NASA Contractor Report 165587

1

NASA-CR-165587

V/STOL TANDEM FAN TRANSITION SECTION MODEL TEST

W. E. Simpkin
Vought Corporation
Dallas, Texas

CONTRACT NA3-22155
March 1982

NASA

1. Report No. NASA CR-165587	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle V/STOL Tandem Fan Transition Section Model Testing		5. Report Date March, 1982
		6. Performing Organization Code 80378
7. Author(s) William E. Simpkin		8. Performing Organization Report No. TR2-53200/2R-53085
		10. Work Unit No.
9. Performing Organization Name and Address Vought Corporation P. O. Box 225907 Dallas, Texas 75265		11. Contract or Grant No. NA3-22155
		13. Type of Report and Period Covered Contractor Report
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D. C. 20546		14. Sponsoring Agency Code
15. Supplementary Notes Project Manager: Robert C. Williams, Propulsion Aero Division, NASA Lewis Research Center, Cleveland, Ohio 44135		

16. Abstract

An approximately 0.25 scale model of the transition section of a Tandem Fan variable cycle engine nacelle was tested in the NASA Lewis Research Center 10-by-10 foot wind tunnel. Two 12-inch, tip-turbine driven fans were used to simulate a Tandem Fan engine. Three testing modes simulated a V/STOL Tandem Fan airplane. Parallel mode has two separate propulsion streams for maximum low speed performance. A front inlet, fan, and downward vectorable nozzle forms one stream. An auxilliary top inlet provides air to the aft fan - supplying the core engine and aft vectorable nozzle. Front nozzle and top inlet closure, and removal of a blocker door separating the two streams configures the Tandem Fan for series mode operations as a typical aircraft propulsion system. Transition mode operation is formed by intermediate settings of the front nozzle, blocker door, and top inlet. Program emphasis was on the total pressure recovery and flow distortion at the aft fan face. A range of fan flow rates were tested at tunnel airspeeds from 0 to 240 knots, and angles-of-attack from -10 to 40° for all three modes. In addition to the model variables for the three modes, model variants of the top inlet were tested in the parallel mode only. These lip variables were: aft lip boudary layer bleed holes, and a three position turning vane. Also a "bellmouth" extension of the top inlet side lips was tested in parallel mode.

This preliminary investigation established the feasibility of the variable cycle Tandem Fan engine in the V/STOL application. Design refinements to increase the top inlet total pressure recovery and reduce the distortion were identified. However, no large problems were detected in any aspect of the program. Although distortion levels observed in parallel mode operation were elevated, the regions of low pressure were quite small leading to the marginal acceptability of the flow in the as-tested configuration. The effect of the top inlet aft lip variables was small. In series mode testing, total pressure losses and distortion at the aft fan were attributed to the model instrumentation, fan mounting and model cavities not typical of a full-scale operational propulsion system. Distortion at the aft fan during transition mode testing was dominated by a central core of high pressure air at front fan discharge pressure.

17. Key Words (Suggested by Author(s)) V/STOL Inlets, Tandem Fan, Variable Cycle Engine		18. Distribution Statement Unclassified - Unlimited Category 02	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 147	22. Price*

* For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA Contractor Report 165587

V/STOL TANDEM FAN TRANSITION SECTION MODEL TEST

W. E. Simpkin

Vought Corporation

Dallas, Texas

CONTRACT NA3-22155

March 1982

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

1.0 SUMMARY

The NASA Lewis Research Center conducted a test program in 1981 to establish the operating characteristics of a Vought Corporation designed and built tandem fan model propulsion system. This wind tunnel model was powered by two co-axial 12 inch diameter tip turbine driven fans. The variable cycle tandem fan propulsion system simulated by the model is particularly well suited for a supersonic V/STOL fighter. For vertical operations, the system operates as a high by-pass ratio engine with separate vectorable nozzles from the front fan, and aft fan and core. Air supply to the aft fan and core is through an auxiliary top flush inlet between the two fans during vertical operations. The model is based on the lines of a twin podded Navy V/STOL. The conceptual lines of a more recent Vought supersonic V/STOL single engine high performance airplane concept are also shown.

The primary emphasis of this investigation was examination of the flow properties at the aft fan face in the three operating modes (parallel, series and transition) of a variable cycle tandem fan propulsion system. In the parallel mode used in airplane vertical and transition flight, the aft fan face flow is influenced by the configuration of the top flush inlet. Various top inlet lip configurations were tested with minor performance differences. The principal observations indicated the need for a non-separating internal flow path from the top inlet to the aft fan, and a need to eliminate twin vorticies typical of a flush inlet. Use of small blow in door auxiliary inlets on the nacelle sides is a probable resolution of the vortex flow problem, as observed by the introduction of additional flow to the aft fan during transition mode testing.

Series mode tandem fan operation is used for all normal wing borne airplane operations. The most significant finding of the series mode testing was distortion and turbulence attributed to the front nozzle and top inlet cavities in an otherwise smooth duct between the two fans. Model duct losses due to these cavities, a service strut, and a front fan discharge rake was in the order of 60% of the duct dynamic pressure. This loss was inherent in the test model. However, for an airplane configuration normal design refinements would result in negligible or minimal inter-duct losses.

Transition mode operations occur during propulsion system (and airplane flight) conversion to and from parallel and series modes (vertical and wing borne flight). Blocker door configuration of concentric cone frustrums that were sequentially removed for transition mode simulation resulted in a central core of flow at the aft fan face having a total pressure approximately equal to the front fan discharge pressure. Additionally, the partial admission top inlet flow was stratified resulting in a small region of low pressure air. Consequently a relatively high distortion was observed. The use of a vaned blocker door as described in the current V/STOL airplane design* should basically resolve this difficulty. Notwithstanding, the region of low energy air was small, one per rev, and since it was only moderately depressed below the average, stall free operation of the aft fan and core of a tandem fan engine should be expected.

This investigation established the basic suitability of the variable cycle tandem fan for V/STOL aircraft. Even in this feasibility demonstration of the transition section marginally acceptable flow conditions for engine integration were present at all conditions. There were no major problems discovered although opportunities for improvements were identified. Significant improvement testing in the future could be performed at static conditions without using the wind tunnel.

* Contract NAS2-11003

2.0 INTRODUCTION

Since the conception of the tandem fan engine by the Vought Corporation in the mid '70's, various airplanes have been conceptually designed to capitalize on its unique attributes for V/STOL aircraft. The Vought designated V-530 is a twin engine subsonic V/STOL (U.S. Navy Type A V/STOL). The tandem fan engines operate in parallel mode throughout the flight envelope with only nozzle vectoring variable geometry. In this configuration, a conventional subsonic inlet supplies air to the front fan that discharges aft under the nacelle for conventional flight or is vectored down for direct lift. A top inlet in various scoop and semi-submerged scoop configurations supplies the aft fan and core-engine during all flight modes. This second propulsion stream is exhausted thru an aft vectorable nozzle.

The NASA Lewis Research Center tested a quarter scale dual fan powered inlet model of the V530 in the 10' x 10' tunnel, as reported in Ref. 1 and 2. A fan powered test of the front thrust deflecting nozzle is due to be reported in the near future.

From the conception of the tandem fan engine, its attractiveness as a variable cycle engine was recognized. As a variable cycle engine, the front fan flow is in parallel with the aft fan for V/STOL operations and in series with the aft fan for conventional flight. Thus a high by-pass ratio engine is configured for V/STOL, and a low by-pass ratio cycle for normal flight. As such, it is ideally suited for a supersonic V/STOL airplane.

A three-view drawing of a Vought twin engine version of a fighter-attack (U.S. Navy Type B V/STOL) airplane employing this concept is presented in Figure 2-1. The aircraft is a preliminary design sized from mission analysis and engine cycle studies. Details of the propulsion system are presented in Figure 2-2. The Tandem Fan configuration results in an attractive design since additional engines for lift or engine out conditions are not required. The engines are cross-shafted so that the fans of both nacelles are powered in the event of an engine failure. The concept results in an aerodynamically clean, low drag, nacelle since both front and rear fans operate with a common inlet and nozzle in the series flow cruise mode. A simple pitch and roll

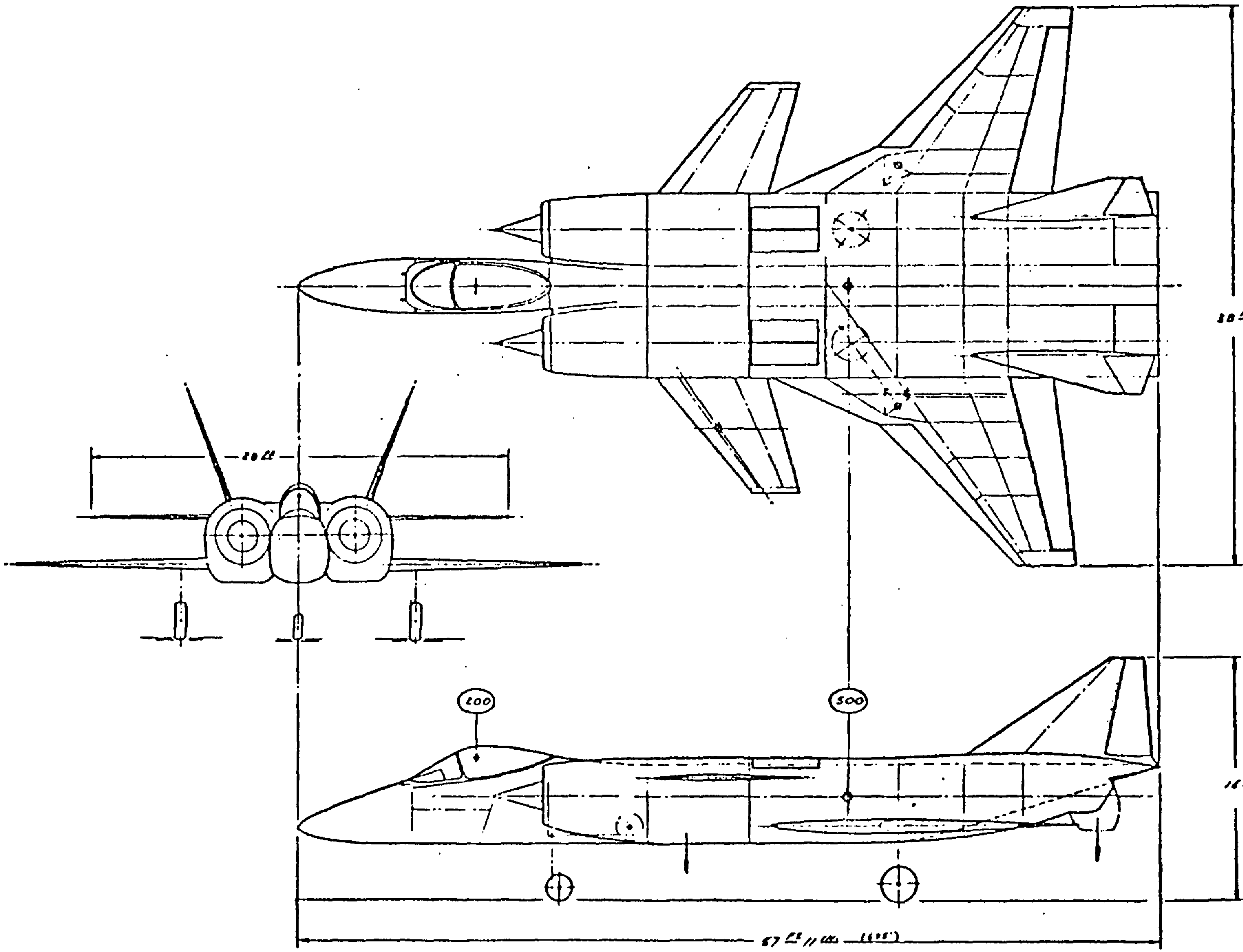
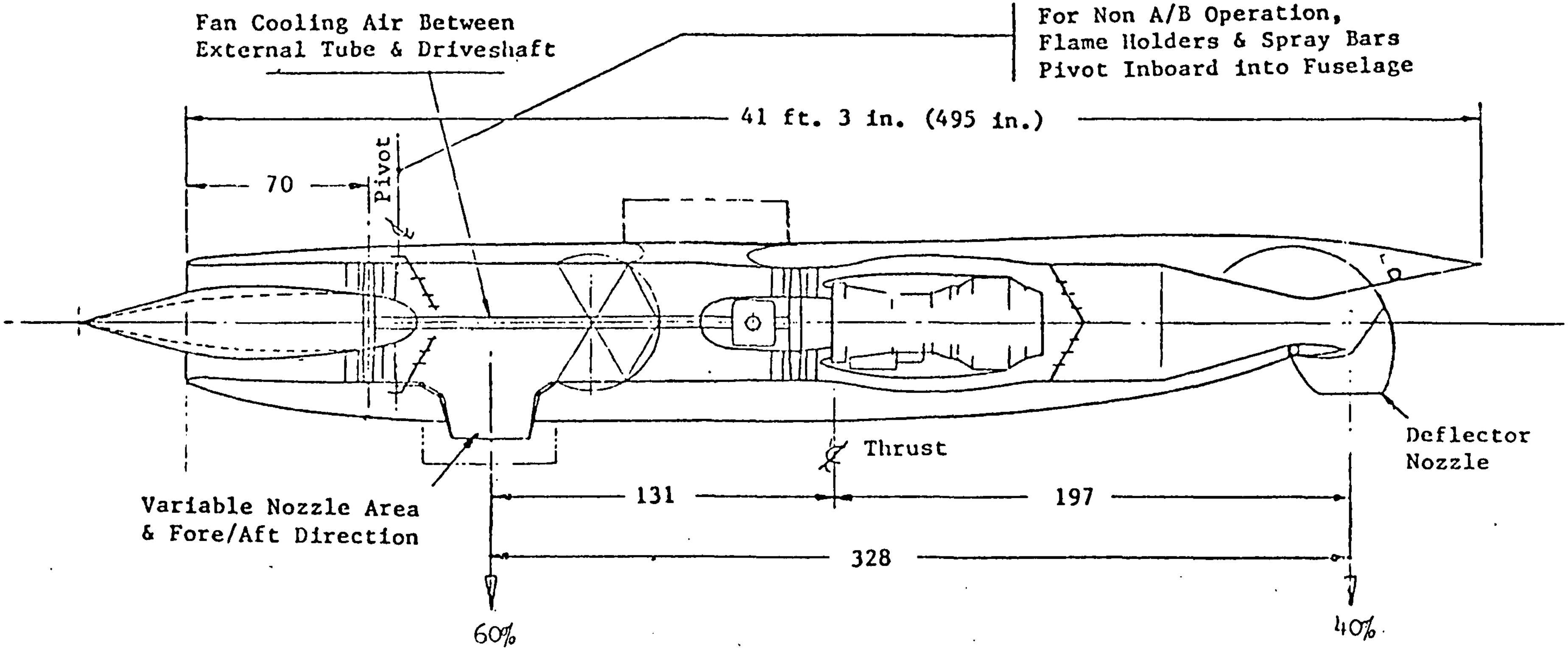


Figure 2-1 V/STOL B Fighter

VOUGHT



Front Fan - 47.86 in. Diameter
Aft Fan - 44.77 in. Diameter
Core Inlet - 28.57 in. Diameter
L.P. Turbine - 36.24 in. Diameter
Eng. Length - 80 in. (Incl. Nozzle)

Figure 2-2 Series Flow Tandem Fan Propulsion System

VOUGHT

control system is provided either by variable area nozzles or variable inlet guide vanes (VIGV) that change the thrust split between the front and aft nozzles or between nacelles when operating in the parallel flow VTOL mode. Low temperature duct burning may be provided to both ducts for A/B VTOL operation.

Recently, a high performance, single engine V/STOL fighter designed around the Vought Series Flow Tandem Fan (SFTF) propulsion concept has been studied for the NASA Ames Research Center (Ref. 3). Integration of the SFTF into an efficient fighter configuration is accomplished with minimal compromise to the aerodynamic configuration, as illustrated by the TF120 general arrangement, Figure 2-3. Figure 2-4 is an artist's rendering of the TF120. A summary description and performance envelope, Figure 2-5, are included herein to present an updated example of an application of the SFTF.

The TF120 is a canard delta configuration featuring extensive wing body blending in both planform and cross section. Canard control surfaces are located on the wing strakes. Small booms extend aft from the wing to carry outboard vertical fins and ventrals. Two small control fins mounted on the lower corners of the inlets pivot from vertical to horizontal depending on flight regime.

The TF120 is a control configured vehicle with movable surfaces which can be optimally phased throughout the operating envelope. In addition to providing direct lift and direction sideforce, this system can cope with battle damage or random failures with fewer channels of redundancy than usually postulated for fly-by-wire because of the multiplicity of controls.

The ventral fins below the inlets are unit control surfaces with two axes of travel. In addition to pivoting to generate normal forces, these surfaces can be adjusted to any dihedral angle between -15 and -75 degrees. In the down position they help generate direct side forces and aid in directional control. At supersonic speeds they fold out to reduce the rearward shift in aerodynamic center and augment longitudinal and lateral control. At a -45 degree setting the fins can be used as two-axis controls for gust alleviation and precision target tracking. The aft vertical and ventral fins are all moving controls that are mechanically independent. Therefore a total of six

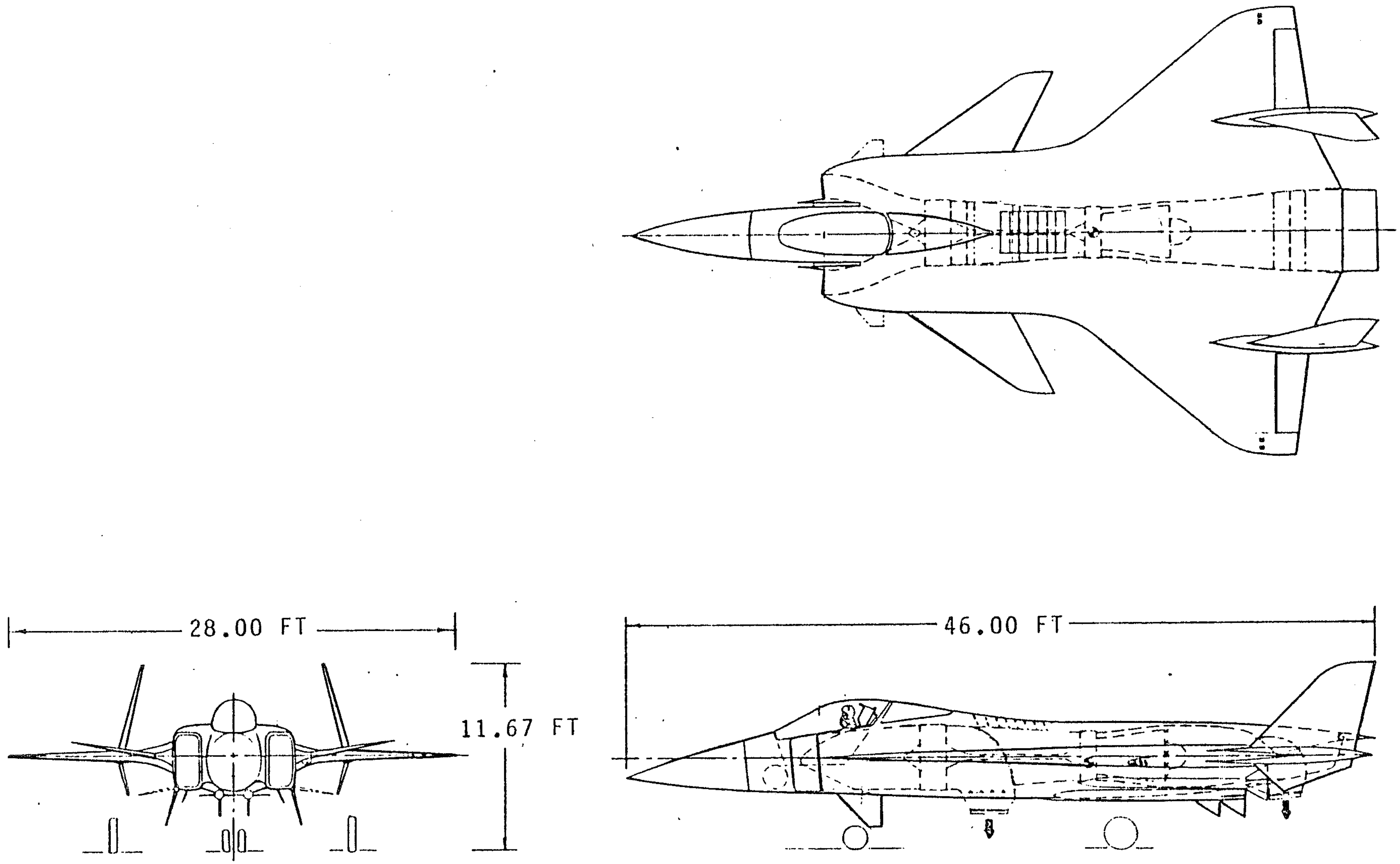
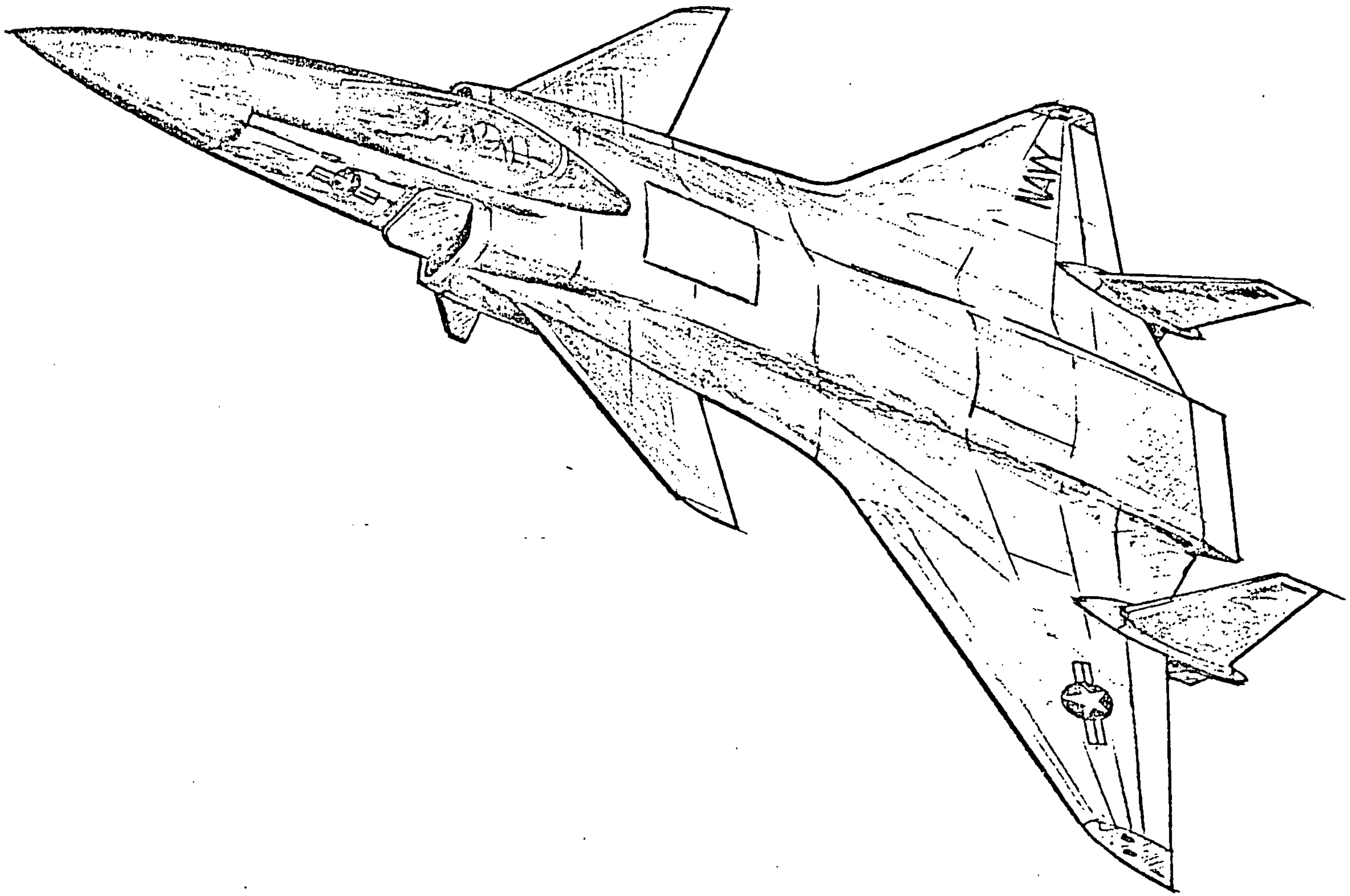


Figure 2-3 TF 120 Tandem Fan V/STOL Fighter

VOUGHT



VOUGHT

Figure 2-4 TF 120 Tandem Fan V/STOL Fighter

S = 350 FT ESF = 1.0

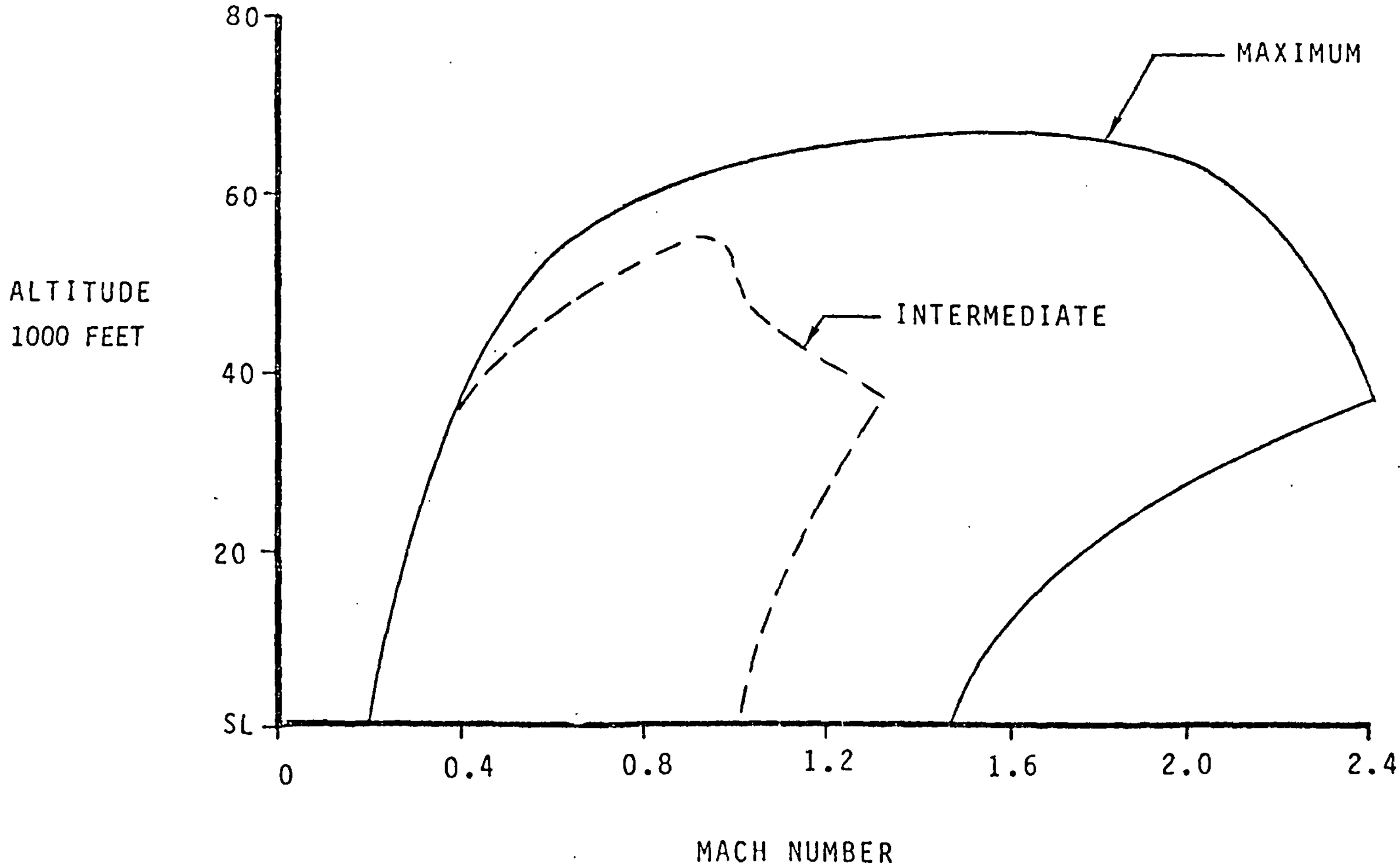


Figure 2-5 TF 120 Performance Envelope

control surfaces are available to generate side forces. The four ventrals provide control effectiveness into the post-stall regime to enhance combat agility.

Force controls available for longitudinal and lateral control are wing trailing edge flaps (elevons), canards and the inlet ventral fins. A trailing edge flap attached to the 2-D vectorable supersonic nozzle provides longitudinal trim and high speed thrust vectoring capability.

With the control surface group under integrated software control, it is possible to compensate for wide-ranging flight conditions, control non-linearites and component failures. Thus, a very high level of system performance can be achieved. However a high quality aerodynamic data base will be required to realize this potential.

The propulsion system for the TF120 is the Series Flow Tandem Fan (SFTF) variable cycle engine. The system is composed of shaft-coupled forward and aft fan units driven by a turbofan engine as shown in Figure 2-6. Both fans employ variable inlet guide vanes (VIGV) for thrust modulation in the parallel flow mode (vertical operation) and for fan matching in the series flow mode as used for normal flight operations. The blocker door, a moderate temperature burner for the forward fan, the forward fan ventral nozzle, and the rear fan inlet are located between the two fan units.

In high speed flight, the propulsion cycle is a conventional afterburning turbofan. For vertical operation, the front fan flow is separated from the aft fan/core engine flow by simultaneously closing the duct diverter valve and opening the front fan exhaust nozzle and aft fan top inlet. A unique "venetian blind" blocker door acts as a variable porosity wall to provide a "soft" smoothly distributed flow diversion to minimize aft fan flow distortion during the transition to and from series and parallel flow modes.

The forward fan uses low temperature duct burning during V-mode operation. The VIGVs provide the rapid and precise thrust modulation needed for hover control.

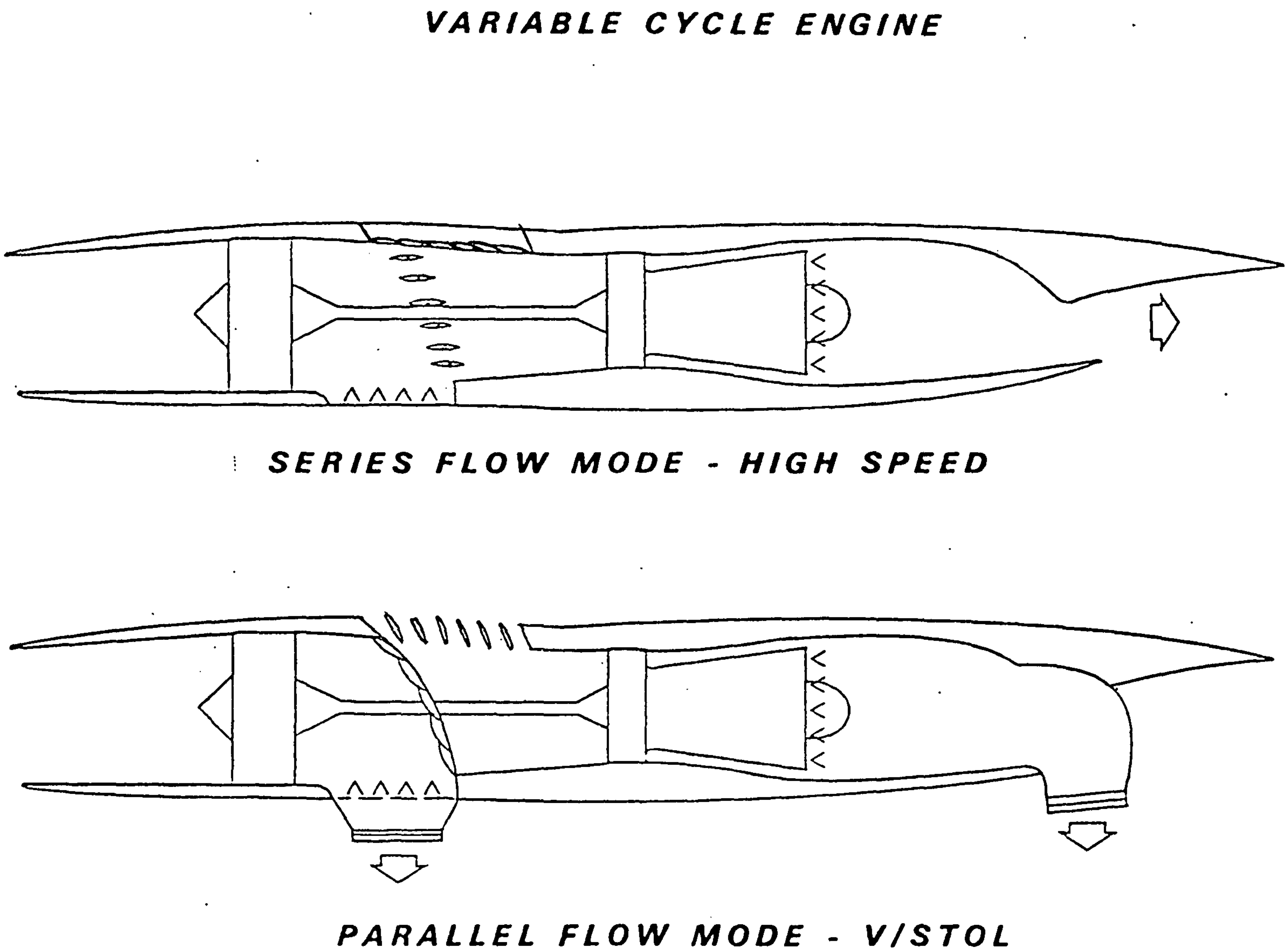


Figure 2-6 Convertible Cycle Tandem Fan Propulsion System

VOUGHT

The side inlets have a fixed geometry vertical ramp, bifurcated duct design with blow-in doors for improved VTO performance. The aft vertical mode top inlet is of flush design located on the upper fuselage. (See Figure 2-3, 2-4)

The forward nozzle is similar to the Vought V-530 parallel flow tandem fan V/STOL nozzle but has a low temperature burner incorporated into the system to augment thrust during VTO. An 2-D vectorable supersonic nozzle is used to vector the aft flow stream. Full afterburning of the aft flow stream is possible anywhere in the flight envelope, but is not required in the hover mode.

The series flow tandem fan concept achieves longitudinal control by differential modulation of the variable inlet guide vanes. VIGV thrust modulation delivers rapid pitch attitude response. Vanes in both exhaust streams provide yaw control in hover. Roll control is accomplished by a demand bleed reaction jet system mounted on the wing tips.

The downwash flowfield of this airplane during hover in and out of ground effect is considered to have some positive aspects and minimal adverse effects. In ground proximity, a single warm fountain would form near the airplane CG where there is considerable planform surface to provide lift. The top inlet is exceptionally well shielded from reingestion, and the forward running ground jet is not normally subject to reingestion in the front inlet. Out of ground effect, the suck down due to entrainment would be minimal due to any effect of the front jet being only on the fuselage, and the aft nozzle entrainment having a suck down primarily on the frontal region of the nozzle. The ground jet temperatures, 1000°F max, would be moderate very close to the airplane. Tire and store heating would be modest even in the limit due to the short time of exposure to these moderate temperatures.

The primary scope of this program was to design, fabricate test, and evaluate a subscale model of the transition section for a Tandem Fan propulsion system. The model simulated the Tandem Fan concept back to and including the aft fan with the exception of the duct burner and driveshaft. The existing subsonic V/STOL A subscale front inlet was used in place of a supersonic inlet. The model was powered by two 12-inch diameter Tech Development Inc. tip turbine driven fans and was tested in the NASA-LeRC 10 x 10 - foot wind tunnel.

