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ABLATION AND THERMAL RESPONSE OF THE SNAP-27 GRAPHITE LM FUEL CASK DURING MULTIPLE ORBIT REENTRY

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ABSTRACT

The ablative response of the SNAP-27 Graphite LM Fuel Cask (GLFC) is presented for each pass through the atmosphere in a multiple orbit atmospheric reentry for several initial perigee altitudes. The thermal response of the GLFC is presented for one pass through the atmosphere during a multiple orbit reentry.

The cutoff date for information in this report, with the exception of the "exact" trajectory multiple orbit reentry ablation analysis, is October 28, 1968. The cutoff date for the exact trajectory ablation analysis is May 15, 1969.

SUMMARY

As part of the Aerospace Nuclear Safety Program, Sandia Laboratories' Aerospace Nuclear Safety Department conducted a number of aerothermodynamic analyses of the SNAP-27 Graphite Lunar Module Fuel Cask (GLFC). The analyses included orbital decay atmospheric reentries and prompt supercircular velocity reentries from translunar aborts.

In addition to the above mentioned atmospheric reentries, the SNAP-27 GLFC and the Lunar Module (LM) can reenter the atmosphere at angles shallower than the nominal reentry angles. This possibility exists if an Apollo mission abort should occur during or after translunar injection. For these shallow reentry angles, the GLFC would undergo a multiple orbit reentry, passing through the atmosphere several times before final reentry, as the highly elliptical orbit (with initial apogee near the moon) decayed.

This report summarizes the thermal response of the GLFC on one of these passes through the atmosphere, and the ablation which occurs on the GLFC each time it passes through the atmosphere.

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Introduction

As part of the NASA Apollo program, the Apollo Lunar Surface Experiment Package (ALSEP) (Figure 1) will gather data on the characteristics and environment of the lunar surface and subsurface. References 1 and 2 describe the various experiments that are part of the ALSEP array.

The AEC developed the SNAP-27 radioisotope thermoelectric generator (RTG) to provide electrical power for the ALSEP. The General Electric Company (GE) designed and fabricated the SNAP-27 generator, fuel capsule, and Graphite Lunar Module Fuel Cask (GLFC) under AEC contract. The SNAP-27 fuel capsule (Figure 2) is contained in the GLFC (Figure 3) during transport to the lunar surface. The GLFC is designed to provide protection to the fuel capsule during possible mission aborts and thus prevent the release of radioactive fuel to the atmosphere.

As part of the Aerospace Nuclear Safety Program, the Aerospace Nuclear Safety Department of Sandia Laboratories conducted several aerothermodynamic analyses of the GLFC to determine its capability to protect adequately the fuel capsule assembly. (Previous analyses of earlier protection systems showed that fuel capsule protection for some mission aborts was inadequate.[3,4] These analyses[5,6] included orbital decay atmospheric reentry and supercircular velocity lunar return reentries.

