743	5959	8 Min	141011	5-21-87
10130	11979	6639	8 Min		
11500	12218	7723	7 Min		
11270	12596	8847	9 Min		
8550	11738	5356	7 Min		
10170	12022	6449	6 Min		
11580	12274	7457	6 Min		
13090	12811	9542	7 Min		

THRUST	NH RPM	FUEL FLOW	TOTAL TIME	ENG SER#
,430	11804	5320	5 min.	142542 6-16-8
10320	12124	6586	6 min.	
1500	12364	7483	5 min.	
13030	12686	8724	7 min.	
3760	11707	5479	5 Min	141483 6-18-87
10160	11993	6398	5	
11410	12258	7313	6	
3210	12651	8852	5	
8470	11707	5310	6	
0020	12028	6381	7	
11340	12319	7357	6	
3330	12742	8962	6	
8630	11772	5530	6	
10040	12055	6371	5	
11510	12344	7441	6	
13300	12767	9028	6 Min	
670	11905	5651	5 Min	141931
10010	12097	6426	5	6-24-87
410	12348	7389	6	
13050	12697	8827	5	
580	11945	5555	5	
10020	12185	6608	5	
11520	12461	7537	6	
3300	12620	8200	6	
8570	11925	5459	7	
10070	12177	6551	5	
11550	12438	7668	5	
1.690	12644	8493	6 Min	

THRUST	NH RPM	FUEL FLOW	TOTAL TIME	ENG SER #
8450	11849	5271	7 MIN	141359
10040	12183	6390	7	7-15-87
11350	12490	7410	6	
12350	12708	8230	8	
8500	11930	5400	6	
9990	12165	6375	7	
11470	12485	7485	7	
12100	12646	8020	7	
8550	11975	5440	7	
10020	12230	6503	7	
11450	12525	7545	8	
12550	12760	8435	7	
8540	11985	5430	7	
9950	12250	6420	6	
11450	12545	7515	8	
12610	12790	8465	8 MIN	

TF-41 PERFORMANCE CALCULATION RECORD	FRC CK 14393	TS CK 1212
	TSN 4379	TYPE TEST
	TSO 0432	DATA PLATE

ENGINE SERIAL NUMBER 141252	SEQUENCE NUMBER 783	DATE 2 Feb 87
TEST CELL NUMBER Two	OPERATOR [illegible]	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	10 min 3	10 min 4	60 min 5	60 min 6	60 min 7	60 min 8
DEW POINT	56	56	56	56	59	59	59	59
PAMB	29.77	29.77	29.77	29.77	29.61	29.61	29.60	29.60
P1	29.61	29.58	29.55	29.53	29.44	29.41	29.39	29.38
T1	84.	84.	85.	85.	100.	101.	102.	102.
TF (Fuel Temp)	88.	93.	96.	98.	91.	93.	96.	96.
AL AREA	45.798							
LAB SG	.8257 @ 60°				.8004 @ 60°			
P3	362	395	442	502	372	425	483	504
T3	744	775	818	873	786	838	889	911
RES. VALUE					4.360	4.360	4.360	4.360
J BOX TEMP (JBT)	.	.	.	.	144.	148.	14.2	131.
FNO Obs	8170	9150	10520	12220	8400	9970	11520	12330
FNC Thrust	8304	9320	10741	12612	8572	10201	11865	12545
FNT	8415	9430	10851	12723	8683	10311	11976	12656
FNT 77°	8436	9454	10879	12755	8704	10337	12006	12687
NLO Obs	7299	7571	7934	8410	7489	7920	8243	8547
NLC	7114	7379	7726	8190	7192	7600	8018	8494
NHO Obs	11611	11790	12079	12442	11823	12134	12487	12622
NHC rpm	11318	11492	11763	12116	11355	11643	11872	12101
WFO Obs	5088	5745	6711	8052	5347	6450	7670	8160
WFC fuel flow	5152	5814	6791	8161	5320	6421	7634	8130
WFC 77°								
P5.1 Obs	22.9	25.8	30.2	35.7	23.9	29.0	34.0	36.0
P5C	53.60	56.67	61.31	67.11	54.75	60.13	65.40	67.53
E.P.R.	1.791	1.894	2.049	2.243	1.830	2.009	2.261	2.257
DELTA P Obs	38.8	43.6	50.2	59.2	40.3	47.9	56.5	59.3
WAIC	204.2	214.1	227.1	243.4	207.9	223.3	239.4	244.3
T5 Obs	984	1032	1093	1165	916	982	1042	1069
T5C 77°	967	1015	1072	1143	864	925	981	1004
TLQSC	1739	1812	1909	2043	1749	1867	1977	2037
TLQS (A)	1767	1841	1944	2080	1844	1971	2080	2143

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14314	T5 CK 1222
	TSN 4379	TYPE TEST FR
	TSO 432	DATA PLATE 5/64, 96.17

ENGINE SERIAL NUMBER 141252	SEQUENCE NUMBER	DATE 1 Aug 85
TEST CELL NUMBER Two	OPERATOR Salacheep	INSPECTOR Bernau

NASL CDI 93 AMD

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	12 min 3	5 min 4	5	6	7	8
DFW POINT	54	54	54	54				
PAMB	29.72	29.72	29.72	29.72	.	.	.	.
P1	29.54	29.52	29.50	29.49	.	.	.	.
T1	78.	78.	78.	76.	.	.	.	.
TF (Fuel Temp)	99.	91.	94.	96.	.	.	.	.
A4 AREA	45.798							
LAB SG	.8195 @ 60 °				.	@	°	
P3	379	439	475	518				
T3	756	818	842	879				
RES. VALUE					4.252	4.252	4.252	4.252
J BOX TEMP (JBT)	.	.	.	.	.	.	.	.
FNO Obs	8590	10350	11540	12850				
FNC Thrust	8762	10585	11826	13091				
FNT	8873	10696	11937	13202				
FNT 77°	8895	10723	11966	13235				
NLO Obs	7425	7905	8170	8450				
NLC	7279	7749	8009	8299				
NHO Obs	11650	12035	12250	12495				
NHC ~~Thrust~~ rpm	11450	11798	12009	12272				
WFO Obs	5390	6643	7396	8375				
WFC fuel flow	5478	6762	7531	8553				
WFC 77°								
P5.1 Obs	24.4	30.3	33.4	37.4	.	.	.	.
P5C	55.25	61.43	64.73	68.95	.	.	.	.
E.P.R.	1.845	2.053	2.163	2.305	.	.	.	.
DELTA P Obs	41.4	50.1	55.4	61.2	.	.	.	.
WAIC	209.8	227.0	236.9	246.9	.	.	.	.
T5 Obs	1006	1088	1128	1176				
T5C 77°	1004	1086	1125	1179				
THQSC	1780	1919	1990	2091				
THQS (A)	1784	1924	1995	2086				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 2 hours 30 min 6 · Additional military pwr - 20 min.

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	T5 CK
	TSH 3635	TYPE TEST
	TSO 2730	DATA PLATE

ENGINE SERIAL NUMBER 141298	SEQUENCE NUMBER 789	DATE 12 Aug 85
TEST CELL NUMBER 2	OPERATOR CPI Norton	INSPECTOR ADI Hubmeier

DATA TO BE STORED/RECORDED

DATA	1	2	3	4	5	6	7	8
DEW POINT	8 min 60	9 min 60	14 min 60	7 min 60	7 min 61	7 min 61	8 min 61	8 min 61
PAMB	29.67	29.67	29.66	29.66	29.64	29.64	29.64	29.64
P1	29.50	29.46	29.46	29.45	29.44	29.43	29.42	29.39
T1	83.0	82.7	83.3	83.9	84.0	84.7	84.9	85.2
TF (Fuel Temp)	90.	93.	93.	95.	93.	95.	95.	95.
A4 AREA	45.855							
LAB SG	.8219 @ 60°				.8219 @ 60°			
P3	377	425	463	507	383	424	473	533
T3	766	806	840	884	772	811	854	909
RES. VALUE	X	X	X	X	4.629	4.629	4.629	4.629
J BOX TEMP (JBT)	X	X	X	X	107	110	111.	115.
FNO Obs	8580	10150	11160	12450	8750	10050	11500	13200
FNC Thrust	8760	10396	11442	12780	8953	10301	11809	13594
FNT	8871	10506	11553	12897	9064	10411	11920	13704
FNT 77°	8893	10533	11582	12929	9087	10437	11950	13739
NLO Obs	7493	7860	8159	8515	7525	7875	8275	8700
NLC	7307	7667	7955	8297	7331	7667	8055	8416
NHO Obs	11740	12020	12248	12542	11779	12043	12340	12686
NHC rpm	11449	11726	11941	12221	11476	11725	12012	12346
WFO Obs	5464	6428	7194	8280	5540	6415	7450	8775
WFC fuel flow	5531	6519	7299	8402	5599	6483	7541	8905
WFC 77°								
P5.1 Obs	24.5	28.8	32.0	36.2	24.9	28.8	33.1	38.3
P5C	55.37	59.95	63.29	67.72	55.87	59.97	64.51	70.05
E.P.R.	1.850	2.003	2.115	2.263	1.867	2.004	2.156	2.346
DELTA P Obs	41.6	47.7	53.6	60.2	42.4	48.2	55.0	63.0
WAIC	210.6	222.6	233.8	245.6	212.4	223.8	231.5	250.4
T5 Obs	1009	1068	1110	1168	876	925	970	1025
T5C 77°	994	1054	1094	1149	863	909	953	1006
T4QSC	1796	1894	1965	2080	1793	[illegible]	1990	2112
T4QS (A)	1821	1919	1994	2112	1823	1923	2026	2152

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 1 hr 10 min Additional military Run Time 35 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	TS CK
	TSN 3635	TYPE TEST F/R
	TSO 2730	DATA PLATE /

ENGINE SERIAL NUMBER 141248	SEQUENCE NUMBER 789	DATE 12 AUG 85
TEST CELL NUMBER 2	OPERATOR AD1 LAND	INSPECTOR AD2 [illegible]

DATA TO BE STORED/RECORDED

DATA	Point 1	Point 2	Point 3	Point 4	5	6	7	8
DEW POINT	60	60	60	60				
PAMB	29.66	29.66	29.66	29.66	.	.	.	.
P1	29.48	29.46	29.44	29.42	.	.	.	.
T1	77.	77.	76.	76.	.	.	.	.
TF (Fuel Temp)	95.	96.	97.	98.	.	.	.	.
AL AREA	.45,855							
IAB SG	0.8247 @ 60 °				.	@	°	
P3	374	447	473	565				
T3	748	813	836	917				
RES. VALUE	6.009	6.009	6.009	6.009				
J BOX TEMP (JBT)	102.	102.	104.	106.	.	.	.	.
FNO Obs	8500	10675	11525	13980				
FNC Thrust	8691	10948	11841	14412				
FNT	8801	11059	11951	14522				
FNT 77°	8420	11087	11981	14559				
NLO Obs	7405	8000	8190	8870				
NLC	7262	7845	8039	8707				
NHO Obs	11630	12082	12245	12755				
NHC rpm	11405	11849	12020	12520				
WFO Obs	5319	6855	7430	9425				
WFC Fuel flow	5426	7010	7616	9688				
WFC 77°								
P5.1 Obs	24.1	30.8	33.3	41.3	.	.	.	.
P5C	55.06	62.05	64.72	73.19	.	.	.	.
E.P.R.	1.838	2.073	2.163	2.446	.	.	.	.
DELTA P Obs	41.0	51.6	55.6	67.6	.	.	.	.
WAIC	209.3	230.2	237.5	257.8	.	.	.	.
T5 Obs	872	952	977	1065				
T5C 77°	874	954	981	1069				
THQSC	1775	1944	2006	2193				
THQS (A)	1775	1944	2001	2178				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 1 hour 5 min Additional military time 15 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	TS CK
	TSN 3635	TYPE TEST
	TSO 2730	DATA PLATE