3.0 SYMBOLS AND ABBREVIATIONS

1. AFANPR - Aft fan pressure ratio - referenced to tunnel total pressure for all parallel mode operations, data reading numbers 17 to 188, and 336 to 374, i.e. average aft fan out total pressure/PTO.

   Referenced to the average recovery of all aft fan face rake probes for transition and series mode operations, data reading numbers 190 to 335, i.e. average aft fan out total pressure/PRECAA x PTO.

2. ALPHA - Angle of attack, degrees.

3. DMAX40 - Distortion of 40 probes at aft fan face - PTMAX-PTMIN/PREC40xPTO.

4. DPT - DMAX40, aft fan face distortion, used on report figures.

5. DQO - Measured tunnel test section dynamic pressure, pounds per square foot.

6. DR# - Data reading number, test point designator.

7. FFANPR - Front fan pressure ratio - referred to tunnel total pressure.

8. MNFFA - Aft fan face Mach number, calculated.

9. MNTHA - Front inlet throat average Mach number, calculated.

10. MO - Tunnel test section Mach number, calculated.

11. PCSPDA - Aft fan operating corrected speed, in percent of design speed 18144 RPM, referred to TTO, calculated.

12. PCSPDF - Front fan operating corrected speed, in percent of design speed 18144 RPM, referred to TTO, calculated.

13. PPS - Flow rate, pounds per second.

14. PRECAA - Average recovery at the aft fan face rake referred to PTO area average of 104 probes, calculated.

15. PREC40 - Area averaged recovery of 40 probes at the aft fan face, referred to PTO.

16. PT - Total pressure, pounds per square foot, absolute.

17. PTAV=PREC40 - Aft fan recovery used on report figures

18. PTO - Tunnel test section total pressure average of 4 probes

19. QO - Test section dynamic pressure, direct reading tunnel test section PTO minus static pressure pounds per square foot.

20. REC=PREC40 - Aft fan recovery

21. RPMAVA - Aft fan speed - average of 2 sensors, revolutions per minute.

22. RPMAVF - Front fan speed - average of 2 sensors, revolutions per minute.

23. RPMCAV - Front fan corrected speed, referred to TTO and 519^{o}R, revolutions per minute, calculated.

24. RPMCAVA- Aft fan corrected speed, referred to TTO and 519^{o}R, revolutions per minute, calculated.

25. RMS - Root mean square of the aft fan face total pressure, pounds per square foot absolute.

26. TTO - Tunnel test section total temperature, average of 4 thermocouples, ^{o}R.

27. WAFC=WRAKEC - Aft fan weight flow, "corrected", this symbol used on report figures.

28. WINFC - Front fan weight flow at test section conditions of PTO and TTO, in pounds per second. Based on previous calibration and front inlet lip static pressures.

29. WRAKEC - Aft fan weight flow calculated from 104 total and 16 static pressures, and test section total temperature, TTO.

Greek Symbols

α = Angle of Attack

4.0 PROGRAM OBJECTIVES AND DESCRIPTION

The objectives of this test program were to explore the operation of model inlets and interstage variable geometry hardware for a variable engine cycle tandem fan propulsion system in simulated V/STOL operations converting to and from normal wing borne flight. The operating characteristics of the front inlet, front nozzle, interstage blocker door and top inlet were surveyed in simulated static and low speed flight in a model powered by a front fan simulator and an aft fan simulator. Full parallel flow mode, series mode, and two intermediate configurations simulating transition from one mode to the other were tested. This test data was to form a data base for further design development.

The model was designed for testing in the 10' x 10' wind tunnel at NASA Lewis Research Center. The various model configurations were tested over a speed range of 0 to Mach 0.3 and angles of attack from -10^0 to $+40^0$, with front and aft fan power at various levels.

This test was oriented to evaluation of the flow at the aft fan face for the various operating conditions. The top inlet supplied all the air flow for the aft fan during parallel mode operations. In transition mode, the combined flows from the top inlet and front fan through the partial blocker door opening supply the air flow to the aft fan. In the series mode, the flow from the front fan plus the front fan tip turbine drive air supply the aft fan. The aft fan flow conditions were evaluated in terms of recovery and distortion at various system power levels and simulated flight conditions.

5.0 TEST PROGRAM DESCRIPTION

The scope of this program consisted of the design and fabrication of the model by the Vought Corporation. Instrumentation, installation, and testing in the NASA Lewis Research Center 10' x 10' wind tunnel and data reduction were performed by Lewis personnel. Data analysis and reporting were by Vought.

5.1 Test Objectives

Specific test objectives to be accomplished during the wind tunnel entry were as follows:

1. Determine aft inlet pressure recovery and distortion under a wide variety of airspeed, angle-of-attack, and model configuration conditions. Parallel flow only.
2. Determine aft inlet pressure recovery and distortion as the model gradually changes from parallel to series operation, conditions and configurations to be selected based on 1 above.
3. Investigate the interaction between front and aft inlets.
4. Perform a short flow visualization test run. Tufts and paint streaks will be photographed to record surface flow patterns.
5. Investigate one or several "quick fixes" to any flow problems noted during previous testing.
6. Obtain data to analyze aft fan performance in the partial or full series mode.

5.2 Test Equipment

This test program was planned to simulate the static and low speed operation of the tandem fan propulsion system as described in the twin engine podded system in Section 2. In the airplane system, movable components are scheduled to open the front nozzle, close the blocker door, and open the top inlet for vertical operations. In this configuration, the front fan operates in a parallel mode with the aft fan and core engine. In wing borne flight the front fan discharges directly to the aft fan and core for series mode operation (front nozzle closed, blocker door opened, top inlet closed). For conversion from and to parallel and series modes, the movable components are scheduled to sequentially open the blocker door, close the front nozzle, and then close the top inlet.

5.2.1 Model Description

The model was designed to simulate these airplane propulsion system configurations by use of adjustable and added or removed components. A general layout of the model is presented in Figure 5.2-1. The front inlet, fan mount, and fan discharge rake were used from the test program reported in Ref. 1. The fan drive air supply, control and metering system were also used and duplicated for the aft fan power supply. A central source of heated high pressure air supplied these drive systems.

The blocker door consisted of three nested sections of a cone. Removal of the center cone tip provided a 1/3 open area at the blocker door station. Removal of the next cone ring resulted in 2/3 open duct area. Removal of the outer ring provided a clean duct for series mode operations. The front nozzle area had a "trim" capability for fine area adjustment. Also, by addition of nozzle blocks, the area could be set at nominally 1/3 or 2/3 area or fully closed. The top inlet area was adjustable by movement of overlapping arc segments to provide full open, 2/3 or 1/3 open area, or fully closed.

Details of the adjustable front nozzle and top inlet are shown in Figure 5.2-2. Two inlet lip variants are incorporated into the aft lip nearest the fan. Bleed holes and a variable position lip vane were the options. When the lip vane was removed and the bleed holes closed, the aft inlet was in the basic configuration. Configuration 1 (basic) and 2 (basic and bleed holes) with the vane removed had a top inlet length of 12.85 inches. When the lip vane was installed (Configuration 3, 4 and 5) the net length was 12.40 inches. The lip vane could be positioned at 1/2, 1 and 1 1/2 inches forward of the basic inlet lip. Figure 5.2-3 is a photograph of the model transition section showing the bleed holes open and the lip vane deployed 1 1/2 inches.

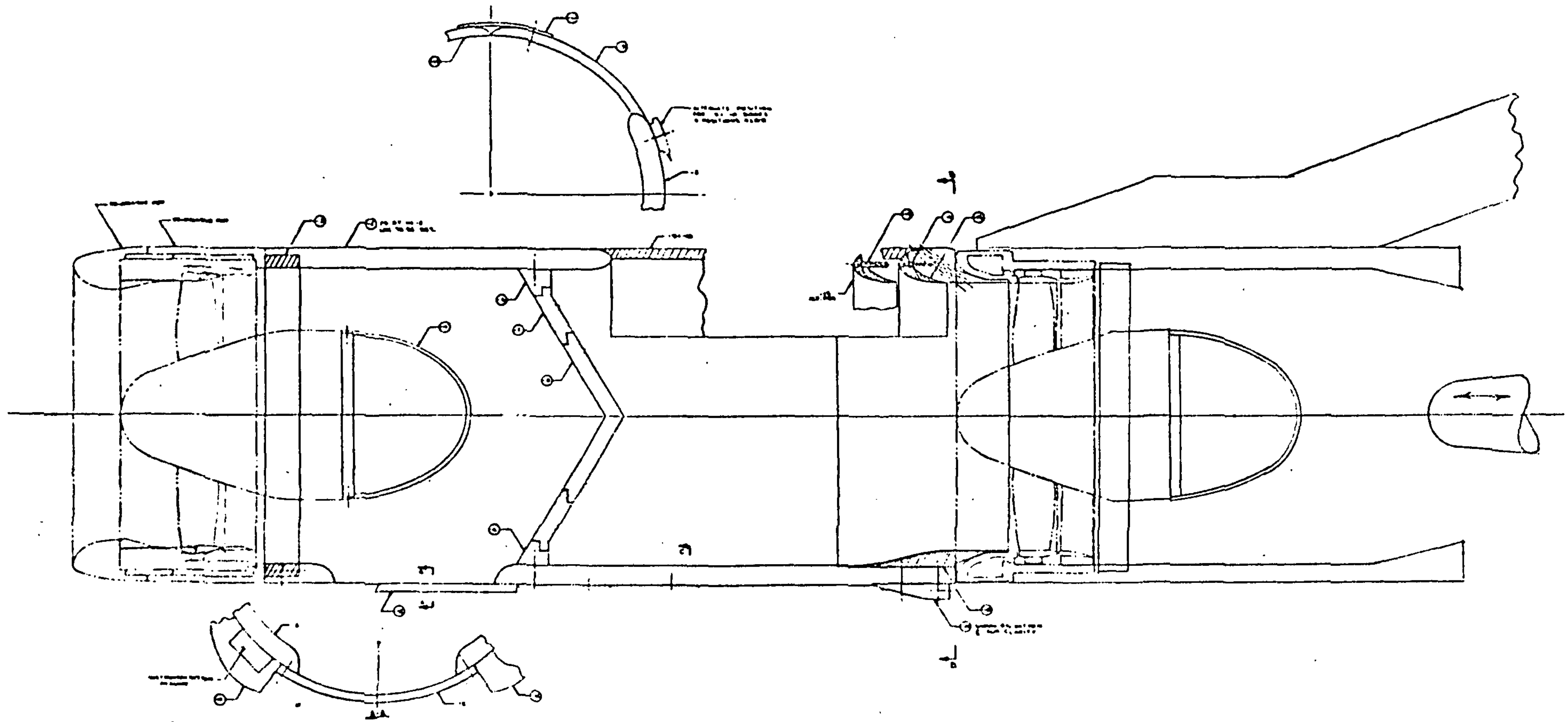


FIGURE 5.2-1 TANDEM FAN WIND TUNNEL MODEL

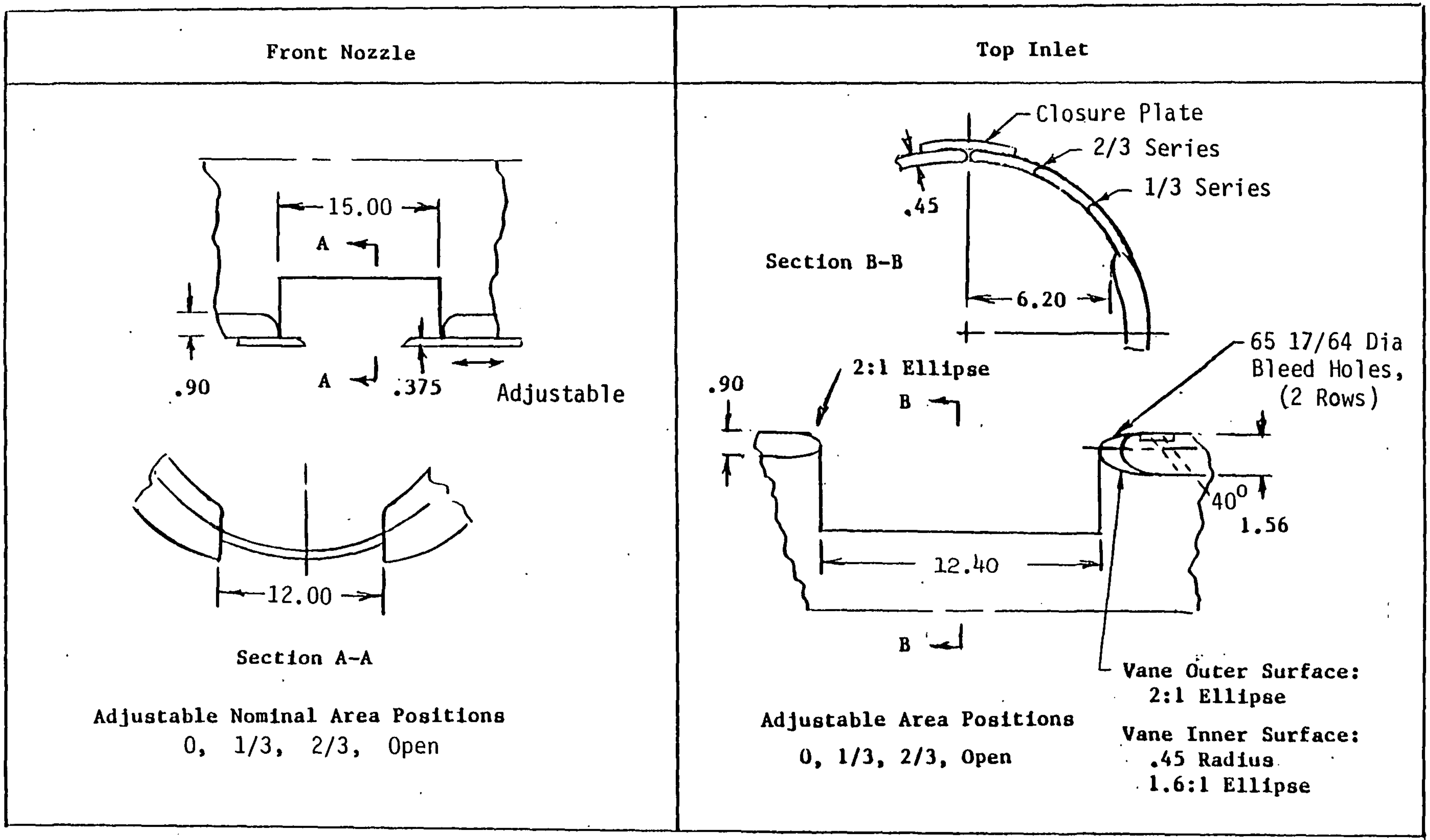


Figure 5.2-2 Front Nozzle and Top Inlet Details

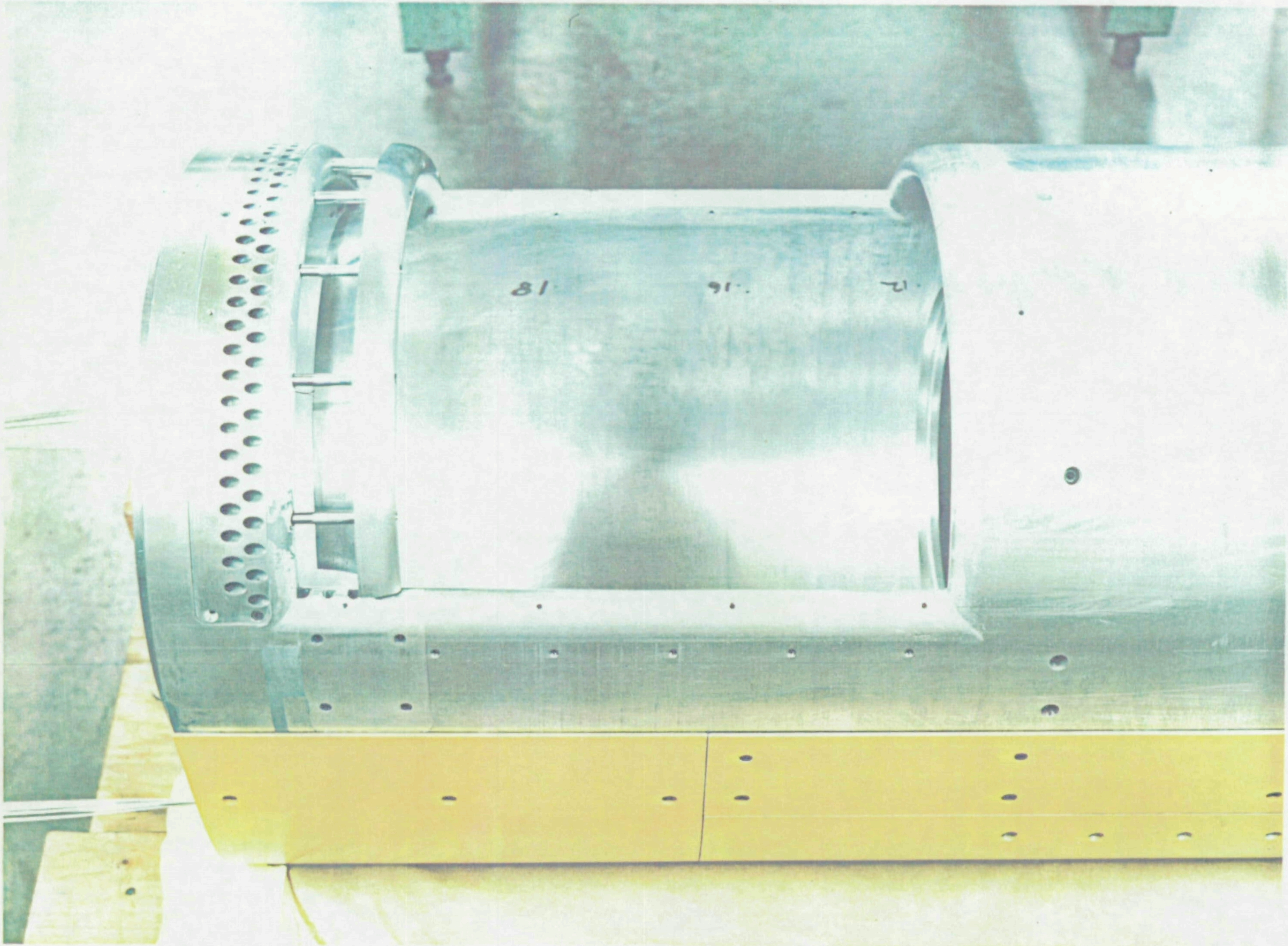


FIGURE 5.2-3 TOP INLET PICTORIAL DETAILS

5.2.2 Instrumentation

The model was instrumented to measure the properties of front inlet flow, front fan and turbine discharge properties, aft fan face flow and total pressure mapping, the operating parameters of both fans, turbine drive air for both fans and aft inlet lip and duct static pressures. Front fan flow was measured by front inlet lip static pressures and the flow calibration obtained during testing reported in Ref. 1. Turbine drive air was controlled and metered in a ventura system for each of the fans. A two leg rake of 10 total pressure and 4 total temperature probes was used at the discharge from the front and aft fans. Total and static pressures were measured in the tip turbine discharge passage of both fans. An eight leg rake was used to obtain detailed flow properties at the aft fan face. It contained 104 total pressure probes and 8 dynamic total pressure transducers. Two speed sensors were used to measure the RPM of each of the fans. Wind tunnel test section instrumentation provided free stream total pressure and temperature dynamic pressure (airspeed), and model angle of attack.

5.3.1 Operating Procedures

The test program was conducted in three parts, corresponding to the three modes of tandem fan operation. For parallel mode operations, the following procedure was used. The model geometry configuration was first established. The front fan nozzle in this configuration was fully open in all parallel mode testing. Also the top inlet was fully open in parallel mode testing, and the blocker door fully intact - preventing flow from the front fan to the aft fan. During start-up adjustments, without tunnel flow, the aft fan discharge nozzle plug was adjusted to back pressure the aft fan to a level appropriate to the desired RPM and flow rate. The nozzle plug was not reset during parallel mode testing. The run series was performed for each configuration by setting the operating speeds for both fans, and taking data upon stabilization of the fan speeds and tunnel dynamic pressure at the desired angle of attack. In general, only one parameter was changed between data reading numbers.

For transition mode testing, upon set up of the selected geometry, the front fan was brought up to desired speed at static tunnel condition. The front nozzle area was manually adjusted to back pressure the front fan appropriately. For example, in the 1/3 series transition mode, the front nozzle was closed approximately 1/3, the blocker door center cone was removed (1/3 open area), and the top inlet was closed to the 2/3 open position. Then with the front fan operating, the front nozzle was adjusted to appropriately back pressure the front fan. The aft fan was brought up to desired speed, and the aft nozzle plug set to back pressure the aft fan. For the 2/3 series mode transition testing, the front nozzle was trimmed from the nominal 1/3 open position, the blocker door was 2/3 open, and the top inlet was 1/3 open. Although a calibrated fan map, Appendix C, was available, in general both fans were operated at pressure ratios less than the largest nozzle area operating line. This operating procedure was used to increase the flow rate since fan vibration levels prevented operations at the maximum rated speed. Upon final setting of the front and aft nozzle areas, the run sequence was performed by varying one of the following parameters: fan speed (RPM), tunnel dynamic pressure (q), or angle of attack. The data readings were taken upon stabilization of fan RPM and tunnel q.

In the series mode testing, the front nozzle and top inlet were fully closed. The blocker door rings were totally removed between the front and aft fans. An analysis was performed to establish the operating mass flow rates required to simulate an engine in series mode. This analysis is similarly applicable to a lesser extent to transition mode testing. In an engine, although the actual mass flow rate is constant, the corrected flow through consecutive compressor stages decreases due to the pressure rise. However, the area also decreases, resulting in approximately the same disc Mach number at the face of each stage. The two independently driven fans in the model had the same disc area. However, the aft fan in series mode is supplied with the flow from the front fan and the front fan tip turbine drive air exhaust. In general, the front turbine exhaust at front fan discharge corrected conditions was approximately equal to the decrease in the corrected flow rate of the front fan discharge. Consequently, an engine in series mode was simulated in the model when the front and aft fan corrected flows were equal.

In both transition and series mode operations, the front and aft fan flow rates and pressure ratios were highly interactive, thus, complicating the setting of operating points to simulate the operation of a tandem fan engine where the front and aft fans would be operating at the same speed. For example, in the series mode, the three tandem fan variables (front and aft fan speed, and aft nozzle area) would have required real time evaluation of each operating parameter during the process of set-up of the operating variables to establish the degree of closeness to typical engine operations. Although this procedure was not done during this test series, and actually could not be done since the aft fan rake did not include temperature measurement, the test objectives were obtained. The degree of tandem fan engine simulation was considered adequate for a preliminary evaluation of aft fan distortion and recovery at the selected test conditions.

5.3.2 Run Log Summary

Performance of the test program was undertaken in three operating modes (parallel, transition, and series). Specific data points were identified as data reading numbers. Appendix A is a listing of the summary of all test points as data reading numbers. The following three paragraphs relate operating mode and data reading numbers.

5.3.2.1 Parallel Mode

Parallel mode testing explored four aft lip variations of the basic model and the test of bellmouth type extensions to the two side lips of the top inlet. Oil flow studies were made on the basic model and with the bellmouth.

	Data Reading Numbers
o Configuration 1, Basic Model - Front Inlet, Front Fan, Front Nozzle Open, Blocker Door Closed, Top Inlet Open, Aft Fan and Aft Variable Position Plug Nozzle	17-49
o Configuration 2, Basic Model, +Bleed Holes on Aft Lip of Top Inlet	51-83
o Configuration 3, Basic Model, Bleed Holes, + 1/2" Spaced Vane on Aft Lip of Top Inlet	85-114
o Configuration 4, Basic Model, Bleed Holes, + 1" Spaced Vane of Aft Lip of Top Inlet	116-149
o Configuration 5, Basic Model, Bleed Holes, + 1 1/2 Spaced Vane on Aft Lip of Top Inlet	155-188
o Configuration 9, Basic Model, Bell-Mouth Doors on Sides of Top Inlet	337-368

5.3.2.2 Transition Mode

- o Configuration 6, (1/3 series) Front Inlet, Front Fan, 2/3 Front Nozzle, 1/3 Open Blocker Door, 2/3 Open Top Inlet in Basic Configuration, Aft Fan and Variable Position Plug Nozzle — 190-246
- o Configuration 7, (2/3 series), Front Inlet, Inlet Fan, 1/3 Front Nozzle, 2/3 Open Blocker Door, 1/3 Open Top Inlet in Basic Configuration, Aft Fan and and Variable Position Plug Nozzle — 250-303

5.3.2.3 Series Mode

- o Configuration 8, (full series), Front Inlet, Front Fan, Front Nozzle Closed, Blocker Door Removed, Top Inlet Closed, Aft Fan and Variable Position Plug Nozzle — 304-335

6.0 TEST RESULTS

A complete summary of reduced test data of the three operating modes (parallel, transition, and series) are contained in Appendix A. Selected data on each of these modes is discussed in this section. Although the front fan was operational during all tests, it primarily impacts only the transition and series flow modes. A vibration problem restricted operations to approximately 65% of rated speed, corresponding to a mass rate of about 70% during the parallel and 1/3 series mode operations.

6.1 Parallel Mode

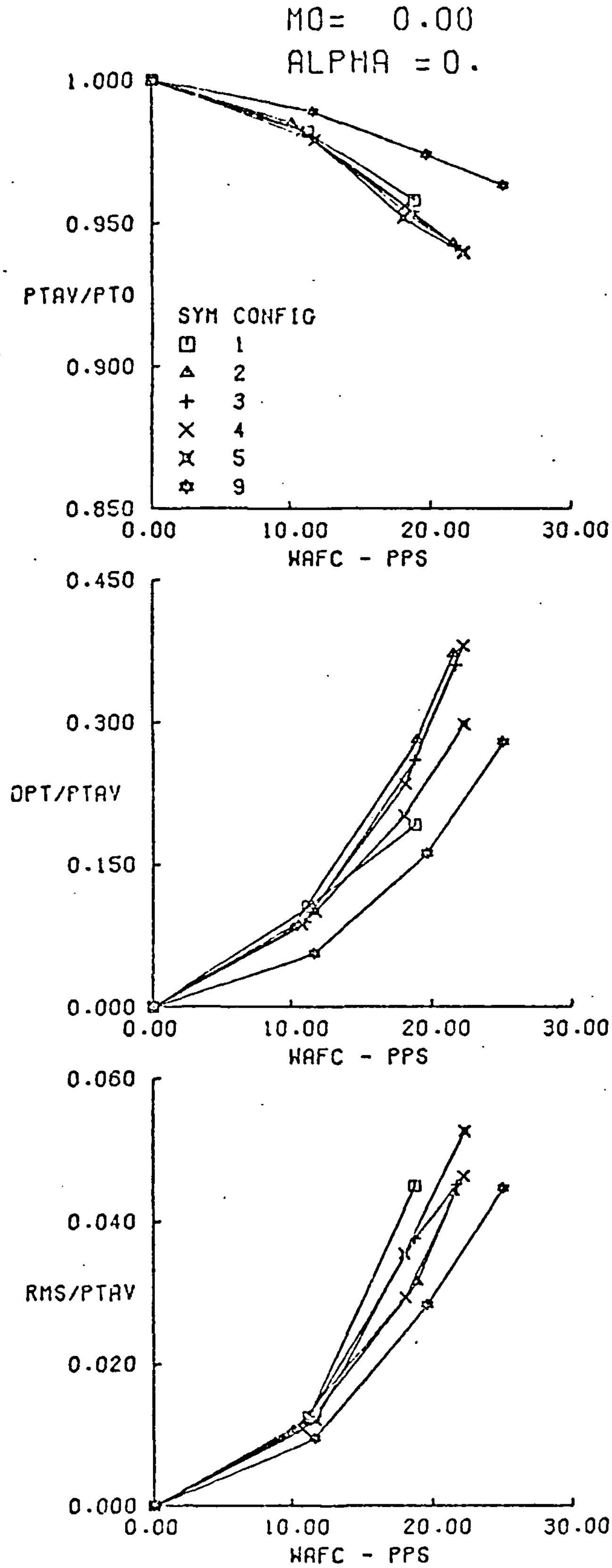
The test data of the parallel flow configurations includes data from static operations and operations at freestream Mach numbers 0.1, 0.2, and 0.3 with angles of attack from -10° to 40°.

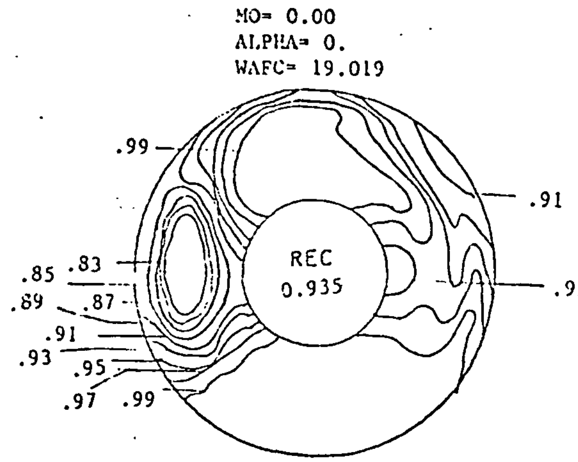
6.1.1 Static

The static performance of the top inlet expressed in aft fan face properties is presented in Figure 6.1.1-1. Total pressure recovery levels of inlet configurations 1-5 are comparable. However max minus min distortion is significantly different. The recovery of configurations 1, 2 and 9 could be expected to be slightly higher than 3, 4 and 5 since the flow area of the inlet is 3.5% greater due removal of the slat thickness (0.45").

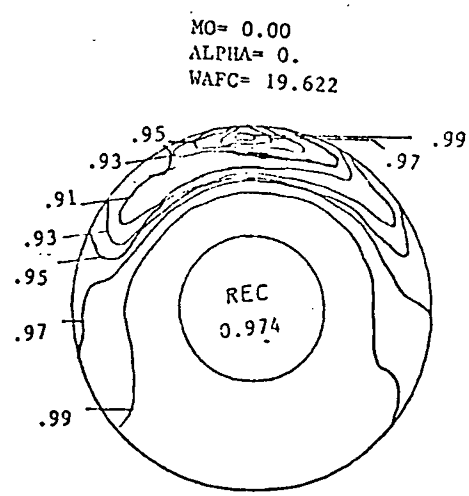
Differences in these five configurations are only in the aft lip treatment as was shown in paragraphs 5.2.1 and 5.3.2.1. Configuration 9 simulating laterally opening bifold doors providing "bellmouth" sides was a test program configuration "fix" for the top inlet. This was done to reduce lip losses. A degree of success was achieved in that inlet losses at the fan faced were reduced in the order of 50%. Notwithstanding the losses of even the "bellmouth" inlet are approximately one 'q', based on the projected throat area. Actually this is not surprising since the flow path divergence from the top inlet "aerodynamic" throat into the entrance to the aft fan would result in local separation in the inlet duct near the inlet lips in front, and in all probability near the other lip surfaces also. Thus the flow is unguided and in a simplistic view, it is "dumped" into the aft fan entrance volume in a sudden expansion.

FRONT FAN FLOW ≈ AFT FAN FLOW





CONFIG. 2



CONFIG. 9
BELL-MOUTH DOORS
AFT INLET

Figure 6.1.1-1 Static Operation, Parallel Mode

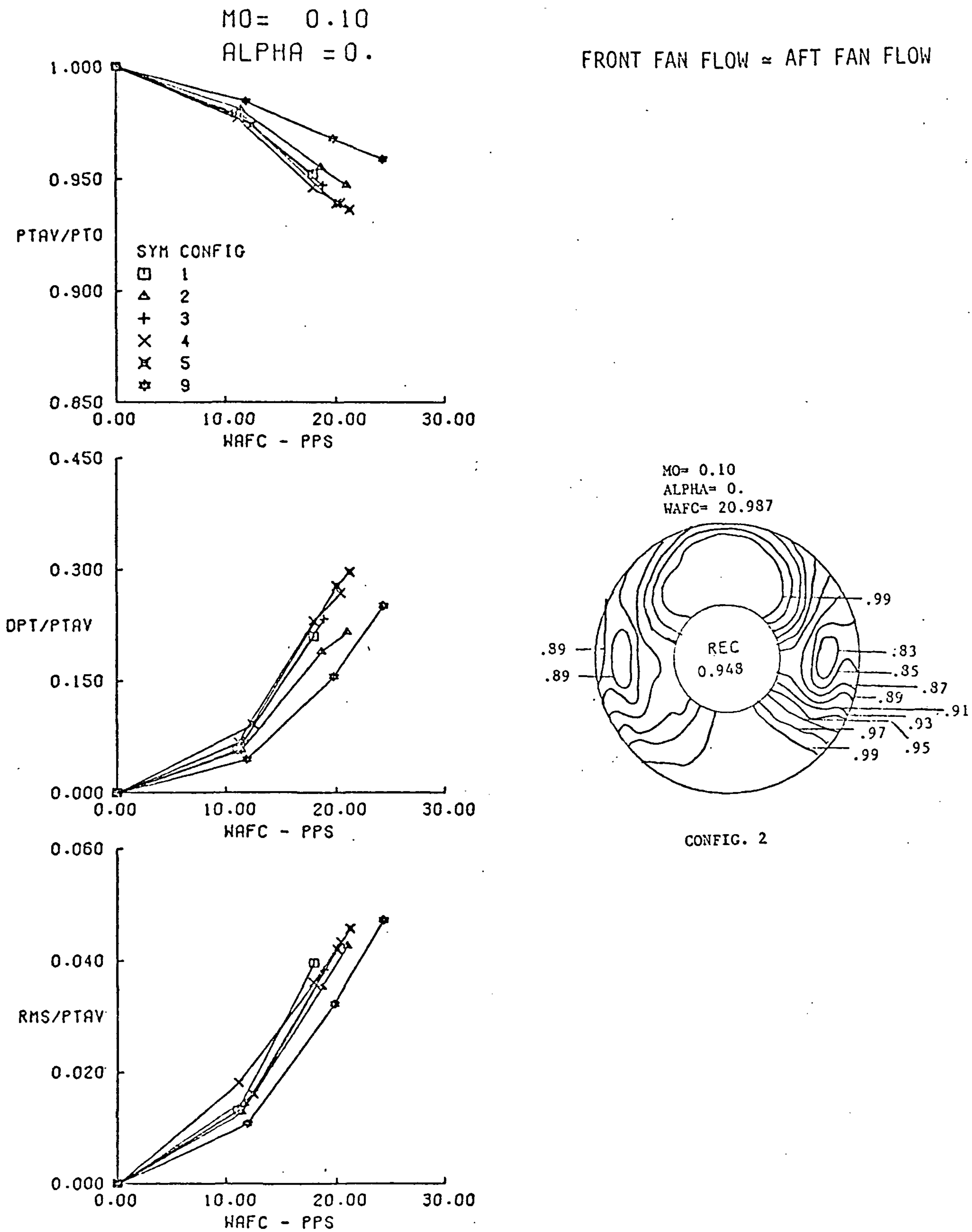
Small regions of very low total pressure on each lateral side of the fan face are characteristic of configurations 1 thru 5 in all operations. These two per rev pockets of low energy flow are quite limited in extent giving rise to large distortion values. The stall margin impact of these pockets may actually be minimal on a long chord fan blade, especially since the pockets are mainly located in the mid-span of the fan blades. These low pressure pockets are considered to be free vorticies characteristic of flush inlets. The "bellmouth" side lip extensions (configuration 9) effectively suppress the formation of the vorticies as shown in Figure 6.1.1-1. Elimination of the vorticies by the bellmouth is the reason for the significant improvement in recovery and reduced distortion at static conditions. Similarly, in later testing, it was observed that the vortex pockets were destroyed with low flow in the 1/3 series runs as discussed in Paragraph 6.2.1.

6.1.2 In-Flight

Figures 6.1.2-1 thru 6.1.2-6 present the performance of the top inlet (expressed in terms of aft fan recovery and distortion) as a function of forward speed, angle of attack and fan flow rate. Formation of the two vorticies characteristic of a flush inlet are well defined with forward flight. In general, angle of attack at a given Mach number increases the size of the vorticies, but not necessarily the strength (indicated by max distortion). The bleed holes (configuration 2) to improve lip flow around the aft lip of the top inlet appear to be the most effective of the original configurations in-flight with and without angle of attack. The unsteady activity level (RMS) increases with both Mach number and angle of attack. This is an additional indication of vortex activity. Figure 6.1.2-7 is a crossplot of the performance characteristics of configuration 2.