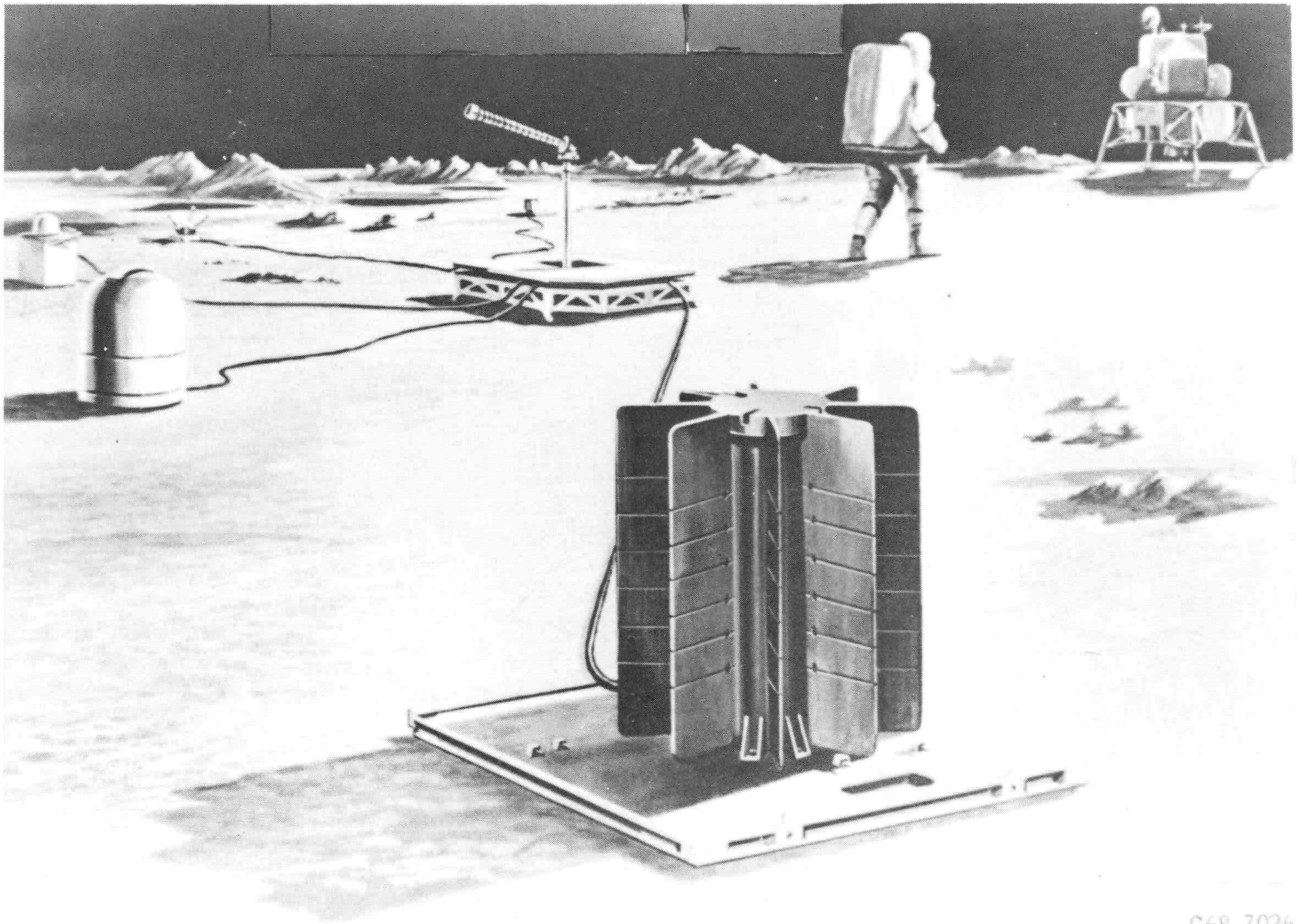

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Figure 1. Apollo Lunar Surface Experiment Package