ENGINE SERIAL NUMBER 141298	SEQUENCE NUMBER 789	DATE 12 Aug 85
TEST CELL NUMBER 2	OPERATOR CPI Norton	INSPECTOR ADI Hubmeier

DATA TO BE STORED/RECORDED

DATA	1	2	3	4	5	6	7	8
DEW POINT	8 min 60	9 min 60	14 min 60	7 min 60	7 min 61	7 min 61	8 min 61	8 min 61
PAMB	29.67	29.67	29.66	29.66	29.64	29.64	29.64	29.64
P1	29.50	29.46	29.46	29.45	29.44	29.43	29.42	29.39
T1	83.0	82.7	83.3	83.7	84.0	84.7	84.9	85.2
TF (Fuel Temp)	90.	93.	93.	95.	93.	95.	95.	95.
A4 AREA	45.855							
LAB SG	.8219 @ 60°				.8219 @ 60°			
P3	377	425	463	507	383	424	473	533
T3	766	806	840	884	772	811	854	909
RES. VALUE	X	X	X	X	4.629	4.629	4.629	4.629
J BOX TEMP (JBT)	X	X	X	X	107	110	111.	115.
FNO Obs	8580	10150	11160	12450	8750	10050	11500	13200
FNC Thrust	8760	10396	11442	12780	8953	10301	11809	13594
FNT	8871	10506	11553	12897	9064	10411	11920	13704
FNT 77°	8893	10533	11582	12929	9087	10437	11950	13739
NLO Obs	7493	7860	8159	8515	7525	7875	8275	8700
NLC	7307	7667	7955	8297	7331	7667	8055	8416
NHO Obs	11740	12020	12248	12542	11779	12043	12340	12686
NHC [illegible]	11449	11726	11941	12221	11476	11725	12012	12346
WFO Obs	5464	6428	7194	8280	5540	6415	7450	8775
WFC fuel flow	5531	6519	7299	8402	5599	6483	7541	8905
WFC 77°								
P5.1 Obs	24.5	28.8	32.0	36.2	24.9	28.8	33.1	38.3
P5C	55.37	59.95	63.29	67.72	55.87	59.97	64.51	70.05
E.P.R.	1.850	2.003	2.115	2.263	1.867	2.004	2.156	2.3[illegible]
DELTA P Obs	41.6	47.7	53.6	60.2	42.4	48.2	55.0	63.0
WAIC	210.6	222.6	233.8	245.6	212.4	223.8	231.5	250.4
T5 Obs	1009	1068	1110	1168	876	925	970	1025
T5C 77°	994	1054	1094	1149	863	909	953	1006
T4QSC	1796	1894	1965	2080	1793	[illegible]	1990	2112
T4QS (A)	1821	1919	1994	2112	1823	[illegible]	2026	2152

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

MAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 1 hr 10 min Additional military Run Time 35 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	TS CK 1205
	TSI	TYPE TEST
	TSO	DATA PLATE

ENGINE SERIAL NUMBER 141234	SEQUENCE NUMBER 800	DATE 5OCT85
TEST CELL NUMBER 2	OPERATOR BERNARD	INSPECTOR BERNARD

DATA TO BE STORED/RECORDED

DATA	8 minutes 1	8 minutes 2	8 minutes 3	9 minutes 4	8 minutes 5	8 minutes 6	7 minutes 7	9 minutes 8
DEW POINT	51	51	51	51	51	51	51	51
PAMB	29.66	29.66	29.66	29.66	29.64	29.64	29.64	29.64
P1	29.45	29.46	29.42	29.40	29.46	29.44	29.42	29.40
T1	71.	71.	71.	71.	72.	73.	73.	73.
TF (Fuel Temp)	78.	80.	85.	88.	89.	88.	90.	91.
AN AREA	45,932							
LAB SG	.8177 @ 0				.8195 @ 60 °			
P3	377	426	482	565	395	455	502	565
T3	743	787	833	914	762	813	859	922
RES. VALUE	4.9424	4.9424	4.9424	4.9424	4.6928	4.6928	4.6928	4.6928
J BOX TEMP (JBT)	88	90.	92.	96.	90.	90.	96.	100
FNO Obs	8570	10090	11580	13810	9060	10500	12100	13800
FNC Thrust	8767	10346	11910		9278	10776	12449	14234
FNT	8878	10451	12021		9334	10887	12559	14345
FNT 77°	8900	10483	12051		9413	10914	12591	14331
NLO Obs	7373	7785	8169	8603	7534	7969	8380	8837
NLC	7277	7684	8063		7429	7850	8255	8702
NHO Obs	11630	11920	12225	12729	11753	12051	12387	12758
NHC rpm	11479	11765	12069		11539	11901	12203	12568
WFO Obs	5175	6173	7270	9110	5575	6676	7802	9207
WFC fuel flow	5338	6375	7511		5727	6870	8039	9506
WFC 77°								
P5.1 Obs	24.0	28.7	33.5	40.7	25.9	30.9	35.5	40.6
P5C	54.41	59.86	64.95	.	56.70	62.16	67.05	72.48
E.P.R.	1.835	2.001	2.177	.	1.802	2.077	2.241	2.422
DELTA P Obs	41.6	49.6	56.6	67.0	44.6	52.0	59.9	65.0
WAIC	210.4	225.1	239.5	.	216.1	231.0	245.1	258.4
T5 Obs	852	910	967	1056	875	939	990	1054
T5C 77°	869	929	954		890	951	1003	1068
TLQSC	1753	1855	1966		1797	1901	2026	2164
TLQS (A)	1728	1839	1939		1776	1882	2008	2144

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

Idle Time 1 hour 20 minutes

Time at 90% 20 Additional minutes

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	TS CK 1208
	TSN 4024	TYPE TEST FR
	TSO 1997	DATA PLATE

SERIAL NUMBER 141234	SEQUENCE NUMBER	DATE 5 Oct 85
TEST CELL NUMBER Two	OPERATOR Carpenter	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	8 min. 1	8 min. 2	12 minutes 3	8 min. 4	8 min. 5	8 min. 6	8 min. 7	8 min. 8
DEW POINT	53	53	53	53	55	55	55	55
PAMB	29.79	29.79	29.79	29.79	29.70	29.70	29.70	29.70
P1	29.60	29.57	29.55	29.52	29.54	29.52	29.49	29.47
T1	85.	85.	85.	86.	90.	90.	91.	91.
TF (Fuel Temp)	84.	86.	89.	90.	88.	89.	92.	92.
Ah AREA	45.937							
LAB SG	.8239 @ °				.8232 @ °			
P3	383	427	475	530	387	435	475	545
T3	775	813	857	912	792	834	871	938
RES. VALUE					4.445	4.445	4.445	4.445
J BOX TEMP (JBT)	.	.	.	.	110.	112.	115.	116.
FNO Obs	8700	10050	11350	12900	8800	10250	11380	13220
FNC Thrust	8894	10248	11598	13216	8964	10465	11644	13563
FNT	8960	10358	11708	13326	9075	10576	11754	13647
FNT 77°	8982	10384	11738	13360	9095	[illegible]	11764	13708
NLO Obs	7490	7855	8210	8655	7540	7956	8255	8790
NLC	7296	7651	7997	8423	7310	7713	7996	8514
NHO Obs	11225	12070	12340	12690	11902	12158	12407	12826
NHC rpm	11518	11757	12020	12350	11539	11787	12017	12425
WFO Obs	5355	6265	7225	8460	5475	6377	7249	8810
WFC fuel flow	5426	6358	7336	8599	5495	6411	7285	8877
WFC 77°	—	—	—	—	—	—	—	—
P5.1 Obs	24.4	28.6	32.7	37.7	24.8	28.9	32.7	38.7
P5C	55.19	59.62	63.94	69.20	55.26	59.94	63.96	70.30
E.P.R.	1.844	1.992	2.137	2.314	1.859	2.005	2.135	2.349
DELTA P Obs	42.3	48.8	55.4	63.3	43.2	49.8	55.4	65.0
WAIC	211.5	224.4	236.7	250.4	213.6	225.5	236.9	253.4
T5 Obs	1006	1055	1120	1188	894	947	991	1063
T5C 77°	981	1045	1099	1163	868	919	960	1030
T4QSC	1862	1866	1953	2075	1769	1857	1943	1044
T4QS (A)	1795	1900	1989	[illegible]	1863	[illegible]	2006	[illegible]

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

WAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Additional Time at 90% - 20 minutes

TF-41 PERFORMANCE CALCULATION RECORD	FXC CK 14149	T5 CK 1200
	TSN 2391	TYPE TEST F/R
	TSO	DATA PLATE 8523

ENGINE SERIAL NUMBER 141234	SEQUENCE NUMBER	DATE.
TEST CELL NUMBER	OPERATOR	INSPECTOR

DATA TO BE STORED/RECORDED

DATA	5 MIN 1	5 MIN 2	11 MIN 3	7 MIN 4	5 MIN 5	5 MIN 6	10 MIN 7	6 MIN 8
DEW POINT	55	55	55	55	56	56	56	56
PAMB	29.56	29.56	29.56	29.56	29.57	29.57	29.57	29.57
P1	29.40	29.37	29.34	29.32	29.42	29.39	29.36	29.35
T1	69.	69.	69.	69.	69.	69.	69.	69.
TF (Fuel Temp)	89.	90.	92.	94.	90.	90.	92.	95.
AL AREA	45,788							
LAB SG	.8247 @ 60°				.8239 @ 60°			
P3	382	430	480	535	375	428	486	525
T3	745	787	834	884	735	784	839	877
RES. VALUE								
J BOX TEMP (JBT)								
FNO Obs	8560	10000	11410	12950	8390	9950	11580	12930
FNC thrust	8784	10289	11770	13390	8603	10230	11940	13356
FNT	8890	10399	11851	13301	8713	10341	12050	13467
FNT 77°	8917	10426	11910	13635	8735	10367	12081	13501
NLO Obs	7400	7760	8145	8564	7325	7735	8169	8500
NLC	7315	6499	8051	8466	7246	7646	8075	8402
NHO Obs	11745	11980	12279	12537	11673	11938	12254	12515
NHC rpm	11610	11843	12155	12492	11538	11800	12113	12371
WFO Obs	5355	6255	7365	8560	5220	6250	7486	8433
WFC fuel flow	5532	6499	7665	8920	5400	6483	7779	8765
WFC 77°								
P5.1 Obs	24.5	28.6	32.5	38.2	24.7	28.7	33.9	37.9
P5C	55.48	59.85	65.06	70.07	55.65	59.92	65.45	69.70
E.P.R.	1.854	2.000	2.174	2.342	1.860	2.002	2.187	2.329
DELTA P Obs	41.2	47.8	55.2	62.4	40.0	47.4	55.6	61.4
WAIC	209.8	223.0	237.0	249.5	207.3	222.2	237.7	243.7
T5 Obs	960	1022	1088	1148	958	1024	1098	1148
T5C 77°	980	1043	1110	1170	978	1045	1120	1171
T4QSC	1786	1883	2006	2120	1769	1854	2016	2116
T4QS (A)	1752	1848	1969	2078	1735	1849	1979	2078