6.1.3 Top Inlet Flow Visualization

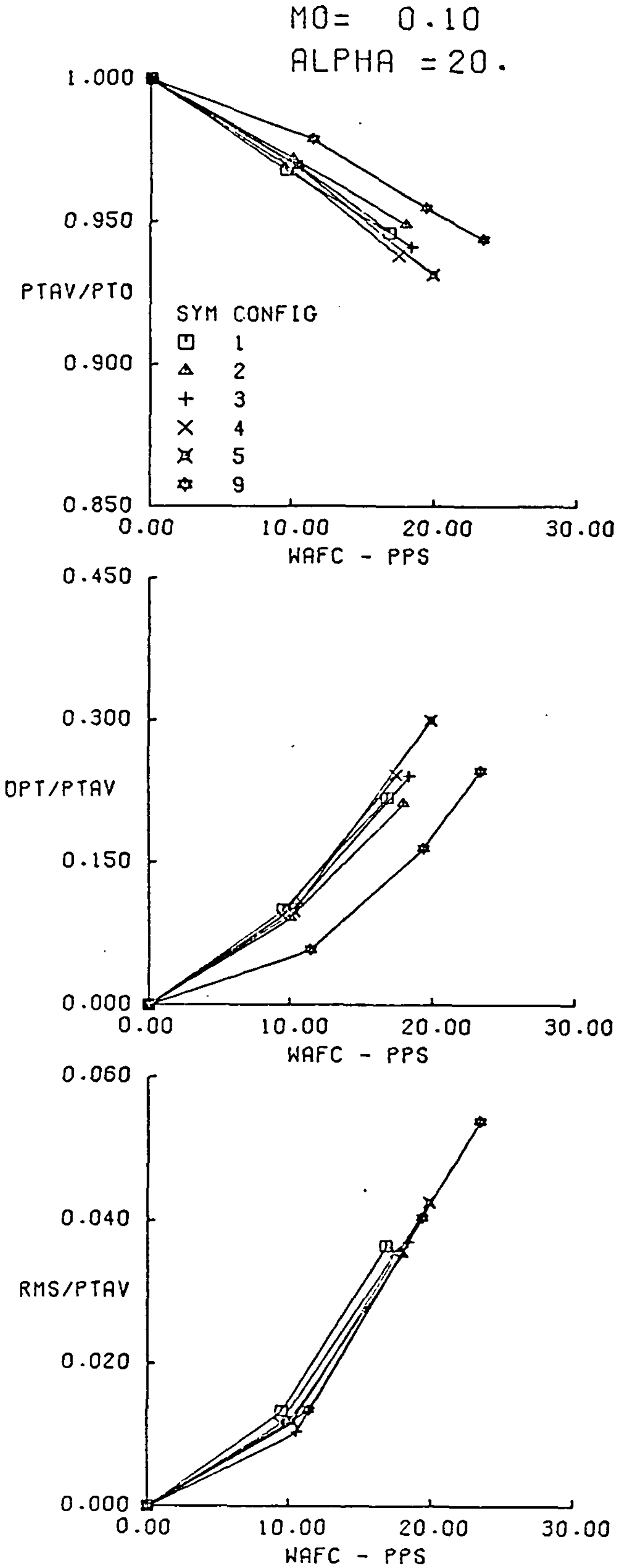
Small dots of multi-colored viscous oil were applied to many nacelle and top inlet locations to observe the migration of the oil as indicators of flow direction in the boundary layer. Figures 6.1.3-1, -2, -3 and -4 show the results of oil flow testing of configuration[1] at forward speeds of 80 knots at 40° angle of attack. The most noteworthy observation of Figure 6.1.3-1 is the significant external flow toward the front nozzle due to entrainment of

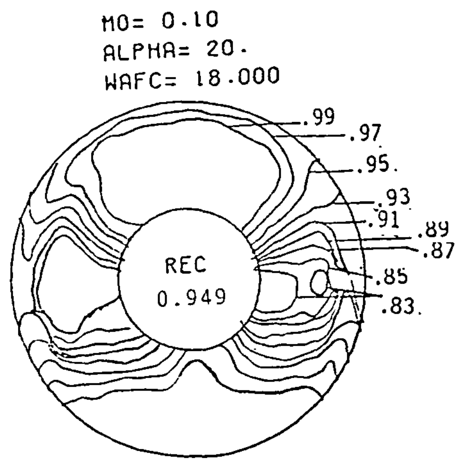


6.1.2-1 Flight Simulation, Parallel Mode

MO=0.1, α=0

FRONT FAN FLOW ≈ AFT FAN FLOW



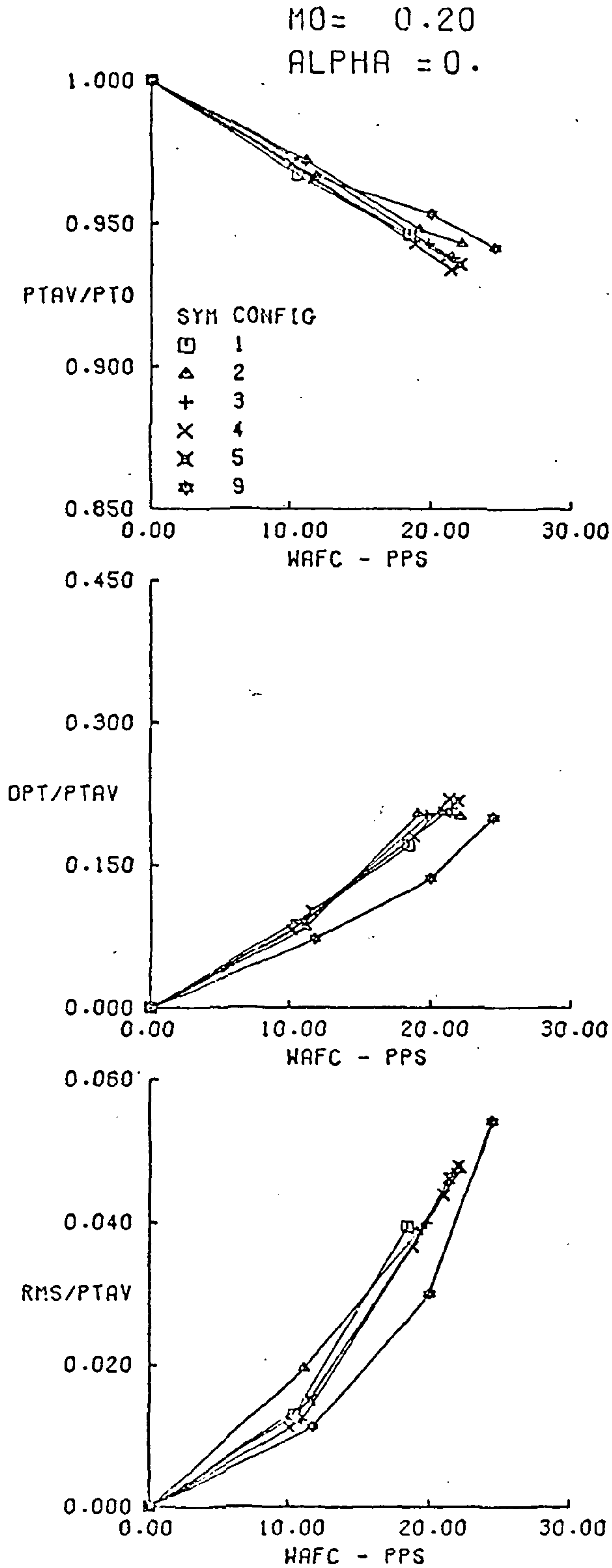


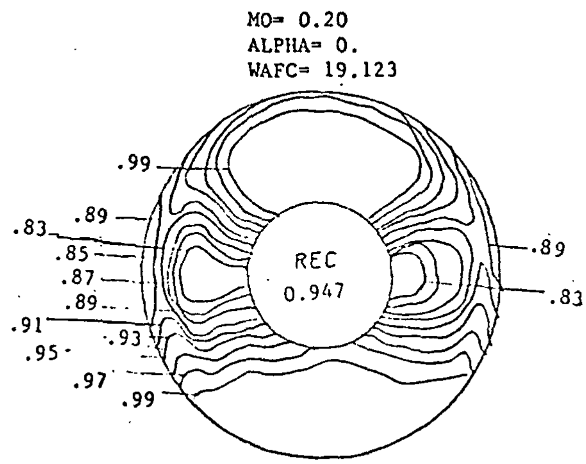
CONFIG. 2

6.1.2-2 Flight Simulation, Parallel Mode

MO=0.1, α=20^0

FRONT FAN FLOW ∝ AFT FAN FLOW

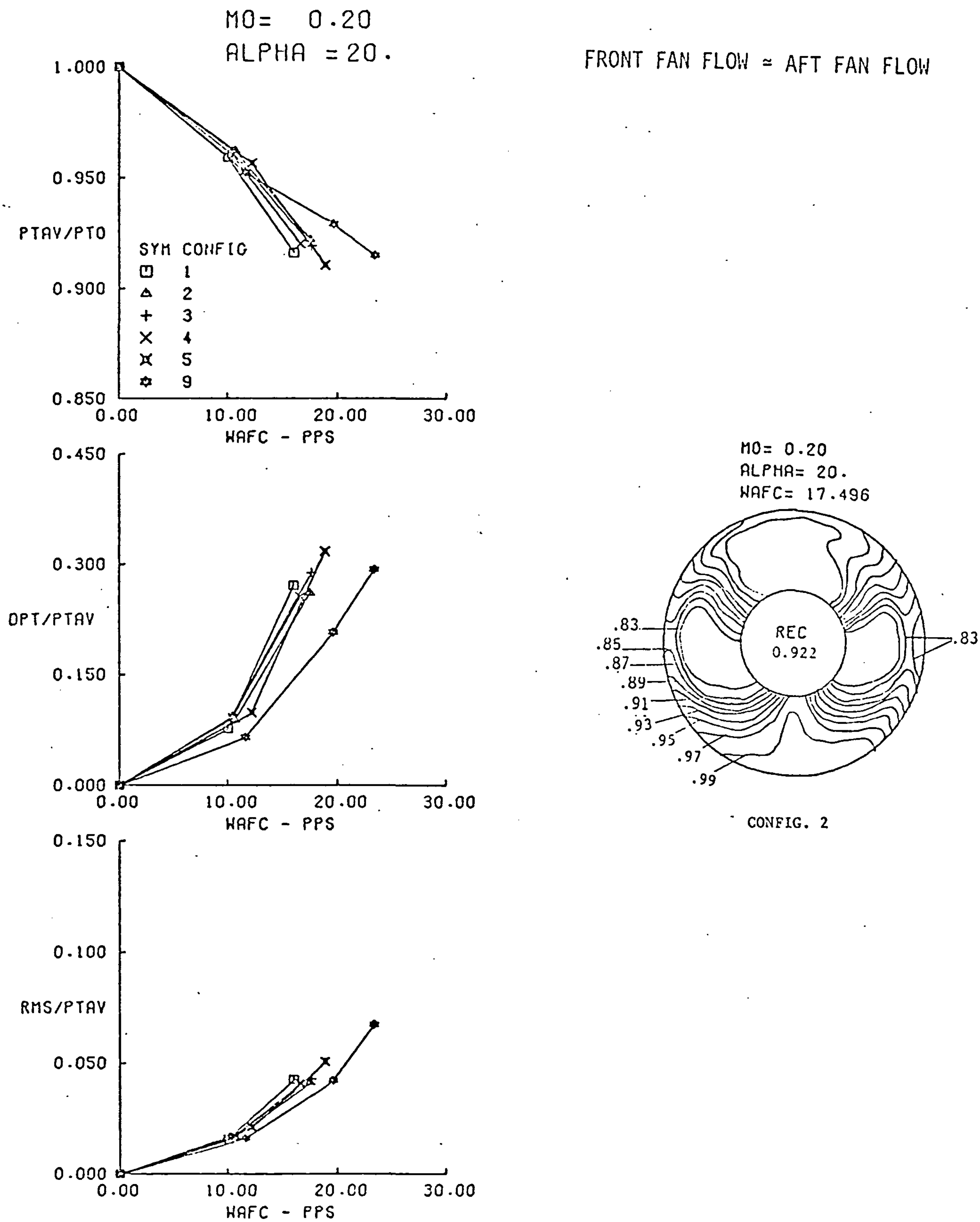




CONFIG. 2

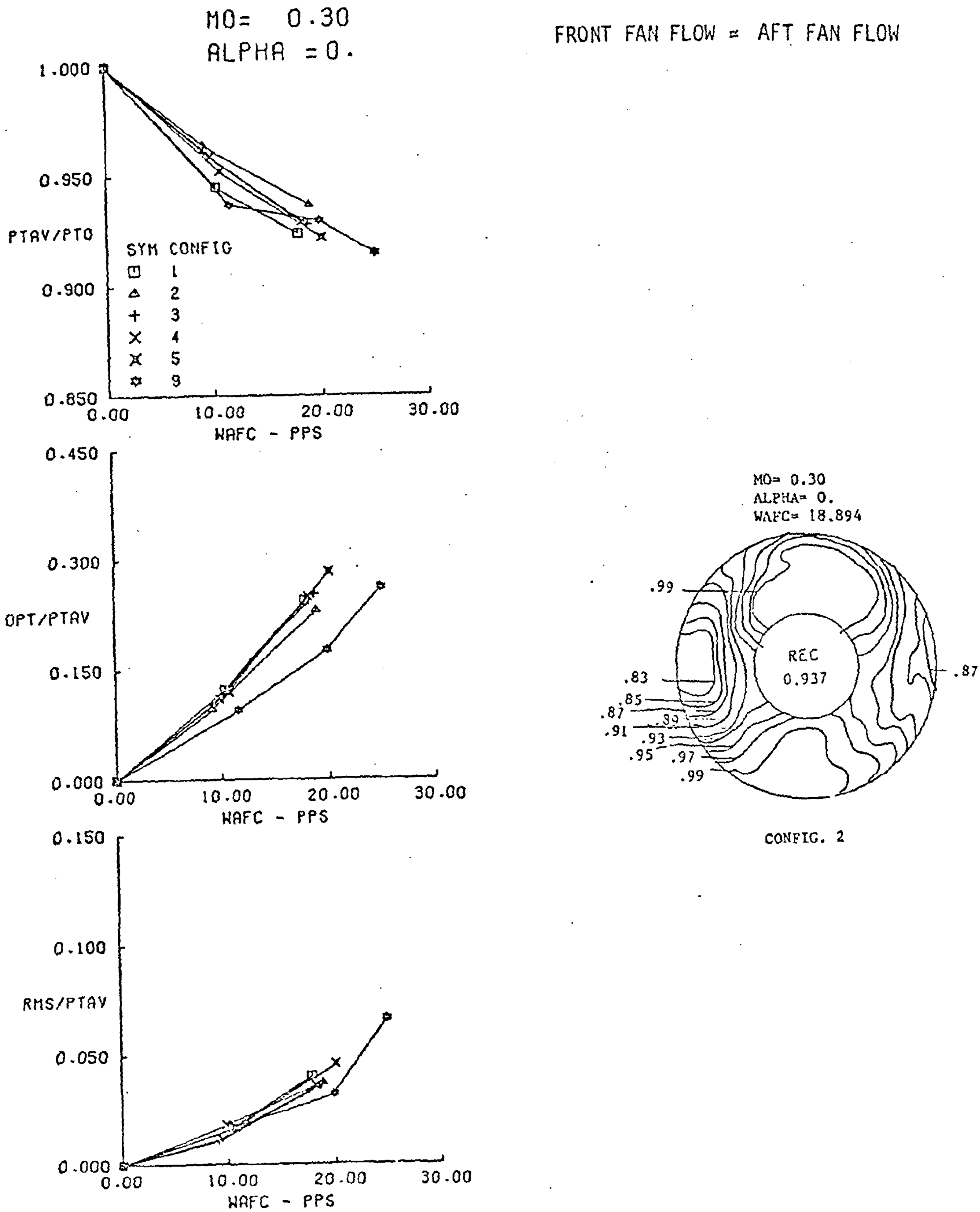
6.1.2-3 Flight Simulation, Parallel Mode

MO=0.2, α=0



6.1.2-4 Flight Simulation, Parallel Mode

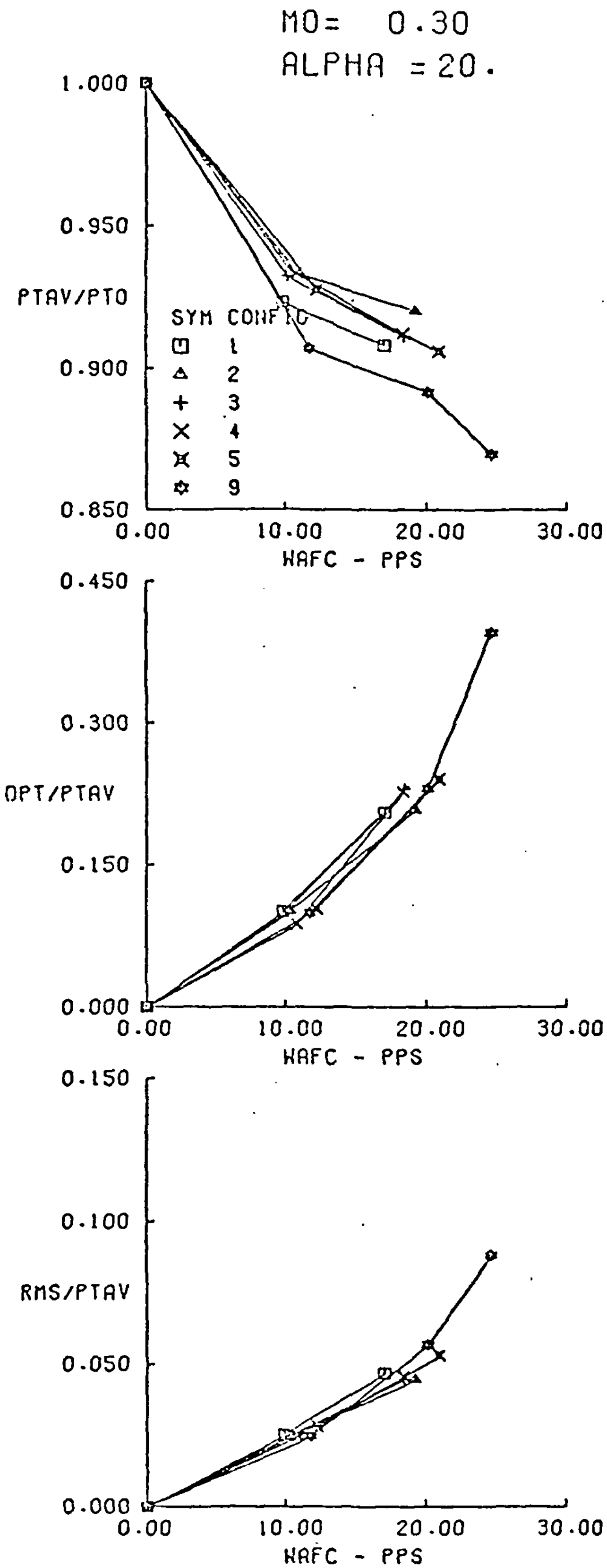
$M0=0.2,\ \alpha=20^0$

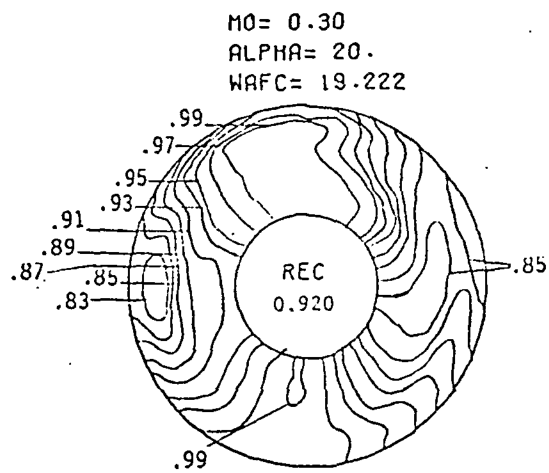


6.1.2-5 Flight Simulation, Parallel Mode

MO=0.3, α=0

FRONT FAN FLOW ≈ AFT FAN FLOW



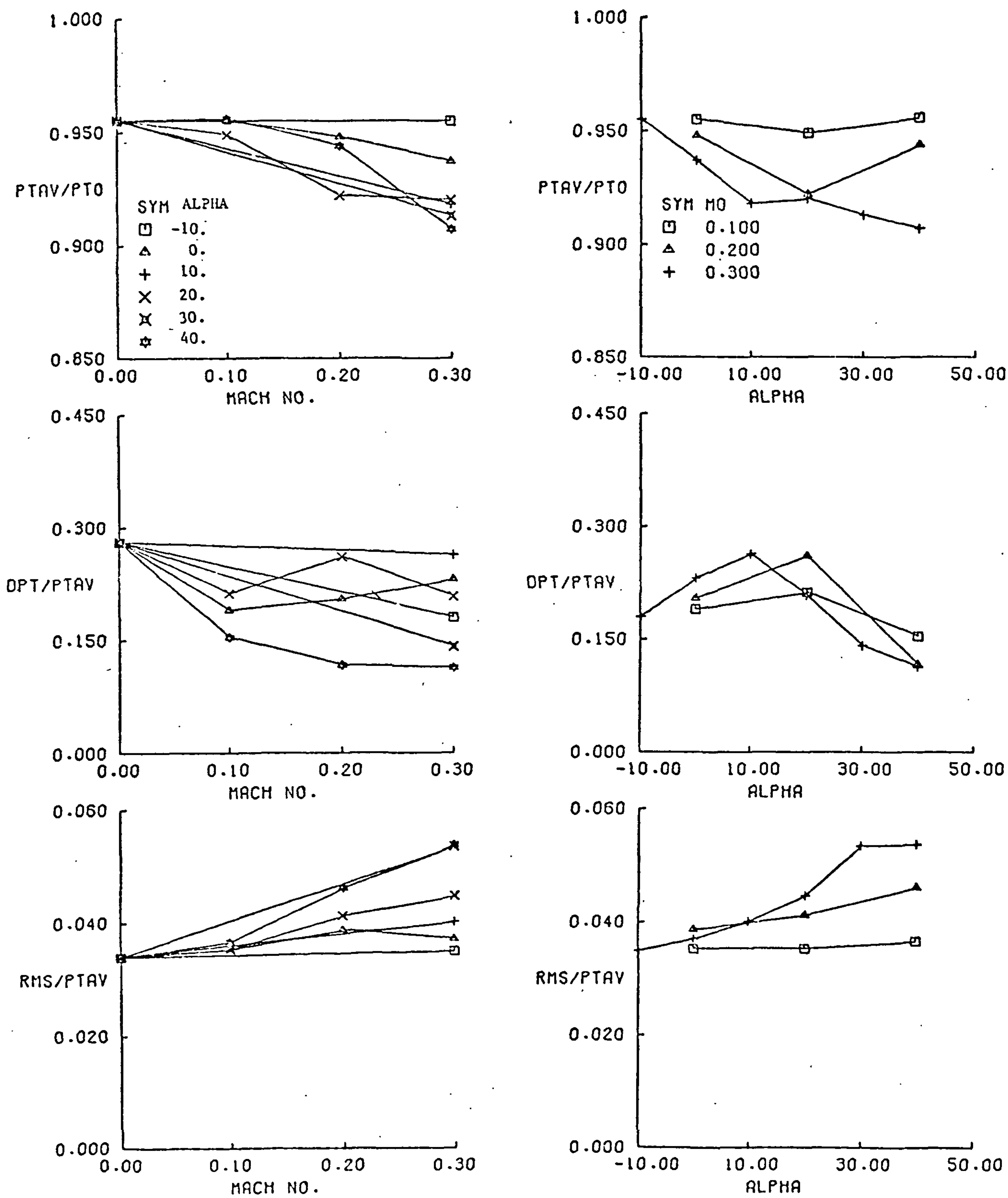


CONFIG. 2

6.1.2-6 Flight Simulation, Parallel Mode

MO=0.3, $\alpha=20^{0}$

AFT FAN FLOW PROPERTIES
CONFIG. 2- PARALLEL FLOW
AFT FAN FLOW- 20 PPS



6.1.2-7 Flight Simulation, Configuration 2, Parallel Mode the freestream in the front nozzle jet. In areas away from the front nozzle, upward flow is observed due to both the high angle of attack and top inlet flow induction.

Figure 6.1.3-2 is a close-up view of the basic configuration (#1) of the top inlet. Noteworthy observations are:

- o The stagnation point is outside of the side lips of the inlet.
- o The side wise direction of the flow in the region slightly upstream of the fore lip may be the first upstream indication of the formation of the side vorticies typical of flush inlets.

Figures 6.1.3-3 and -4 provide the best indication of the detailed flow mechanics of top inlet operation. A clear indication of separation at the lip-duct intersection is shown. The separation bubble is well defined in that there is upward surface flow toward the stagnation line. This separation was postulated by the observation of a flow "dump" type recovery loss.

Figure 6.1.3-5 shows the boundary layer flow paths inside the "Bellmouth" inlet. The flow separation due to local duct divergence at the inlet duct side is observed. Thus, the duct separation is shown to not be a lip effect.

6.1.4 Top Inlet Lip Static Pressure Distribution

Fifteen static pressure orifices were located on one-half of the top inlet at the lip highlight. These pressures provides a better understanding of the distribution of flow around the front, side and aft lips. Figure 6.1.4-1 shows the lip Mach number distribution with 20 lb/sec flow rate at static flight conditions with the aft lip bleed holes open and closed. The most significant observation made from this data is that the aft corner and aft lip operate at high velocities under static conditions. The addition of a well rounded fillet in the aft corner should relieve the peak velocities observed in the sharp corner, even though the total inlet area would be slightly decreased.

One possible rationale for the lower aft lip velocity with the bleed holes, holds that the bleed hole flow tends to produce a thicker effective lip, thus reducing the hi-lite velocity. The reduced aft lip velocity would require more flow along the inlet sides that are more closely coupled to the fan than the front lip - as observed.

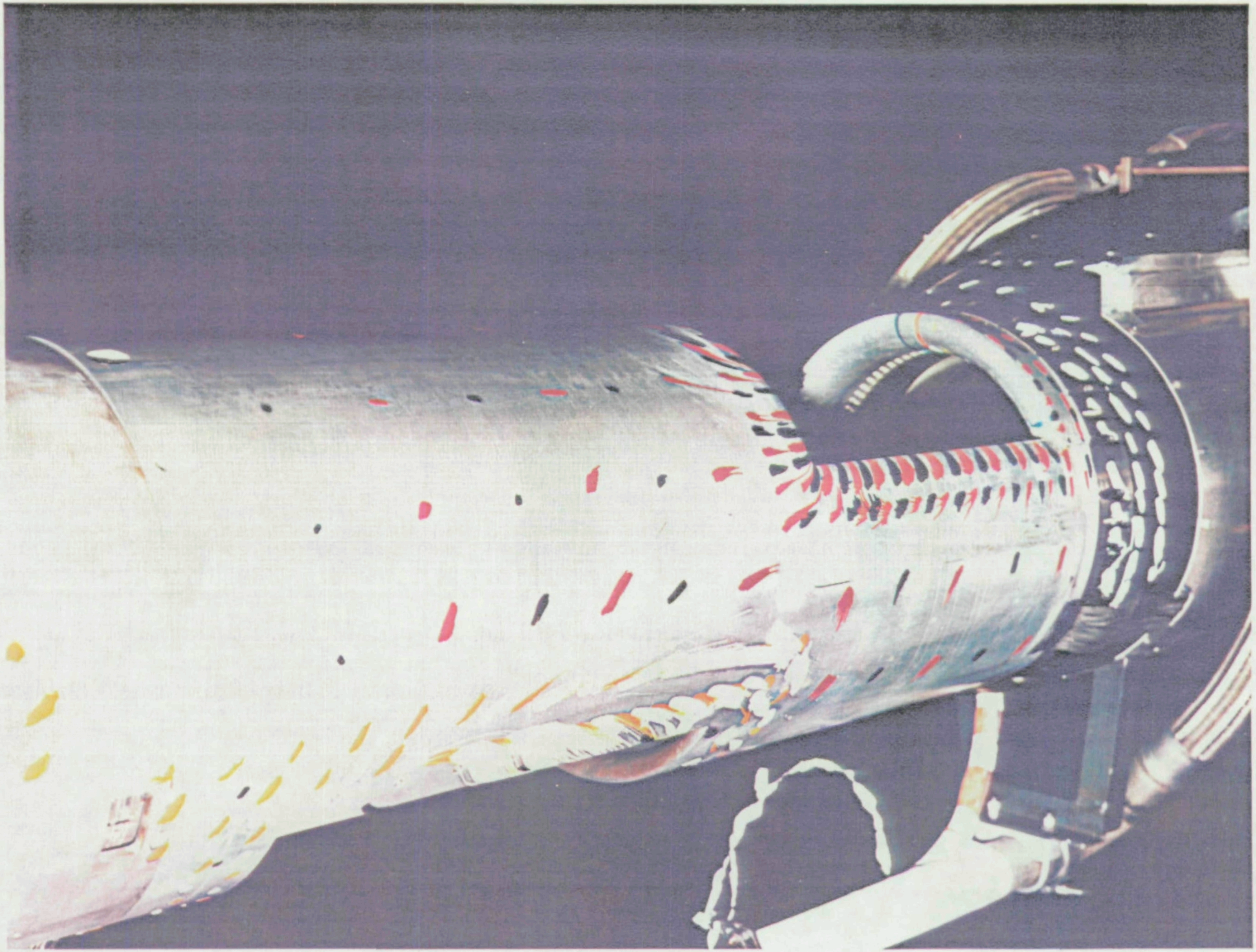


Figure 6.1.3-1. - Nacelle boundary layer flow visualization, V_0 = 80 knots, α = 40^0, WAFC = 25 PPS, 10 minutes flow time.

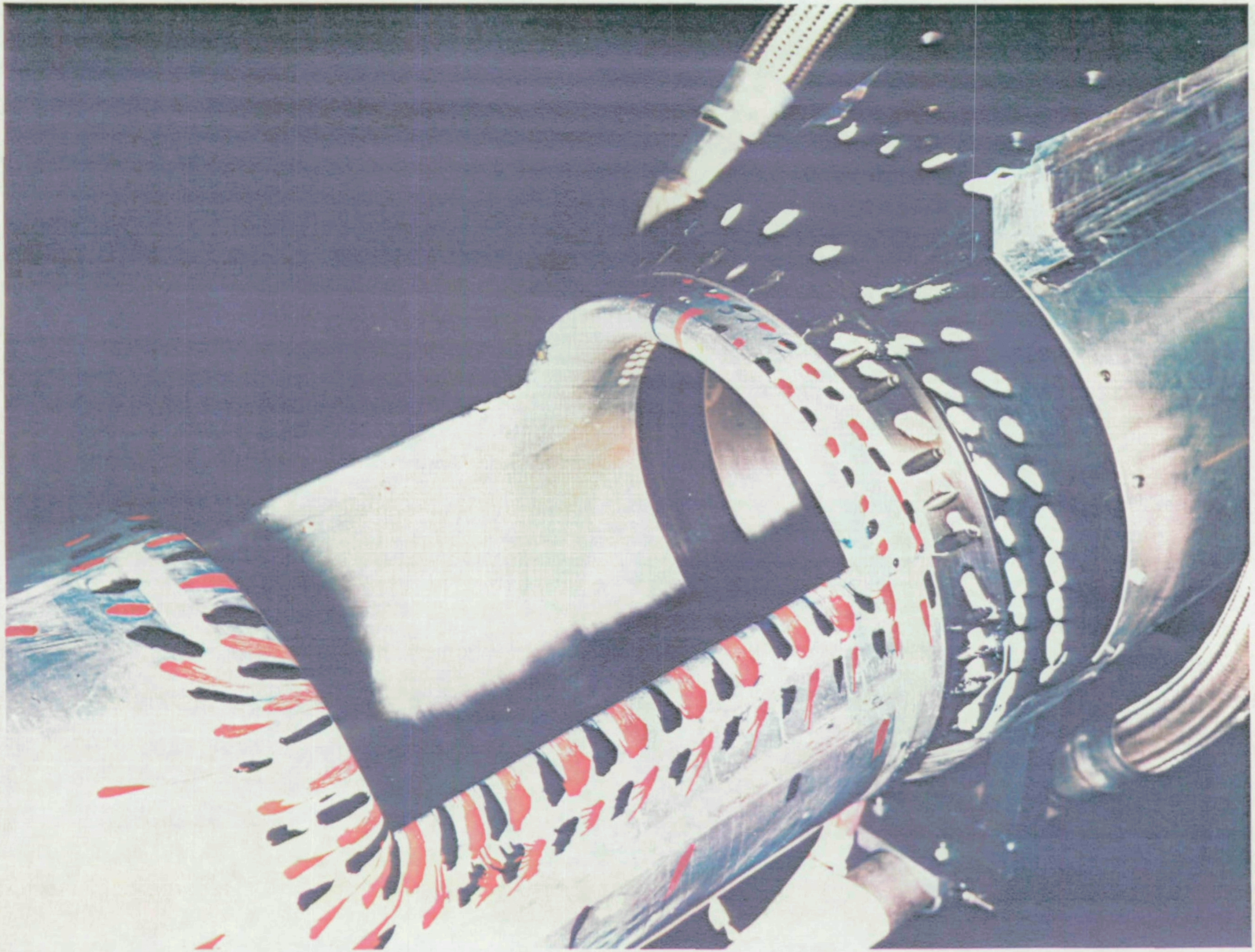


Figure 6.1.3-2. - Top inlet boundary layer flow visualization, V_0 = 80 knots, α = 40^0, WAFC = 25 PPS, 10 minutes flow time.

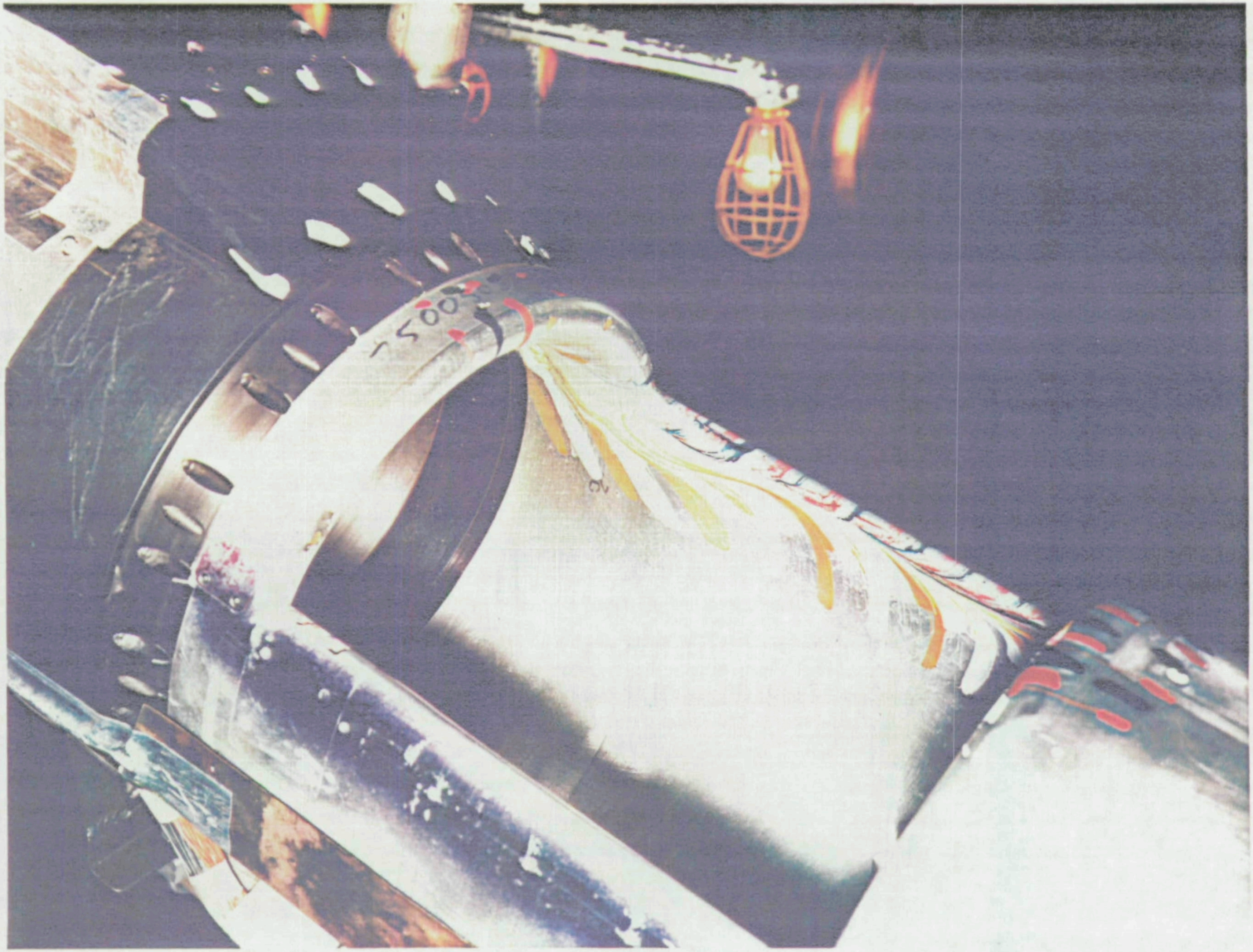


Figure 6.1.3-3. - Top inlet duct boundary layer flow visualization, looking aft, V_0 = 80 knots, α = 40^0, WAFC = 25 PPS, 10 minutes flow time.