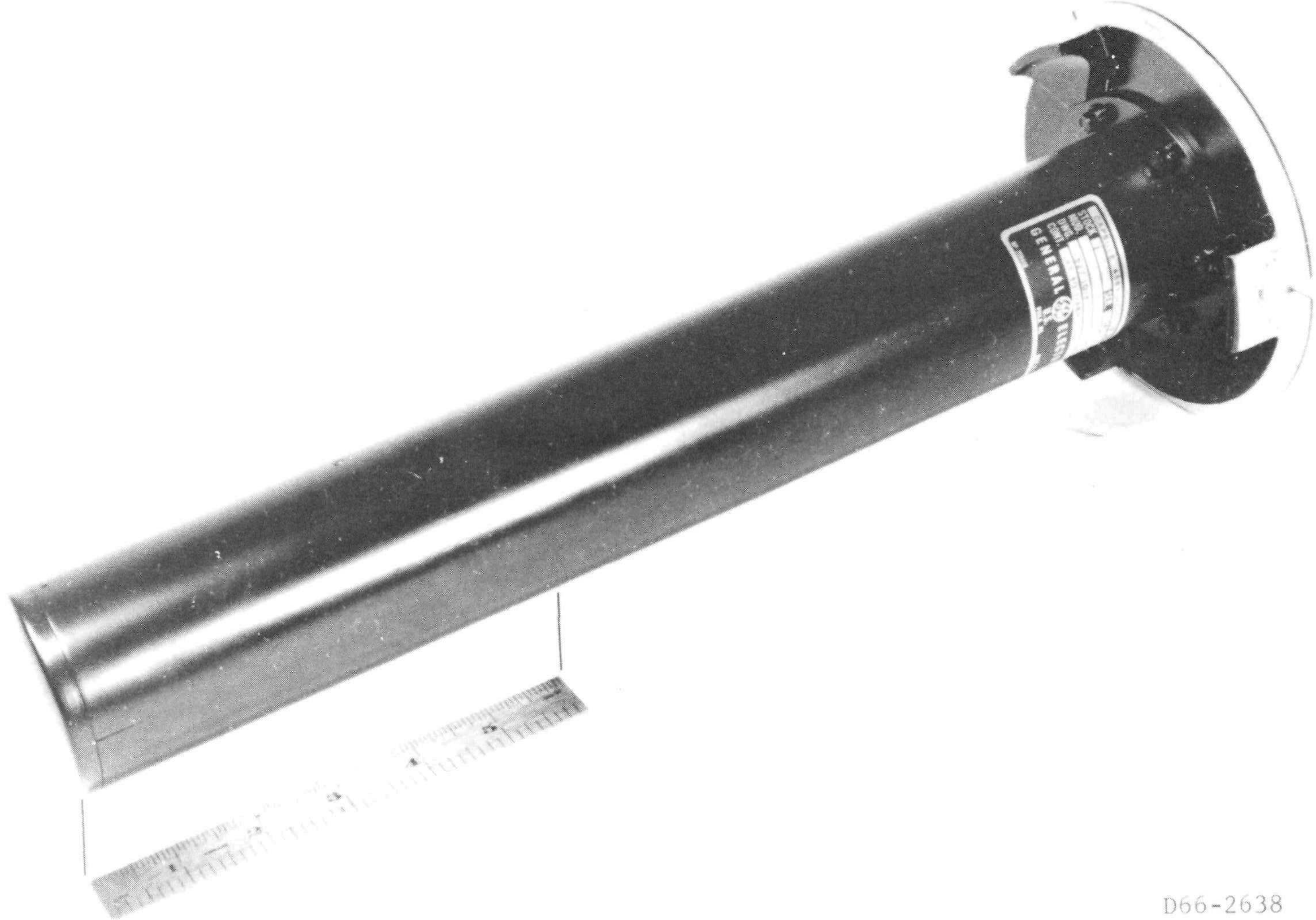

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Figure 2. SNAP-27 fuel capsule