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

IDLE Time 1 hour Additional Military time 15 min

4. 4373

5. 4373

TF-41 PERFORMANCE CALCULATION RECORD

FMC CK 14343		T5 CK 1185	
TSM		TYPE TEST	
TSO		DATA PLATE	

ENGINE SERIAL NUMBER 141494	SEQUENCE NUMBER 797	DATE 10 SEPT 85
TEST CELL NUMBER 2	OPERATOR	INSPECTOR

DATA TO BE STORED/RECORDED

DATA	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
DEW POINT	48	48	48	48	45	45	45	45
PAMB	29.71	29.71	29.71	29.71	29.68	29.68	29.68	29.68
P1	29.54	29.50	29.48	29.46	29.50	29.48	29.46	29.42
T1	58.6	59.1	59.6	61.4	65.1	65.5	65.4	65.5
TF (Fuel Temp)	93.	89.	91.	92.	87.	90.	92.	94.
AL AREA	45.823							
LAB SG	.8126 @ 60°				.8185 @ 60°			
P3	382	428	475	555	379	430	475	553
T3	722	764	804	883	734	778	817	890
RES. VALUE	[illegible]	[illegible]	[illegible]	[illegible]	5.1875	5.1873	5.1873	5.1872
J BOX TEMP (JBT)	[illegible]	[illegible]	[illegible]	[illegible]	88.	90.	94.	95.
FNO Obs	8760	10010	11530	13700	8700	10200	11530	13620
FNC Thrust	8958	10269	11850	14120	8901	10459	11848	14047
FNT	9064	10375	11960	14231	9011	10570	11954	14158
FNT 77°	9092	10[illegible]	11990	14266	9034	10596	11989	14193
NLO Obs	7344	7716	8066	8683	7370	7774	8095	8687
NLC	7336	7704	8099	8655	7317	7716	8035	8622
NHO Obs	11630	11863	12114	12[illegible]	11686	11922	12173	12617
NHC RPM	11[illegible]7	11894	12088	12541	11603	11833	12083	12522
WFO Obs	5259	6214	7123	8943	5292	6272	7148	8879
WFC Fuel	5455	6438	7385	9281	5442	6492	7408	9225
WFC 77°	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
P5.1 Obs	29.8	29.2	33.4	39.9	29.8	29.2	33.1	39.7
P5C	55.7	60.3	64.5	71.7	55.7	60.3	64.5	71.5
E.P.R.	1.86	2.01	2.16	2.34	1.86	2.01	2.15	2.39
DELTA P Obs	42.4	49.2	55.5	66.5	42.2	49.4	55.8	66.0
WAIC	211.8	225.4	237.5	255.6	211.5	225.7	237.5	254.9
T5 Obs	923	987	1043	1134	843	899	948	1020
T5C 77°	969	1033	1089	1178	872	928	978	1051
TLQSC	1771	1877	1964	2148	1774	1883	1967	2139
TLQS (A)	1679	1801	1885	2072	1725	1833	1915	2083

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 40 min · Additional military power time ~ 20 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CX 14395	T5 CX 1185
	TSN 3826.5	TYPE TEST F/N
	TSO 6512.6	DATA PLATE [illegible]

ENGINE SERIAL NUMBER 141494	SEQUENCE NUMBER 797	DATE
TEST CELL NUMBER 2	OPERATOR	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	6 min 1	7 min 2	7 min 3	7 min 4	5 min 5	5 min 6	[illegible]	5 min 8
DEW POINT	45	45	45	45	42	42	42	42
PAMB	29.66	29.66	29.66	29.66	29.60	29.60	29.60	29.60
P1	29.47	29.44	29.42	29.38	29.40	29.37	29.32	29.30
T1	69.3	67.2	69.7	69.2	75.	75.	75.	75.
TF (Fuel Temp)	93.	92.	95.	96.	86.	90.	95.	97.
AL AREA	45,823							
LAB SG	.8185 @ 60°				.8181 @ 60°			
P3	383	447	479	545	380	423	470	535
T3	744	789	829	891	751	785	832	886
RES. VALUE	6.4714	6.4714	6.4714	6.4714	5.63	5.63	563	5.63
J BOX TEMP (JBT)	90.	93.	97.	98.	95.	96.	99.	101.
FNC Obs	8750	10470	11650	13400	8750	10020	11510	13130
FNC Thrust	8957	10751	11983	[illegible]	8971	10294	11869	13573
FNT	9067	10862	12094		9081	10408	11980	13684
FNT 77°	9090	10889	12128		9104	10435	12010	13718
NLO Obs	7419	7835	8163	8668	7430	7755	8154	8603
NLC	7337	7764	8069		7309	7629	8022	8463
NHO Obs	11743	11992	12241	12618	11779	11960	12241	12590
NHC RPM	11613	11883	12101		11584	11766	12042	12386
WFO Obs	5373	6467	7342	8774	5340	6150	7290	8560
WFC fuel	5521	6685	7570		5484	6318	7494	8812
WFC 77°	X	X	X	X	X	X	X	X
P5.1 Obs	24.8	30.0	33.5	39.1	24.6	28.4	33.2	38.3
P5C	55.7	61.2	64.9	.	55.61	59.65	64.81	70.24
E.P.R.	1.86	2.04	2.17	.	1.858	1.993	2.166	2.347
DELTA P Obs	42.4	50.2	56.4	65.3	42.2	48.	55.6	63.8
WAIC	211.9	227.2	238.7	.	211.7	223.2	237.6	251.7
T5 Obs	872	932	978	1043	870	913	969	1028
T5C 77°	892	957	998		877	920	976	1035
THQSC	1779	2250	1986		1772	1850	1984	2087
THQS (A)	1747	2201	1953		1764	1841	1975	2077

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

WAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 2 hour 15 min

Additional [illegible] 25 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	TS CK [illegible]
	TSN 2826.5	TYPE TEST 1/K
	TSO 650.1	DATA PLATE [illegible]

ENGINE SERIAL NUMBER 141494	SEQUENCE NUMBER 797	DATE 10 [illegible] 85
TEST CELL NUMBER 7	OPERATOR [illegible]	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	Engine 1	Engine 2	Engine 3	Engine 4	5	6	7	8
DEW POINT	45	45	45	45				
PAMB	29.58	29.58	29.58	29.58	.	.	.	.
P1	29.40	29.38	29.34	29.32	.	.	.	.
T1	72.	72.	72.	72.	.	.	.	.
TF (Fuel Temp)	93.	92.	95.	97.	.	.	.	.
AL AREA	45.823							
LAB SG	.8211 @ 60°				.	@ 60°		
P3	373	430	475	540				
T3	738	784	828	889				
RES. VALUE	5.968	5.968	5.968	5.968				
J BOX TEMP (JBT)	94.	96.	97.	100.	.	.	.	.
FNO Obs	9530	10030	11530	13290				
FNC Normal	8747	10309	11887	13738				
FNT	8854	10420	11998	13848				
FNT 77°	8880	10446	12024	13883				
NLO Obs	7335	7775	8145	8643				
NLC	7235	7669	8034	8525				
NHO Obs	11695	11948	12233	12600				
NHC Normal	11536	11786	12067	12429				
WFO Obs	5166	6209	7250	8660				
WFC Normal	5317	6408	7494	8965				
WFC 77°								
P5.1 Obs	23.7	28.8	33.2	39.0	.	.	.	.
P5C	51.66	60.03	64.76	70.82	.	.	.	.
E.P.R.	1.827	2.006	2.164	2.370	.	.	.	.
DELTA P Obs	41.	48.4	55.8	64.6	.	.	.	.
WAIC	209.2	224.0	237.9	253.0	.	.	.	.
T5 Obs	858	916	971	1034				
T5C 77°	871	930	985	1048				
THQSC	1751	1854	1973	2110				
THQS (A)	1730	1832	1951	2086				

START TIME: | STOP TIME: | TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14391	T5 CK 1195
	TSN 3639	TYPE TEST F/R
	TSO 2531	DATA PLATE

ENGINE SERIAL NUMBER 141477	SEQUENCE NUMBER 796	DATE [illegible]
TEST CELL NUMBER [illegible]	OPERATOR [illegible]	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	6 min 1	6 min 2	12 min 3	7 min 4	10 min 5	10 min 6	10 min 7	10 min 8
DEW POINT	50.9	50.9	50.9	50.9	56	56	56	56
PAMB	29.80	29.80	29.80	29.80	29.54	29.54	29.84	29.84
P1	29.62	29.58	29.56	29.54	29.54	29.62	29.[illegible]	29.[illegible]
T1	68.3	67.5	68.0	68.0	82.	82.	82.	82.
TF (Fuel Temp)	86.0	88.0	90.0	90.	90.	92.	93.	94.
A4 AREA	45.617							
LAB SG	0.8225 @ 60°				.8211 @ 60°			
P3	378	425	478	530	385	425	485	545
T3	735	774	820	868	770	807	860	911
RES. VALUE					4.794	1.794	4.794	1.794
J BOX TEMP (JBT)					104.	109.	115.	14.
FNO Obs	8540	10010	11490	13050	8550	9984	11680	13210
FNC Thrust	8697	10226	11764	13393	8668	10167	11933	
FNT	8809	10337	11875	13504	8795	10278	12044	
FNT 77°	8830	10362	11905	13538	[illegible]	[illegible]	[illegible]	
NLO Obs	7325	7695	8085	8495	7453	7788	8245	8664
NLC	7248	7620	8002	8408	7[illegible]	[illegible]	8051	
NHO Obs	11646	11859	12146	12460	11632	12008	12368	12[illegible]
NHC Spoon	11524	11744	12022	12333	11359	11726	12067	
WFO Obs	5225	6150	7230	8425	5410	6249	7538	8741
WFC Fuel	5383	6354	7474	8731	5457	6311	7630	
WFC 77°								
P5.1 Obs	24.5	28.7	33.6	38.2	24.9	28.7	34.0	34.0
P5C	55.31	59.77	64.92	69.80	55.6	59.68	65.29	.
E.P.R.	1.848	1.997	2.169	2.332	1.861	1.994	2.151	.
DELTA P Obs	41.0	47.6	55.	62.6	41.9	47.6	56.0	63.8
WAIC	208.7	221.9	235.8	249.0	21[illegible]	221.9	237.[illegible]	.
T5 Obs	955	1013	1075	1135	886	936	998	1052
T5C 77°	976	1037	1099	1160	877	926	[illegible]	
T4QSC	1769	1872	1979	2103	[illegible]	[illegible]	[illegible]	
T4QS (A)	1733	1830	1938	2060	[illegible]	[illegible]	2023	