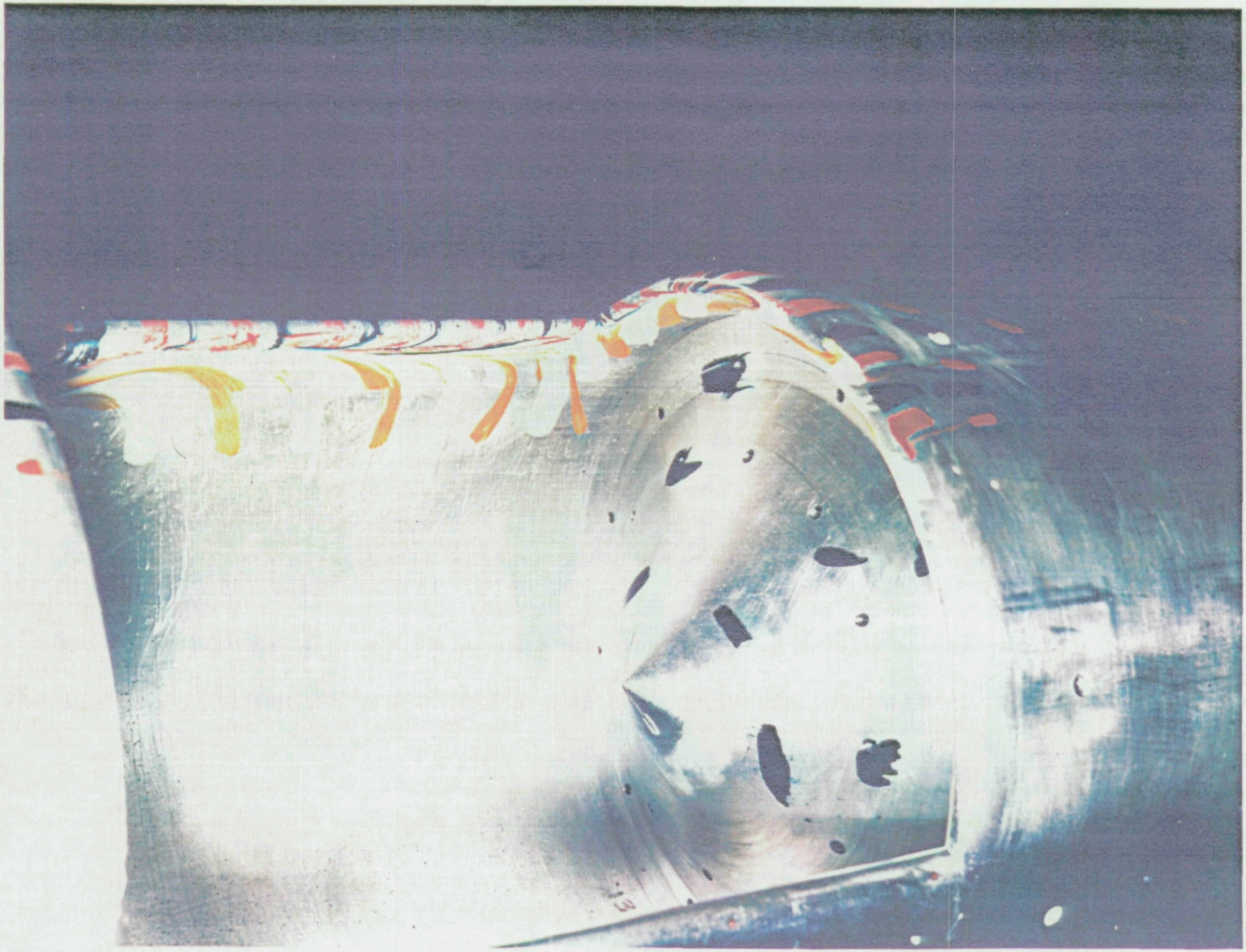


Figure 6.1.3-4. - Top inlet boundary layer flow visualization, looking forward, V_0 = 80 knots, α = 40^0, WAFC = 25 PPS, 10 minutes flow time.

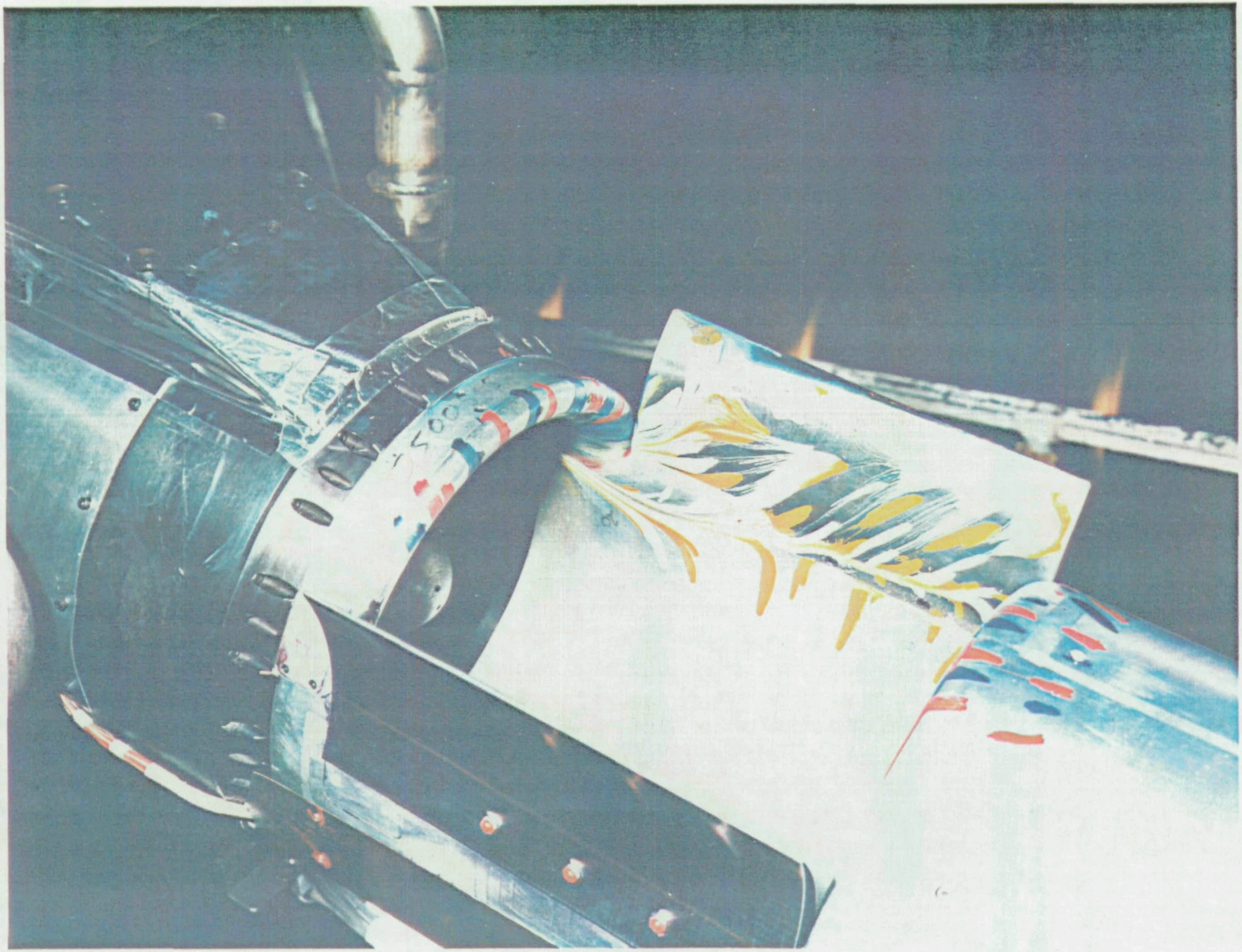


Figure 6.1.3-5. - Bell-mouth top inlet boundary layer flow visualization, V_0 = 80 knots, α = 40^0, WAFC = 25 PPS, 10 minutes flow time.

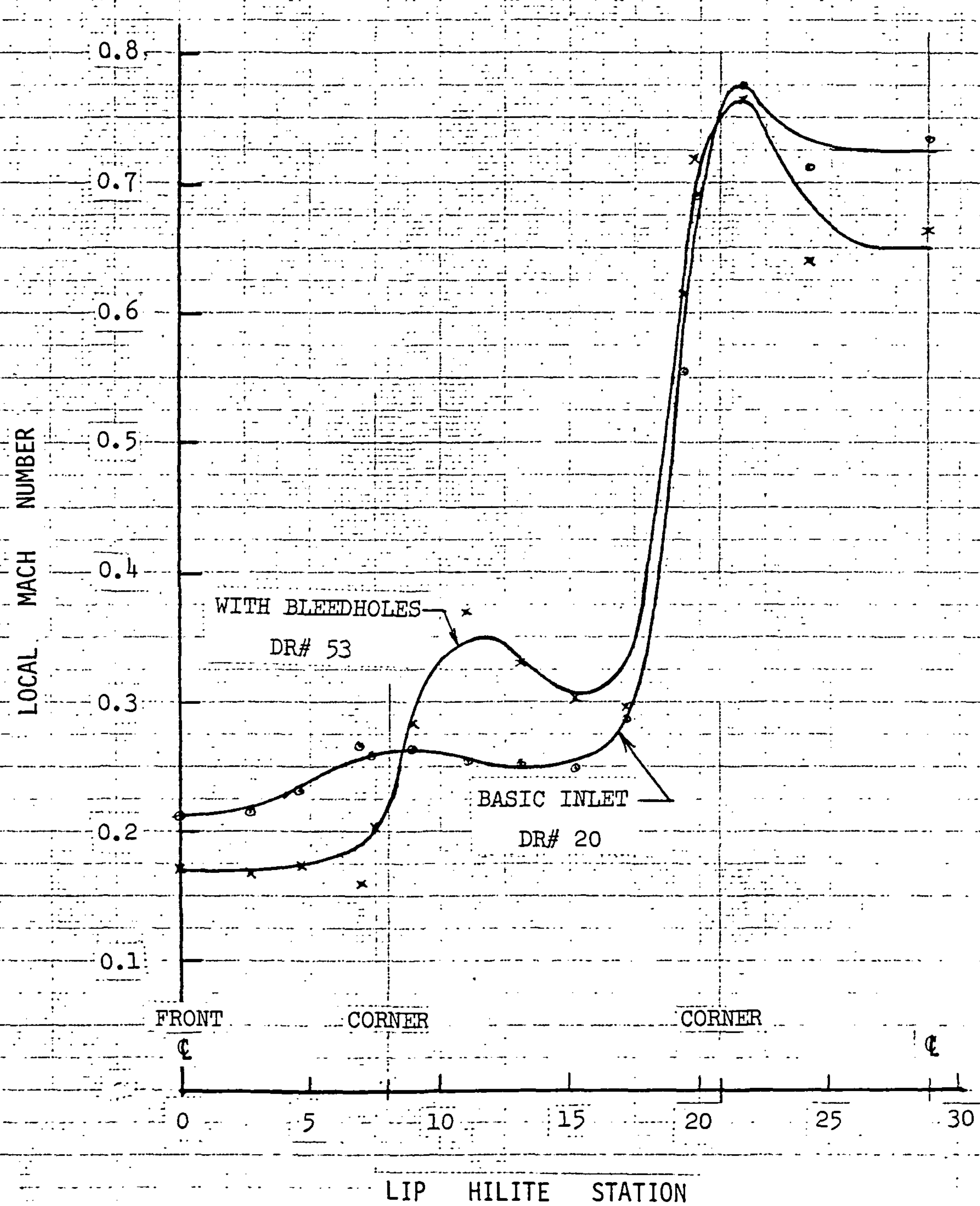


FIGURE 6.1.4-1 TOP INLET LIP FLOW DISTRIBUTION

$y_0 = 0$, WAFC = 20 LB/SEC

6.2. Parallel to Series Mode Transition

A critical issue of a variable cycle engine is its ability to change from one mode of operation to another with satisfactory operating characteristics. In airplane conversion from VTO to accelerating wing borne flight it may be desirable to transition the propulsion system from parallel to series mode operation over a period from 30 to 300 seconds. Similarly conversion to vertical landing may use propulsion system transition over a period of a minute, more or less. In any case, distortion transients could produce fan stall unless the excessive distortion occured only for a period less than one half of a fan revolution. Thus transition from one operating mode to another mode must occur without unacceptable distortion to maintain stall-free fan operation. That is, even in the limit, movement of large components in the gas stream could not likely be made fast enough to prevent fan stall, if intermediate points during the movement result in unacceptable distortion. Consequently, for preliminary design purposes, and the intent of this investigation, distortion produced during cycle changeover are considered as "steady state" and, thus, independent of the speed of the conversion.

6.2.1 One-Third Series

Transition from parallel flow to series flow was simulated in three discrete steps (1/3, 2/3, and full series flow). The one-third series configuration opens the blocker door to one-third of the duct area, closes the front nozzle approximately one-third to provide the appropriate front fan discharge pressure, and closes the top inlet for the aft fan by approximately one-third. The effect of this configuration is to retain the same front fan operating condition and slightly supercharge the aft fan.

Figure 6.2.1-1 and -2 show the aft fan face recovery levels, distortion, unsteady flow activity, and steady state distortion patterns at 0^{o} and 20^{o}angle of attack at 0, 0.1, 0.2, and 0.3 freestream Mach number for two fan flow rates, corresponding to roughly 40% and 65% fan operating speed. The corresponding operating points are nominal front fan pressure ratios of approximately 1.05 and 1.20. However to increase the airfow rate within the fan RPM vibration limits, the front nozzle area was set such that lower than calibration pressure ratios were obtained. The main test observations at low flow (low RPM) conditions (Figure 6.2.1-1) are:

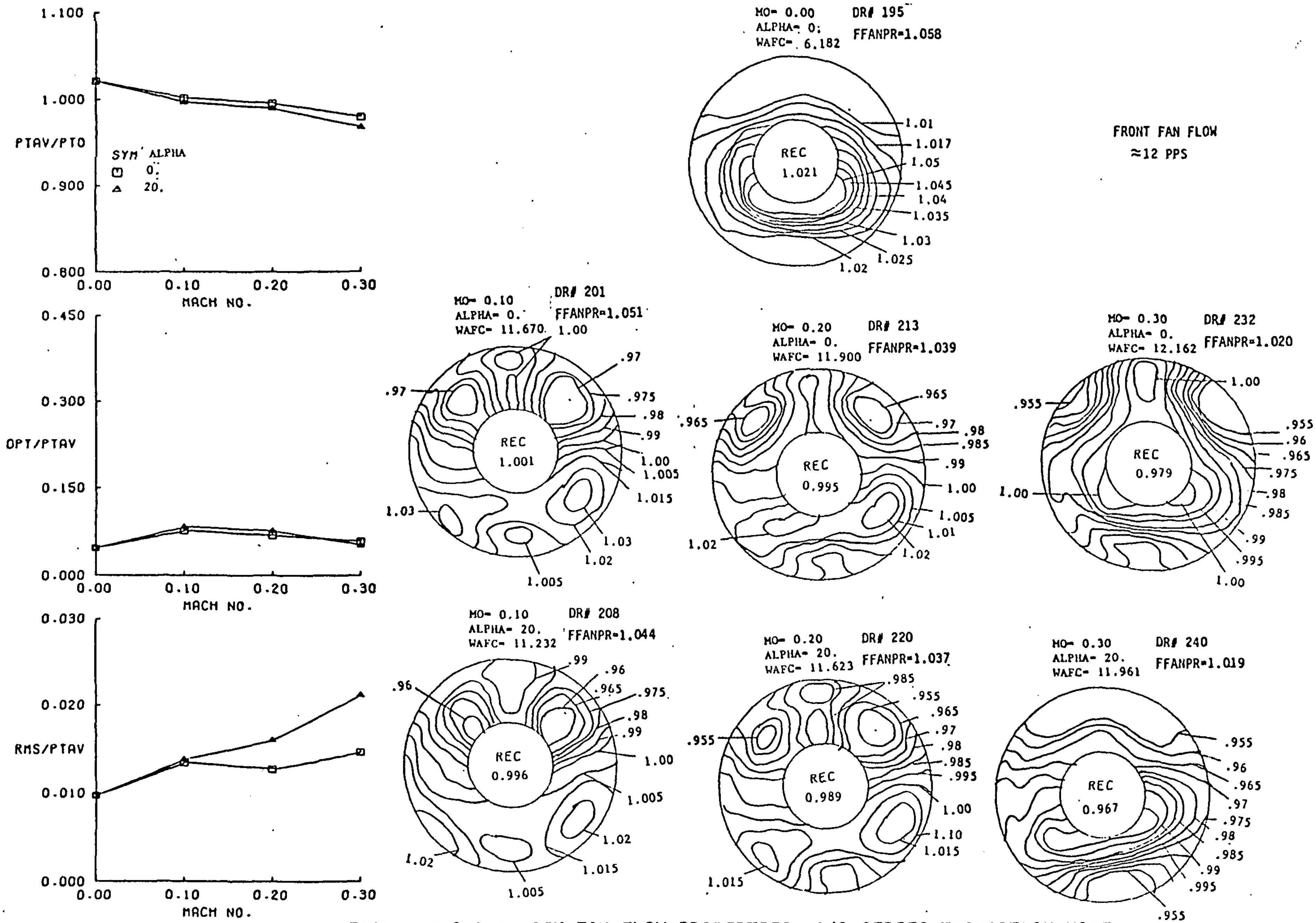


FIGURE 6.2.1-1 AFT FAN FLOW PROPERTIES, 1/3 SERIES TRANSITION MODE, CONFIGURATION 6, LOW FLOW

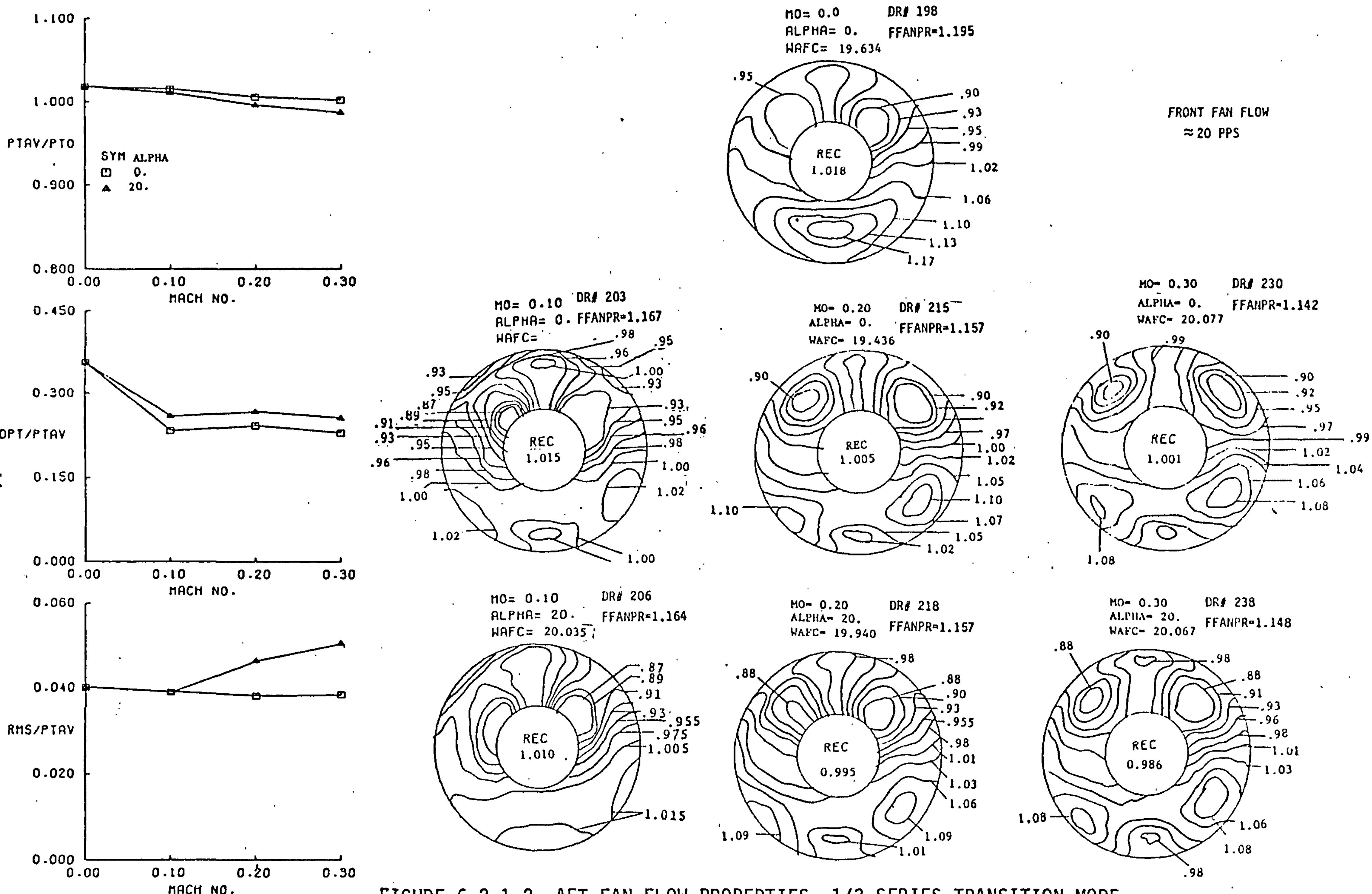


FIGURE 6.2.1-2 AFT FAN FLOW PROPERTIES, 1/3 SERIES TRANSITION MODE, CONFIGURATION 6, MODERATE FLOW

- o Pressure recovery at the aft fan face increases over parallel mode operations by approximately the ratio of the front fan pressure ratio.
- o The typical top inlet vorticies (small regions of low pressure) appearing in parallel flow mode are eliminated (static case) or attenuated even though the max minus min distortion levels are comparable in the 1/3 series and parallel modes.
- o The stall margin loss due to distortion would be significantly decreased relative to parallel flow mode since the min pressure is greatly increased, and the max pressure is above ambient - tending to unload the aft fan.

Figure 6.2.1-2 presents a somewhat different flow distribution at moderate flow conditions - corresponding to 65% RPM. The main observations at these flow conditions are:

- o Typical flush inlet vorticies are apparent in the distortion patterns - shifted toward the top.
- o Small regions of high pressure air from the front fan occur in the lower quadrants of the aft fan face.
- o Distortion levels, max minus min, are moderately high, however the stall margin loss would not be as great as in comparable distortion levels found in full parallel flow operations at these flow rates since the high pressure regions would unload the aft fan, and the low pressure regions are nearer the average recovery than in parallel mode operation.
- o The overall recovery level is comparable to the low flow operation in this 1/3 series configuration and is likewise higher than the parallel mode recovery by the amount of the front fan pressure ratio.
- o The unsteady level of activity although moderate is significantly greater than at the low flow conditions - another indication of the existence of the vorticies.
- o The aft fan recovery is strongly influenced by the top inlet performance - i.e. the aft fan recovery is significantly lower than the front fan discharge pressure.

6.2.2 Two Thirds Series

The two-thirds series flow configuration was the second step of transition. The fans were removed from the model for rework and rebalancing between the 1/3 series and 2/3 series testing. This rework reduced vibration levels such that higher flow rates were accommodated. Consequently three flow rate ranges were tested -- approximately 12, 20, and 25 pounds per second, corresponding to nominally 40, 65, and 85% of design speed.

As previously cited, the front fan operations during low flow conditions are obstensibly only slightly powered above windmilling. This can be observed in detail data reduction as front fan pressure ratios less than one. Thus the aft fan recovery is less than one, and in some cases even lower than the recovery at corresponding parallel mode operations, due to the top inlet being two-thirds closed. A detailed explanation of these conditions is discussed in the second paragraph of Section 6.3.

Figure 6.2.2-1 presents data for the 2/3 series mode (Configuration 7) operation at low flow rates (12 pounds per second) at static, and Mach 0.1, 0.2 and 0.3 at angles of attack of 0 and 20^o. The following observations are made characterizing the significance of this data:

- o The twin vorticies associated with flush inlets are not apparent.
- o The distortion levels are low.
- o The RMS level of activity is considered to be from small scale turbulence produced by the blocker door.
- o The low pressure region at the top of the fan is considered to result from top inlet inflow at approximately freestream static pressure.

Figure 6.2.2-2 presents data for the 2/3 series mode operation at moderate flow rates (20 pounds per second) at static, and Mach 0.1, 0.2 and 0.3. As with the low flow data, the front fan is lightly loaded - indicating the effective flow area of the 1/3 open front nozzle and 2/3 open blocker door was greater than anticipated. This resulted in lower than anticipated recovery levels at the aft fan face. For example, data reading #291, operations at M0=0.3, 0^o angle of attack, the front fan mass flow rate was 18 lb./sec., but the front fan pressure ratio was only 1.025. Consequently, with the aft fan operating at roughly 20 lb./sec., the recovery at the aft fan face was 0.979.

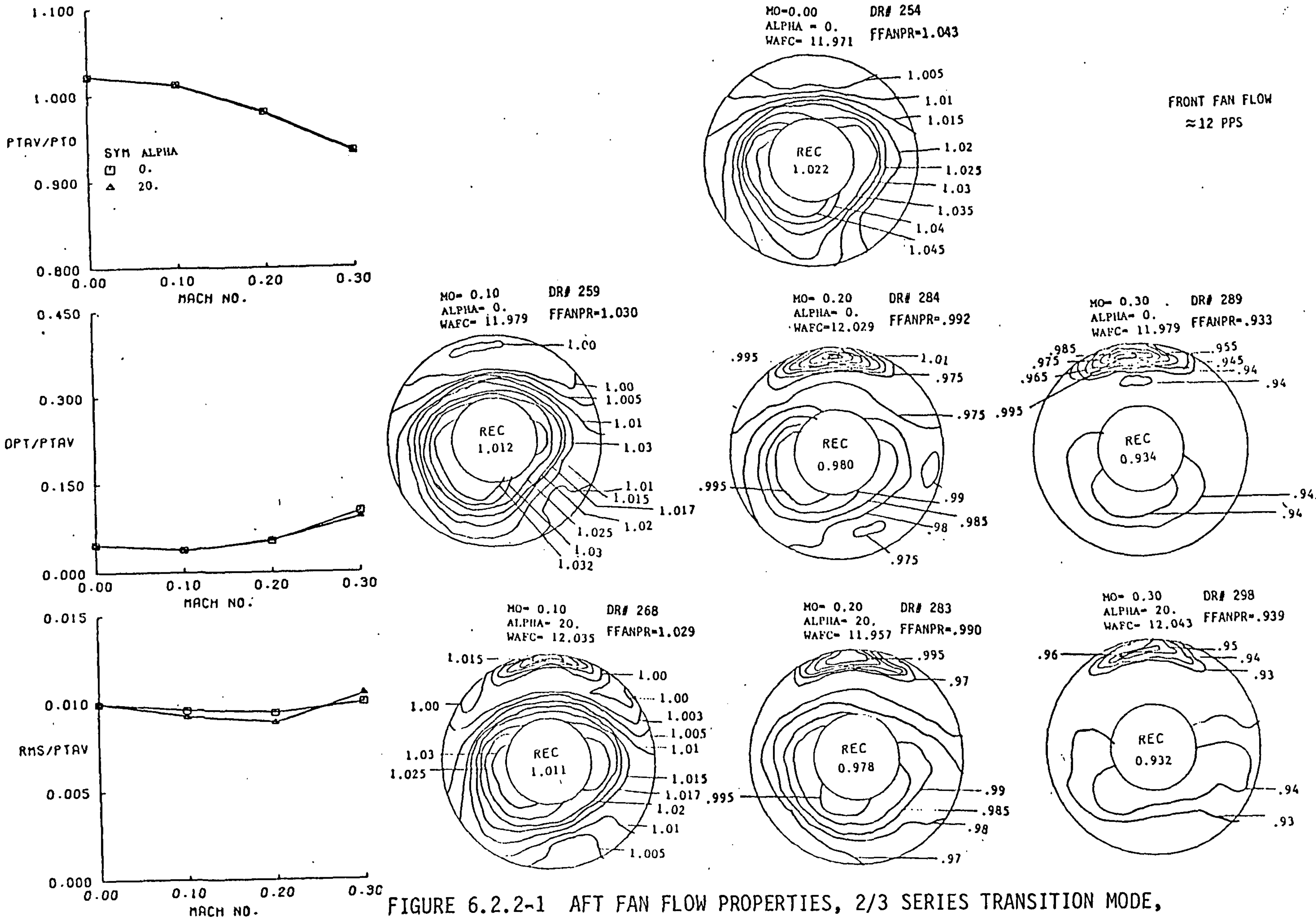


FIGURE 6.2.2-1 AFT FAN FLOW PROPERTIES, 2/3 SERIES TRANSITION MODE, CONFIGURATION 7, LOW FLOW

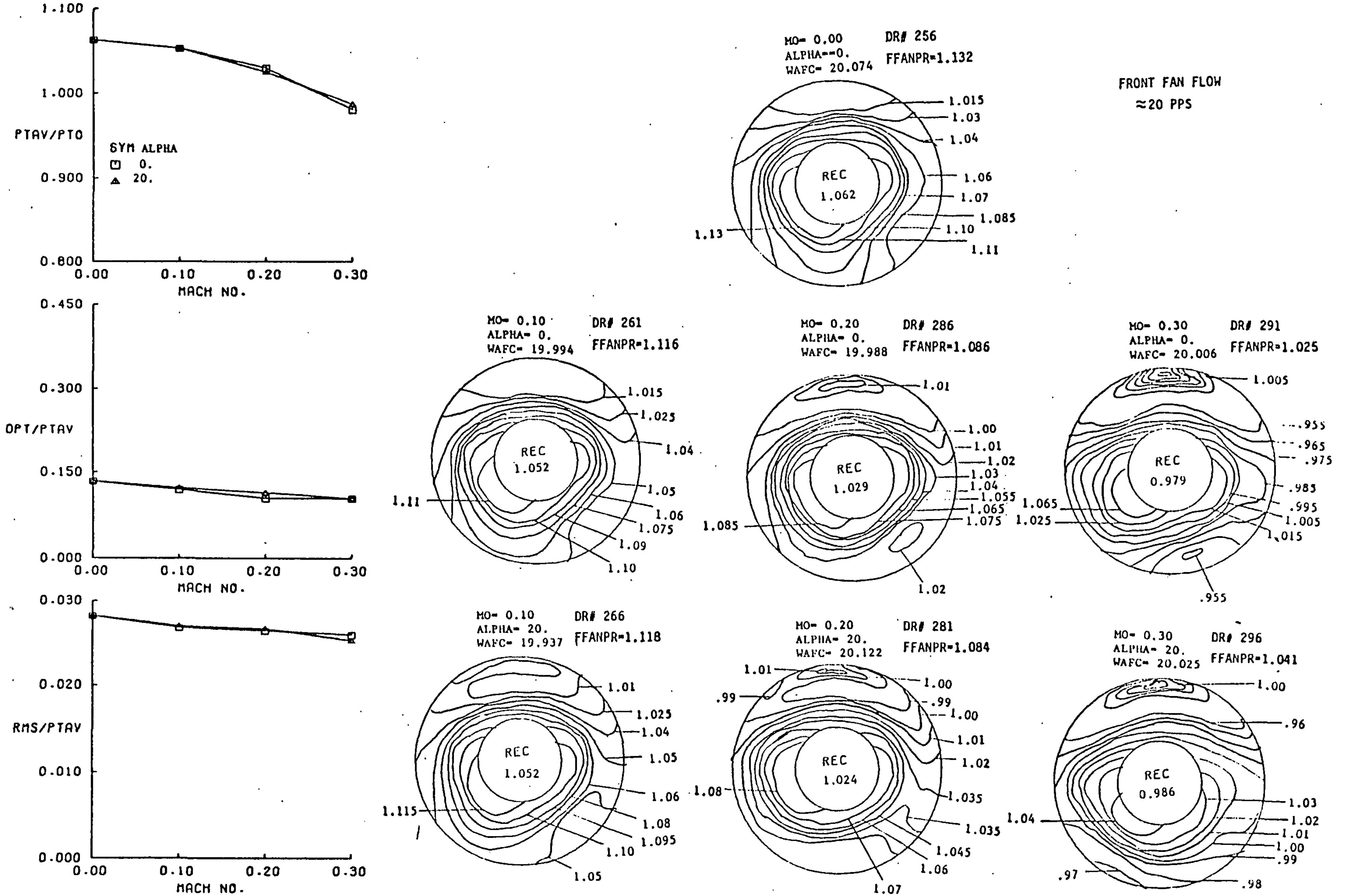


FIGURE 6.2.2-2 AFT FAN FLOW PROPERTIES, 2/3 SERIES TRANSITION MODE, CONFIGURATION 7, MODERATE FLOW

The following observations of the 2/3 series transition mode operations at moderate flow rates are:

- o There is no indication of top inlet vorticies.
- o Distortion levels are significantly increased. However this is due to a small region of high pressure flow from the front fan - unloading the aft fan rather than tending to stall the fan.
- o Turbulence level as indicated by RMS is lower than most other operating points.
- o As at low flow rate operations, a small area of lower pressure air is observed at the top of the fan face. Top inlet inflow is considered to be the source of this lower pressure air.

Figure 6.2.2-3 presents data of the two-thirds series operation at high flow (roughly 25 lb./sec.). The front and aft fan flow rates are approximately equal. The extent of interaction between the front and aft fans is more pronounced in this mode than in the 1/3 series mode. The best data comparisons are available in the consecutive runs in which only angle of attack was changed - i.e. at M0=0.1 and 0.3. Even so a Mach number effect is not properly discernable between 0.1 and 0.3 since the front fan speed was set at a significantly lower RPM at M0=0.3 than at 0.1. Consequently the front fan flow rate and pressure ratio at M0=0.3 is significantly reduced. See Section 6.3, second paragraph. Thus a Mach number effect is not obtainable. However at either of the Mach 0.1 or 0.3 settings, there is very little recovery or distortion difference due to angle of attack. The most significant observations at the aft fan face are:

- o A small region of high pressure flow from the front fan appears near the aft fan hub on the lower side and a small region of flow from the top inlet at approximately freestream static pressure appears on the topside.
- o The max minus min distortion is moderately high. However the low pressure region is small, and is in the order of less than 10% below the average recovery. The high pressure regions are higher at 25 lb/sec than at 20 lb/sec, but the low pressure levels are approximately equivalent.