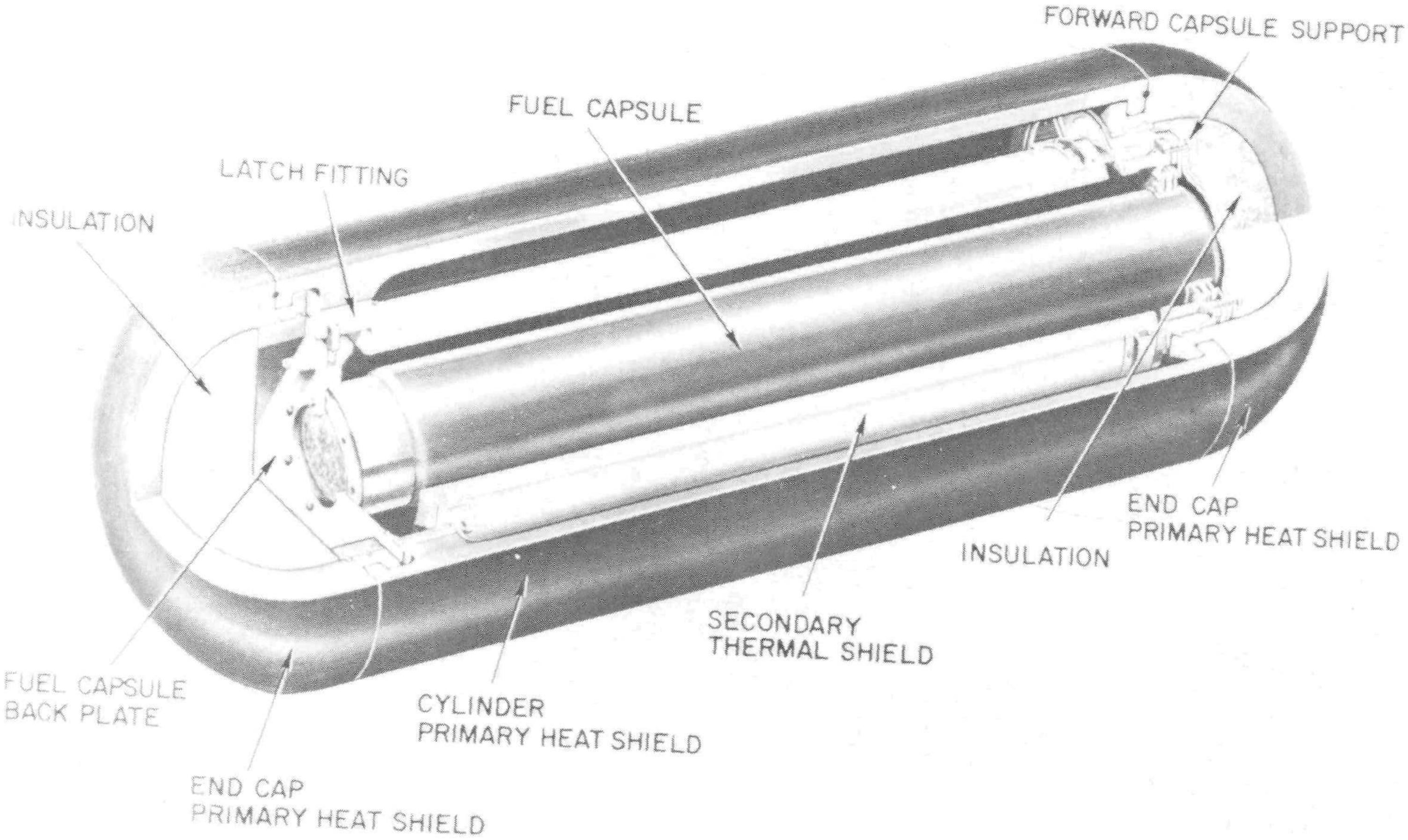

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Figure 3. SNAP-27 Graphite LM Fuel Cask
(cutaway view)

In addition to the above abort reentry conditions, it is possible, after an abort following translunar injection, for the LM and the GLFC to reenter the Earth's atmosphere at an angle too shallow to cause prompt reentry to Earth impact. For these shallow reentry angles, the GLFC and LM will experience a multiple revolution orbital decay from a highly elliptical orbit with initial apogee near the moon.

At the request of the Reentry Working Group of the SNAP-27/ALSEP Interagency Review Panel, the Aerospace Nuclear Safety Department of Sandia Laboratories conducted an aerothermodynamic analysis to determine: (1) the temperature response of the GLFC during multiple orbit reentry, (2) the ablation of the GLFC during a multiple orbit reentry, and (3) the reentry angle which separates prompt lunar return reentries from the lunar return multiple orbit reentry. At the suggestion of NASA/Ames, the ablation and thermal analyses were conducted for a side-on-stable orientation during the multiple orbit reentry. This assumption results in maximum mass removal by ablation along the stagnation line. These analyses were conducted from September 23, 1968, to October 28, 1968, and the results were presented at the Reentry Working Group meeting at King of Prussia, Pennsylvania, on October 29 through 31, 1968.

This report documents the ablation and thermal analyses that were conducted to determine the thermal and ablative responses of the GLFC during a multiple orbit reentry. The environment experienced by the GLFC during a multiple orbit reentry is documented in Reference 7.

Ablation Model

The ablation model of the GLFC was constructed for use with the Charring Material Ablation (CMA) computer code.[8] This code is operational on the Sandia CDC 3600 and CDC 6600 computers. The CMA code uses an implicit, finite-difference computational procedure for computing the one-dimensional transient transport of thermal energy in a three-dimensional isotropic material which can ablate from the front surface and decompose (char) in depth. The finite-difference equations in the code are obtained from the laws of conservation of mass and energy. A mass and energy balance is maintained internally in the ablating material and also at the material surface. The printout from the code includes such information as total ablation, current ablation rates, nodal temperatures and densities, and convective, radiative, and conductive heat transfer rates.

The nodal construction used for the GLFC ablation model is shown in Figure 4. The ablation model consists of only the graphite portion of the GLFC since this is the ablating portion of the cask. The rear wall is assumed to be adiabatic.