START TIME: 0630 | STOP TIME: | TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Idle Time 40 min Additional Military Time 15 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14893	T5 CK 1192
	TSN	TYPE TEST 1 IP
	TSO	DATA PLATE 8755

ENGINE SERIAL NUMBER 141357	SEQUENCE NUMBER 501	DATE 16 SEPT 85
TEST CELL NUMBER 2	OPERATOR	INSPECTOR

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	10 min 3	6 min 4	5 min 5	5 min 6	4 min 7	6 min 8
DEW POINT	47	47	47.	47	46	46	46	46
PAMB	29.70	29.70	29.70	29.70	29.66	29.66	29.66	29.66
P1	29.52	29.48	29.46	29.46	29.47	29.45	29.44	.38.
T1	71.	72.	72.	72.	75.	75.	77.	76.
TF (Fuel Temp)	73.	80.	85.	89.	86.	88.	90.	91.
A4 AREA	45850							
LAB SG	.8182 @ 70°				.8251 @ 79°			
P3	386	430	490	538	386	436	480	558
T3	750	786	835	886	755	802	842	913
RES. VALUE	[illegible]	[illegible]	[illegible]	[illegible]	48745	48745	48745	48745
J BOX TEMP (JBT)	[illegible]	[illegible]	[illegible]	[illegible]	95.	99.	102.	111.
FNO Obs	8750	10030	11630	13180	8660	10270	11650	13710
FNC Thrust	8940	10275	11943	13557	8857	10530	11963	14142
FNT	9050	10385	12053	13668	8968	10640	12074	14252
FNT 77°	9073	10411	12083	13702	8990	10667	12104	14288
NLO Obs	7423	7750	8144	8555	7415	7838	8183	8756
NLC	7321	7644	8032	8438	7293	7709	8034	8604
NHO Obs	11757	11961	12247	12563	11775	12041	12285	12712
NHC rpm	11607	11767	12079	12391	11582	11843	12061	12492
WFO Obs	5395	6253	7379	8542	5385	6436	7425	9056
WFC fuel	5579	6453	7613	8809	5551	6644	7653	9381
WFC 77°								
P5.1 Obs	20.8	28.7	33.5	38.0	24.5	29.2	33.3	39.8
P5C	55.70	59.8	64.9	69.6	55.9	60.3	64.7	71.7
E.P.R.	1.86	2.00	2.17	2.32	1.85	2.01	2.16	2.39
DELTA P Obs	42.9	48.2	56.0	63.4	41.7	49.2	55.8	65.9
WAIC	211.8	223.3	237.8	250.5	210.5	225.3	237.5	250.8
T5 Obs	971	1024	1089	1152	872	935	984	1056
T5C 77°	986	1037	1102	1166	879	942	986	1060
T4QSC	1787	1871	1993	2093	1775	1897	1995	2146
T4QS (A)	1761	1849	1970	2069	1767	1888	1995	2141

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

MAS LENCORE (40) 13700/14 (REV. 12-77) (FRONT)

IDle Time 1 hour Additional military Time 20 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14197	T5 CK 1195
	TGH 3708	TYPE TEST
	T30 1644	DATA PLATE

ENGINE SERIAL NUMBER 141551	SEQUENCE NUMBER 793	DATE 20 AUG 85
TEST CELL NUMBER 2	OPERATOR AD2 NASIPAK	INSPECTOR AD2 [illegible]

DATA TO BE STORED/RECORDED

DATA	1	2	3	4	5	6	7	8
DEW POINT	58	58	55	58	56	56	56	56
PAMB	29.68	29.64	29.64	29.68	29.70	29.70	29.70	29.70
P1	29.51	29.49	29.47	29.46	29.53	29.51	29.49	29.46
T1	76.	75.	75.	73.	72.	72.	71.	70.
TF (Fuel Temp)	86.	90.	91.	92.	92.	93.	94.	95.
A4 AREA	45.513							
LAB SG	.8222 @ 60 °				.8231 @ 60 °			
P3	378	428	478	548	380	430	484	574
T3	733	794	838	905	741	878	851	919
RES. VALUE	—	—	—	—	4.7899	4.7899	4.7899	4.7894
J BOX TEMP (JBT)	—	—	—	—	100.	101.	104.	105.
FNC Obs	8560	10010	11500	13430	8510	10090	11530	14160
FNC	8744	10250	11803	13822	8691	10329	11831	14587
FNT	8855	10361	11914	13932	8801	10440	11942	14698
FNT 77°	8877	10387	11944	13967	8823	10466	11972	14735
NLC Obs	7278	7766	8135	8670	7326	7737	8107	8794
NLC	7242	7632	7994	8536	7231	7626	7998	8676
NHO Obs	11778	12009	12290	12693	11713	11968	12252	12774
NHC	11564	11801	12078	12497	11545	11796	12088	12603
WFO Obs	5263	6238	7287	8867	5226	6218	7219	9333
WFC	5385	6391	7479	9139	5358	6387	7540	9647
WFC 77°	—	—	—	—	—	—	—	—
P5.1 Obs	24.0	28.5	33.2	39.6	24.1	28.8	33.4	41.4
P5C	54.87	59.60	64.57	71.32	54.96	59.90	64.77	73.26
E.P.R.	1.833	1.992	2.158	2.384	1.837	2.002	2.164	2.448
DELTA P Obs	41.2	48.2	55.4	65.0	41.2	48.2	55.8	67.6
WAIC	209.6	223.6	237.0	253.4	209.5	223.4	237.6	257.4
T5 Obs	974	1034	1093	1176	856	914	967	1063
T5C 77°	977	1039	1099	1188	869	928	983	1083
T4QSC	1749	1875	1983	2150	1756	1968	1979	2181
T4QS (A)	1744	1866	1973	2130	1735	1946	1952	2151

START TIME: 2130	STOP TIME:	TOTAL RUN TIME: hrs. min.

I Die Time 1 hour 10 min

Additional Military Time [illegible]

TF-41 PERFORMANCE CALCULATION RECORD	FAC CK	TS CK
	TSN	TYPE TEST
	TSO	DATA PLATE

ENGINE SERIAL NUMBER 141511	SEQUENCE NUMBER 785	DATE 5 AUG 85
TEST CELL NUMBER TW11	OPERATOR GALLEGOS	INSPECTOR ROSS T

DATA TO BE STORED/RECORDED

DATA	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
DEW POINT	58	58	58	58	59	59	59	59
PAMB	29.73	29.73	29.73	29.73	29.71	29.71	29.71	29.71
P1	29.55	29.52	29.51	29.49	29.55	29.53	29.50	29.49
T1	88.	89.	89.	90.	91.	92.	92.	93.
TF (Fuel Temp)	91.	92.	96.	97.	96.	96.	98.	98.
AL AREA	45.898				45.898			
IAB SC	.9219 @ 60°				.9226 @ 60°			
P3	380	423	462	500	360	395	435	476
T3	774	813	846	882	761	795	831	865
RES. VALUE					6.250	6.250	6.250	6.250
J BOX TEMP (JBT)	.	.	.	.	107	112	114	116
FNO Obs	8700	10000	11200	12400	8400	9150	10250	11550
FNC	8862	10276	11454	12705	8140	9327	10575	11814
FNT	9473	10326	11565	12815	8250	9437	10685	11929
FNT 77°	9495	10342	11594	12848	8271	9461	10712	11959
NLO Obs	7490	7605	9140	8450	7345	7650	7980	8270
NLC	7272	7605	7996	8190	7112	7400	7719	7993
NHO Obs	11990	12210	12325	12580	11980	12096	12290	12460
NHC	11632	11845	12005	12193	11512	11695	11889	12042
WFO Obs	5940	6300	7100	8000	5080	5770	6640	7490
WFC	5967	6336	7137	8045	5077	5772	6650	7506
WFC 77°								
P5.1 Obs	24.5	28.7	32.2	36.0	23.0	26.2	30.2	33.8
P5C	55.33	59.75	63.44	67.46	53.73	57.100	61.32	65.11
E.P.R.	1.849	1.997	2.120	2.254	1.795	1.909	2.049	2.176
DELTA P Obs	41.7	48.0	53.5	59.4	38.8	44.4	50.	56.
WAIC	210.5	223.1	233.4	243.9	204.6	216.1	227.0	238.1
T5 Obs	996	1047	1093	1145	893	930	977	1023
T5C 77°	969	1017	1062	1110	864	898	943	996
THQSC	1770	1858	1932	2022	1729	1802	1896	1970
THQS (A)	1816	1910	1982	2082	1786	1865	1962	2042

START TIME: | STOP TIME: | TOTAL RUN TIME: hrs. min.

Idle Time 1 hour 40 min

Approximate Warming Time 30 min

WAS LEMSCRE (NO) 12700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14773	TS CK 1192
	TGT 1265	TYPE TEST Full Cu
	TSO	DATA PLATE

ENGINE SERIAL NUMBER 141612	SEQUENCE NUMBER	DATE 6 Aug 85
TEST CELL NUMBER #2	OPERATOR Salachief	INSPECTOR Bernard

DATA TO BE STORED/RECORDED

DATA	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
DPM POINT	52	52	52	52	51	51	51	51
PAMB	29.68	29.68	29.68	29.68	29.68	29.68	29.68	29.68
P1	29.52	29.49	29.46	29.44	29.52	29.50	29.48	29.46
T1	65.	65.	64.	64.	62.	62.	63.	63.
TF (Fuel Temp)	89.	92.	95.	97.	95.	96.	97.	100.
AL AREA	45.669							
IAS SG	.8211 @ 60 °				.8229 @ °			
P3	379	435	482	543	365	440	484	550
T3	728	776	817	872	724	774	815	873
RES. VALUE					5.3343	5.3343	5.3343	5.3343
J BOX TEMP (JBT)	.	.	.	.	87.	88.	91.	95.
FNC Obs	8600	10680	11670	13270	8600	10340	11750	13400
FNC	8793	10406	11998	13677	8796	10603	12075	13605
FNT	8904	10517	12109	13787	8907	10714	12185	13715
FNT TT°	8926	10543	12139	13822	8929	10741	12216	13750
NLO Obs	7320	7760	8115	8545	7315	7775	8120	8556
NLC	7265	7702	8062	8469	7283	7740	8075	8485
NHO Obs	11605	11900	12175	12535	11590	11890	12170	12550
NHC	11518	11811	12096	12453	11557	[illegible]	12169	12451
WTO Obs	5725	6315	7295	8595	5245	6340	7350	8705
WFC	5405	6541	7573	8935	5439	[illegible]	7640	8958
WFC TT°								
P5.1 Obs	29.0	29.0	33.2	35.6	29.2	29.5	33.7	36.7
P5C	54.88	60.15	64.64	[illegible]	55.09	60.67	65.12	70.64
E.P.R.	1.834	2.010	2.100	[illegible]	1.841	2.027	2.176	2.361
DELTA P Obs	41.4	49.2	56.4	64.6	42.0	[illegible]	[illegible]	[illegible]
WAIC	209.8	225.4	238.7	252.7	211.1	[illegible]	[illegible]	[illegible]
T5 Obs	945	1009	1058	1128	941	[illegible]	[illegible]	1012
T5C TT°	974	1040	1093	1152	877	[illegible]	968	1009
THOSC	1765	1882	1986	[illegible]	1751	1892	1979	[illegible]
THOS (A)	1715	1865	1926	[illegible]	1695	1866	1946	[illegible]