Difficulty in establishing the aft fan operating point on the fan map was experienced since there was not aft fan face temperature measurement. Consequently, transition and series mode testing are somewhat difficult to

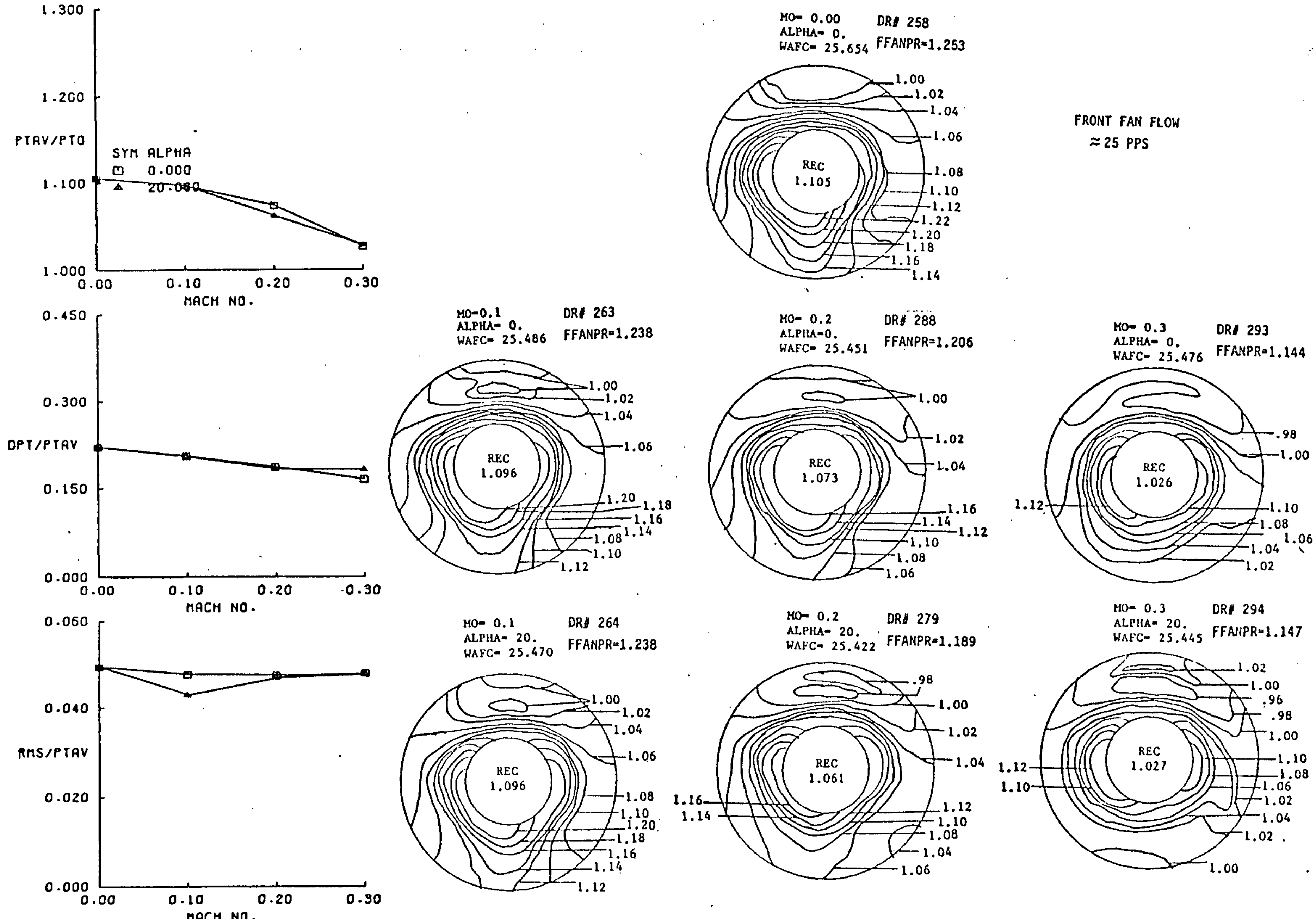


FIGURE 6.2.2-3 AFT FAN FLOW PROPERTIES, 2/3 SERIES TRANSITION MODE, CONFIGURATION 7, HIGH FLOW

assess since corrected flow and corrected speed are only approximations. However the basic issue of distortion produced in these configurations at low, moderate, and high flow rates can be observed for general design guidance.

6.3. Series Mode

Series mode configuration testing was a simulation of tandem fan propulsion system used for CTOL and normal wing borne flight. The front nozzle and top inlet were closed, and the blocker door totally removed. The duct between the two fans, although neither discharging or admitting air, did have two significant internal cavities at the front nozzle and top inlet positions, but the duct was smooth at the blocker door station. There was a 4 strut pressure and temperature rake and a large service strut installed at the front fan discharge station.

As discussed in paragraph 5.3.1, Operating Procedures, in start-up series mode testing at static conditions, the aft fan discharge nozzle plug was set to back pressure the aft fan appropriately . The actual aft fan mass flow rate was equal to the sum of the actual front fan plus front fan turbine discharge flows. Three sets of data were taken for the series mode: low, moderate, and high flow corresponding roughly to 12, 20, and 25 pounds per second. Since flow throughout the test model in all testing was subsonic, testing at a given corrected flow rate with a fixed discharge nozzle area results in a decreasing fan pressure ratio characteristic with increasing tunnel Mach number. This can be seen in Figure 6.3.-1. This characteristic is formed by having a fixed geometry constant fan face Mach number due to operation at a given corrected flow, and unchoked or subsonic nozzle flow. Thus the actual nozzle pressure ratio is a constant. Consequently the fan pressure ratio to maintain a given corrected flow is decreased by the amount of the tunnel total to static pressure ratio increase as Mach number increases. Correspondingly, the front and aft fan RPM required for a given flow rate decreases with tunnel Mach number. This same characteristic is also observed in the transition mode (Configurations 6 and 7) testing as shown in Figure 6.3.-1. As an evaluative diagnostic for the series mode testing, it was established that the passage of the air thru the rake and over the two cavities and service strut, while mixing with turbine discharge air resulted in a pressure loss characteristic of the series mode model of approximately 0.6 of the average duct dynamic pressure. In development of the tandem fan

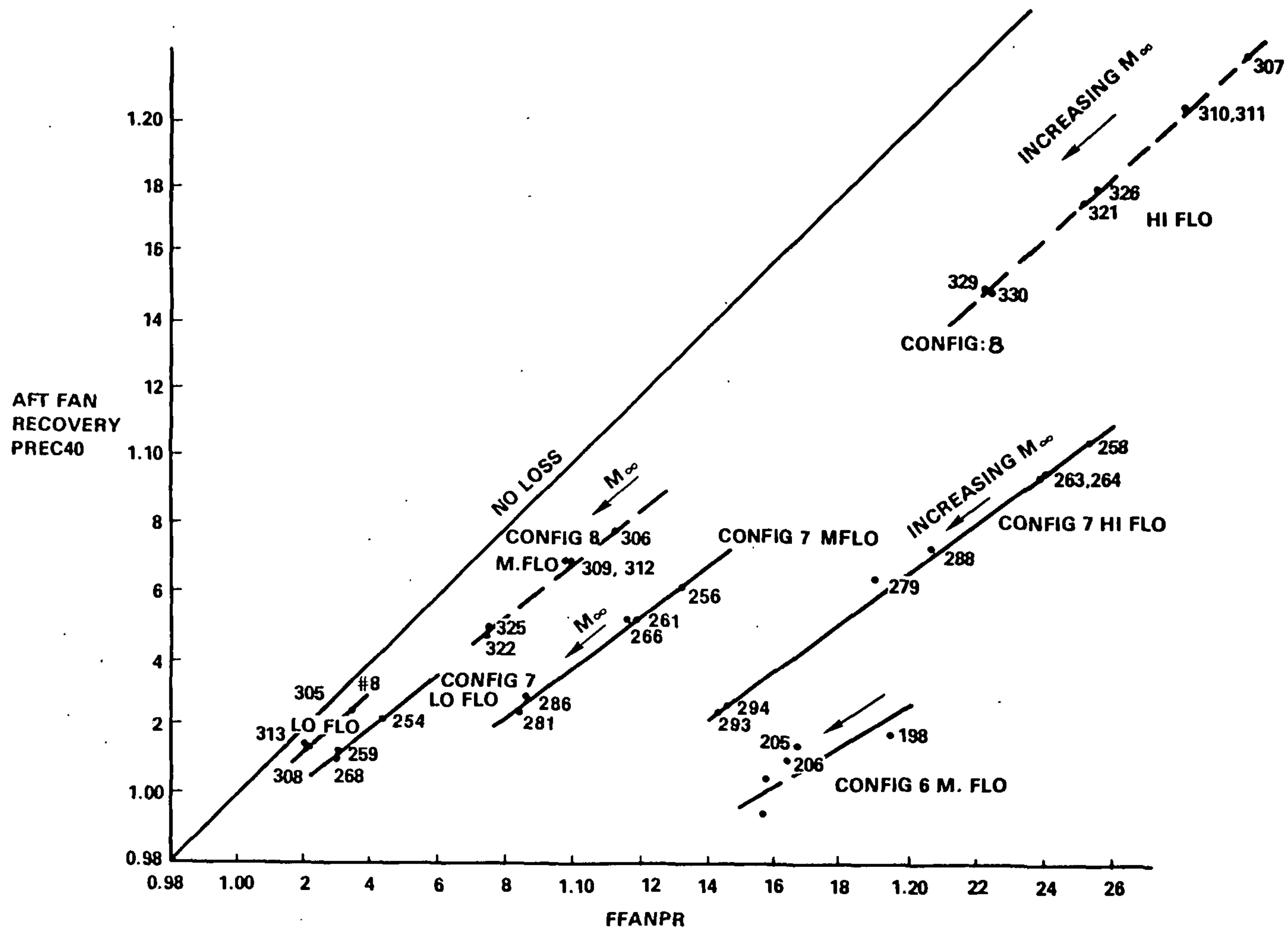


Figure 6.3-1 Tandem Fan Model Test Operating Characteristics - Lines of Constant Corrected Flow

engine, this interstage duct loss could and would be greatly reduced by providing a smooth duct, and of course eliminating the rake and tip turbine inflow.

Figures 6.3.-2,-3, and -4 present the recovery, distortion and turbulence level at the aft fan face at low, moderate, and high flow rates, respectively. The significant observations are:

- The distortion and turbulence significantly increase with mass flow rate. This is considered to result from the top inlet cavity being closely coupled to the aft fan. This would explain why both the distortion and turbulence increase with flow rate.
- The decreasing recovery level at the aft fan face with increasing Mach number is not an inlet characteristic, but the result of decreasing front fan pressure ratio. The decreasing fan pressure ratio at a given corrected flow rate with increasing freestream Mach number is a fundamental characteristic of any flow system having a fixed area nozzle with subsonic flow throughout the system. Thus when holding corrected flow constant at low speed flight conditions with fixed geometry and low pressure ratio fans, the fan pressure ratio will decrease with increasing flight Mach number up to the point in which the inlet recovery and fan pressure rise chokes the nozzle.
- With exception of the low pressure "pocket" at the top of the aft fan face, resulting from the top inlet cavity, the distortion is quite moderate.

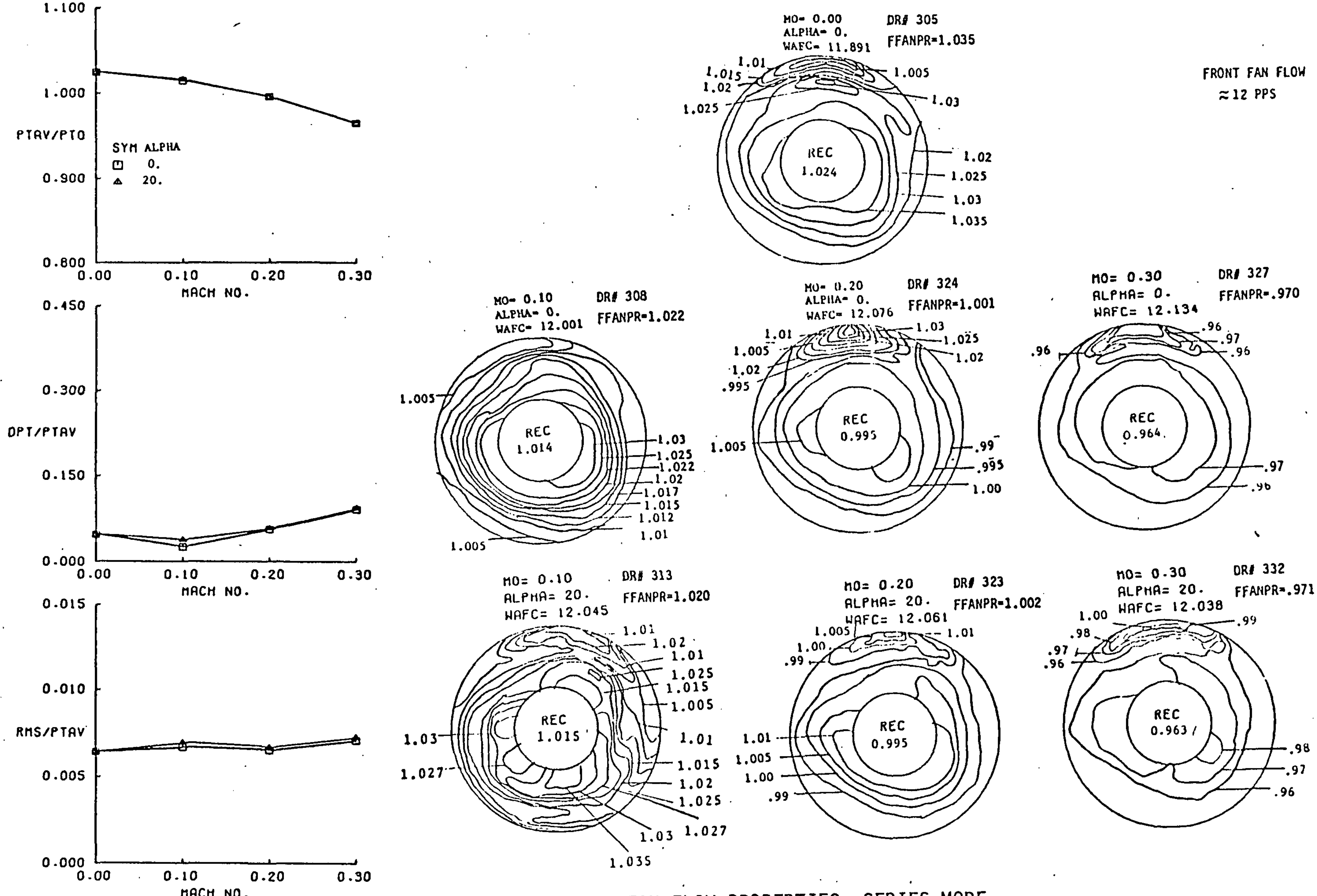


FIGURE 6.3-2 AFT FAN FLOW PROPERTIES, SERIES MODE, CONFIGURATION 8, LOW FLOW CONDITIONS

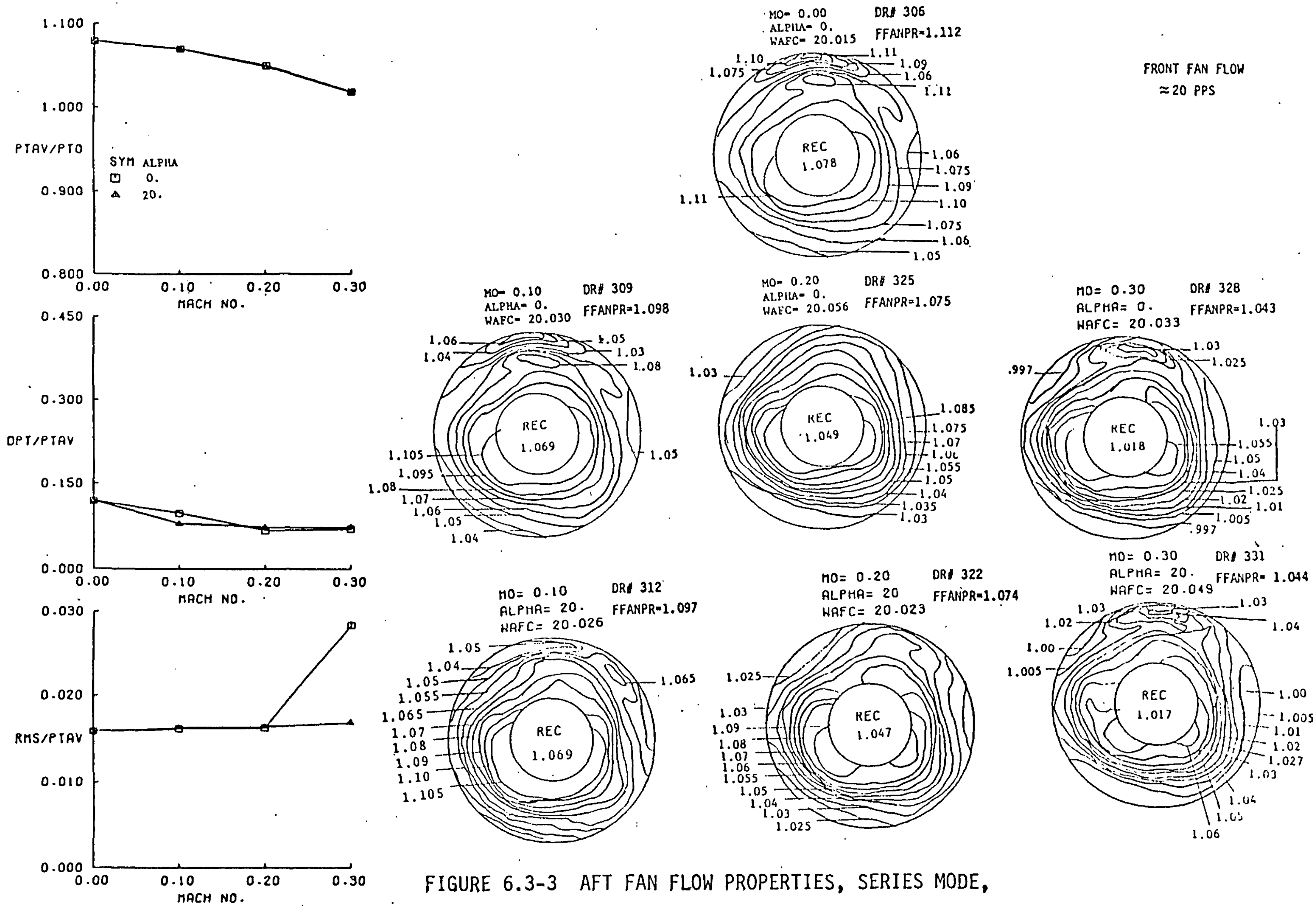


FIGURE 6.3-3 AFT FAN FLOW PROPERTIES, SERIES MODE, CONFIGURATION 8, MODERATE FLOW CONDITIONS

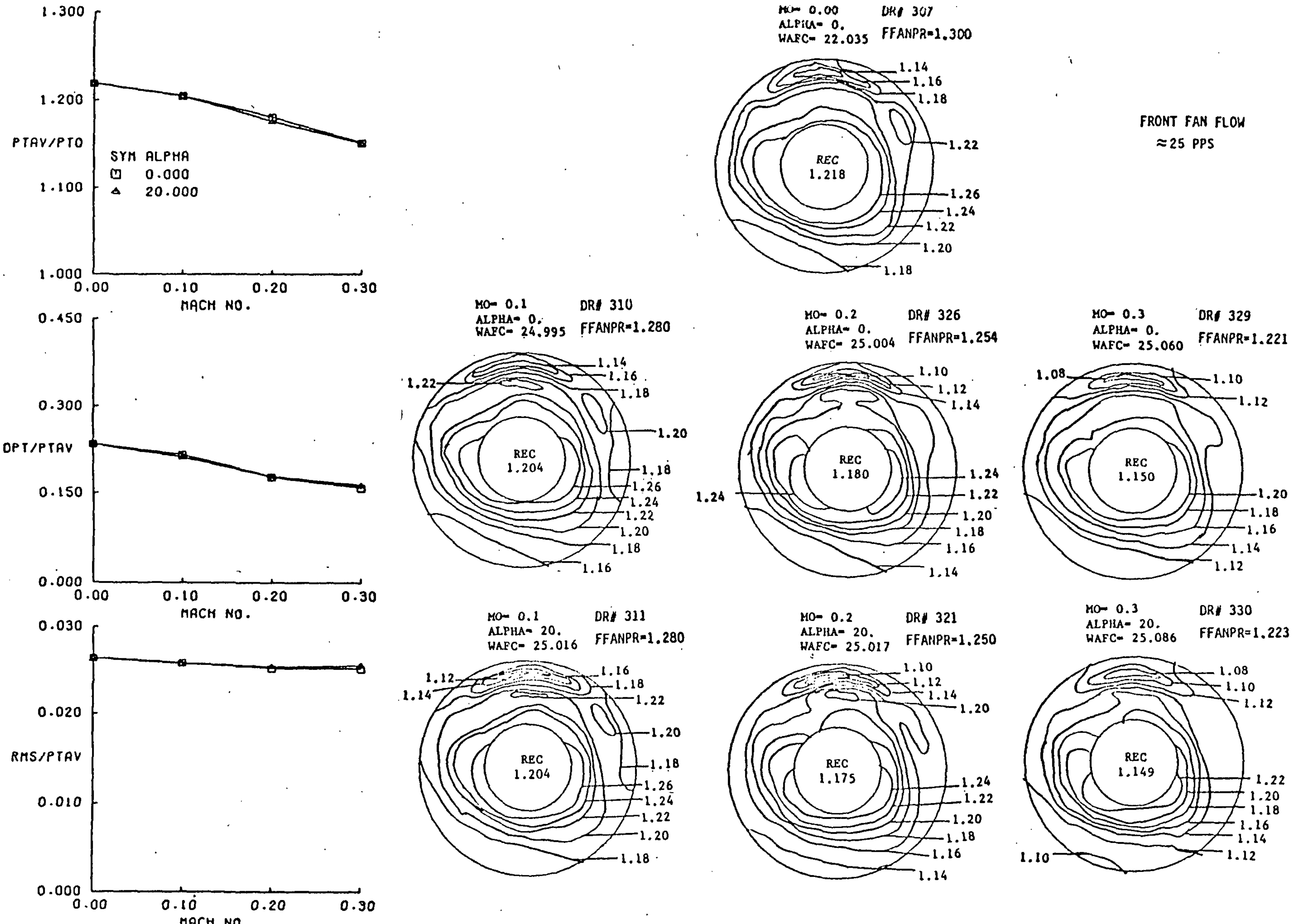


FIGURE 6.3-4 AFT FAN FLOW PROPERTIES, SERIES MODE, CONFIGURATION 8, HIGH FLOW CONDITIONS

7.0 CONCLUSIONS AND RECOMMENDATIONS

The experimental investigation of this program was subdivided into three major areas corresponding to the operating modes: parallel, transition, and series. Thus, the specific conclusions and recommendations for these three operating modes are presented in three paragraphs. In addition, there is a paragraph of overall general conclusions and recommendations.

7.1 Parallel Mode

The top inlet, as configured, exhibited some of the same characteristics as a flush inlet in that twin side vorticies were formed. However, the tested configurations left the flow basically unguided downstream of the inlet lips. Thus in a simplistic view, the inlet flow thru the 'throat' is dumped, and the aft fan face recovery displays the result of this '1q' loss. That is, the dynamic pressure of the top inlet flow at the "aerodynamic" throat is roughly equivalent to the recovery loss at the various mass flows. Installation of the bellmouth type lip extension (Configuration 9) although slightly improving the recovery, did not change the basic inlet dump loss characteristic. Paint flow studies further confirmed this observation. The vortex cores were at low total pressure. Some pressure measurement error may have occurred due to high cross flow on the probes indicating the lowest total pressure. This low pressure within the vortex cores resulted in high max minus min distortion. However, this distortion could possibly be acceptable to an engine since there is a quite small region of low pressure.

Several approaches to eliminate these problems of the top inlet appear promising. For the tested configuration, blow-in doors on the nacelle sides will likely attenuate the vorticies. Configuring the blocker door to assist in guiding the flow at the forward lip of the top inlet as shown on Figure 2-6, would help decrease the dump loss. . A reconfiguration of the transition section to a rectangular shape along the lines of TF120 as shown in Section 2.0 would provide top inlet flow guidance, and accommodate both a vaned entry and vaned blocker door. This approach would help to decrease the dump losses, and basically eliminate vortex formation, or at least result in producing smaller-weaker vorticies.

7.2 Transition Mode

The blocker door of the tested configuration was a build up of concentric nesting frustrums of a cone. Consequently, the 1/3 and 2/3 series mode transition flows exhibited a high energy core flow at basically front fan discharge pressure. Flow from the front fan resulted in the absence or weakening of top inlet vorticies characteristic of parallel operations. The distortion levels were significant due to the recovery at the aft fan still being strongly influenced by the partially open top inlet and the core of high pressure air from the front fan. In this case, the max minus min distortion is dominated by the core of high pressure air relative to the average recovery. The low pressure regions are not extensively depressed below the average. Although a vaned blocker door (recommended in 7.1) should be an improvement, the transition mode distortion is considered to be acceptable and not likely to stall most fans since the high pressure regions would tend to unload the fan.

Thus, the vaned blocker door and vaned top inlet recommended for parallel mode configuration is also recommended to improve transition mode flows. Notwithstanding, some distortion will still be experienced due to the entrance of lower energy ambient air thru the top inlet.

7.3 Series Mode

The series mode testing conducted was a simulation of a conventional two stage fan turbofan engine. As such, the typical unchoked fan stream at low Mach numbers was observed. If aft fan recovery was examined without consideration of the system context, a misleading observation of a decreasing recovery with increasing freestream Mach number could be made. This observation is possible also in transition data evaluation. However, this trend is a characteristic of the test procedure rather than representing a loss mechanism.

The need for a "clean" duct is high lighted in the series mode data. The significant interstage pressure loss and distortion of the series mode data are considered to arise from the rake and cavities that are not necessarily characteristic of a full scale tandem fan engine. The tandem fan propulsion systems studied use afterburners for high supersonic flight and high energy maneuvers. As such, a variable geometry aft nozzle would be a portion of the system. In future testing, use of aft nozzle reset to properly back pressure the fans at lower freestream Mach numbers (up to nozzle choking at MO about 0.5) would provide a more realistic simulation. An alternate test approach using constant area nozzle and constant fan speed at the various freestream Mach numbers would more nearly simulate airplane and engine operations in the low speed regime. With this approach, the flow rate would increase slightly with Mach number.

7.4 General Conclusions and Recommendations

This preliminary investigation established the feasibility of the variable cycle tandem fan engine in the V/STOL application. Although design improvements have been identified, there were no large problems or "show stoppers" detected in any aspect of the program. The as tested configurations, without improvements, tested in steady-state at some of the worst conditions to be experienced as transients were marginally acceptable. Notwithstanding, big pay-offs in propulsion system size and weight are potentially available by improvements in the top inlet to increase the top inlet pressure recovery. Similarly, decreasing the top inlet distortion would permit fan design with generally higher output and efficiency due to tailoring the operating line of the fan map closer to the stall line.

Considerable insight into the design variables can be obtained in static testing with or without a bellmouth front inlet, and is recommended for evaluation of some of the design modifications cited in Sections 7.1, 7.2 and 7.3.

This data presentation is considered to present a preliminary view of flow relationships of the configuration tested and to provide guidance for future development. Performance of testing of this type with the many variables is complex and difficult to maintain an adequate degree of simulation. Addition of temperature probes at the aft fan face would provide the capability to more closely determine the corrected speed and corrected flow rate of the aft fan in transition and series mode testing.

As a general observation, the operating procedures and operating mode transition scheduling of a tandem fan propulsion system provide additional flexibility in tailoring a highly satisfactory operational V/STOL airplane. Acceleration and climb capability from VTO to wing borne flight in parallel mode by nozzle vectoring is inherent in the tandem fan design. One approach to transition from parallel to series mode would have an extended sequencing of components to provide a 'soft' transition at any power level. In this transition procedure, of varying duration, the blocker door opening would 'lead' the closing of the front nozzle; thus, moving the fan operating point on a constant speed line on the front fan map to the right. The effect on the top inlet would initially be an "aerodynamic" closing of the top inlet. The front fan would not overspeed since it is on the same shaft as the aft fan. As the blocker doors are further opened, the front nozzle would start closing. Finally, the top inlet would be closed as the front nozzle is closed. In going from series to parallel modes, the front nozzle opening would 'lead' top inlet opening and blocker door closing. Thus, extension of the test matrix to additional combinations of front nozzle, blocker door and top inlet areas to more fully characterize transition modes is recommended.

Balance of the tip turbine driven fan engine simulators restricted operations to approximately 85% of design rated speed. However, in setting up the test points, the nozzle areas were set such that the corrected flow rate was approximately 25 lb/sec at 85% speed. Relating this flow rate to turbofan engine state of the art practice, a corrected air flow per square foot of fan annulus area of 40 lb/sec is typical. For the 12" fans used, this would correspond to a corrected flow rate of 26.4 lb/sec. Since inlet losses are a function of the inlet Mach number squared, and the inlet Mach number varies directly with corrected flow, the observed inlet total pressure losses at maximum rated engine speeds would be increased by approximately 11%, due to testing at 25 lb/sec. Thus, the fan speed limitations during this test program did not significantly compromise the inlet loss data to be expected from these configurations.

Reference

1. Low Speed Test of the Aft Inlet Designed for a Tandem Fan V/STOL Nacelle," W.W. Rhoades and A.H. Ybarra, NASA CR-159752 (Vought Technical Report 2-30320/OR-52360), February 1980.

2. "Additional Testing of the Inlets Designed for a Tandem Fan V/STOL Nacelle", Andres H. Ybarra, NASA CR-165310 (Vought Report 2-53020/IR-52726), June 1981.

3. "Study of Aerodynamic Technology for Single Cruise-Engine V/STOL Fighter/Attack Aircraft", H. H. Driggers, NASA CR-166271.

APPENDICIES

A. DATA READING SUMMARY OUTPUT

B. TRANSITION SECTION MODEL DRAWINGS

C. TWELVE-INCH FAN OPERATING MAP

APPENDIX A

DATA READING SUMMARY OUTPUT

- SEE SECTION 3.0 FOR SYMBOLS AND ABBREVIATIONS
- SEE SECTION 5.3.2 RUN LOG SUMMARY FOR CONFIGURATION/ IDENTIFICATION
- DATA READING NUMBERS (RDG)
  1-12, 14, 50, 84, 115, 151-54, 249 & 251
  INTENTIONALLY OMITTED

READING NO. = 13

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-11.86	0.312	0.998	-672.69	-3.68	2057.111	1.000	4.842	-666.939	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9994	0.0909	0.0000	4.88	0.027	527.988	1.0005	0.0055	0.000	0.044

READING NO. = 15

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	54.10	0.000	**********	0.00	0.00	0.000	1.000	0.000	0.000	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
*******************		0.0000	0.00	0.000	609.668	*********	0.5000	0.000	0.000

READING NO. = 16

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	54.10	0.000	**********	0.00	0.00	0.000	1.000	0.000	0.000	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
*******************		0.0000	0.00	0.000	609.668	*********	0.5000	0.000	0.000

READING NO. = 17

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.42	0.498	1.000	10.99	0.06	2050.847	1.000	6.044	10.879	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9998	0.0021	0.0000	6.10	0.033	529.459	0.9999	0.0088	2.516	0.046

READING NO. = 18

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.42	0.509	1.000	10.99	0.06	2050.847	1.000	3.626	10.879	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9997	0.0018	0.0000	3.66	0.020	529.459	1.0000	0.0090	2.520	0.046

READING NO. = 19

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.40	0.445	1.000	6.10	0.03	2050.955	1.000	4.831	6.039	0.002

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9996	0.0015	0.0000	4.88	0.027	530.222	1.0000	0.0079	2.557	0.116

READING NO. = 20

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.432	0.04	-0.26	18.753	0.958	14069.09	77.04	2050.622	1.239	14267.145	13978.453	0.461

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9566	0.1915	2.3109	14359.66	78.633	525.753	1.2203	0.3594	21.309	22.212

READING NO. = 21

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.807	0.03	-0.24	19.113	0.949	9999.99	54.76	2051.336	1.115	14268.355	9935.566	0.436

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9470	0.3248	1.7172	14360.88	78.639	525.753	1.2287	0.3676	15.705	21.281

READING NO. = 22

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.215	0.01	-0.26	18.784	0.948	5048.22	27.65	2052.313	1.027	14267.402	5016.211	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9457	0.3115	0.2055	14358.43	78.634	525.644	1.2276	0.3601	7.451	21.214

READING NO. = 23

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.317	0.01	-0.26	18.159	0.943	14.65	0.08	2052.452	0.999	14270.574	14.558	0.461

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9396	0.3156	0.3014	14360.88	78.652	525.589	1.2271	0.3461	2.558	22.208

READING NO. = 24

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.005	0.00	-0.26	10.338	0.977	8.55	0.05	2052.683	0.999	8120.141	8.491	0.256

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9761	0.0982	0.0069	8172.38	44.754	525.698	1.0698	0.1874	2.539	13.418

READING NO. = 25

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.645	0.02	-0.26	11.245	0.982	8123.54	44.49	2050.816	1.072	8121.359	8071.629	0.244

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9819	0.1058	0.6159	8173.59	44.761	525.698	1.0712	0.2047	12.555	12.858

READING NO. = 26

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.152	0.10	-0.51	17.932	0.952	14160.66	76.63	2043.151	1.233	14117.652	13904.270	0.442

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9493	0.2103	13.3739	14377.97	77.809	538.317	1.2061	0.3411	21.014	21.486

READING NO. = 27

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.167	0.10	-0.55	11.038	0.979	8093.02	43.72	2043.474	1.066	7968.828	7931.734	0.251

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9782	0.0575	13.3894	8130.87	43.920	540.322	1.0627	0.2007	12.457	13.206

READING NO. = 28

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.084	0.10	19.99	9.495	0.968	8426.31	45.46	2043.479	1.071	8328.906	8247.645	0.246

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9662	0.0997	13.3087	8509.34	45.904	541.730	1.0688	0.1716	12.955	12.925

READING NO. = 29

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.069	0.10	19.99	16.838	0.946	14033.69	75.59	2042.904	1.228	13615.195	13714.219	0.415

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9423	0.2179	13.2982	13932.36	75.040	543.461	1.1895	0.3174	20.750	20.448

READING NO. = 30

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.186	0.10	40.04	17.820	0.954	13853.00	74.48	2041.348	1.221	13564.168	13514.145	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9514	0.1499	13.4024	13904.28	74.758	545.354	1.1943	0.3386	20.629	21.229

READING NO. = 31

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.172	0.10	39.93	11.116	0.981	7996.58	42.96	2041.638	1.065	7849.949	7794.027	0.248

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9806	0.0413	13.3909	8053.95	43.265	546.326	1.0612	0.2022	12.289	13.050

READING NO. = 32

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.246	0.19	-0.60	10.483	0.967	7574.16	40.10	2021.885	1.048	7287.297	7275.570	0.227

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9663	0.0864	51.2220	7586.37	40.164	562.475	1.0496	0.1902	11.887	12.001

READING NO. = 33

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.197	0.19	-0.60	18.418	0.946	13861.55	73.28	2021.312	1.207	13388.590	13296.078	0.424

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9436	0.1707	51.1754	13958.00	73.791	564.084	1.1804	0.3519	19.772	20.817

READING NO. = 34

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.246	0.19	19.99	16.016	0.916	14139.90	74.88	2020.048	1.218	13948.152	13585.691	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9122	0.2712	51.2203	14517.15	76.875	562.207	1.1956	0.3000	20.195	19.846

READING NO. = 35

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.197	0.19	19.97	10.048	0.959	7975.82	42.24	2020.520	1.057	7694.086	7663.586	0.236

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9587	0.0768	51.1746	8007.57	42.406	562.153	1.0577	0.1820	12.316	12.435

READING NO. = 36

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.241	0.19	39.91	11.120	0.953	8088.14	42.83	2020.661	1.059	7807.918	7770.387	0.239