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

Idle Time 55 min Additional Idle Time 50 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	T5 CK 1153
	TSN 2239	TYPE TEST
	TSO 2534	DATA PLATE [illegible]

ENGINE SERIAL NUMBER 141630	SEQUENCE NUMBER 795	DATE 24 Aug 59
TEST CELL NUMBER II	OPERATOR [illegible]	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	4 min 3	5 min 4	5 min 5	5 min 6	5 min 7	5 min 8
DEW POINT	53	53	53	53	57	57	57	57
PAMP	29.68	29.68	29.68	29.68	29.69	29.69	29.69	29.61
P1	29.50	29.48	29.46	29.44	29.50	29.48	29.46	29.42
T1	71.	72.	73.	75.	78.	78.	79.	79.
TF (Fuel Temp)	81.	84.	85.	86.	87.	88.	88.	88.
AL AREA	45.664							
LAB SG	.8200 @ 60°				.8262 @ 60°			
P3	380	434	484	563	380	432	498	545
T3	744	792	835	911	756	802	865	945
RES. VALUE					5.2662	5.2662	5.2662	5.2662
J BOX TEMP (JBT)					103.	104	109	111.
FNO Obs	8520	10030	11530	13620	8560	10040	11840	14130
FNC	8710	10276	11839	14027	8765	10260	12[illegible]	
FNT	8821	10387	11950	14138	8875	10391	12[illegible]	
FNT 77°	8843	10[illegible]	11960	14173	8898	10417	12587	
NLO Obs	7385	7601	8205	8780	7434	7594	8357	8768
NLC	7[illegible]	7691	8082	8648	7286	7[illegible]	8163	
NHO Obs	11701	11950	12058	12693	11981	12019	12400	12890
NHC	11547	11782	12054	12[illegible]	11546	11779	12149	
WFO Obs	5213	6230	7303	9054	5275	6284	7160	9640
WFC	5375	6430	75[illegible]	9264	5405	6415	7927	
WFC 77°	—	—	—	—	—	—	—	—
P5.1 Obs	24.0	28.7	33.2	40.0	24.0	28.5	34.7	41.3
P5C	54.89	59.84	[illegible]	71.79	54.89	59.[illegible]	66.[illegible]	.
E.P.R.	1.7[illegible]	2.000	2.159	2.399	1.834	1.993	[illegible]	.
DELTA P Obs	40.6	47.8	55.0	65.2	40.8	47.8	57.2	61.8
WAIC	[illegible]	[illegible]	[illegible]	253.6	268.7	282.7	[illegible]	.
T5 Obs	95[illegible]	[illegible]	[illegible]	1164	859	916	968	[illegible]
T5C 77°	[illegible]	1031	1066	[illegible]	859	916	985	
T4QSC	[illegible]	[illegible]	1922	2146	1766	1[illegible]	[illegible]	
T4QS (A)	[illegible]	[illegible]	1957	[illegible]	1770	[illegible]	[illegible]	

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

WAS LEMCOFE (40) 13700/14 (REV. 12-77) (FRONT)

Idle time 30 min 5277 [illegible]

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	T5 CK
	TSN 3185	TYPE TEST F/R
	TSO	DATA PLATE

ENGINE SERIAL NUMBER 141952	SEQUENCE NUMBER 784	DATE 2 Aug-85
TEST CELL NUMBER 2	OPERATOR Nasipak	INSPECTOR Boersma

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	5 min 3	5 min 4	5	6	7	8
DEW POINT	57	57	57	57				
PAMB	29.70	29.70	29.70	29.70	.	.	.	.
P1	29.52	29.50	29.49	29.46	.	.	.	.
T1	78.	78.	78.	78.	.	.	.	.
TF (Fuel Temp)	92.	94.	95.	96.	.	.	.	.
AL AREA	45,900							
LAB SG	.8155 @ 60°				.	@	°	
P3	372	405	435	470				
T3	744	773	799	834				
RES. VALUE	X	X	X	X				
J BOX TEMP (JBT)	X	X	X	X	.	.	.	.
FNO Obs	8510	9550	10470	11500				
FNC	8687	9808	10722	11802				
FNT	8798	9918	10832	11913				
FNT 77°	8820	9943	10860	11942				
NLO Obs	7365	7465	7866	8161				
NLC	7218	7316	7709	7998				
NHO Obs	11852	11820	11982	12209				
NHC	11420	11584	11743	11966				
WFO Obs	5350	6042	6646	7469				
WFC	5407	6112	6728	7573				
WFC 77°	X	X	X	X	X	X	X	X
P5.1 Obs	24.2	27.3	30.1	33.5	.	.	.	.
P5C	55.06	58.34	61.28	64.91	.	.	.	.
E.P.R.	1.940	1.949	2.048	2.169	.	.	.	.
DELTA P Obs	40.8	45.4	49.6	53.0	.	.	.	.
WAIC	208.7	217.9	226.1	236.2	.	.	.	.
T5 Obs	983	1032	1069	1115				
T5C 77°	981	1030	1067	1113				
THQSC	1771	1848	1907	1999				
THQS (A)	1775	1852	1911	2003				

START TIME: 2230 | STOP TIME: | TOTAL RUN TIME: hrs. min.

Idle Time 1 hour Additional Military Rest time 10 min

WAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	TS CK
	TSN 3185.4	TYPE TEST F/R
	TSO 8000	DATA PLATE

ENGINE SERIAL NUMBER 141952	SEQUENCE NUMBER 790	DATE 8-13-85
TEST CELL NUMBER II	OPERATOR Gallegos	INSPECTOR Rossi

DATA TO BE STORED/RECORDED

DATA	1	2	3	4	5	6	7	8
DEW POINT	58	58	58	58				
PAMB	29.76	29.76	29.76	29.76	.	.	.	.
P1	29.59	29.57	29.56	29.53	.	.	.	.
T1	70.4	71.5	71.7	72.6	.	.	.	.
TF (Fuel Temp)	97.	95.	97.	99.	.	.	.	.
AL AREA	45.900							
IAB GS	.82776	60°			.	G	C	
P3	365	406	445	502				
T3	729	769	805	855				
RES. VALVE								
J BOX TEMP (JBT)	.	.	.	.	.	.	.	.
FNO Obs	9400	9650	10730	12400				
FNC	8562	9865	10974	12717				
FNT	8673	9964	11085	12828				
FNT 77°	8695	9991	11113	12860				
NLO Obs	7290	7643	7918	8355				
NLC	7195	7535	7805	8229				
NHO Obs	11565	11845	12097	12455				
NHC	11414	11678	11925	12267				
WFO Obs	5215	6080	6815	8150				
WFC	5366	6251	7000	8388				
WFC 77°								
PS.3 Obs	23.7	27.8	31.2	36.7	.	.	.	.
PSC	54.50	58.98	62.36	68.18	.	.	.	.
E.P.R.	1.821	1.965	2.084	2.279	.	.	.	.
DELTA P Obs	40.2	46.2	51.6	59.8	.	.	.	.
WAIC	207.3	219.4	227.8	244.5	.	.	.	.
T5 Obs	961	1018	1069	1135				
T5C 77°	977	1032	1086	1147				
THOSC	1787	1887	1966	2090				
THOS (A)	1760	1863	1947	2057				

START TIME: 0959 (AM) | STOP TIME: | TOTAL RUN TIME: hrs. min.

Idle Time 50 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	T5 CK
	TSN [illegible]	TYPE TEST F/R
	TSO [illegible]	DATA PLATE

ENGINE SERIAL NUMBER 141952	SEQUENCE NUMBER 798	DATE 9-23-85
TEST CELL NUMBER 7L	OPERATOR [illegible]	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED — RECHECK OF DATA [illegible]

DATA	Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
DEN POINT	53	53	53	53	53	53	53	53
PAMB	29.66	29.66	29.66	29.66	29.68	29.68	29.68	29.68
P1	29.48	29.46	29.44	29.41	29.45	29.46	29.44	29.42
T1	87.	89.	88.	88.	86.	85.	85.	84.
TF (Fuel Temp)	89.	92.	95.	95.	92.	94.	96.	97.
AB AREA	45.878							
IAB SG	.8207 @ 60°				.8191 @ 60°			
P3	370	405	445	502	370	454	455	505
T3	769	807	841	872	755	814	843	889
RPS, VALUE	X	X	X	X	X	X	X	X
J BOX TEMP (JBT)	.	.	.	.	.	.	.	.
FNC Cbs	8370	9550	10680	12350	[illegible]	10030	11100	12450
FNC	8458	9764	10842	12684	9336	10266	11362	
FNT	8569	9874	11052	12800	9448	10376	11492	
FNT 77°	8570	9899	11030	12832	9472	10402	11521	
NLC Cbs	7400	7760	8055	8484	7255	7949	8120	8474
NLC	7182	7531	7825	8245	7461	7645	7919	
NHC Cbs	11799	12000	12340	12602	[illegible]	12079	12298	12612
NHC	11403	11646	11870	12242	11524	11766	11919	
WFO Cbs	5225	6110	6985	8140	5392	6472	7167	8262
WFC	5257	6150	6944	8230	5442	6534	7242	
WFC 77°	X	X	X	X	X	X	X	X
P5.2 Cbs	23.5	27.5	31.0	36.4	26.1	29.1	32.2	36.9
P5C	54.33	58.54	62.26	67.80	57.07	60.24	63.54	.
E.P.R.	1.816	1.956	2.060	2.272	1.907	2.013	2.123	.
DELTA P Cbs	40.2	46.0	51.8	60.0	44.2	48.4	53.2	60.4
WATC	207.6	219.7	230.5	245.2	215.7	233.9	253.0	.
T5 Cbs	1002	1059	1107	1169	1044	1079	1119	1174
T5C 77°	973	1029	1074	1139	1013	1058	1078	
TMGSC	1747	1867	1939	2060	1833	1907	1975	
TMGS (A)	1796	1918	1988	2111	1891	1937	2011	

START TIME: 1645	STOP TIME:	TOTAL TEST TIME: hrs. min.