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9529	0.0355	51.2166	8127.21	43.033	562.314	1.0633	0.2023	12.592	12.596

READING NO. = 37

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.217	0.19	39.95	18.218	0.938	13632.03	72.15	2019.006	1.199	13171.215	13091.484	0.416

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9373	0.1117	51.1939	13715.05	72.593	562.743	1.1897	0.3474	19.798	20.471

READING NO. = 38

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
97.341	0.26	-10.11	18.589	0.948	12916.61	67.97	1991.816	1.163	12397.117	12333.008	0.414

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9458	0.1833	89.0795	12983.75	68.326	569.280	1.1477	0.3557	18.563	20.403

READING NO. = 39

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.339	0.26	-10.11	11.785	0.970	5326.57	27.98	1994.363	1.005	5634.594	5076.137	0.193

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9694	0.0668	91.7657	5912.58	31.055	571.474	1.0035	0.2151	10.268	10.309

READING NO. = 40

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.261	0.26	-0.62	10.400	0.945	7115.12	37.41	1992.820	1.029	6789.281	6786.949	0.235

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9444	0.1231	91.6883	7117.57	37.419	570.404	1.0378	0.1886	12.266	12.384

READING NO. = 41

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.369	0.26	-0.62	17.900	0.924	13523.37	71.09	1990.904	1.179	12960.750	12899.027	0.387

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9208	0.2446	91.7874	13588.08	71.433	570.457	1.1662	0.3404	19.276	19.342

READING NO. = 42

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.320	0.26	9.46	16.333	0.903	14218.04	74.74	1990.979	1.206	13754.805	13560.359	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8996	0.2728	91.7426	14421.92	75.809	570.564	1.1887	0.3066	19.963	19.860

READING NO. = 43

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.369	0.26	19.99	17.079	0.908	14218.04	74.77	1988.995	1.207	13819.371	13565.441	0.414

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9070	0.2053	91.7837	14484.18	76.165	570.137	1.1932	0.3225	20.131	20.408

READING NO. = 44

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.300	0.26	30.18	17.839	0.897	14136.24	74.34	1989.072	1.207	13465.891	13488.023	0.398

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8968	0.1454	91.7209	14113.04	74.217	570.083	1.1987	0.3390	20.197	19.758

READING NO. = 45

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.310	0.26	40.02	17.927	0.895	14033.69	73.80	1988.496	1.199	13461.242	13390.184	0.402

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8949	0.1137	91.7305	14108.16	74.191	570.083	1.1968	0.3410	20.357	19.950

READING NO. = 46

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.281	0.26	39.93	10.518	0.906	8834.08	46.45	1992.243	1.065	8597.500	8428.605	0.236

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9064	0.0539	91.7103	9011.11	47.385	570.137	1.0781	0.1908	14.300	12.457

READING NO. = 47

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.310	0.26	30.15	9.426	0.912	8454.39	44.46	1992.097	1.055	8086.527	8066.727	0.225

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9116	0.0660	91.7336	8475.15	44.569	570.083	1.0660	0.1703	13.574	11.891

READING NO. = 48

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.359	0.26	19.97	9.892	0.923	7846.41	41.27	1991.877	1.043	7566.445	7488.383	0.224

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9231	0.1010	91.7778	7928.21	41.702	569.816	1.0564	0.1790	13.042	11.853

RDG 49 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 49

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.193	0.26	9.48	9.184	0.937	7076.05	37.23	1993.114	1.029	6718.625	6754.754	0.215

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9357	0.1192	91.6295	7038.21	37.029	569.548	1.0422	0.1658	12.129	11.425

READING NO. = 51

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.659	0.02	-0.58	10.129	0.985	7406.91	40.67	2083.828	1.059	7395.395	7378.371	0.257

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9841	0.0838	0.6258	7424.00	40.759	523.022	1.0584	0.1835	11.520	13.458

READING NO. = 52

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.422	0.04	-0.55	19.019	0.955	13557.55	74.43	2084.138	1.219	13153.176	13504.621	0.429

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9538	0.2802	2.3070	13204.73	72.493	523.077	1.1964	0.3654	21.038	21.008

READING NO. = 53

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.251	0.04	-0.58	18.941	0.951	13092.41	71.88	2084.362	1.206	13026.848	13042.656	0.412

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9493	0.2812	2.1406	13076.54	71.797	522.968	1.1959	0.3637	20.380	20.335

READING NO. = 54

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.740	0.04	-0.55	21.549	0.943	14111.82	77.47	2084.735	1.241	15558.590	14056.727	0.518

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9410	0.3721	2.6062	15619.57	85.751	523.077	1.2703	0.4257	21.924	24.158

READING NO. = 55

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.113	0.10	-0.55	11.451	0.981	7994.14	43.41	2076.634	1.067	7920.945	7876.441	0.267

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9798	0.0573	13.3399	8039.30	43.656	534.627	1.0619	0.2087	12.446	13.943

READING NO. = 56

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.157	0.10	-0.55	18.650	0.955	13623.48	73.95	2077.135	1.218	13506.949	13416.770	0.440

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9525	0.1898	13.3773	13715.05	74.443	535.115	1.1914	0.3571	20.694	21.424

READING NO. = 57

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.177	0.10	-0.58	20.987	0.947	14226.58	77.20	2077.567	1.239	15337.387	14007.879	0.496

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9439	0.2155	13.4007	15576.85	84.531	535.333	1.2441	0.4118	21.591	23.438

READING NO. = 58

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.094	0.10	19.99	18.000	0.949	13440.36	72.93	2073.179	1.212	13333.359	13232.398	0.422

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9456	0.2118	13.3177	13542.90	73.486	535.441	1.1826	0.3426	20.548	20.733

READING NO. = 59

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.113	0.10	19.99	10.070	0.972	7985.59	43.34	2073.646	1.067	7950.578	7862.828	0.251

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9704	0.0914	13.3343	8074.71	43.819	535.333	1.0636	0.1824	12.600	13.196

READING NO. = 60

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.069	0.10	39.93	11.058	0.982	7662.06	41.58	2074.117	1.061	7579.520	7544.656	0.255

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9811	0.0385	13.2964	7697.47	41.774	535.279	1.0581	0.2011	12.196	13.363

READING NO. = 61

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.162	0.10	40.09	19.271	0.956	13512.38	73.31	2072.960	1.215	13393.145	13300.613	0.449

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9532	0.1535	13.3846	13606.39	73.816	535.658	1.1916	0.3712	20.748	21.760

READING NO. = 62

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.206	0.10	40.04	20.592	0.951	14071.54	76.32	2073.569	1.233	14401.348	13847.492	0.476

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9479	0.1771	13.4227	14634.35	79.372	535.930	1.2200	0.4022	21.529	22.738

READING NO. = 63

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.085	0.19	-0.60	11.166	0.972	7494.81	40.15	2045.591	1.053	7324.355	7285.195	0.253

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9716	0.0843	51.0900	7535.10	40.368	549.295	1.0492	0.2032	11.768	13.260

READING NO. = 64

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.099	0.19	-0.60	19.123	0.948	13568.54	72.64	2045.590	1.208	13329.961	13179.359	0.445

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9458	0.2045	51.1029	13723.59	73.468	550.104	1.1839	0.3678	19.868	21.589

READING NO. = 65

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.070	0.19	-0.60	22.128	0.943	14142.35	75.71	2045.737	1.227	15252.203	13736.707	0.498

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9404	0.2011	51.0741	15702.60	84.062	550.104	1.2301	0.4403	20.678	23.508

READING NO. = 66

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.080	0.19	19.99	17.496	0.922	14030.03	75.08	2045.520	1.225	13727.770	13622.270	0.414

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9182	0.2608	51.0816	14138.68	75.660	550.536	1.1918	0.3316	20.628	20.394

READING NO. = 67

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.207	0.19	19.97	10.751	0.962	8520.32	45.59	2045.979	1.073	8320.887	8272.285	0.271

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9615	0.0882	51.1968	8570.38	45.860	550.590	1.0663	0.1953	13.181	14.161

READING NO. = 68

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.090	0.19	39.91	11.240	0.959	7842.75	41.95	2046.600	1.060	7667.898	7612.207	0.247

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9586	0.0418	51.0957	7900.13	42.261	550.913	1.0612	0.2046	12.183	13.006

READING NO. = 69

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.124	0.19	40.04	19.887	0.944	13422.04	71.78	2046.165	1.201	13116.070	13023.672	0.428

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9434	0.1162	51.1237	13517.27	72.289	551.237	1.1855	0.3855	20.073	20.970

READING NO. = 70

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.178	0.19	39.93	22.672	0.939	13912.82	74.38	2045.296	1.226	15410.566	13494.602	0.508

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9389	0.1649	51.1734	15888.17	84.935	551.668	1.2516	0.4545	20.886	23.837

RDG 71 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 71

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.222	0.26	-10.16	11.898	0.978	5153.21	27.34	2009.208	1.012	4965.180	4960.480	0.227

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9774	0.0687	91.6751	5158.10	27.365	560.114	1.0099	0.2173	9.451	11.985

READING NO. = 72

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.232	0.26	-10.14	19.296	0.955	12801.85	67.88	2009.676	1.169	12150.367	12315.977	0.411

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9527	0.1797	91.6842	12629.71	66.966	560.758	1.1379	0.3718	18.626	20.302

READING NO. = 73

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.261	0.26	-10.14	22.238	0.944	14078.86	74.63	2008.486	1.210	15276.516	13539.980	0.496

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9416	0.2264	91.7091	15884.50	84.196	561.134	1.2215	0.4432	20.090	23.417

READING NO. = 74

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.232	0.26	-0.62	18.894	0.937	13083.86	69.33	2009.171	1.181	12685.105	12579.461	0.404

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9339	0.2309	91.6857	13193.75	69.913	561.456	1.1555	0.3626	18.890	20.016

READING NO. = 75

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.261	0.26	-0.64	9.150	0.964	4841.90	25.66	2007.621	1.007	4640.191	4655.457	0.190

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9627	0.0959	91.7060	4826.02	25.574	561.402	1.0112	0.1651	9.168	10.164

RDG 76 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 76

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.339	0.26	9.48	9.605	0.948	6847.76	36.28	2005.094	1.036	6622.953	6581.883	0.230

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9473	0.1127	91.7730	6890.49	36.502	561.778	1.0371	0.1736	11.425	12.146

READING NO. = 77

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.310	0.26	9.48	18.594	0.918	13776.09	72.95	2005.960	1.203	13309.512	13236.777	0.407

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9149	0.2633	91.7520	13851.78	73.355	562.153	1.1746	0.3558	19.624	20.114

READING NO. = 78

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.193	0.26	19.97	19.222	0.920	14153.33	74.93	2008.274	1.221	13698.043	13596.004	0.427

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9180	0.2077	91.6445	14259.55	75.496	562.422	1.1833	0.3701	20.118	20.926

READING NO. = 79

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.212	0.26	19.93	10.436	0.934	7918.45	41.94	2008.453	1.055	7645.102	7609.902	0.248

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9343	0.1012	91.6649	7955.07	42.136	561.938	1.0548	0.1893	12.556	13.034

READING NO. = 80

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.251	0.26	30.15	10.178	0.927	8020.99	42.45	2005.749	1.061	7801.426	7702.941	0.243

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9270	0.0610	91.6999	8123.54	42.997	562.743	1.0618	0.1844	12.291	12.787

READING NO. = 81

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.173	0.26	30.18	19.229	0.913	13340.24	70.62	2007.088	1.194	12933.266	12812.492	0.409

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9132	0.1409	91.6270	13465.99	71.281	562.636	1.1789	0.3702	19.143	20.208

READING NO. = 82

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.349	0.26	39.91	19.309	0.907	13402.50	70.91	2005.525	1.193	12930.008	12865.551	0.405

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9074	0.1128	91.7805	13469.65	71.263	563.226	1.1825	0.3721	19.560	20.060

READING NO. = 83

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
100.320	0.26	39.91	11.178	0.917	8331.09	44.07	2005.168	1.064	8150.445	7996.934	0.243

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9174	0.0423	91.7583	8491.02	44.921	563.280	1.0710	0.2034	13.176	12.799

READING NO. = 85

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.60	0.732	1.000	2.44	0.01	2063.411	1.000	7.267	2.422	0.003

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0000	0.0013	0.0000	7.33	0.040	527.334	1.0000	0.0130	2.494	0.138

READING NO. = 86

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.693	0.02	-0.60	11.021	0.982	7801.24	42.76	2063.486	1.066	7738.398	7759.039	0.244

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9817	0.0892	0.6610	7780.49	42.650	524.661	1.0618	0.2004	12.066	12.864

READING NO. = 87

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.315	0.04	-0.60	18.745	0.954	13048.46	71.56	2063.479	1.202	13091.395	12983.285	0.414

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9526	0.2597	2.2017	13157.12	72.153	524.224	1.1832	0.3592	20.019	20.402

READING NO. = 88

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.315	0.04	-0.60	21.719	0.942	14025.14	76.93	2063.588	1.236	15549.660	13958.000	0.492

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9393	0.3600	2.2018	15624.46	85.701	524.006	1.2560	0.4299	21.430	23.275

READING NO. = 89

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.542	0.29	-10.11	11.143	0.977	4938.34	26.47	1986.779	1.013	4810.656	4803.531	0.223

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9764	0.0725	109.7450	4945.67	26.514	548.540	1.0091	0.2027	8.950	11.802

READING NO. = 90

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.347	0.29	-10.11	19.282	0.951	12840.91	68.77	1991.617	1.175	12486.984	12477.488	0.421

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9483	0.1872	109.5745	12850.68	68.822	549.673	1.1414	0.3714	18.853	20.684

READING NO. = 91

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.581	0.29	-0.62	18.778	0.928	13141.25	70.29	1987.712	1.184	12896.516	12754.324	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9259	0.2529	109.7787	13287.75	71.079	550.967	1.1562	0.3600	19.086	19.853

READING NO. = 92

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.376	0.29	-0.64	9.152	0.961	4855.32	25.91	1992.228	1.010	4736.809	4701.344	0.196

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9603	0.1028	109.6022	4891.95	26.107	553.553	1.0137	0.1651	9.038	10.461

READING NO. = 93

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.386	0.29	9.46	8.477	0.945	6376.51	33.99	1993.055	1.029	6201.340	6167.098	0.220

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9449	0.1127	109.6122	6411.91	34.178	554.845	1.0342	0.1526	11.020	11.682

READING NO. = 94

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.454	0.29	9.46	18.468	0.911	13868.88	73.81	1986.929	1.212	13421.465	13391.992	0.397

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9088	0.2740	109.6646	13899.39	73.972	556.620	1.1727	0.3530	19.735	19.748

READING NO. = 95

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.288	0.29	19.95	18.469	0.911	13992.18	74.32	1988.417	1.217	13572.641	13484.398	0.413

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9095	0.2300	109.5227	14083.75	74.805	558.824	1.1795	0.3530	19.914	20.375

READING NO. = 96

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.571	0.29	19.95	10.192	0.932	7897.69	41.89	1985.373	1.054	7625.609	7599.766	0.242

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9319	0.1010	109.7674	7924.55	42.028	560.489	1.0543	0.1847	12.507	12.726

READING NO. = 97

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.464	0.29	30.15	10.363	0.922	7896.47	41.85	1985.308	1.055	7652.637	7592.770	0.230

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9226	0.0492	109.6756	7958.73	42.177	561.348	1.0579	0.1879	12.378	12.132

READING NO. = 98

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.523	0.29	30.15	19.072	0.909	13339.02	70.66	1983.504	1.196	12811.672	12819.883	0.398

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9092	0.1299	109.7230	13330.48	70.611	561.885	1.1740	0.3666	19.031	19.773

READING NO. = 99

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.532	0.29	39.93	19.305	0.904	13265.77	70.24	1984.151	1.188	12795.613	12744.004	0.398

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9040	0.0889	109.7292	13319.50	70.523	562.368	1.1760	0.3720	19.319	19.760

READING NO. = 100

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.269	0.29	39.91	10.478	0.913	8145.52	43.12	1986.439	1.059	7842.406	7823.648	0.228

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9137	0.0398	109.5022	8165.05	43.223	562.583	1.0653	0.1901	12.932	12.076

READING NO. = 101

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.202	0.19	-0.62	11.058	0.971	7364.18	39.38	2023.437	1.053	7321.031	7144.551	0.240

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9697	0.0889	51.1844	7546.08	40.350	551.398	1.0488	0.2011	11.473	12.633

READING NO. = 102

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
54.938	0.19	-0.62	19.774	0.943	14116.71	75.45	2022.052	1.227	13795.055	13689.684	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9405	0.2021	50.9443	14225.36	76.031	551.884	1.1836	0.3828	20.304	21.233

READING NO. = 103

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.056	0.19	-0.62	21.556	0.938	14171.65	75.75	2022.043	1.228	15074.414	13743.625	0.484

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9355	0.2094	51.0531	15543.88	83.082	551.830	1.2173	0.4259	20.386	23.022

READING NO. = 104

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.085	0.19	19.97	17.626	0.919	14154.55	75.61	2021.717	1.229	14107.133	13719.016	0.417

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9149	0.2885	51.0769	14554.99	77.751	552.476	1.1950	0.3344	20.387	20.520

READING NO. = 105

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.056	0.19	19.97	10.446	0.962	8335.97	44.54	2021.683	1.070	8104.328	8080.660	0.261

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9611	0.0939	51.0504	8360.39	44.667	552.314	1.0622	0.1895	12.657	13.672

READING NO. = 106

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.114	0.19	39.93	10.651	0.956	7986.81	42.67	2021.138	1.064	7752.461	7741.813	0.245

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9554	0.0390	51.1006	7997.80	42.727	552.368	1.0622	0.1934	12.228	12.904

READING NO. = 107

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
54.977	0.19	40.04	19.919	0.942	13329.25	71.18	2020.932	1.200	12974.410	12914.086	0.424

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9416	0.0823	50.9802	13391.52	71.508	552.907	1.1847	0.3862	19.579	20.807

READING NO. = 108

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
13.967	0.10	39.95	19.231	0.950	13882.30	74.57	2050.758	1.223	13590.680	13529.988	0.444

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9474	0.1532	13.2007	13944.57	74.904	546.380	1.1956	0.3703	20.571	21.559

READING NO. = 109

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.084	0.10	39.91	12.040	0.981	8268.82	44.42	2050.895	1.071	8085.160	8060.172	0.271

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9807	0.0398	13.3097	8294.46	44.561	546.219	1.0659	0.2200	12.511	14.172

READING NO. = 110

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.015	0.10	19.97	10.618	0.969	8727.86	46.89	2049.747	1.081	8536.191	8507.629	0.265

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9671	0.1058	13.2414	8757.17	47.047	546.219	1.0715	0.1927	13.175	13.849

READING NO. = 111

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.035	0.10	20.01	18.400	0.941	14160.66	76.06	2049.242	1.233	13980.766	13799.922	0.432

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9370	0.2408	13.2652	14346.23	77.054	546.488	1.1992	0.3515	20.798	21.102

READING NO. = 112

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
13.888	0.10	-0.62	18.847	0.947	14142.34	75.96	2049.755	1.234	13984.336	13782.074	0.441

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9440	0.2337	13.1267	14349.89	77.074	546.488	1.2045	0.3615	20.694	21.449

READING NO. = 113

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.064	0.10	-0.62	11.710	0.977	8539.85	45.88	2049.348	1.077	8357.320	8325.180	0.272

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9765	0.0699	13.2929	8572.82	46.061	546.110	1.0677	0.2136	12.755	14.187

READING NO. = 114

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-14.79	0.779	1.000	4.88	0.03	2060.386	1.000	4.778	4.778	0.000

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9998	0.0026	0.0000	4.88	0.026	542.109	1.0003	0.0138	0.000	0.000

READING NO. = 116

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.55	0.541	0.999	7.33	0.04	2062.871	0.999	7.305	7.305	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9994	0.0015	0.0000	7.33	0.040	521.872	0.9999	0.0096	2.510	0.046

READING NO. = 117

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.400	0.02	-0.55	10.796	0.982	7391.04	40.67	2062.852	1.059	7442.152	7378.773	0.232

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9815	0.0867	0.3786	7454.52	41.017	520.726	1.0573	0.1961	11.637	12.239

READING NO. = 118

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.738	0.03	-0.53	18.069	0.956	12280.54	67.56	2062.967	1.178	12672.574	12258.234	0.406

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9546	0.2349	1.6582	12695.64	69.844	520.890	1.1715	0.3441	19.227	20.097

READING NO. = 119

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.510	0.04	-0.55	22.222	0.940	14113.05	77.64	2059.762	1.242	15642.387	14087.410	0.490

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9380	0.3805	2.3898	15670.85	86.212	520.890	1.2565	0.4428	21.732	23.216

READING NO. = 120

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.318	0.10	-0.53	11.155	0.977	7576.61	41.21	2049.730	1.060	8122.215	7477.602	0.268

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9768	0.0674	13.5317	8229.75	44.765	532.834	1.0635	0.2030	11.705	13.993

READING NO. = 121

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.279	0.10	-0.55	17.914	0.946	12627.27	68.64	2049.984	1.184	13638.355	12454.656	0.436

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9429	0.2305	13.4929	13827.37	75.167	533.486	1.1954	0.3407	19.193	21.261

READING NO. = 122

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.299	0.10	-0.53	20.374	0.939	14154.55	76.92	2049.587	1.237	15442.285	13956.801	0.480

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9361	0.2686	13.5105	15661.09	85.110	533.812	1.2428	0.3970	21.245	22.891

READING NO. = 123

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.406	0.10	20.01	17.513	0.938	12772.55	69.37	2049.797	1.189	13708.168	12585.770	0.426

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9356	0.2419	13.6132	13911.60	75.552	534.518	1.1940	0.3319	19.451	20.888

READING NO. = 124

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.211	0.10	19.99	9.842	0.970	7521.67	40.84	2049.520	1.059	8127.414	7410.547	0.254

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9687	0.0938	13.4290	8249.29	44.794	534.681	1.0654	0.1781	11.608	13.328

READING NO. = 125

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.308	0.10	39.93	10.852	0.979	7520.45	40.82	2046.706	1.059	7732.953	7407.090	0.256

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9792	0.0436	13.5185	7851.30	42.620	535.007	1.0595	0.1972	11.705	13.414

RDG 126 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 126

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.357	0.10	39.95	18.558	0.950	12502.74	67.84	2046.487	1.181	13510.566	12308.664	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9479	0.1750	13.5642	13723.59	74.463	535.496	1.1844	0.3550	19.046	21.227

READING NO. = 127

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.181	0.10	39.95	19.773	0.942	14132.58	76.65	2046.209	1.238	14407.355	13907.563	0.460

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9393	0.1913	13.4006	14640.46	79.406	535.930	1.2105	0.3828	21.344	22.173

READING NO. = 128

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
54.958	0.19	-0.60	10.157	0.971	7663.29	41.26	2021.186	1.057	6938.297	7486.973	0.228

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9701	0.0812	50.9610	7101.69	38.240	543.732	1.0422	0.1840	11.943	12.070

READING NO. = 129

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.183	0.19	-0.58	18.798	0.943	12809.18	68.87	2020.269	1.183	13287.852	12495.852	0.426

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9419	0.1800	51.1618	13621.04	73.236	545.354	1.1708	0.3604	18.879	20.869

READING NO. = 130

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.222	0.19	-0.58	21.348	0.934	14174.09	76.20	2020.014	1.230	15256.680	13825.320	0.487

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9322	0.2195	51.2003	15641.55	84.087	545.516	1.2226	0.4207	20.657	23.105

READING NO. = 131

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.290	0.19	19.99	16.623	0.920	12684.65	68.15	2020.153	1.181	13578.414	12364.570	0.404

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9171	0.2557	51.2614	13929.91	74.837	546.218	1.1820	0.3128	18.716	20.031

READING NO. = 132

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.300	0.19	19.99	10.500	0.960	7738.98	41.56	2021.485	1.058	8035.168	7540.340	0.259

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9600	0.0914	51.2695	8246.84	44.286	546.705	1.0602	0.1905	11.956	13.563

READING NO. = 133

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.368	0.19	39.93	10.924	0.956	7695.03	41.29	2018.419	1.059	7669.074	7491.969	0.246

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9565	0.0345	51.3325	7876.93	42.268	547.515	1.0587	0.1986	11.852	12.927

READING NO. = 134

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.134	0.19	39.97	19.058	0.938	12567.45	67.43	2017.681	1.177	13032.742	12235.207	0.422

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9382	0.0831	51.1154	13386.64	71.829	547.569	1.1815	0.3663	18.783	20.744

READING NO. = 135

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.280	0.19	39.93	22.846	0.933	14354.77	77.01	2018.425	1.237	15711.500	13971.848	0.514

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9330	0.1234	51.2494	16142.10	86.593	547.838	1.2620	0.4591	21.140	24.009

READING NO. = 136

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.292	0.29	-10.09	11.107	0.973	7395.92	39.42	1978.625	1.044	4928.945	7151.988	0.221

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9733	0.0728	108.6248	5097.05	27.166	555.006	1.0104	0.2021	12.045	11.732

READING NO. = 137

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.764	0.29	-10.09	18.522	0.948	12905.62	68.77	1983.200	1.175	12159.445	12478.156	0.401

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9463	0.1925	108.1629	12575.99	67.016	555.168	1.1337	0.3542	18.639	19.877

READING NO. = 138

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.901	0.29	-10.09	21.691	0.938	14420.70	76.81	1982.290	1.228	15251.383	13936.973	0.490

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9362	0.2471	108.2780	15780.73	84.057	555.652	1.2100	0.4292	20.258	23.208

READING NO. = 139

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.950	0.29	-0.60	18.188	0.929	12901.96	68.71	1981.710	1.178	12650.188	12466.164	0.392

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9270	0.2493	108.3231	13092.41	69.721	555.921	1.1500	0.3468	18.536	19.507

READING NO. = 140

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.911	0.29	-0.60	9.856	0.959	7414.23	39.47	1980.057	1.047	5662.867	7161.723	0.216

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9579	0.1100	108.2856	5862.53	31.211	556.244	1.0256	0.1783	11.927	11.434

READING NO. = 141

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.882	0.29	9.50	9.546	0.941	7557.07	40.22	1979.843	1.051	7590.688	7298.281	0.251

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9401	0.1250	108.2623	7859.84	41.836	556.459	1.0529	0.1725	11.951	13.202

READING NO. = 142

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.774	0.29	9.50	17.373	0.904	12887.31	68.60	1980.679	1.177	13310.336	12447.191	0.398

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9027	0.2697	108.1667	13780.97	73.359	556.351	1.1708	0.3289	18.570	19.757

READING NO. = 143

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.862	0.29	19.99	18.396	0.912	12890.97	68.62	1977.936	1.179	13732.984	12450.121	0.420

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9110	0.2274	108.2402	14219.26	75.689	556.405	1.1844	0.3514	18.578	20.667

READING NO. = 144

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.823	0.29	19.97	10.888	0.933	7726.77	41.12	1980.459	1.053	7694.570	7460.004	0.243

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9334	0.0875	108.2075	7969.72	42.408	556.782	1.0578	0.1979	12.005	12.817

READING NO. = 145

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.813	0.29	30.18	11.203	0.924	7795.14	41.48	1978.984	1.055	7784.523	7526.379	0.233

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9244	0.0394	108.1976	8062.50	42.904	556.728	1.0625	0.2039	12.174	12.312

RDG 146 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 146

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.057	0.29	30.18	19.218	0.910	12916.61	68.71	1975.329	1.183	12836.445	12466.461	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9096	0.1175	108.4085	13299.96	70.748	557.158	1.1793	0.3700	18.538	19.871

READING NO. = 147

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.126	0.29	39.95	19.007	0.904	12798.19	68.08	1975.288	1.176	12844.688	12352.160	0.399

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9046	0.0800	108.4709	13308.50	70.793	557.158	1.1782	0.3652	18.722	19.825

READING NO. = 148

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.989	0.29	39.91	22.966	0.898	14580.63	77.53	1978.071	1.240	15716.461	14066.375	0.485

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8976	0.1116	108.3534	16291.04	86.621	557.642	1.2623	0.4623	20.892	23.064

READING NO. = 149

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.735	0.29	39.91	10.963	0.914	7749.96	41.22	1978.594	1.055	8337.273	7479.508	0.244

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9140	0.0433	108.1292	8638.75	45.951	557.212	1.0719	0.1993	12.255	12.842

READING NO. = 150

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-12.35	1.398	1.001	7.33	0.04	2050.199	1.002	7.180	7.180	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0013	0.0074	0.0000	7.33	0.040	540.214	1.0004	0.0248	0.000	0.000

READING NO. = 155

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.039	0.00	-2.57	0.535	1.000	7.33	0.04	2070.789	1.000	4.884	7.326	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9999	0.0017	0.0346	4.88	0.027	518.915	1.0044	0.0095	2.464	0.000

READING NO. = 156

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.947	0.02	-0.46	11.757	0.979	7298.25	40.26	2070.962	1.058	8058.145	7305.367	0.231

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9785	0.1005	0.9052	8050.29	44.412	517.988	1.0652	0.2145	11.446	12.186

READING NO. = 157

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.520	0.04	-0.46	17.993	0.952	12514.95	69.00	2071.497	1.186	13267.863	12519.215	0.391

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9495	0.2012	2.3965	13263.34	73.125	518.646	1.1711	0.3424	19.650	19.481

READING NO. = 158

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
3.301	0.05	-0.46	22.270	0.940	14159.44	78.06	2071.458	1.244	15876.027	14162.770	0.458

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9371	0.2977	3.1412	15872.29	87.500	518.755	1.2371	0.4440	21.931	22.083

READING NO. = 159

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.416	0.10	-0.46	12.447	0.974	7275.05	39.84	2056.132	1.057	9001.102	7227.809	0.273

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9729	0.0916	13.6214	9059.94	49.609	525.807	1.0774	0.2279	11.376	14.239

READING NO. = 160

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.338	0.10	-0.49	20.023	0.939	12551.57	68.50	2059.017	1.186	14961.590	12428.902	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9358	0.2782	13.5455	15109.26	82.460	529.295	1.2133	0.3887	19.188	21.217

READING NO. = 161

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.416	0.10	-0.46	21.227	0.936	14185.07	77.37	2058.868	1.241	15715.566	14038.523	0.447

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9329	0.2966	13.6191	15879.62	86.616	529.893	1.2293	0.4177	21.515	21.683

READING NO. = 162

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.513	0.10	20.05	19.881	0.931	12541.81	68.32	2058.647	1.184	15308.066	12396.324	0.433

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9276	0.2996	13.7126	15487.72	84.370	531.254	1.2193	0.3853	19.259	21.139

READING NO. = 163

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.367	0.10	20.05	10.315	0.969	7408.13	40.34	2058.583	1.057	8241.926	7319.191	0.240

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9683	0.0979	13.5766	8342.07	45.425	531.689	1.0678	0.1870	11.552	12.659

READING NO. = 164

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.367	0.10	39.95	12.429	0.979	7408.13	40.32	2059.014	1.058	8332.961	7315.457	0.261

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9790	0.0458	13.5726	8438.52	45.927	532.233	1.0698	0.2276	11.635	13.654

READING NO. = 165

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.416	0.10	39.97	20.089	0.945	12543.03	68.21	2059.912	1.183	14453.934	12376.008	0.438

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9423	0.2098	13.6193	14649.00	79.662	533.103	1.1998	0.3902	19.364	21.357

READING NO. = 166

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.347	0.10	39.95	19.774	0.943	14065.43	76.46	2059.592	1.236	14467.313	13872.484	0.432

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9402	0.2076	13.5561	14668.53	79.736	533.537	1.2013	0.3828	21.526	21.110

READING NO. = 167

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.895	0.19	-0.51	11.607	0.966	6778.17	36.45	2029.686	1.043	7959.777	6612.707	0.239

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9645	0.1013	51.8184	8158.95	43.870	545.297	1.0645	0.2116	10.779	12.616

READING NO. = 168

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.524	0.19	-0.51	21.010	0.938	12535.70	67.32	2030.110	1.176	14542.578	12214.578	0.442

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9361	0.2051	51.4819	14924.91	80.151	546.648	1.1960	0.4124	18.604	21.490

READING NO. = 169

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.739	0.19	-0.51	21.991	0.936	14204.61	76.28	2029.266	1.233	15362.641	13840.055	0.462

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9334	0.2173	51.6726	15767.30	84.671	546.702	1.2158	0.4368	20.695	22.248

RDG 170 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 170

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.944	0.19	20.03	18.857	0.910	12535.70	67.31	2029.106	1.178	15088.750	12212.777	0.419

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9070	0.3174	51.8613	15487.72	83.161	546.810	1.2208	0.3617	18.653	20.626

READING NO. = 171

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.188	0.19	20.01	12.251	0.956	7016.23	37.65	2030.420	1.048	9009.883	6831.105	0.274

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9562	0.0984	52.0814	9254.06	49.658	547.512	1.0838	0.2241	11.026	14.299

READING NO. = 172

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.022	0.19	39.93	11.547	0.952	7013.79	37.64	2029.209	1.049	8291.957	6828.742	0.247

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9517	0.0448	51.9282	8516.66	45.701	547.510	1.0779	0.2105	11.030	13.010

READING NO. = 173

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.925	0.19	39.95	21.204	0.938	12425.83	66.64	2028.568	1.174	13982.707	12091.418	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9378	0.0927	51.8411	14369.42	77.065	548.105	1.2031	0.4171	18.724	21.215

READING NO. = 174

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.993	0.19	39.95	21.490	0.936	14130.14	75.77	2029.031	1.232	14353.121	13748.496	0.442

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9350	0.1113	51.9044	14751.55	79.107	548.213	1.2120	0.4242	21.240	21.489

READING NO. = 175

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.050	0.29	-10.00	11.827	0.974	6045.66	32.27	1987.715	1.027	5405.125	5855.652	0.224

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9741	0.0760	110.1978	5580.51	29.790	553.227	1.0235	0.2159	10.342	11.844

READING NO. = 176

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.206	0.29	-10.00	20.006	0.945	12090.09	64.48	1987.955	1.154	13207.414	11699.887	0.426

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9435	0.2129	110.3348	13647.90	72.792	554.196	1.1595	0.3883	17.742	20.870

READING NO. = 177

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.040	0.29	-10.00	21.952	0.938	14230.25	75.91	1987.787	1.223	15244.824	13773.641	0.477

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9354	0.2486	110.1900	15750.20	84.021	553.981	1.2022	0.4358	20.185	22.769

READING NO. = 178

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.991	0.29	-0.51	20.071	0.922	12170.67	64.87	1987.430	1.157	14076.336	11770.422	0.414

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9194	0.2835	110.1467	14554.99	77.581	554.896	1.1866	0.3898	17.811	20.427

READING NO. = 179

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.030	0.29	-0.53	10.700	0.952	5916.25	31.54	1987.140	1.025	6650.039	5721.961	0.224

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9513	0.1195	110.1776	6875.84	36.651	554.842	1.0494	0.1943	10.053	11.849

READING NO. = 180

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.030	0.29	9.57	11.352	0.934	6408.25	34.14	1986.455	1.033	8585.797	6193.902	0.257

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9337	0.1473	110.1749	8882.92	47.320	555.542	1.0798	0.2067	10.606	13.462

READING NO. = 181

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.030	0.29	9.57	20.094	0.900	12545.47	66.79	1987.247	1.170	14959.824	12118.816	0.428

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8971	0.2879	110.1777	15486.50	82.451	556.187	1.2129	0.3903	18.247	20.957

READING NO. = 182

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.109	0.29	20.01	20.889	0.906	12545.47	66.80	1987.026	1.172	14961.273	12119.988	0.438

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9045	0.2404	110.2480	15486.50	82.458	556.080	1.2212	0.4094	18.287	21.331

READING NO. = 183

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.148	0.29	19.99	12.342	0.927	6375.29	33.95	1987.527	1.034	8586.367	6159.066	0.253

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9269	0.1036	110.2816	8887.80	47.323	556.080	1.0880	0.2259	10.364	13.302

READING NO. = 184

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121:050	0.29	30.20	11.456	0.915	6367.96	33.90	1986.598	1.035	9303.574	6150.500	0.263