PWA LOG-OFF (HD) 10700/14 (REV. 12-77) (FRONT)

Idle Time 1 hour 15 min Afterburner Running Time 35 min

TF-41 PERFORMANCE CALCULATION RECORD	FMC CK 14306	TS CK 1193
	TSM 3133	TYPE TEST
	TSO D	DATA PLATE

ENGINE SERIAL NUMBER 141952	SEQUENCE NUMBER 799	DATE 27 SEPT 85
TEST CELL NUMBER 2	OPERATOR	INSPECTOR

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	5 min 3	7 min 4	5	6	7	8
DEW POINT	59	59	59	59				
PAMB	29.63	29.63	29.63	29.63	.	.	.	.
P1	29.40	29.40	29.38	29.35	.	.	.	.
T1	76.	76	75.	75.	.	.	.	.
TF (Fuel Temp)	91.	89.	88.	88.	.	.	.	.
AL AREA	45.888							
LAB SG	.82023 60°				.	@	°	
P3	372	422	474	547				
T3	751	795	839	913				
RES. VALUE	5.216	5.216	5.216	5.216				
J BOX TEMP (JBT)	95.	100.	104	109.	.	.	.	.
FNC Obs	8540	10030	11510	13720				
FNC	8729	10353	11947	14175				
FNT	8540	10464	11957	14236				
FNT 77°	8722	10490	11957	14322				
NLC Obs	7413	7799	8159	8769				
NLC	7277	7651	8046	8616				
NHC Obs	11694	12007	12319	12301				
NHC	11510	11757	12105	12578				
WFC Obs	5373	6291	7261	9059				
WFC	5430	6447	7468	9353				
WFC 77°								
P5.2 Obs	34.2	43.7	53.0	49.2	.	.	.	.
P5C	55.41	59.95	64.49	72.18	.	.	.	.
E.P.R.	1.942	2.003	2.155	2.412	.	.	.	.
DELTA P Obs	42.0	47.9	55.5	66.7	.	.	.	.
WAIC	211.6	225.3	237.5	256.6	.	.	.	.
T5 Obs	846	935	986	1065				
T5C 77°	891	940	993	1072				
TW2SC	1777	1838	1928	2122				
TLCS (A)	1772	1834	1929	2163				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

Idle time 2-hours additional [illegible] time [illegible]

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14306	T5 CK #93
	TGI 3125	TYPE TEST 1/K
	TSO ∅	DATA PLATE 1

ENGINE SERIAL NUMBER 141952	SEQUENCE NUMBER 799	DATE 26 SEPT 85
TEST CELL NUMBER II	OPERATOR Smyth	INSPECTOR Boersma

DATA TO BE STORED/RECORDED

DATA	5 MIN 1	5 MIN 2	12 MIN 3	7 MIN 4	6 MIN 5	6 MIN 6	6 MIN 7	7 MIN 8
DEW POINT	56	56	56	56	60	60	60	60
PAMB	29.67	29.67	29.67	29.67	29.68	29.68	29.68	29.68
P1	29.47	29.46	29.44	29.42	29.48	29.44	29.42	29.40
T1	68.	68.	68.	67.	71.	71.	71.	71.
TF (Fuel Temp)	85.	90.	93.	95.	92.	93.	96.	98.
A4 AREA	45.828							
LAB SG	0.8202 @ 60 °				.8204 @ 60 °			
P3	374	419	467	517	372	420	471	568
T3	733	775	816	866	739	782	826	927
RES. VALUE	X	X	X	X	4.866	4.866	4.866	4.866
J BOX TEMP (JHT)	X	X	X	X	94.	95.	99.	105
FNO Obs	8570	10010	11430	12790	8500	10000	11480	14230
FNC	8775	10269	11752	13131	8639	10264	11810	14693
FNT	8886	10380	11863	13292	8809	10374	11920	14804
FNT 77°	8908	10406	11893	13325	8830	10400	11950	14841
NLO Obs	7345	7694	8083	8475	7363	7750	8134	8596
NLC	7267	7612	7997	8393	7261	7643	8022	8773
NHO Obs	11206	11902	12204	12525	11626	11932	12259	12863
NHC	11483	11776	12075	12404	11466	11767	12090	12686
WFO Obs	5250	6165	7180	8276	5287	6203	7259	9436
WFC	5424	6365	7417	8569	5417	6371	7461	9725
WFC 77°	X	X	X	X	X	X	X	X
P5.1 Obs	24.2	28.5	33.0	37.7	24.3	28.5	33.2	41.5
P5C	55.16	59.68	64.40	69.43	55.25	59.72	64.70	73.51
E.P.R.	1.843	1.994	2.154	2.320	1.846	1.996	2.162	2.457
DELTA P Obs	41.8	48.2	54.9	62.0	41.9	48.1	55.4	68.0
WAIC	211.0	223.6	236.1	249.6	211.4	223.6	237.3	252.4
T5 Obs	954	1012	1069	1127	855	908	962	1059
T5C 77°	976	1035	1093	1155	871	925	979	1076
T4QSC	1776	1880	1982	2099	1782	1878	1982	2157
T4QS (A)	1739	1840	1941	2051	1757	1852	1955	2167

START TIME: 1955	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMCORE (NC) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14392	TS CK 1217
	TST 1550	TYPE TEST F/R
	TSD	DATA PLATE 8447

ENGINE SERIAL NUMBER 142563	SEQUENCE NUMBER 791	DATE 15 AUG 85
TEST CELL NUMBER 2	OPERATOR SAL	INSPECTOR BERWIND

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	10 min 3	6 min 4	5 min 5	7 min 6	7 min 7	6 min 8
DEW POINT	55	55	55	55	55	55	55	55
PAMB	29.51	29.51	29.51	29.51	29.51	29.51	29.51	29.51
P1	29.34	29.32	29.30	29.28	29.34	29.32	29.30	29.28
T1	69.	68.	69.	68.	67.	67.	67.	67.
TF (Fuel Temp)	90.	90.	90.	90.	90.	92.	93.	95.
A4 AREA	45.772							
LAB SG	.8231 @ 60°				.8231 @ 60°			
P3	375	434	477	562	375	432	483	568
T3	739	788	828	907	733	783	828	912
RES. VALVE	4.002	4.002	4.002	4.002	4.002	4.002	4.002	4.002
J BOX TEMP (JBT)	90.	93.	96.	99.	89.	91.	93.	97.
FNO Obs	8560	10050	11540	13870	8510	10040	11560	14018
FNC	8802	10360	11922	14378	8755	10351	11946	14536
FNT	8913	10471	12033	14489	8863	10462	12057	14646
FNT 77°	8935	10497	12063	14525	8886	10488	12087	14683
NLO Obs	7358	7796	8166	8779	7325	7777	8147	8788
NLC	7273	7714	8072	8686	7255	7702	8069	8804
NHO Obs	11561	11930	12177	12651	11623	11904	12184	12676
NHC	11428	11804	12037	12518	11512	11790	12067	12555
WFO Obs	5218	6312	7245	9109	5162	6268	7311	9210
WFC	5411	6568	7549	9553	5365	6523	7622	9605
WFC 77°	X	X	X	X	X	X	X	X
P5.1 Obs	24.1	29.1	33.1	40.2	24.0	29.1	33.5	40.9
P5C	55.13	60.42	64.69	72.27	55.04	60.42	65.1	73.61
E.P.R.	1.842	2.019	2.162	2.415	1.839	2.019	2.176	2.440
DELTA P Obs	41.2	49.0	55.4	66.2	41.2	48.8	55.8	66.2
WAIC	210.0	225.7	237.5	255.8	210.1	225.3	238.2	255.7
T5 Obs	842	907	955	1038	831	897	950	1041
T5C 77°	863	931	977	1063	857	923	977	1069
THQSC	1772	1887	1985	2175	1760	1881	1987	2178
THQC (A)	1739	1847	1949	2130	1719	1837	1941	2129

START TIME: | STOP TIME: | TOTAL RUN TIME: hrs. min.

IDle Time 2 hours

Additional Military Pwr Time 20 min

MAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	TS CK 1217
	TSN 1859	TYPE TEST full run
	TSO 0	DATA PLATE 8847

ENGINE SERIAL NUMBER 142563	SEQUENCE NUMBER 791	DATE 15 Aug 85
TEST CELL NUMBER 2	OPERATOR Salocheep	INSPECTOR Bernard

DATA TO BE STORED/RECORDED

DATA	5 min 1	6 min 2	12 min 3	5 min 4	6 min 5	6 min 6	6 min 7	6 min 8
DEW POINT	55	55	55	55	56	56	56	56
PAMB	29.51	29.51	29.51	29.51	29.52	29.52	29.52	29.52
P1	29.35	29.32	29.30	29.28	29.36	29.33	29.30	29.28
T1	73.	73.	72.	72.	71.	71.	71.	70.
TF (Fuel Temp)	89.	89.	91.	92.	90.	92.	92.	93.
A4 AREA	45.772							
LAB SG	.8222 @ 60 °				.8231 @ °			
P3	379	432	479	532	384	434	482	562
T3	749	795	836	884	748	791	833	907
RES. VALUE	X	X	X	X	4.2597	4.2597	4.2597	4.2597
J BOX TEMP (JBT)	.	.	.	.	93.	95.	97.	100.
FNO Obs	8510	10150	11500	12940	8780	10080	11550	13650
FNC	8743	10457	11876	13393	9023	10384	11930	14143
FNT	8853	10569	11986	13504	9133	10495	12041	14254
FNT 77°	8876	10595	12016	13538	9156	10521	12071	14290
NLO Obs	7405	7810	8170	8570	7410	7800	8190	8755
NLC	7292	7691	8053	8448	7310	7695	8080	8645
NHO Obs	11705	11964	12220	12520	11710	11935	12210	12650
NHC	11527	11782	12046	12342	11553	11775	12046	12492
WFO Obs	5270	6315	7329	8440	5340	6305	7335	9090
WFC	5435	6531	7597	8764	5521	6527	7614	9470
WFC 77°	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~
P5.1 Obs	24.0	29.1	33.3	37.8	24.7	29.1	33.4	40.1
P5C	55.00	60.41	64.88	69.69	55.73	60.40	65.01	72.15
E.P.R.	1.836	2.019	2.168	2.329	1.862	2.019	2.172	2.411
DELTA P Obs	41.2	43.6	55.4	62.6	42.2	48.8	55.8	66.2
WAIC	210.0	214.0	237.5	250.1	212.0	225.2	238.3	256.0
T5 Obs	980	1052	1110	1165	857	916	968	1048
T5C 77°	990	1063	1124	1179	874	933	985	1061
T4QSC	1768	1881	1990	2094	1774	1876	1984	2157
T4QS (A)	1759	1864	1967	2070	1749	1850	1957	2123

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

WAS LEMOORE (NO) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	TS CK 1215
	TSM 1859	TYPE TEST F/R
	TSO	DATA PLATE 3549

ENGINE SERIAL NUMBER 142563	SEQUENCE NUMBER 791	DATE 15 Aug 83
TEST CELL NUMBER 2	OPERATOR Sal	INSPECTOR [illegible]