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9153	0.0818	110.1947	9632.52	51.276	556.349	1.0976	0.2088	10.322	13.789

RDG 185 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 185

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.001	0.29	30.20	20.997	0.908	12535.70	66.69	1985.809	1.173	13870.016	12100.027	0.415

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9081	0.1401	110.1511	14369.42	76.444	557.047	1.2031	0.4120	18.209	20.433

READING NO. = 186

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.021	0.29	39.95	20.838	0.905	12180.43	64.81	1985.267	1.161	13793.563	11758.230	0.416

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9046	0.0961	110.1682	14288.85	76.023	556.940	1.2073	0.4082	18.115	20.496

READING NO. = 187

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.972	0.29	39.95	21.733	0.903	14309.60	76.13	1985.200	1.231	14297.766	13812.262	0.425

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9028	0.0946	110.1231	14812.59	78.802	557.048	1.2182	0.4303	20.829	20.841

READING NO. = 188

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
121.099	0.29	39.93	10.955	0.903	6569.40	34.95	1984.614	1.038	9295.820	6341.379	0.245

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9038	0.0635	110.2379	9630.07	51.234	556.994	1.1027	0.1991	10.718	12.896

READING NO. = 189

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.039	0.00	-14.13	0.705	1.000	7.33	0.04	2066.289	1.000	7.156	7.156	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9999	0.0025	0.0345	7.33	0.039	543.889	1.0052	0.0125	2.537	0.069

RDG 190 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 190

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.059	0.01	-0.53	0.717	1.000	7.33	0.04	2043.681	1.000	6.069	7.283	0.003

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9999	0.0018	0.0546	6.10	0.033	525.040	1.0047	0.0127	0.000	0.164

READING NO. = 191

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.440	0.02	-0.53	5.634	1.017	6892.93	37.80	2042.438	1.048	1200.177	6858.492	0.056

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0172	0.0384	0.4158	1206.20	6.615	524.224	0.9954	0.1006	11.568	3.054

READING NO. = 192

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.231	0.03	-0.53	9.334	1.053	11734.83	64.35	2042.184	1.150	2044.217	11674.992	0.163

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0525	0.1205	1.1718	2054.69	11.267	524.333	0.9791	0.1686	19.296	8.759

READING NO. = 193

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.319	0.03	-0.55	9.288	1.052	11666.46	63.97	2042.216	1.148	2039.465	11607.578	0.163

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0518	0.1172	1.2535	2049.81	11.240	524.279	0.9797	0.1677	19.195	8.742

READING NO. = 194

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.856	0.04	-0.53	10.282	1.067	13295.07	72.91	2042.514	1.192	2292.239	13228.660	0.191

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0662	0.1519	1.7642	2303.75	12.634	524.224	0.9738	0.1864	21.319	10.186

READING NO. = 195

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.488	0.02	-0.53	6.182	1.021	7337.32	40.24	2040.564	1.058	1303.499	7301.043	0.076

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0206	0.0467	0.4631	1309.97	7.184	524.169	0.9946	0.1106	11.511	4.126

READING NO. = 196

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.231	0.03	-0.53	10.273	1.064	12397.74	68.07	2038.945	1.180	2189.068	12349.980	0.187

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0632	0.1484	1.1699	2197.53	12.065	523.022	0.9766	0.1862	19.271	9.985

READING NO. = 197

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.680	0.03	-0.53	10.806	1.072	13256.01	72.79	2039.210	1.206	2332.939	13207.012	0.207

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0711	0.1780	1.5983	2341.59	12.858	522.858	0.9751	0.1963	20.429	11.021

READING NO. = 198

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.781	0.02	-0.49	19.634	1.018	12911.73	70.91	2039.326	1.195	13317.348	12866.023	0.464

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0166	0.3558	0.7417	13364.66	73.398	522.695	1.1517	0.3796	20.330	22.295

READING NO. = 199

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.527	0.02	-0.49	20.077	0.976	6999.14	38.45	2040.310	1.051	13322.566	6975.824	0.442

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9756	0.2218	0.5038	13367.10	73.427	522.476	1.1779	0.3899	11.767	21.488

RDG 200 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 200

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.557	0.02	-0.51	19.530	0.958	24.42	0.13	2040.345	0.999	13323.785	24.336	0.417

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9579	0.1579	0.5311	13368.32	73.434	522.476	1.1850	0.3772	2.740	20.530

READING NO. = 201

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.377	0.10	-0.49	11.670	1.001	6971.06	38.13	2028.701	1.051	7535.359	6918.617	0.268

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0002	0.0760	13.5799	7592.48	41.531	526.898	1.0538	0.2129	11.459	13.991

READING NO. = 202

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.387	0.10	-0.49	19.743	0.976	6696.37	36.42	2028.953	1.045	13289.895	6608.203	0.440

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9759	0.1832	13.5950	13467.21	73.247	532.942	1.1755	0.3821	11.154	21.429

READING NO. = 203

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.338	0.10	-0.49	20.066	1.015	12208.51	66.23	2028.812	1.167	13070.438	12016.578	0.460

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0134	0.2320	13.5473	13279.20	72.037	535.712	1.1504	0.3897	19.007	22.165

READING NO. = 204

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.289	0.10	-0.51	11.277	1.052	12213.39	66.08	2028.094	1.168	3848.021	11988.660	0.247

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0516	0.1610	13.5024	3920.15	21.208	538.641	0.9966	0.2053	18.730	13.004

READING NO. = 205

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.435	0.10	19.99	11.310	1.050	12214.61	65.93	2028.301	1.167	4003.151	11962.813	0.248

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0494	0.1588	13.6374	4087.41	22.063	541.078	0.9999	0.2059	18.813	13.064

READING NO. = 206

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.377	0.10	19.99	20.035	1.010	12214.61	65.88	2028.882	1.164	13208.359	11953.836	0.457

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0088	0.2577	13.5811	13496.51	72.797	541.891	1.1485	0.3890	19.022	22.034

READING NO. = 207

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.338	0.10	20.01	20.021	0.969	6717.13	36.22	2029.388	1.043	13622.469	6571.754	0.448

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9695	0.2108	13.5444	13923.81	75.080	542.216	1.1896	0.3886	11.446	21.727

READING NO. = 208

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.318	0.10	19.99	11.232	0.996	6714.68	36.18	2029.497	1.044	7526.445	6564.453	0.260

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9959	0.0828	13.5251	7698.69	41.482	543.027	1.0547	0.2044	10.950	13.630

READING NO. = 209

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.406	0.10	39.93	11.574	0.999	6712.24	36.13	2028.735	1.045	6943.559	6554.891	0.249

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9987	0.0596	13.6069	7110.24	38.269	544.217	1.0467	0.2110	10.931	13.082

READING NO. = 210

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.347	0.10	39.93	19.741	0.971	6713.46	36.10	2027.479	1.043	13497.484	6549.254	0.439

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9702	0.2062	13.5584	13835.91	74.391	545.352	1.1800	0.3821	11.312	21.365

READING NO. = 211

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.015	0.10	39.93	20.057	1.010	12174.33	65.42	2027.534	1.163	13306.828	11870.090	0.465

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0085	0.2284	13.2449	13647.90	73.340	545.946	1.1590	0.3895	18.764	22.334

READING NO. = 212

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.123	0.10	39.93	11.169	1.049	12179.21	65.42	2027.924	1.166	3806.214	11869.574	0.237

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0484	0.1540	13.3477	3905.51	20.978	546.432	0.9987	0.2032	18.545	12.525

READING NO. = 213

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.300	0.19	-0.60	11.900	0.995	6696.37	35.64	1999.843	1.039	6550.465	6466.758	0.262

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9950	0.0679	51.2590	6783.05	36.103	556.510	1.0406	0.2173	10.971	13.708

READING NO. = 214

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.251	0.19	-0.58	20.077	0.976	6345.98	33.78	1998.802	1.033	13094.570	6129.273	0.446

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9762	0.1443	51.2134	13557.55	72.170	556.349	1.1667	0.3900	10.729	21.632

READING NO. = 215

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.251	0.19	-0.58	19.436	1.005	12182.88	64.83	1999.126	1.157	13180.285	11762.297	0.480

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0039	0.2408	51.2154	13651.56	72.643	556.779	1.1608	0.3750	18.277	22.877

READING NO. = 216

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.349	0.19	-0.60	11.471	1.043	12184.10	64.78	1996.994	1.158	3492.166	11754.398	0.237

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0425	0.1470	51.2998	3619.83	19.247	557.640	0.9908	0.2090	18.063	12.521

READING NO. = 217

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.300	0.19	19.97	11.166	1.039	12184.10	64.74	1994.549	1.159	3514.696	11747.039	0.236

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0388	0.1520	51.2560	3645.46	19.371	558.338	0.9948	0.2032	18.130	12.466

READING NO. = 218

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.134	0.19	19.97	19.940	0.995	12186.54	64.71	1995.966	1.157	13673.434	11740.918	0.484

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9954	0.2654	51.1092	14192.40	75.361	559.144	1.1731	0.3867	18.330	22.998

READING NO. = 219

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.309	0.19	19.97	20.081	0.963	6319.13	33.54	1994.873	1.033	13500.176	6086.309	0.447

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9636	0.1803	51.2643	14016.60	74.406	559.467	1.1830	0.3901	10.830	21.680

RDG 220 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 220

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.339	0.19	19.97	11.623	0.989	6475.39	34.35	1994.870	1.037	6964.035	6232.023	0.258

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9894	0.0763	51.2894	7235.99	38.382	560.327	1.0489	0.2120	10.655	13.504

READING NO. = 221

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.349	0.19	39.91	11.807	0.984	6475.39	34.33	1994.870	1.038	6600.477	6229.344	0.243

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9843	0.0632	51.3022	6861.19	36.378	560.809	1.0444	0.2155	10.739	12.791

READING NO. = 222

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.290	0.19	39.93	20.148	0.955	6242.21	33.08	1996.170	1.033	13558.965	6001.297	0.438

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9547	0.1138	51.2471	14103.28	74.730	561.506	1.1867	0.3916	10.930	21.334

READING NO. = 223

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.114	0.19	39.93	20.472	1.002	12065.68	63.92	1996.615	1.156	12494.336	11597.781	0.457

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0010	0.1854	51.0878	12998.40	68.862	561.721	1.1494	0.3993	18.149	22.047

READING NO. = 224

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
55.427	0.19	39.93	11.322	1.031	12065.68	63.88	1995.152	1.155	3576.640	11589.484	0.227

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0311	0.1441	51.3726	3723.60	19.713	562.526	0.9959	0.2062	18.032	12.027

READING NO. = 225

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.097	0.29	-10.11	12.066	0.987	6254.42	32.94	1955.992	1.028	4811.875	5976.059	0.227

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9868	0.0525	108.4218	5036.01	26.520	568.476	1.0188	0.2205	10.624	12.010

READING NO. = 226

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.184	0.29	-10.11	20.516	0.964	5694.05	29.97	1956.525	1.016	12857.707	5438.320	0.447

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9637	0.1381	108.4976	13462.33	70.865	568.958	1.1704	0.4004	10.477	21.666

READING NO. = 227

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.927	0.29	-10.09	20.277	1.005	12184.10	64.13	1956.039	1.147	12337.090	11636.344	0.476

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0045	0.2249	109.1551	12917.83	67.995	569.011	1.1394	0.3947	17.791	22.741

READING NO. = 228

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.214	0.29	-10.11	11.513	1.029	12038.82	63.34	1956.739	1.147	2505.887	11493.285	0.203

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0297	0.1391	108.5271	2624.83	13.811	569.439	0.9719	0.2098	17.437	10.823

READING NO. = 229

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.175	0.29	-0.62	11.193	1.024	12038.82	63.31	1954.870	1.146	2564.122	11487.879	0.203

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0243	0.1460	108.4871	2687.09	14.132	569.975	0.9766	0.2037	17.442	10.813

READING NO. = 230

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.044	0.29	-0.64	20.077	1.001	12037.60	63.31	1955.346	1.142	12319.090	11487.254	0.468

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0003	0.2275	109.2616	12909.29	67.896	569.921	1.1357	0.3900	17.619	22.440

READING NO. = 231

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.862	0.29	-0.62	20.479	0.964	5602.49	29.46	1957.269	1.016	12667.336	5344.340	0.438

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9645	0.1374	108.2137	13279.20	69.816	570.349	1.1574	0.3995	10.310	21.326

READING NO. = 232

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.009	0.29	-0.62	12.162	0.979	5593.94	29.40	1954.342	1.020	5597.031	5333.941	0.242

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9794	0.0579	108.3358	5869.86	30.848	570.830	1.0312	0.2224	9.737	12.753

READING NO. = 233

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.598	0.29	9.48	11.946	0.975	5646.44	29.72	1954.264	1.020	5603.109	5392.086	0.240

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9753	0.0629	107.9720	5867.41	30.881	569.118	1.0311	0.2182	10.020	12.668

READING NO. = 234

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.927	0.29	9.48	20.478	0.959	5626.91	29.64	1955.607	1.017	12825.355	5377.734	0.430

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9594	0.1640	109.1542	13419.60	70.686	568.208	1.1574	0.3995	10.463	21.039

RDG 235 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 235

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.350	0.29	9.50	19.774	0.995	12193.86	64.25	1955.001	1.149	12694.172	11656.648	0.470

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9948	0.2497	108.6452	13279.20	69.963	567.941	1.1424	0.3828	17.906	22.508

READING NO. = 236

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.083	0.29	9.50	11.779	1.022	12154.79	64.04	1954.552	1.150	3339.985	11618.750	0.224

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0225	0.1525	109.2923	3494.08	18.408	567.994	0.9866	0.2150	17.687	11.872

READING NO. = 237

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.751	0.29	19.97	11.545	1.021	12154.79	64.03	1954.071	1.151	3290.815	11618.199	0.229

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0216	0.1513	108.9991	3442.80	18.137	568.048	0.9870	0.2105	17.792	12.085

READING NO. = 238

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.360	0.29	19.97	20.067	0.986	12152.35	64.02	1953.272	1.148	13216.934	11615.863	0.474

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9855	0.2539	108.6473	13827.37	72.845	568.048	1.1596	0.3897	17.966	22.663

READING NO. = 239

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.755	0.29	19.97	20.582	0.946	5405.93	28.48	1954.145	1.017	13308.570	5167.516	0.436

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9468	0.1539	108.1103	13922.59	73.350	567.995	1.1798	0.4020	9.972	21.262

READING NO. = 240

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.067	0.29	19.97	11.961	0.967	5418.14	28.54	1955.346	1.019	6392.875	5179.188	0.248

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9676	0.0509	108.3916	6687.82	35.234	567.994	1.0457	0.2185	9.765	13.018

READING NO. = 241

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.126	0.29	30.16	12.062	0.958	5416.92	28.54	1952.929	1.019	6724.625	5178.266	0.250

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9579	0.0602	108.4432	7034.55	37.063	567.941	1.0521	0.2204	9.937	13.118

READING NO. = 242

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
120.347	0.29	30.16	20.771	0.934	5381.51	28.35	1953.236	1.016	13522.035	5143.691	0.430

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9333	0.0876	109.5255	14147.23	74.526	568.102	1.1901	0.4066	10.315	21.041

READING NO. = 243

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.468	0.29	30.16	20.649	0.979	11638.38	61.32	1952.184	1.136	12606.031	11125.098	0.445

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9781	0.1893	108.7432	13187.64	69.478	567.995	1.1485	0.4036	17.466	21.593

READING NO. = 244

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.712	0.29	30.16	11.643	1.001	11642.04	61.33	1952.130	1.138	4206.672	11127.555	0.248

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0021	0.1328	108.9602	4401.17	23.185	568.101	1.0084	0.2123	17.248	13.058

READING NO. = 245

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.263	0.29	39.91	11.897	0.980	11643.26	61.33	1949.858	1.138	6734.715	11127.672	0.299

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9800	0.1578	108.5558	7046.76	37.118	568.209	1.0504	0.2172	17.421	15.447

READING NO. = 246

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.175	0.29	39.93	20.672	0.930	11594.43	61.08	1953.970	1.133	17506.168	11081.520	0.512

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9288	0.3091	108.4833	18316.44	96.485	568.155	1.2780	0.4042	17.764	23.958

READING NO. = 247

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
118.579	0.29	39.91	18.976	0.896	4597.73	24.22	1952.609	1.006	17512.359	4394.129	0.432

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8947	0.1897	107.9561	18323.77	96.519	568.209	1.2761	0.3645	9.884	21.095

READING NO. = 248

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
119.536	0.29	39.91	12.184	0.932	5073.86	26.72	1951.495	1.012	9190.832	4847.348	0.276

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9316	0.0995	108.8033	9620.30	50.655	568.637	1.0882	0.2228	10.274	14.383

READING NO. = 250

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.137	0.01	-12.07	0.593	1.000	21.98	0.12	2055.593	1.000	22.753	21.556	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0000	0.0013	0.1304	23.20	0.125	539.401	1.0001	0.0105	2.423	0.000

READING NO. = 252

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.518	0.02	-0.44	18.442	1.046	9982.90	54.16	2054.134	1.099	9872.109	9826.449	0.398

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0458	0.1050	0.4935	10029.29	54.410	535.659	1.0933	0.3524	17.272	19.775

READING NO. = 253

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.508	0.02	-0.44	18.451	1.046	9982.90	54.16	2054.135	1.099	9874.016	9825.945	0.397

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0457	0.1047	0.4867	10031.73	54.420	535.713	1.0929	0.3526	17.247	19.738

READING NO. = 254

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.273	0.01	-0.35	11.971	1.022	6707.36	36.35	2052.958	1.043	5913.371	6595.223	0.235

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0216	0.0470	0.2604	6013.91	32.591	536.798	1.0306	0.2187	11.568	12.422

READING NO. = 255

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.606	0.02	-0.33	19.969	1.007	6436.33	34.88	2052.618	1.038	12156.250	6328.402	0.425

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0063	0.0664	0.5754	12363.56	66.999	536.853	1.1546	0.3874	11.469	20.839

RDG 256 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 256

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.596	0.02	-0.31	20.074	1.062	11408.86	61.81	2053.231	1.132	10783.242	11215.297	0.446

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0617	0.1331	0.5687	10969.35	59.431	537.070	1.1103	0.3899	19.175	21.651

READING NO. = 257

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.977	0.03	-0.31	25.609	1.049	11327.06	61.37	2053.069	1.129	17079.176	11134.883	0.609

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0488	0.1621	0.9316	17373.94	94.131	537.070	1.2872	0.5384	19.200	26.800

READING NO. = 258

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.957	0.03	-0.28	25.654	1.105	15421.80	83.54	2052.638	1.253	17056.184	15157.848	0.636

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.1050	0.2195	0.9108	17353.19	94.005	537.232	1.2618	0.5398	24.564	27.482

READING NO. = 259

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.387	0.10	-0.28	11.979	1.012	6303.26	33.78	2051.418	1.030	5737.043	6128.773	0.231

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0116	0.0377	13.5901	5900.38	31.619	548.972	1.0281	0.2188	11.461	12.189

READING NO. = 260

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.396	0.10	-0.24	20.106	1.003	5940.66	31.76	2050.625	1.024	11829.688	5762.086	0.418

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0019	0.0518	13.6052	12196.31	65.199	551.668	1.1454	0.3906	11.183	20.565

READING NO. = 261

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.289	0.10	-0.24	19.994	1.052	11146.37	59.52	2051.100	1.116	10578.520	10799.723	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0511	0.1184	13.5002	10918.07	58.303	552.853	1.1057	0.3880	18.599	21.219

READING NO. = 262

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.220	0.10	-0.22	25.546	1.041	11153.70	59.50	2051.067	1.113	16736.441	10795.262	0.597

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0407	0.1335	13.4392	17292.14	92.242	554.038	1.2786	0.5364	18.774	26.489

READING NO. = 263

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.416	0.10	-0.24	25.486	1.096	15349.77	81.78	2051.128	1.238	16467.129	14838.473	0.623

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0955	0.2035	13.6220	17034.54	90.758	555.383	1.2519	0.5345	24.085	27.162

READING NO. = 264

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.621	0.10	20.07	25.470	1.096	15352.21	81.73	2050.792	1.239	16455.941	14828.625	0.620

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0951	0.2034	13.8156	17036.98	90.696	556.298	1.2484	0.5340	24.158	27.087

READING NO. = 265

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
13.742	0.10	20.07	25.504	1.042	11223.29	59.70	2050.915	1.116	16699.293	10831.617	0.597

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0406	0.1329	12.9854	17303.13	92.038	557.212	1.2785	0.5351	18.871	26.499

READING NO. = 266

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.387	0.10	20.05	19.937	1.052	11220.84	59.66	2050.698	1.118	10529.629	10824.051	0.433

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0510	0.1215	13.5921	10915.63	58.034	557.749	1.1064	0.3867	18.726	21.144

READING NO. = 267

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.328	0.10	20.05	19.940	1.000	5947.99	31.58	2052.069	1.025	11823.797	5730.754	0.411

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9988	0.0652	13.5404	12272.00	65.166	559.093	1.1445	0.3867	11.185	20.311

READING NO. = 268

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.308	0.10	20.03	12.035	1.011	6166.52	32.72	2052.106	1.029	5877.973	5936.746	0.231

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0101	0.0369	13.5204	6105.48	32.396	559.952	1.0307	0.2199	11.039	12.192

READING NO. = 269

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.318	0.10	39.65	12.049	1.010	6165.30	32.69	2051.529	1.029	5846.121	5931.871	0.230

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0096	0.0390	13.5301	6076.18	32.221	560.650	1.0302	0.2202	11.208	12.169

READING NO. = 270

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.338	0.10	39.65	19.945	0.999	5840.55	30.96	2051.277	1.024	11860.914	5618.078	0.409

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9983	0.0590	13.5487	12330.60	65.371	560.919	1.1432	0.3868	11.081	20.211

RDG 271 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 271

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.084	0.10	39.65	19.944	1.050	11159.80	59.15	2051.148	1.116	10498.500	10732.141	0.431

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0491	0.1211	13.3114	10916.85	57.862	561.187	1.1055	0.3868	18.656	21.072

READING NO. = 272

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.064	0.10	39.65	25.465	1.037	11042.60	58.51	2050.824	1.112	16639.180	10615.879	0.593

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0362	0.1332	13.2889	17308.02	91.706	561.563	1.2779	0.5339	18.621	26.393

READING NO. = 273

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
13.703	0.10	39.65	25.332	1.093	15165.42	80.33	2051.349	1.232	16128.695	14575.195	0.612

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0917	0.2019	12.9544	16781.83	88.893	561.885	1.2393	0.5298	23.970	26.885

READING NO. = 274

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.687	0.19	39.61	12.051	0.974	4158.22	22.08	2047.453	0.990	5781.332	4006.351	0.221

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9737	0.0663	52.5443	6000.48	31.864	559.093	1.0302	0.2202	11.163	11.685

READING NO. = 275

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.628	0.19	39.63	19.771	0.959	3422.05	18.20	2046.701	0.982	11769.598	3301.990	0.392

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9569	0.0932	52.4926	12197.53	64.868	557.427	1.1448	0.3828	10.639	19.520

READING NO. = 276

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.745	0.19	39.61	19.999	1.019	10284.45	54.54	2047.160	1.078	10377.660	9896.020	0.421

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0177	0.1166	52.5950	10785.00	57.196	560.543	1.1036	0.3881	18.619	20.701

READING NO. = 277

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.716	0.19	39.63	25.672	1.005	10124.52	53.67	2047.379	1.072	16912.504	9737.926	0.568

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0042	0.1328	52.5682	17583.93	93.213	561.026	1.2842	0.5404	18.629	25.698

READING NO. = 278

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.628	0.19	39.63	25.402	1.053	14080.08	74.55	2048.105	1.178	16291.824	13526.285	0.587

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0514	0.1945	52.4896	16958.85	89.792	562.368	1.2542	0.5320	23.455	26.206

READING NO. = 279

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.706	0.19	19.99	25.422	1.061	14512.27	76.76	2048.280	1.189	16220.074	13928.199	0.591

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0599	0.1815	52.5589	16900.25	89.396	563.441	1.2506	0.5326	23.517	26.335

READING NO. = 280

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.716	0.19	19.99	25.517	1.013	10363.81	54.76	2045.938	1.077	16449.703	9935.359	0.570

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0119	0.1171	52.5701	17159.07	90.662	564.728	1.2741	0.5355	18.553	25.751

READING NO. = 281

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.491	0.19	19.99	20.122	1.024	10587.22	55.93	2045.991	1.084	10471.242	10147.129	0.424

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0231	0.1127	52.3641	10925.39	57.712	564.996	1.1067	0.3910	18.605	20.812

READING NO. = 282

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.472	0.19	19.99	20.022	0.969	3948.23	20.85	2046.064	0.986	11691.422	3782.142	0.397

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9673	0.0743	52.3465	12204.85	64.437	565.585	1.1442	0.3887	10.729	19.729

READING NO. = 283

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.472	0.19	19.99	11.957	0.978	4238.80	22.37	2046.316	0.990	5731.578	4058.750	0.217

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9774	0.0552	52.3465	5985.84	31.589	566.067	1.0280	0.2184	10.780	11.515

READING NO. = 284

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.501	0.19	-0.66	12.029	0.980	4575.75	24.14	2046.098	0.992	5719.977	4380.563	0.222

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9796	0.0538	52.3733	5974.85	31.525	566.282	1.0257	0.2198	10.972	11.741

READING NO. = 285

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.462	0.19	-0.66	20.119	0.977	4260.77	22.47	2045.669	0.989	11441.641	4076.703	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9762	0.0655	52.3364	11958.24	63.060	566.925	1.1387	0.3909	10.773	19.856

READING NO. = 286

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.394	0.19	-0.66	19.988	1.029	10728.84	56.57	2045.494	1.086	10234.699	10263.902	0.418

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0286	0.1032	52.2803	10698.32	56.408	567.085	1.0979	0.3879	18.431	20.557

READING NO. = 287

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.491	0.19	-0.66	25.522	1.018	10601.88	55.87	2045.306	1.080	16403.063	10137.652	0.571

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0167	0.1160	52.3661	17154.19	90.405	567.621	1.2687	0.5357	18.500	25.773

READING NO. = 288

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.394	0.19	-0.66	25.431	1.073	15108.04	79.59	2044.882	1.206	16117.207	14440.367	0.594

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0717	0.1850	52.2775	16862.41	88.829	568.103	1.2400	0.5328	23.570	26.416

READING NO. = 289

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.195	0.29	-0.69	11.979	0.935	2301.30	12.04	2040.665	0.933	5421.527	2184.138	0.206

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9338	0.1028	113.0606	5712.36	29.881	576.176	1.0181	0.2188	11.747	10.963

READING NO. = 290

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.185	0.29	-0.69	20.133	0.935	2407.52	12.59	2040.594	0.930	11145.473	2283.994	0.379

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9333	0.1232	113.0505	11748.25	61.428	576.656	1.1316	0.3913	12.098	18.992

READING NO. = 291

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.195	0.29	-0.69	20.006	0.979	9362.71	48.93	2040.448	1.025	10129.883	8877.395	0.405

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9790	0.1032	113.0607	10683.67	55.830	577.297	1.0966	0.3883	18.103	20.039

READING NO. = 292

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.166	0.29	-0.69	25.493	0.976	9263.82	48.41	2040.811	1.022	16091.785	8783.227	0.525

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9746	0.1134	113.0386	16972.28	88.689	577.351	1.2469	0.5348	18.126	24.366

READING NO. = 293

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.205	0.29	-0.69	25.476	1.026	14418.26	75.33	2040.808	1.144	15918.676	13667.727	0.552

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0258	0.1639	113.0684	16792.81	87.735	577.564	1.2337	0.5342	23.115	25.210

READING NO. = 294

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.205	0.29	19.97	25.445	1.027	14042.23	73.33	2032.598	1.147	15907.125	13304.516	0.559

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0258	0.1806	113.0599	16789.15	87.672	578.151	1.2437	0.5333	23.007	25.413

READING NO. = 295

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.175	0.29	19.97	25.407	0.978	9256.50	48.33	2032.241	1.039	15911.016	8769.793	0.528

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9764	0.1145	113.0341	16794.04	87.693	578.205	1.2495	0.5321	18.078	24.481

READING NO. = 296

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.195	0.29	19.97	20.025	0.986	9254.05	48.32	2030.511	1.041	10109.207	8767.480	0.402

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9850	0.1028	113.0461	10670.24	55.717	578.205	1.0949	0.3887	17.928	19.936

READING NO. = 297

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.322	0.29	19.95	19.902	0.927	2334.27	12.20	2030.539	0.936	11468.992	2213.680	0.374

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9251	0.1139	113.1622	12093.75	63.211	577.084	1.1359	0.3858	11.864	18.762

READING NO. = 298

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.087	0.29	19.99	12.043	0.932	2207.30	11.57	2030.591	0.939	5871.164	2099.498	0.208

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9314	0.0934	112.9544	6172.63	32.359	573.665	1.0295	0.2201	11.551	11.053

READING NO. = 299

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.195	0.29	39.65	11.996	0.926	2038.82	10.69	2030.368	0.937	5673.914	1939.702	0.209

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9250	0.0997	113.0504	5963.86	31.272	573.398	1.0269	0.2192	12.045	11.116

READING NO. = 300

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.224	0.29	39.65	19.990	0.917	2176.78	11.39	2027.412	0.937	11683.969	2066.718	0.375

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9156	0.1226	113.0722	12306.18	64.396	575.749	1.1430	0.3879	12.137	18.824

READING NO. = 301

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.273	0.29	39.65	20.100	0.978	9058.72	47.42	2027.373	1.028	10159.797	8604.691	0.388

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9769	0.1201	113.1118	10695.88	55.995	575.215	1.0908	0.3905	18.036	19.365

READING NO. = 302

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.253	0.29	39.65	25.320	0.965	8990.35	47.10	2022.802	1.029	16378.895	8545.711	0.528

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9631	0.1531	113.0908	17231.10	90.272	574.413	1.2683	0.5294	17.984	24.486

READING NO. = 303

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.380	0.29	39.65	25.409	1.019	13606.39	71.25	2024.377	1.127	16028.348	12926.828	0.556

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0184	0.2079	113.2027	16870.95	88.340	575.001	1.2481	0.5322	22.937	25.331

READING NO. = 304

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.66	0.618	1.000	23.20	0.12	2050.955	1.000	22.355	22.355	0.001

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0000	0.0127	0.0000	23.20	0.123	558.770	1.0005	0.0110	2.356	0.046

READING NO. = 305

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.137	0.01	-0.66	11.891	1.024	5966.30	31.78	2045.440	1.035	5769.711	5766.172	0.226

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0237	0.0472	0.1297	5969.96	31.800	555.652	1.0311	0.2171	10.039	11.977

RDG 306 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 306

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.469	0.02	-0.62	20.015	1.078	10544.50	56.40	2044.381	1.112	10291.594	10233.539	0.435

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0780	0.1187	0.4435	10604.32	56.722	551.021	1.0979	0.3885	17.699	21.245

READING NO. = 307

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.016	0.03	-0.62	25.035	1.218	15938.22	85.48	2045.795	1.300	15609.797	15510.004	0.707

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.2179	0.2333	0.9692	16040.77	86.033	548.054	1.1968	0.5208	23.965	28.985

READING NO. = 308

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
17.863	0.11	-0.60	12.001	1.014	5657.43	30.39	2052.364	1.022	5514.766	5513.578	0.223

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0141	0.0255	16.8494	5658.64	30.394	546.434	1.0234	0.2193	10.533	11.812

READING NO. = 309

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.347	0.10	-0.60	20.030	1.069	10407.76	55.73	2054.408	1.098	10175.266	10111.219	0.430

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0692	0.0973	13.5558	10473.68	56.081	549.889	1.0915	0.3888	17.915	21.053

READING NO. = 310

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.162	0.10	-0.60	24.995	1.204	15781.95	84.41	2059.207	1.280	15375.012	15315.773	0.680

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.2045	0.2143	13.3840	15842.99	84.739	551.075	1.1854	0.5196	24.002	28.439

READING NO. = 311

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
13.937	0.10	19.99	25.016	1.204	15783.17	84.38	2061.128	1.280	15370.625	15310.230	0.681

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.2044	0.2096	13.1724	15845.43	84.715	551.560	1.1862	0.5202	24.150	28.468

READING NO. = 312

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.367	0.10	19.99	20.026	1.069	10479.79	55.98	2060.059	1.097	10209.891	10157.824	0.434

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0687	0.0786	13.5727	10533.51	56.271	552.422	1.0914	0.3887	18.176	21.196

READING NO. = 313

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.523	0.10	19.99	12.045	1.015	5940.66	31.72	2063.218	1.020	5759.793	5755.063	0.235

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0148	0.0377	13.7227	5945.55	31.745	553.015	1.0243	0.2201	11.351	12.421

READING NO. = 314

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.426	0.10	39.67	12.004	1.015	5669.63	30.25	2049.976	1.022	5472.750	5489.297	0.225

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0145	0.0249	13.6278	5652.54	30.163	553.661	1.0226	0.2193	10.728	11.926

READING NO. = 315

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.308	0.10	39.67	20.036	1.069	10366.25	55.30	2050.090	1.098	10084.902	10034.090	0.430

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0684	0.0835	13.5206	10418.75	55.583	553.930	1.0888	0.3890	17.961	21.025

READING NO. = 316

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.181	0.10	39.67	20.020	1.068	10367.47	55.31	2050.061	1.098	10084.410	10034.781	0.430

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0677	0.0833	13.3988	10418.75	55.580	553.984	1.0893	0.3886	17.989	21.031

READING NO. = 317

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.054	0.10	39.67	25.049	1.200	15670.86	83.57	2050.537	1.279	15263.969	15163.559	0.675

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.2006	0.2050	13.2803	15774.63	84.127	554.307	1.1839	0.5212	23.961	28.339

READING NO. = 318

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.481	0.19	39.65	11.925	0.989	5057.99	26.71	2049.016	0.997	4859.930	4845.895	0.219

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9888	0.0570	52.3572	5072.64	26.785	565.424	1.0117	0.2178	12.080	11.599

READING NO. = 319

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.442	0.19	39.65	20.011	1.043	10124.52	53.42	2050.027	1.073	9763.230	9693.098	0.419

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0428	0.0776	52.3247	10197.77	53.810	566.228	1.0779	0.3884	18.323	20.624

READING NO. = 320

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.442	0.19	39.65	25.019	1.171	15543.88	82.00	2050.532	1.250	14962.848	14878.707	0.639

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.1713	0.1784	52.3245	15631.79	82.467	566.442	1.1738	0.5203	24.123	27.542

READING NO. = 321

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.472	0.19	19.97	25.017	1.175	15547.55	82.00	2050.998	1.250	14960.477	14878.695	0.644

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.1748	0.1770	52.3494	15633.00	82.454	566.710	1.1756	0.5202	23.675	27.669

READING NO. = 322

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.540	0.19	19.97	20.023	1.047	10202.65	53.81	2051.353	1.074	9779.641	9763.281	0.418

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0463	0.0728	52.4104	10219.75	53.900	566.764	1.0789	0.3887	18.071	20.585

READING NO. = 323

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.472	0.19	19.97	12.061	0.995	5109.26	26.94	2044.732	1.002	4920.551	4887.848	0.218

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9942	0.0581	52.3448	5143.45	27.119	567.085	1.0138	0.2204	11.350	11.577

READING NO. = 324

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.550	0.19	-0.69	12.076	0.995	5106.82	26.92	2045.194	1.001	4892.301	4884.125	0.217

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9946	0.0562	52.4216	5115.37	26.964	567.406	1.0141	0.2207	11.028	11.498

READING NO. = 325

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.481	0.19	-0.69	20.056	1.049	10133.07	53.41	2044.983	1.075	9774.094	9691.191	0.418

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0480	0.0674	52.3578	10219.75	53.870	567.406	1.0807	0.3895	17.607	20.556

READING NO. = 326

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.472	0.19	-0.69	25.064	1.180	15603.70	82.23	2045.200	1.254	14994.473	14919.762	0.650

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.1795	0.1761	52.3505	15681.84	82.641	567.674	1.1774	0.5216	23.253	27.787

READING NO. = 327

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.413	0.29	-0.73	12.134	0.964	4203.39	22.01	2037.733	0.970	3989.611	3993.088	0.204