DATA TO BE STORED/RECORDED

DATA	6 min 1	6 min 2	11 min 3	7 min 4	6 min 5	6 min 6	6 min 7	8 min 8
DEW POINT	53	53	53	53	55	55	55	55
PAMB	29.54	29.54	29.54	29.54	29.55	29.55	29.55	29.55
P1	29.36	29.34	29.32	29.30	29.35	29.37	29.33	29.32
T1	62.	62.	62.	62.	65.	66.	65.	65.
TF (Fuel Temp)	92.	92.	95.	96.	93.	95.	96.	97.
A4 AREA	45.772							
LAB SG	.8179 @ °				.8215 @ 60°			
P3	379	438	483	565	380	432	485	553
T3	723	776	816	893	730	777	826	888
RES. VALUE					4.227	4.227	4.227	4.227
J BOX TEMP (JBT)					87.	90.	92.	95.
FNO Obs	8520	10240	11520	13810	8550	10100	11550	13500
FNC	8762	10558	11908	14315	8731	10397	11927	13975
FNT	8873	10669	12019	14426	8892	10508	12037	14086
FNT 77°	8915	10696	12049	14462	8914	10534	12067	14121
NLO Obs	7319	7794	8189	8755	7335	7770	8165	8655
NLC	7284	7757	8091	8714	7278	7703	8102	8533
NHO Obs	11555	11588	12113	12584	11609	11870	12165	12550
NHC	11501	11812	12056	12505	11520	11767	12071	12453
WFO Obs	5178	6388	7299	9129	5210	6250	7370	8870
WFC	5379	6653	7605	9538	5403	6483	7673	9253
WFC 77°								
PS.1 Obs	24.2	29.8	33.6	40.7	29.4	29.2	34.0	39.5
PSC	55.85	61.16	65.22	72.79	55.40	60.47	65.61	71.47
E.P.R.	1.846	2.044	2.179	2.432	1.851	2.021	2.193	2.382
DELTA P Obs	41.4	49.8	56.2	66.9	41.7	49.	56.5	65.4
WAIC	210.4	227.1	238.9	258.9	211.0	225.5	239.5	254.5
T5 Obs	946	1024	1077	1177	833	896	955	1026
T5C 77°	963	1063	1118	1220	863	925	987	1059
TLQSC	1753	1893	1983	2165	1757	1871	1994	2140
TLQS (A)	1692	1824	1915	2092	1708	1823	1939	2082

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (NO) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14313	TS CK 1217
	TSN 1859	TYPE TEST F/R
	TSO	DATA PLATE 8847

ENGINE SERIAL NUMBER 142563	SEQUENCE NUMBER 791	DATE 15 Aug 83
TEST CELL NUMBER 2	OPERATOR SAL	INSPECTOR BOEIJIMA

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	5 min 3	5 min 4	5 min 5	5 min 6	5 min 7	5 min 8
DEW POINT	53	53	53	53	53	53	53	53
PAMB	29.51	29.51	29.51	29.51	29.52	29.52	29.52	29.52
P1	29.34	29.32	29.30	29.28	29.35	29.32	29.31	29.28
T1	64.	64.	64.	63.	63.	63.	62.	62.
TF (Fuel Temp)	93.	94.	95.	95.	92.	92.	94.	93.
AL AREA	45.772							
LAB SG	.8229 @ 60°				.8221 @ 60°			
P3	377	432	484	575	382	430	484	575
T3	727	774	820	907	729	772	819	903
RES. VALUE	4.000	4.000	4.000	4.000	4.137	4.137	4.137	4.137
J BOX TEMP (JBT)	90.	89.	91.	95.	89.	88.	90.	92.
FNO Obs	8500	10070	11600	14020	8650	10100	11590	14000
FNC	8745	10406	11972	14565	8899	10415	11980	14525
FNT	8856	10517	12102	14675	9010	10527	12011	14636
FNT 77°	8878	10543	12133	14712	9032	10555	12121	14673
NLO Obs	7310	7740	8150	8500	7355	7750	8150	8510
NLC	7262	7687	8516	8770	7313	7706	8112	8769
NHO Obs	11555	11840	12140	12655	11595	11837	12135	12640
NHC	11479	11762	12060	12584	11530	11762	12078	12581
WFO Obs	5130	6210	7310	9295	5261	6235	7335	9340
WFC	5343	6480	7642	9775	5483	6516	7682	9823
WFC 77°								
P5.1 Obs	23.9	28.9	33.7	41.4	24.5	29.1	33.9	41.3
P5C	54.94	60.23	65.33	73.65	55.58	60.45	65.54	73.45
E.P.R.	1.836	2.013	2.183	2.46	1.857	2.020	2.190	2.455
DELTA P Obs	41.2	48.6	56.2	68.0	41.8	48.6	55.2	68.2
WAIC	210.0	224.8	238.9	258.9	211.2	224.7	238.9	269.1
T5 Obs	824	886	941	1035	835	892	948	1040
T5C 77°	853	919	975	1073	870	928	987	1081
TLQSC	1751	1859	1980	2186	1769	1886	1997	2193
TLQS (A)	1698	1813	1926	2117	1711	1815	1928	2119

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

WAS LEMOORE (NO) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14393	15 CK 1218
	TSN 1859	TYPE TEST F/R
	TSO	DATA PLATE 8899

ENGINE SERIAL NUMBER 142563	SEQUENCE NUMBER 791	DATE 16 Aug 85
TEST CELL NUMBER II	OPERATOR NORTON	INSPECTOR Rossi

DATA TO BE STORED/RECORDED

DATA	6 MIN 1	6 MIN 2	6 MIN 3	7 MIN 4	5	6	7	8
DEW POINT	55	55	55	55				
PAMB	29.56	29.56	29.56	29.56	.	.	.	.
P1	29.39	29.36	29.34	29.32	.	.	.	.
T1	67.	67.5	68.	68.	.	.	.	.
TF (Fuel Temp)	96.	95.	97.	99.	.	.	.	.
A4 AREA	45.772							
LAB SG	.8217 @ 60°				.	@	°	
P3	383	435	485	550				
T3	739	785	830	893				
RES. VALUE	4,076	4,076	4,076	4,076				
J BOX TEMP (JBT)	88.	93.	94.	97.	.	.	.	.
FNO Obs	8700	10100	11600	13400				
FNC	8935	10398	11970	13864				
FNT	9045	10509	12031	13975				
FNT 77°	9068	10535	12111	14010				
NLO Obs	7385	7790	8170	8675				
NLC	7314	7711	8034	8584				
NHO Obs	11655	11900	12190	12570				
NHC	11543	11780	12062	12438				
WFO Obs	5315	6320	7410	8890				
WFC	5492	6546	7681	9230				
WFC 77°								
P5.1 Obs	24.7	29.3	34.1	39.5	.	.	.	.
P5C	55.72	60.60	65.69	71.46	.	.	.	.
E.P.R.	1.862	2.025	2.195	2.388	.	.	.	.
DELTA P Obs	42.3	49.3	56.6	65.3	.	.	.	.
WAIC	242.24	226.1	239.6	254.4	.	.	.	.
T5 Obs	843	903	957	1028				
T5C 77°	869	928	982	1053				
T4QSC	1771	1879	1993	2143				
T4QS (A)	1730	1838	1952	2099				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

NAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14343	TS CK 1215
	TSK 1733	TYPE TEST
	TSO 0	DATA PLATE

ENGINE SERIAL NUMBER 142596	SEQUENCE NUMBER 801	DATE 10/21/85
TEST CELL NUMBER II	OPERATOR	INSPECTOR

DATA TO BE STORED/RECORDED

DATA	5 min 1	5 min 2	10 min 3	5 min 4	5 min 5	5 min 6	5 min 7	8 min 8
DEW POINT	49	49	49	49	48	48	48	48
PAMB	29.90	29.90	29.90	29.90	29.90	29.90	29.90	29.90
P1	29.72	29.70	29.68	29.66	29.72	29.68	29.64	29.60
T1	55.	55.	56.	57.	62.	62.	62.	61.
TF (Fuel Temp)	75.	78.	82.	80.	78.	81.	83.	84.
AL AREA	45.849							
LAB SG	.8185 @ °				.8703 @ 60 °			
P3	375	425	475	565	373	420	470	590
T3	703	741	788	869	713	753	798	910
RES. VALUE	X	X	X	X	4.288	4.288	4.288	4.288
J BOX TEMP (JBT)	X	X	X	X	92.	94.	97.	106
FNO Obs	8460	9710	11420	13900	8370	9640	11200	14630
FNC	8600	9891	11661	14136	8500	9817	11440	15022
FNT	8711	10002	11772	14246	8611	9927	11551	15133
FNT 77°	8733	10027	11801	14282	8632	9952	11580	15171
NLO Obs	7190	7524	7941	8600	7190	7566	7949	8845
NLC	7207	7541	7952	8603	7159	7533	7919	8815
NHO Obs	11456	11700	12040	12540	11490	11757	12071	12784
NHC	11483	11727	12056	12545	11440	11706	12019	12741
WFO Obs	5128	5959	7083	8970	5075	5945	7015	9729
WFC	5360	6231	7401	9402	5262	6171	7296	10177
WFC 77°	X	X	X	X				
P5.1 Obs	24.0	27.9	33.0	40.5	23.4	27.6	32.4	43.0
P5C	54.76	58.64	64.19	72.08	54.12	58.54	63.62	74.83
E.P.R.	1.829	1.966	2.144	2.41	1.808	1.956	2.126	2.501
DELTA P Obs	40.8	47.0	55.0	66.8	40.2	46.8	54.2	70.5
WAIC	208.0	220.4	235.4	255.4	206.7	220.1	234.1	261.2
T5 Obs	921	990	1047	1154	820	874	927	1054
T5C 77°	975	1036	1103	1211	855	911	965	1096
TLQSC	1765	1839	1966	2145	1746	1837	1956	2231
TLQS (A)	1694	1745	1871	2048	1684	1773	1889	2151

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

IDle TIME 1 HOUR 15 MIN ADDITIONAL MILITARY TIME 25 MIN

NAS LEMOORE (NO) 13700/14 (REV. 12-77) (FHONI)

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK	T5 CK
	TSN 2264	TYPE TEST
	TSO —	DATA PLATE

ENGINE SERIAL NUMBER 142599	SEQUENCE NUMBER 805	DATE 11-15-85
TEST CELL NUMBER 2	OPERATOR CARPENTER	INSPECTOR RUSSI

DATA TO BE STORED/RECORDED

DATA	7 minutes 1	8 minutes 2	12 minutes 3	7 minutes 4	5	6	7	8
DEW POINT	46	46	46	46				
PAMB	30.06	30.06	30.06	30.06	.	.	.	.
P1	29.90	29.88	29.84	29.82	.	.	.	.
T1	52	52	52	52	.	.	.	.
TF (Fuel Temp)	61.	67.	72.	75.	.	.	.	.
A4 AREA	45.829							
LAB SG	.8219 @ 60 °				.	@	°	
P3	383	428	480	550				
T3	705	744	790	854				
RES. VALUE								
J BOX TEMP (JBT)	.	.	.	.	.	.	.	.
FNO Obs	8540	10050	11570	13500				
FNC	8632	10182	11757	13756				
FNT	8743	10292	11867	13867				
FNT 77°	8765	10318	11897	13902				
NLO Obs	7231	7573	7968	8466				
NLC	7270	7614	8011	8512				
NHO Obs	11493	11695	12012	12417				
NHC	11556	11759	12077	12485				
WFO Obs	5271	6186	7318	8828				
WFC	5557	6516	7711	9314				
WFC 77°								
P5.1 Obs	24.4	28.9	33.6	39.8	.	.	.	.
P5C	55.00	59.68	64.64	71.13	.	.	.	.
E.P.R.	1.838	1.995	2.160	2.377	.	.	.	.
DELTA P Obs	42.0	48.3	56.1	65.6	.	.	.	.
WAIC	210.0	222.3	236.8	252.9	.	.	.	.
T5 Obs	911	972	1037	1116				
T5C 77°	972	1036	1104	1186				
T4QSC	1800	1905	2028	2176				
T4QS (A)	1695	1795	1912	2053				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

IDLE TIME – 50 minutes

WAS LEMOORE (40) 13700/14 (REV. 12-77) (FRONT)

Additional military time 3 min

TF-41 PERFORMANCE CALCULATION RECORD	FNC CK 14149	TS CK 1200
	TSK 2991	TYPE TEST 7/X
	TSO —	DATA PLATE [illegible]

ENGINE SERIAL NUMBER 142559	SEQUENCE NUMBER 792	DATE 16 AUG 65
TEST CELL NUMBER [illegible]	OPERATOR Lano	INSPECTOR Bovna

DATA TO BE STORED/RECORDED

DATA	5 MINUTES 1	7 MINUTES 2	7 MINUTES 3	10 MINUTES 4	5	6	7	8
DEW POINT	55	55	55	55				
PAMB	29.60	29.60	29.60	29.60	.	.	.	.
P1	29.44	29.41	29.38	29.36	.	.	.	.
T1	67.	66.	66.	65.	.	.	.	.
TF (Fuel Temp)	90.	92.	94.	95.	.	.	.	.
AL AREA	45.788							
LAB SG	.8235 @ 60°				.	@	°	
P3	377	430	480	560				
T3	732	778	825	901				
RES. VALUE	4.6488	4.6488	4.6488	4.6488				
J BOX TEMP (JBT)	95.	97.	101.	109.	.	.	.	.
FNO Obs	8440	10000	11440	13750				
FNC	8650	10279	11790	14218				
FNT	8761	10389	11900	14329				
FNT 77°	8783	10415	11930	14365				
NLO Obs	7338	7730	8123	8695				
NLC	7267	7663	8053	8628				
NHO Obs	11668	11920	12195	12685				
NHC	11566	11817	12090	12587				
WFO Obs	5215	6250	7313	9175				
WFC	5403	6494	7610	9585				
WFC 77°								
P5.1 Obs	24.0	29.0	33.5	40.6	.	.	.	.
P5C	54.93	60.23	65.02	72.58	.	.	.	.
E.P.R.	1.836	2.013	2.173	2.425	.	.	.	.
DELTA P Obs	40.4	47.8	55.0	66.0	.	.	.	.
WAIC	205.0	222.9	236.5	255.2	.	.	.	.
T5 Obs	842	900	958	1044				
T5C 77°	867	928	956	1075				
TLQSC	1765	1881	1995	2190				
TLQS (A)	1723	1833	1945	2131				

START TIME:	STOP TIME:	TOTAL RUN TIME: hrs. min.

BAS LEMCORE (NO) 13700/14 (REV. 12-77) (FRONT)

APPENDIX B: FORTRAN Program Documentation and Source Coding

```
C-*****************************************************************
C-*                                                               *
C-*    PROGRAM TF41                                               *
C-*                                                               *
C-*****************************************************************
C-*
C-*    PURPOSE:
C-*      THIS PROGRAM CALCULATES A CORRELATION COEFFICIENT TO ESTIMATE
C-*      THE AMOUNT OF OXIDES OF NITROGEN PRODUCED DURING TF41 ENGINE
C-*      TESTING.  THE CORRELATION COEFFICIENT IS EXPRESSED AS AN
C-*      "EMISSIONS TO FUEL RATIO" WHICH ESTIMATES TOTAL NOx EMISSIONS
C-*      ON THE BASIS OF TOTAL FUEL USE ALONE.
C-*
C-*    PROGRAMMER:
C-*      VERONICA J. HOBAN
C-*      AIRCRAFT ENVIRONMENTAL SUPPORT OFFICE
C-*      NORTH ISLAND, CA
C-*      AUGUST 12, 1987
C-*
C-*    VARIABLES:
C-*      IDENTIFIER   TYPE      DESCRIPTION
C-*
C-*      KOUNT        INTEGER   # OF ENGINE TEST RUNS
C-*      N            INTEGER   # OF ENGINE POWER SETTINGS PER TEST
C-*      IESN         INTEGER   ENGINE SERIAL # (LIMITED TO 6 DIGITS)
C-*      J,K,L        INTEGER   MONTH,DAY,YEAR OF ENGINE TEST RUN
C-*      RPM          REAL      ENGINE POWER SETTING IN rpm
C-*      THRUST       REAL      ENGINE THRUST IN POUNDS
C-*      FUEL         REAL      ENGINE FUEL RATE PER POWER SETTING IN
C-*                             POUNDS/HOUR
C-*      TIME         REAL      TIME AT A GIVEN POWER SETTING IN MINUTES
C-*      EI           REAL      EMISSION INDEX EXPRESSED AS POUNDS OF
C-*                             OXIDES OF NITROGEN PER 1000 POUNDS OF
C-*                             FUEL
C-*      FUELUSE      REAL      POUNDS OF FUEL USED PER POWER SETTING
C-*      NOX          REAL      POUNDS OF OXIDES OF NITROGEN RELEASED
C-*                             PER POWER SETTING
C-*      TFUEL        REAL      TOTAL FUEL USE IN POUNDS FOR THE ENGINE
C-*                             TEST RUN
C-*      TNOX         REAL      TOTAL AMOUNT OF OXIDES OF NITROGEN
C-*                             RELEASED FOR THE ENGINE TEST RUN
C-*      COEFF        REAL      CORRELATION COEFFICIENT FOR EACH ENGINE
C-*                             TEST RUN
C-*      ACOEFF       REAL      AVERAGE CORRELATION COEFFICIENT FOR ALL
C-*                             TEST RUNS IN THE INPUT DATA FILE
C-*
C-*      ADDITIONAL VARIABLES WERE USED AS TEMPORARY STORAGE
C-*
C-*    INPUT:
C-*      THE INPUT DATA FILE IS "ENGINE.DAT", AND READING OF THE DATA
C-*      IS LIST DIRECTED.
C-*      THE 1st RECORD CONTAINS "KOUNT" WHICH APPEARS ONLY ONCE IN
C-*      THE DATA FILE.
C-*      THE NEXT N RECORDS CONTAIN "THRUST,RPM,FUEL,TIME" WHICH MUST
C-*      BE EXPRESSED AS REAL VALUES (DECIMAL POINT INCLUDED).
C-*      EACH SUBSEQUENT SET OF ENGINE RUN DATA IS ENTERED IN A
C-*      SIMILAR MANNER.
C-*
C-*    OUTPUT:
C-*      THE OUTPUT DATA FILE IS THE STANDARD OUTPUT DEVICE (LINE
```

```
C-*      PRINTER "LPT1").  THE OUTPUT IS NOT STORED ON DISK.
C-*
C-*    METHOD:
C-*      THE CALCULATION METHOD USED IN THIS PROGRAM IS DESCRIBED
C-*      IN AESO REPORT No. 4-85 (JULY 1985) & AESO REPORT No. 10-87
C-*      (NOVEMBER 1987).
C-*
C-*    RESTRICTIONS:
C-*      THIS PROGRAM IS DESIGNED FOR THE TF41 ENGINE.  IT MAY BE USED
C-*      FOR OTHER ENGINE TYPES AFTER SOME MINOR MODIFICATION.
C-*      1.  REVISE HEADER FORMAT TO REPRESENT ALTERNATE ENGINE TYPE
C-*      2.  REVISE THE LINE EI=a*EXP(b*THRUST) TO INCLUDE VALUES OF
C-*          a AND b WHICH REPRESENT THE ALTERNATE ENGINE TYPE
C-*      3.  REVISE FINAL FORMAT STATEMENT TO REPRESENT ALTERNATE
C-*          ENGINE TYPE.
C-*********************************************************************
C-*
      PROGRAM MAIN
      REAL*4 NOX
      OPEN(50,FILE='ENGINE.DAT',STATUS='OLD')
      OPEN(6,FILE='LPT1',STATUS='OLD')
      READ(50,*) KOUNT
      TCOEFF=0.0
      DO 10 I=1,KOUNT,1
        READ(50,*,END=999) N,IESN,J,K,L
        WRITE(6,9000) I,IESN,J,K,L
9000    FORMAT('1',T10,'TABLE ',I2,'.  Emission of oxides of nitrogen',
     1            1X,'from the testing of'/
     2            T10,'a TF41 engine at NAS Lemoore',
     3            1X,'(Engine Serial Number:  ',I6,')'//
     4            T10,'Date:  ',I2,'/',I2,'/',I4//
     5            T11,'RPM',4X,'THRUST',3X,'FUEL FLOW',3X,'TIME',
     6            3X,'FUEL USE',3X,'EI',3X,'POUNDS NOx'/
     7            T19,'(lb)',5X,'(lb/hr)',4X,'(MIN)',4X,'(lb)'/)
        TNOX=0.0
        TFUEL=0.0
        DO 20 M=1,N,1
          READ(50,*) THRUST,RPM,FUEL,TIME
          EI=2.02*EXP(1.76E-4*THRUST)
          FUELUSE=FUEL*(TIME/60.)
          NOX=EI*FUELUSE/1000.
          TNOX=TNOX + NOX
          TFUEL=TFUEL + FUELUSE
          IRPM=JFIX(RPM)
          ITHRUST=JFIX(THRUST)
          IFUEL=JFIX(FUEL)
          ITIME=JFIX(TIME)
          IF(M.EQ.17)THEN
            WRITE(6,9050) I
9050        FORMAT('1',T10,'TABLE ',I2,' (continued)'//
     1                T11,'RPM',4X,'THRUST',3X,'FUEL FLOW',3X,'TIME',
     2                3X,'FUEL USE',3X,'EI',3X,'POUNDS NOx'/
     3                T19,'(lb)',5X,'(lb/hr)',4X,'(MIN)',4X,'(lb)'/)
            WRITE(6,9100)IRPM,ITHRUST,IFUEL,ITIME,FUELUSE,EI,NOX
          ELSE
            WRITE(6,9100) IRPM,ITHRUST,IFUEL,ITIME,FUELUSE,EI,NOX
9100        FORMAT(' ',T10,I5,3X,I5,5X,I5,6X,I3,4X,F7.1,3X,
     1              F5.2,3X,F6.2/)
          ENDIF
20      CONTINUE
```

```
      COEFF=TNOX/TFUEL
      TCOEFF=TCOEFF + COEFF
      WRITE(6,9200) TFUEL,TNOX,COEFF
9200  FORMAT('0',T10,'Pounds of fuel used in test',9X,F7.1//
     1 T10,'Pounds of NOx per test',32X,F6.2//
     2 T10,'Pounds of NOx per pound of fuel used in test = ',F7.5//)
 10   CONTINUE
      ACOEFF=TCOEFF/FLOAT(KOUNT)
      WRITE(6,9300) ACOEFF
9300  FORMAT('1',T10,'THE AVERAGE CORRELATION COEFFICIENT FOR THE'/
     1            T10,'TF41 ENGINE IS ',F7.5/)
 999  CONTINUE
      CLOSE(50,STATUS='KEEP')
      CLOSE(6)
      STOP
      END
```