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9629	0.0908	112.3661	4199.73	21.989	575.108	0.9951	0.2218	12.223	10.866

READING NO. = 328

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.126	0.29	-0.71	20.033	1.018	9675.25	50.64	2037.429	1.043	9208.324	9188.609	0.398

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.0174	0.0700	112.9962	9696.00	50.751	575.428	1.0621	0.3889	17.697	19.780

READING NO. = 329

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.087	0.29	-0.71	25.060	1.150	15397.38	80.58	2037.108	1.221	14699.055	14620.230	0.611

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.1495	0.1576	112.9602	15480.40	81.013	575.642	1.1640	0.5215	23.062	26.866

READING NO. = 330

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.970	0.29	19.97	25.086	1.149	15403.48	80.60	2036.469	1.223	14694.699	14623.996	0.612

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
1.1490	0.1620	112.8585	15477.96	80.989	575.802	1.1641	0.5223	23.533	26.867

READING NO. = 331

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.078	0.29	19.95	20.049	1.017	9694.78	50.72	2035.740	1.044	9228.816	9203.316	0.400

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0164	0.0733	112.9509	9721.64	50.864	575.909	1.0623	0.3893	18.074	19.832

READING NO. = 332

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.990	0.29	19.95	12.038	0.963	4175.31	21.84	2034.558	0.971	3945.722	3963.104	0.202

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9624	0.0925	112.8734	4157.00	21.747	576.069	0.9958	0.2200	12.352	10.769

READING NO. = 333

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.746	0.29	39.63	12.026	0.957	4114.27	21.52	2032.812	0.967	3900.962	3904.439	0.203

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9557	0.0989	112.6496	4110.61	21.500	576.283	0.9940	0.2198	13.127	10.810

READING NO. = 334

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.804	0.29	39.63	20.022	1.010	9626.41	50.35	2034.068	1.040	9189.488	9135.035	0.401

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0093	0.0813	112.7073	9683.79	50.648	576.336	1.0613	0.3887	18.551	19.904

READING NO. = 335

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
123.677	0.29	39.63	25.003	1.137	15249.66	79.74	2032.962	1.195	14555.250	14467.223	0.599

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.1367	0.1668	112.5917	15342.44	80.221	576.656	1.1612	0.5198	23.864	26.550

READING NO. = 336

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.039	0.00	-13.49	1.413	1.002	23.20	0.12	2045.373	1.002	22.391	22.391	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0022	0.0184	0.0341	23.20	0.123	556.997	1.0004	0.0251	0.000	0.000

READING NO. = 337

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.107	0.01	-12.70	0.514	1.000	23.20	0.13	2049.834	1.000	23.951	22.753	0.002

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0001	0.0013	0.1026	24.42	0.132	539.401	1.0002	0.0091	2.429	0.094

READING NO. = 338

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.899	0.02	-0.64	11.650	0.989	6995.48	37.51	2047.780	1.049	7837.211	6806.191	0.254

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9883	0.0562	0.8540	8055.18	43.194	548.270	1.0613	0.2125	10.568	13.319

READING NO. = 339

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
2.207	0.04	-0.62	19.622	0.974	12402.63	66.69	2047.465	1.167	12841.945	12101.039	0.439

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9722	0.1615	2.1028	13162.00	70.778	545.192	1.1933	0.3793	19.001	21.393

READING NO. = 340

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
4.463	0.05	-0.60	25.038	0.963	16137.21	86.89	2046.992	1.296	17474.309	15765.160	0.575

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9600	0.2794	4.2410	17886.70	96.309	543.786	1.3431	0.5209	24.491	25.886

RDG 341 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 341

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.191	0.10	-0.62	11.905	0.984	6901.47	37.18	2048.369	1.043	7580.586	6746.383	0.249

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9839	0.0448	13.4080	7754.85	41.780	543.137	1.0542	0.2174	11.289	13.110

READING NO. = 342

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.377	0.10	-0.60	19.747	0.968	11874.00	63.93	2048.286	1.147	12831.023	11599.082	0.437

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9654	0.1561	13.5829	13135.14	70.718	543.894	1.1854	0.3822	18.671	21.295

READING NO. = 343

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.357	0.10	-0.60	24.225	0.959	15946.76	85.81	2048.539	1.285	16588.957	15569.801	0.550

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9550	0.2513	13.5643	16990.59	91.429	544.435	1.3063	0.4970	24.382	25.166

READING NO. = 344

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.338	0.10	20.01	23.364	0.944	15960.20	85.85	2048.720	1.285	16579.621	15577.504	0.543

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9403	0.2463	13.5453	16986.93	91.378	544.813	1.3149	0.4730	24.570	24.937

READING NO. = 345

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.299	0.10	19.99	19.340	0.954	12110.85	65.13	2048.903	1.154	13534.016	11816.355	0.451

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9515	0.1654	13.5127	13871.32	74.592	545.192	1.2146	0.3728	19.125	21.810

READING NO. = 346

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.328	0.10	19.99	19.363	0.955	12081.55	64.95	2048.829	1.153	13521.801	11785.430	0.450

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9522	0.1647	13.5392	13861.55	74.525	545.408	1.2134	0.3733	19.047	21.777

READING NO. = 347

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.240	0.10	19.99	11.459	0.979	6879.50	36.98	2049.085	1.042	7683.160	6709.223	0.248

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9783	0.0579	13.4532	7878.16	42.345	545.678	1.0684	0.2088	11.417	13.044

READING NO. = 348

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.230	0.10	39.65	11.890	0.979	6764.74	36.34	2050.455	1.040	7715.105	6593.059	0.246

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9786	0.0334	13.4487	7916.00	42.522	546.380	1.0657	0.2171	11.475	12.942

READING NO. = 349

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.299	0.10	39.65	19.858	0.961	11738.49	63.05	2051.603	1.143	13092.563	11438.891	0.434

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9588	0.1476	13.5103	13435.47	72.159	546.542	1.1949	0.3848	18.765	21.176

READING NO. = 350

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
14.201	0.10	39.67	23.892	0.944	15910.14	85.41	2052.689	1.283	16544.012	15496.414	0.540

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9403	0.2582	13.4160	16985.71	91.182	547.083	1.3107	0.4876	24.704	24.845

RDG 351 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 351

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.540	0.19	39.65	12.163	0.944	4988.40	26.69	2053.909	1.003	7802.949	4842.473	0.233

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9436	0.0429	52.4173	8038.09	43.006	550.751	1.0597	0.2224	10.842	12.295

READING NO. = 352

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.589	0.19	39.63	20.136	0.929	11229.39	60.05	2056.643	1.107	12884.992	10895.031	0.398

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9278	0.1020	52.4609	13280.43	71.015	551.344	1.1771	0.3913	18.990	19.753

READING NO. = 353

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.560	0.19	39.65	24.572	0.910	15891.82	84.97	2057.472	1.256	16466.867	15416.367	0.515

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9076	0.2817	52.4365	16974.72	90.757	551.506	1.3136	0.5070	25.157	24.045

READING NO. = 354

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.608	0.19	19.97	23.343	0.915	15899.15	84.99	2058.405	1.255	16466.020	15420.465	0.499

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9112	0.2929	52.4798	16977.16	90.752	551.722	1.2809	0.4724	24.824	23.539

READING NO. = 355

DQO	MO	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PTO	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.540	0.19	19.97	19.594	0.929	11380.78	60.83	2059.707	1.110	13097.813	11037.586	0.409

PRECAA	DMAX40	QO	RPMAVA	PCDSPDA	TTO	AFANPR	MNFFA	WINFC	WINAC
0.9275	0.2073	52.4151	13505.06	72.188	551.776	1.1793	0.3786	18.995	20.199

READING NO. = 356

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.667	0.19	19.97	11.657	0.952	5407.15	28.90	2046.697	1.006	7402.336	5243.074	0.232

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9516	0.0647	52.5248	7633.98	40.798	551.991	1.0515	0.2126	11.214	12.266

READING NO. = 357

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.628	0.19	-0.69	11.811	0.966	5392.50	28.81	2046.376	1.004	6464.293	5226.574	0.220

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9660	0.0722	52.4907	6669.51	35.628	552.476	1.0387	0.2156	11.326	11.662

READING NO. = 358

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.608	0.19	-0.69	19.987	0.953	11552.92	61.72	2046.630	1.117	12440.492	11197.980	0.416

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9518	0.1358	52.4712	12834.81	68.565	552.422	1.1569	0.3878	18.762	20.471

READING NO. = 359

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
56.560	0.19	-0.69	24.455	0.942	15990.71	85.41	2046.814	1.260	16454.738	15496.414	0.518

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9386	0.1999	52.4306	16979.61	90.690	552.637	1.2760	0.5036	24.404	24.152

READING NO. = 360

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
126.304	0.29	-0.69	11.608	0.937	2083.99	11.11	2040.295	0.944	5507.852	2015.846	0.208

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9360	0.0946	114.9329	5694.05	30.356	554.684	1.0239	0.2117	11.247	11.054

RDG 361 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 361

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.253	0.29	-0.69	19.871	0.930	10532.29	56.15	2040.264	1.058	11538.289	10187.375	0.379

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9281	0.1767	113.1109	11928.94	63.593	554.738	1.1285	0.3851	18.627	18.984

READING NO. = 362

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.244	0.29	-0.69	24.923	0.915	15916.24	84.86	2040.049	1.202	16418.082	15396.527	0.492

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9114	0.2621	113.1053	16972.28	90.488	554.630	1.2674	0.5174	24.574	23.284

READING NO. = 363

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.302	0.29	19.99	24.601	0.870	15911.36	84.81	2037.200	1.233	16989.465	15387.332	0.475

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8645	0.3950	113.1528	17568.05	93.637	554.953	1.3082	0.5079	24.852	22.697

READING NO. = 364

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.283	0.29	19.95	20.123	0.891	10470.02	55.81	2037.238	1.071	12845.469	10126.180	0.376

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8884	0.2305	113.1368	13281.64	70.797	554.845	1.1771	0.3910	18.614	18.879

READING NO. = 365

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.205	0.29	19.95	11.834	0.907	1797.09	9.58	2037.244	0.949	7362.848	1737.991	0.217

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9058	0.0991	113.0644	7613.23	40.580	554.899	1.0515	0.2160	10.505	11.485

RDG 366 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 366

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.283	0.29	39.63	12.384	0.879	2761.57	14.72	2037.274	0.967	8554.941	2670.616	0.211

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8773	0.1190	113.1325	8846.29	47.150	554.953	1.0779	0.2267	11.094	11.225

READING NO. = 367

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.195	0.29	39.63	20.003	0.886	10322.30	55.02	2037.136	1.068	12497.109	9982.340	0.363

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8841	0.1276	113.0586	12922.71	68.877	554.953	1.1548	0.3882	18.650	18.323

READING NO. = 368

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
124.117	0.29	39.63	25.011	0.861	15908.92	84.80	2036.386	1.234	16922.977	15385.707	0.476

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.8574	0.3238	112.9867	17498.46	93.270	554.899	1.3182	0.5201	25.109	22.721

READING NO. = 369

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.107	0.01	-12.02	1.189	0.999	23.20	0.13	2052.498	1.000	25.111	22.719	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9997	0.0469	0.1028	25.64	0.138	541.026	0.9986	0.0211	0.000	0.000

READING NO. = 370

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.000	0.00	-0.66	1.047	1.001	23.20	0.12	2052.719	1.000	22.574	22.574	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0006	0.0029	0.0000	23.20	0.124	548.000	1.0016	0.0186	0.000	0.000

RDG 371 FAC 10X10X1 PGM D059 ** OPTION 11 SUMMARY OUTPUT ** 11/20/81 11/20/81

READING NO. = 371

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.459	0.02	-0.66	11.304	0.984	7559.51	40.55	2055.002	1.051	7947.254	7356.770	0.242

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9833	0.0621	0.4389	8166.27	43.801	548.000	1.0635	0.2058	10.952	12.771

READING NO. = 372

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.928	0.02	-0.71	19.229	0.965	12818.94	68.79	2055.195	1.161	13368.063	12481.297	0.416

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9622	0.1757	0.8846	13729.70	73.678	547.460	1.1881	0.3702	18.594	20.482

READING NO. = 373

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
1.436	0.03	-0.71	23.976	0.952	15906.48	85.38	2054.882	1.269	16906.215	15491.320	0.522

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
0.9478	0.2709	1.3640	17359.29	93.178	547.190	1.2960	0.4900	23.380	24.294

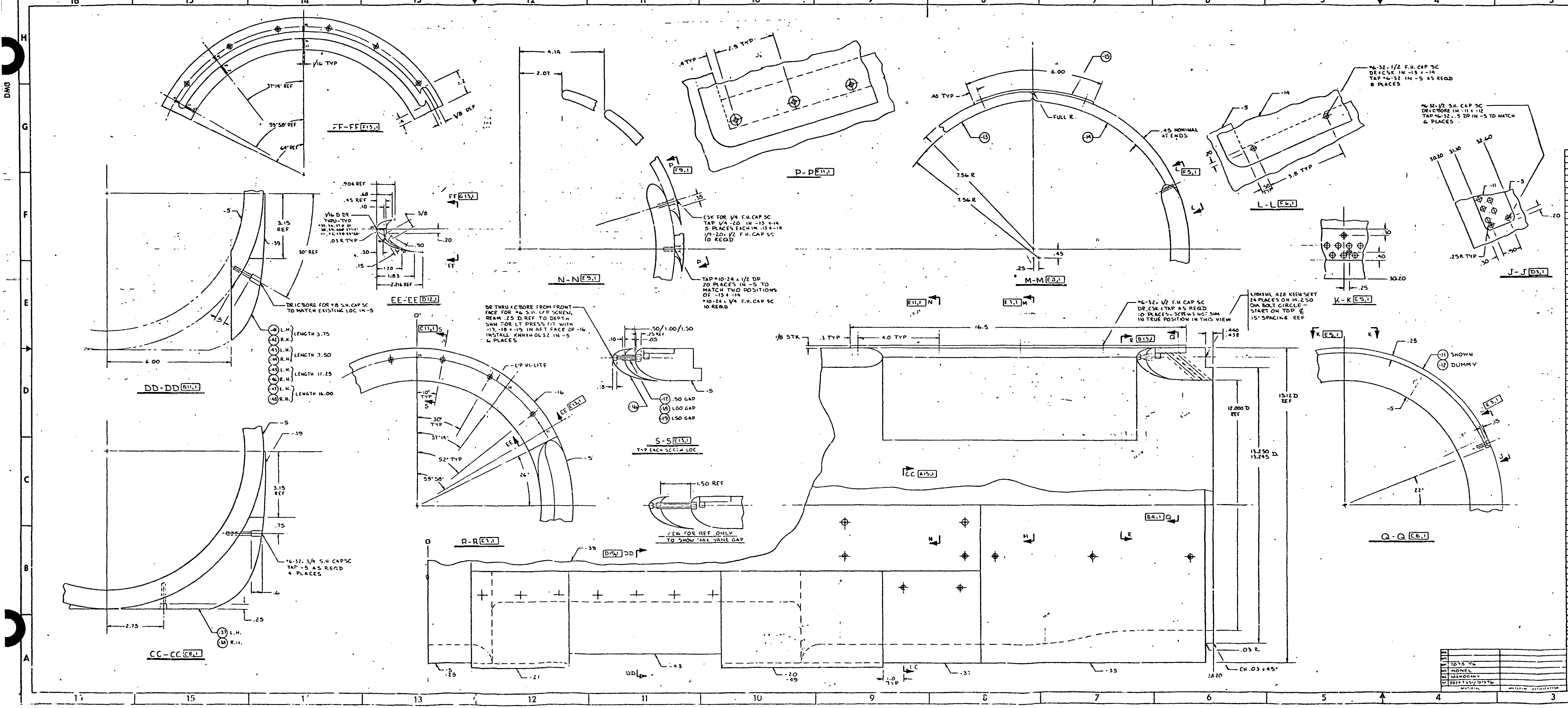
READING NO. = 374

DQ0	M0	ALPHA	WRAKEC	PREC40	RPMAVF	PCDSPDF	PT0	FFANPR	RPMCAVA	RPMCAV	MNTHA
0.020	0.00	-13.24	0.679	1.000	23.20	0.12	2054.446	1.000	23.768	22.580	0.000

PRECAA	DMAX40	Q0	RPMAVA	PCDSPDA	TT0	AFANPR	MNFFA	WINFC	WINAC
1.0005	0.0020	0.0206	24.42	0.131	547.730	1.0034	0.0121	0.000	0.000

APPENDIX B

12" TANDEM FAN TRANSITION SECTION MODEL
NASA LEWIS W. T. MODEL
5 SHEETS



REV	DESCRIPTION	DATE	APPROVED
A	1. UPDATED DWG.		
B	1. MATL SIZE WAS 3/16 NOW 1/4 ON -11 & -12 2. 1/4 STK WAS 3/16 ON -20, -21, -22, -23, -24 3. ADDED -25 THRU -51 4. REVISED STOCK SIZE ON -18 (SHOP IS IN ACCORD) 5. CHGD MATL ON -20 THRU -24 FROM M1 TO M4 6. ADDED 1 BOX OF #6-32 x 1/2 S.H. CAP SC., 1 BOX OF 8-32 x 1/2 S.H. CAP SC, 1 BOX OF 10-24 x 1.0 1 BOX OF 10-32 x 5/8 S.H. CAP SC, 1 BOX OF KNHH 0632 & 1 BOX OF KNHHL 428 KEENSERTS TO L/M		

QTY REQ'D	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATL	STOCK SIZE
1	-51	COVER	M1	3/4 x 2.6 x 3.5
1	-50	R.H. OPP -49		
1	-49	CONTOUR BLK L.H.	M2	AS REQD x 7.9 LG
1	-48	R.H. OPP -47		
1	-47	SIDE BLK L.H.	M2	AS REQD x 16.1
1	-46	R.H. OPP -45		
1	-45	SIDE BLK L.H.	M2	AS REQD x 11.4
1	-44	R.H. OPP -43		
1	-43	SIDE BLK L.H.	M2	AS REQD x 7.6
1	-42	R.H. OPP -41		
1	-41	SIDE BLK L.H.	M2	AS REQD x 3.9
1	-40	R.H. OPP -39		
1	-39	CONTOUR BLK L.H.	M2	AS REQD x 24.8
1	-38	R.H. OPP -37		
1	-37	CONTOUR BLK L.H.	M2	AS REQD x 4.9
1	-36	R.H. OPP -35		
1	-35	CONTOUR BLK L.H.	M2	AS REQD x 11.1
1	-34	R.H. OPP -33		
1	-33	CONTOUR BLK L.H.	M2	AS REQD x 4.9 LG
1	-32	R.H. OPP -31		
1	-31	CONTOUR BLK L.H.	M2	AS REQD x 8.6 LG
1	-30	R.H. OPP -29		
1	-29	CONTOUR BLK L.H.	M2	AS REQD x 12.4 LG
A/R	1/16 O.D.	PRESSURE TUBING	M3	
1 BOX	KNHHL 428	KEENSERT		OR EQUIV
1 BOX	KNHH 0632	KEENSERT		OR EQUIV
1 BOX	KNHL-624	KEENSERT		OR EQUIV
1 BOX	KNH-0832	KEENSERT		OR EQUIV
1 BOX	1/4-20 x 1/2	F.H. CAP SC		"ALLEN"
1 BOX	#10-32 x 5/8	S.H. CAP SC		"ALLEN"
1 BOX	10-24 x 3/4	F.H. CAP SC		"ALLEN"
1 BOX	#10-24 x 1.0	S.H. CAP SC		"ALLEN"
2 BOX	#8-32 x 1/2	S.H. CAP SC		"ALLEN"
1 BOX	#6-32 x 2 1/4	S.H. CAP SC		
1 BOX	#6-32 x 1 3/4	S.H. CAP SC		
1 BOX	#6-32 x 1 1/4	S.H. CAP SC		
1 BOX	#6-32 x 3/4	S.H. CAP SC		"ALLEN"
1 BOX	#6-32 x 1/2	S.H. CAP SC		"ALLEN"
1 BOX	#6-32 x 3/8	S.H. CAP SC		"ALLEN"
1 BOX	#6-32 x 1/2	F.H. CAP SC		"ALLEN"
1	-28	R.H. OPP -27		
1	-27	CONTOUR BLK L.H.	M2	AS REQD x 26.1 LG
1	-26	R.H. OPP -25		
1	-25	CONTOUR BLK L.H.	M2	AS REQD x [illegible] LG
1	-24	NOZZLE DOOR-CLOSED	M4	1/4 STK x 9.0 x 8.0
1	-23	NOZZLE DOOR 3/4	M4	1/4 STK x [illegible]
1	-22	NOZZLE DOOR 1/2	M4	1/4 STK x 9.0 x 9.0
1	-21	NOZZLE DOOR 1/4	M4	1/4 STK x [illegible]
1	-20	NOZZLE DOOR - ADJ	M4	[illegible] STK x 3.0 x 18.0
7	-19	SPACER .50 GAP	M1	.25 STK x 2.0
7	-18	SPACER 1.00 GAP	M1	.25 STK x 1.5
7	-17	SPACER [illegible] GAP	M1	.25 STK x 1.0
1	-16	[illegible]	M1	[illegible] STK x 5.0 x 15.0
1	-15	SUPPORT	M1	[illegible] STK x [illegible] x 16.6
1	-14	R.H. OPP -13		
1	-13	INLET DOOR L.H.	M1	1/2 STK x 10.0 x 15.0
1	-12	DUMMY COVER	M1	[illegible]
1	-11	[illegible] COVER	M1	[illegible]
1	-10	[illegible]	M1	[illegible]
1	-9	[illegible]	M1	[illegible]
1	-8	[illegible]	M1	[illegible]
1	-7	[illegible]	M1	[illegible]
	6	[illegible] SIGNED		
1	5	[illegible]		[illegible]
	4	[illegible]		
	3	[illegible]		
	2	[illegible] ASSY		
1	1	[illegible] ASSY		

	MATERIAL
M4	7075 T6
M3	MONEL
M2	MAHOGANY
M1	2024 T351/7075 T6

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON

LINEAR: .XXX ± .005, .XX ± .010, .X ± .03

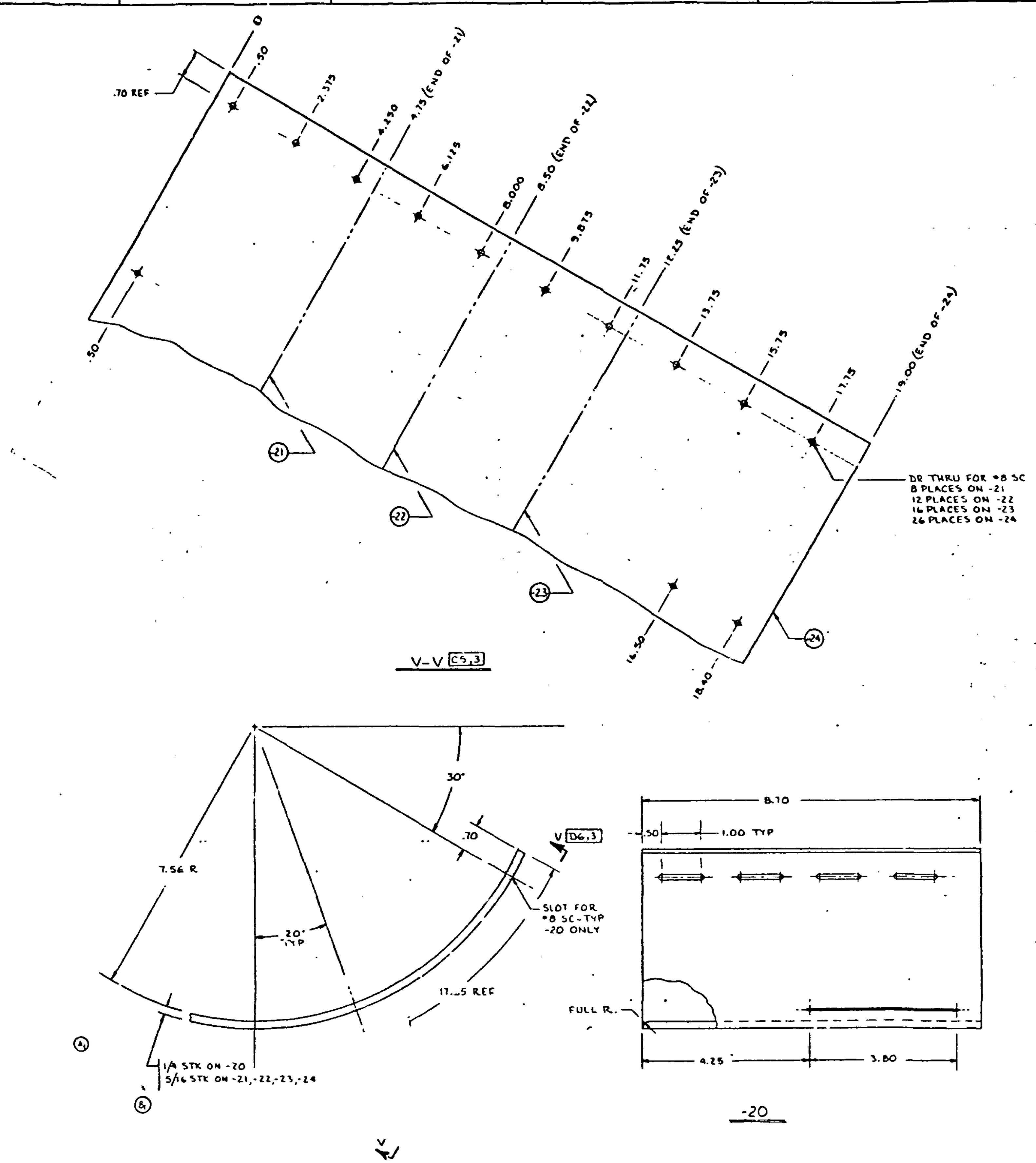
ANGULAR: ± 0°6'

VOUGHT CORPORATION

12" TANDEM FAN TRANSITION SECTION MODEL NASA-LEWIS W.T. MODEL

J 80378 75-00S052 B


REVISIONS
ZONE | REV | DESCRIPTION | DATE | APPROVED
A | 1. UPDATED DWG | 1-31-80
B | 1. UPDATED DWG | 2-11-80
A-24 B-16 | C | 1. ADDED "PRESSURE TAP ···" NOTE 2. REVISED ATTACH SCREW PATTERN BETWEEN -5 AND 75-004910 | 6-4-80
-10
C-C
T-T
D-D
B-B
A-A
-2 ASSY
H-H
-7 & -8
F-F
-9
E-E
VIEW LOOKING FWD
G-G
SEE SEPARATE PARTS LIST
NONSTANDARD SYMBOLS
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
CONTR NO. 2449-AA-1260
VOUGHT CORPORATION
12" TANDEM FAN
TRANSITION SECTION MODEL
NASA-LEWIS W.T. MODEL
SIZE J
FSCM NO. 80378
DWG NO. 75-005052
REV C
SHEET 2
DESIGN GROUP
TEST SYSTEMS DESIGN
M-156



ZONE	REV	DESCRIPTION	DATE	APPROVED
B-8	A	1. 1/4 ST. WAS 3/16		
A-1	B	1. REVISED STK SIZE ON -20		

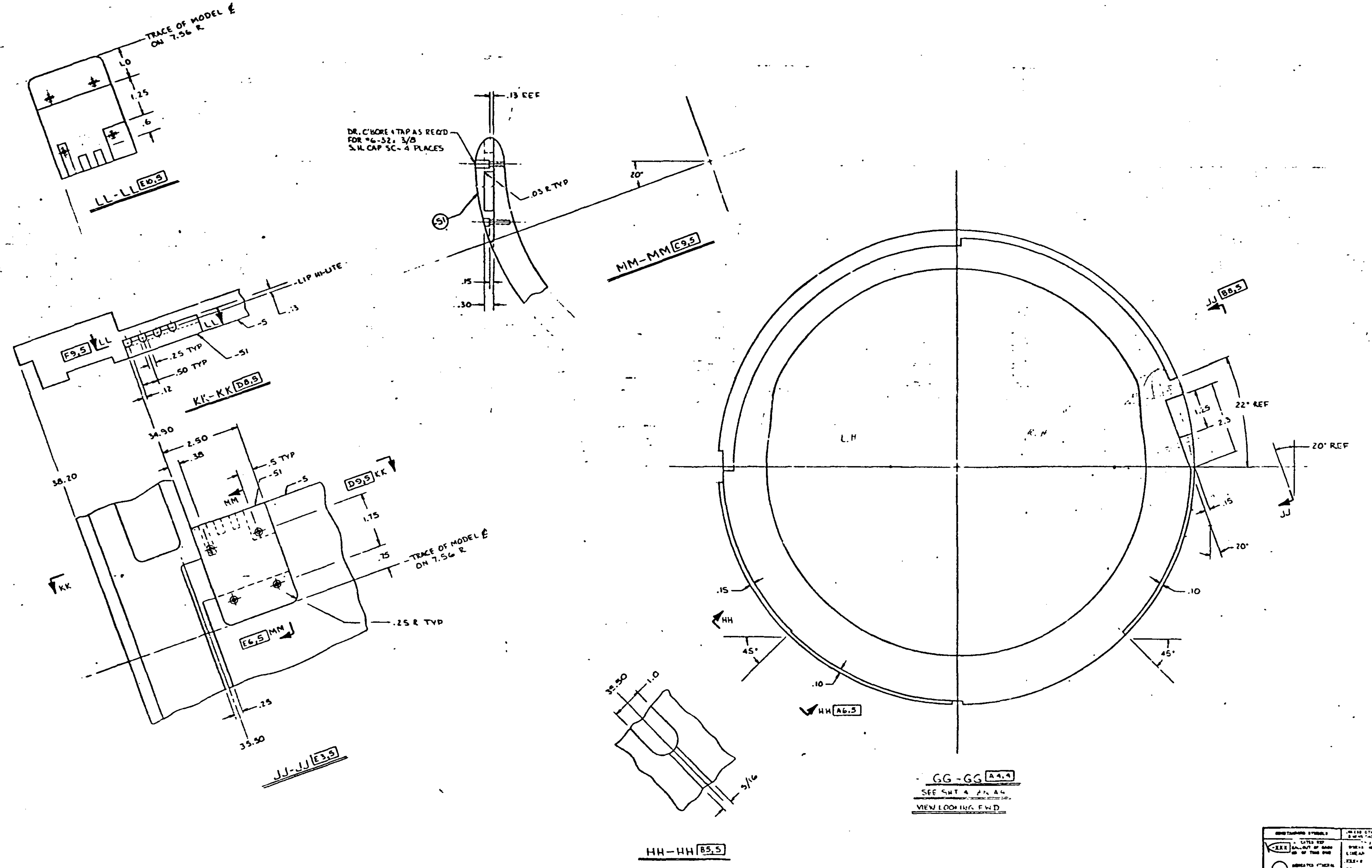
VOUGHT CORPORATION

2" TANDEM FAN
TRANSITION SECTION MODEL
NASA-LEWIS W.T. MODEL

E 80378 | 75-005052 | 5

M-156

LIP HI-LITE
X-X D6,4
L.H. SIDE ONLY
TYP MACHINING IN LIP HI-LITE AREA FOR PRESSURE TAPS
W-W C8,1
L.H. SIDE ONLY
Z-Z D16,4
Y-Y D11,4
BB-BB A6,4
AA-AA D6,4
FAIR THIS AREA WITH WAX OR CLAY IN TUNNEL
CONTOUR TO TEMPLATE - CONSTANT FULL LENGTH OF MODEL
R - SHOP OPTION
BOND TO -24
BOND TO -23
BOND TO -22
BOND TO -21
L.H.
R.H.
SEE SEPARATE PARTS LIST
VOUGHT CORPORATION
2 TANDEM FAN
TRANSITION SECTION MODEL
NASA-LEWIS W.T. MODEL
J 80378
75-005052
M-156



VOUGHT CORPORATION

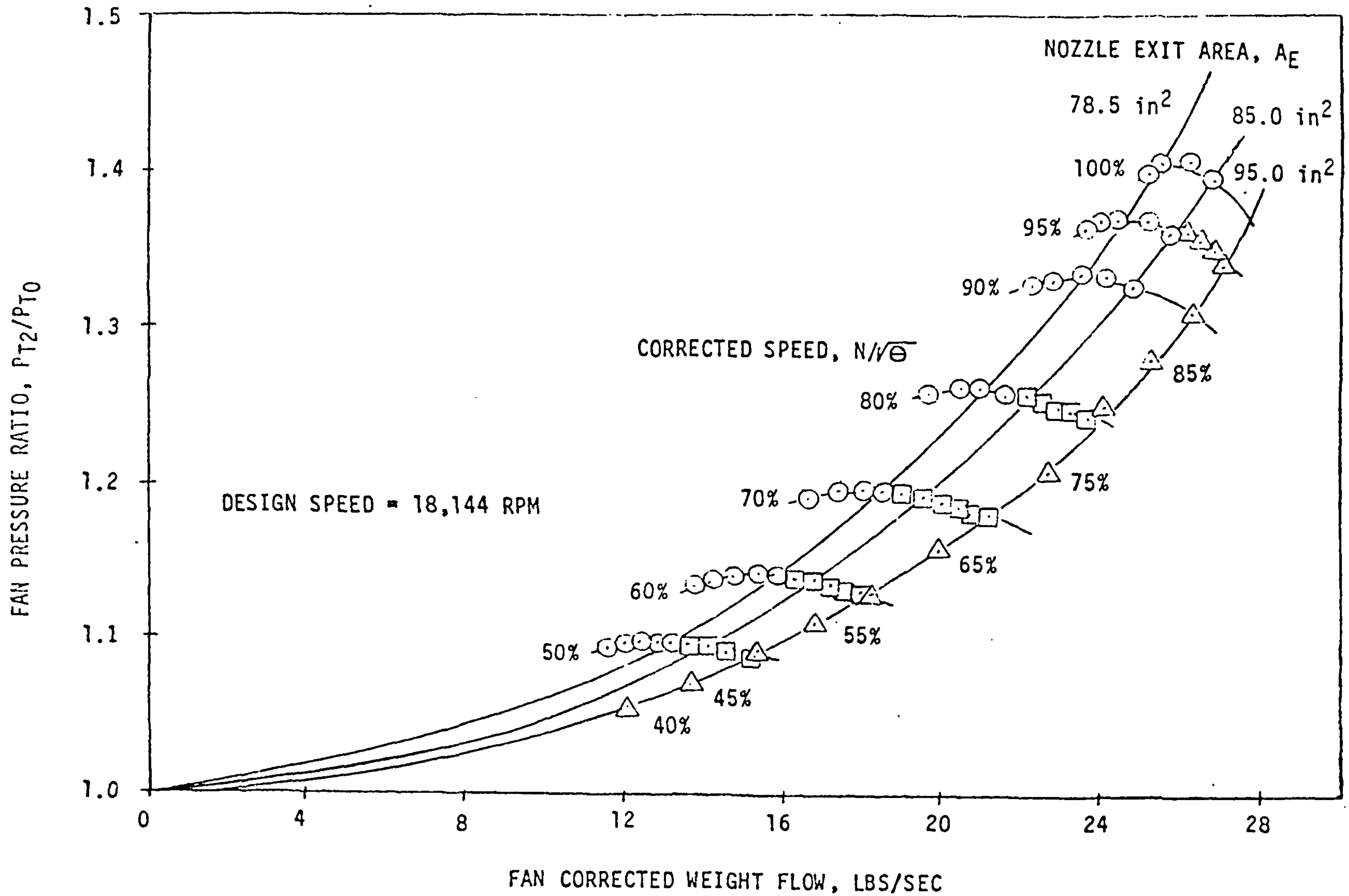
12" TANDEM FAN TRANSITION SECTION MODEL NASA-LEWIS W.T. MODEL

J 80378 | 15-005052

V-156

APPENDIX C

TWELVE-INCH POWERED FAN SIMULATOR
CALIBRATED OPERATING MAP



APPENDIX C. TWELVE-INCH POWERED FAN SIMULATOR CALIBRATION

10/23/89 Dick ~~Schaintout 344/65~~ 8/1/90