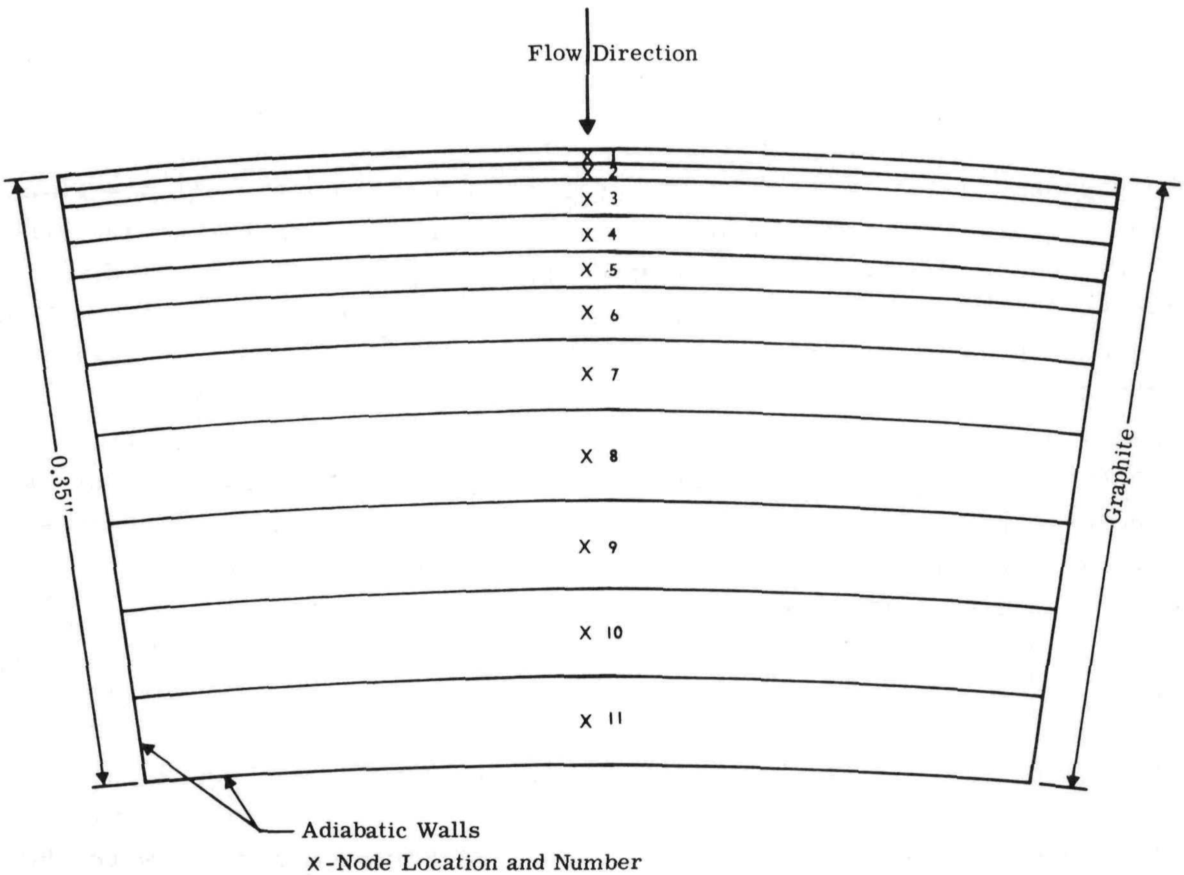

Figure 4. One-dimensional CMA ablation model of GLFC graphite wall

In the CMA code, the aerodynamic heating experienced by the GLFC during passage through the atmosphere is input as a function of time to the external node. The code corrects this cold wall heating rate to account for the hot wall, mass injection into the boundary layer (blowing effect), and surface oxidation. Any surface recession causes the last (deepest) node of the ablating material to shrink. When the surface recedes far enough, this node is dropped from the rear surface of the ablating material, the remaining mass is added to the next node, and the number of nodes is reduced by one.

The material properties of the graphite are input as a function of temperature and are given in Appendix A. Other required input parameters and a typical CMA output are given in Appendix B.

Thermal Model

The thermal model of the GLFC was constructed for use with the Chrysler Improved Numerical Differencing Analyzer for Third Generation computers (CINDA-3G).[9] CINDA is a multioption systems compiler computer code and is operational on the Sandia Univac 1108 computer. The code analyzes a mathematical model of any arbitrary one-, two-, or three-dimensional lumped parameter representation of a physical system governed by a set of diffusion equations. To utilize the code, a thermal analog network representative of the physical system must be constructed. Nonlinear material properties and boundary conditions can be input as functions of one or more independent variables.

The nodal construction of the two-dimensional thermal model of the GLFC is shown in Figure 5. The model consists of 112 nodes, as shown in Table I. The model allows for heat transfer by both conduction and radiation between the appropriate nodes. All radiating surfaces are assumed to be gray with temperature varying emissivities. All other thermal properties are also allowed to vary with temperature. The internal energy generation in the GLFC is included in the fuel nodes. The reentry aerodynamic heating is accounted for by applying a time-varying heat generation to the nodes on the external surface. Each surface node can have a different aerodynamic heating rate applied to it to account for the heating distribution which occurs over the GLFC as it reenters the Earth's atmosphere in a side-on-stable orientation. Radiant cooling is accounted for by allowing each external node to radiate to space.

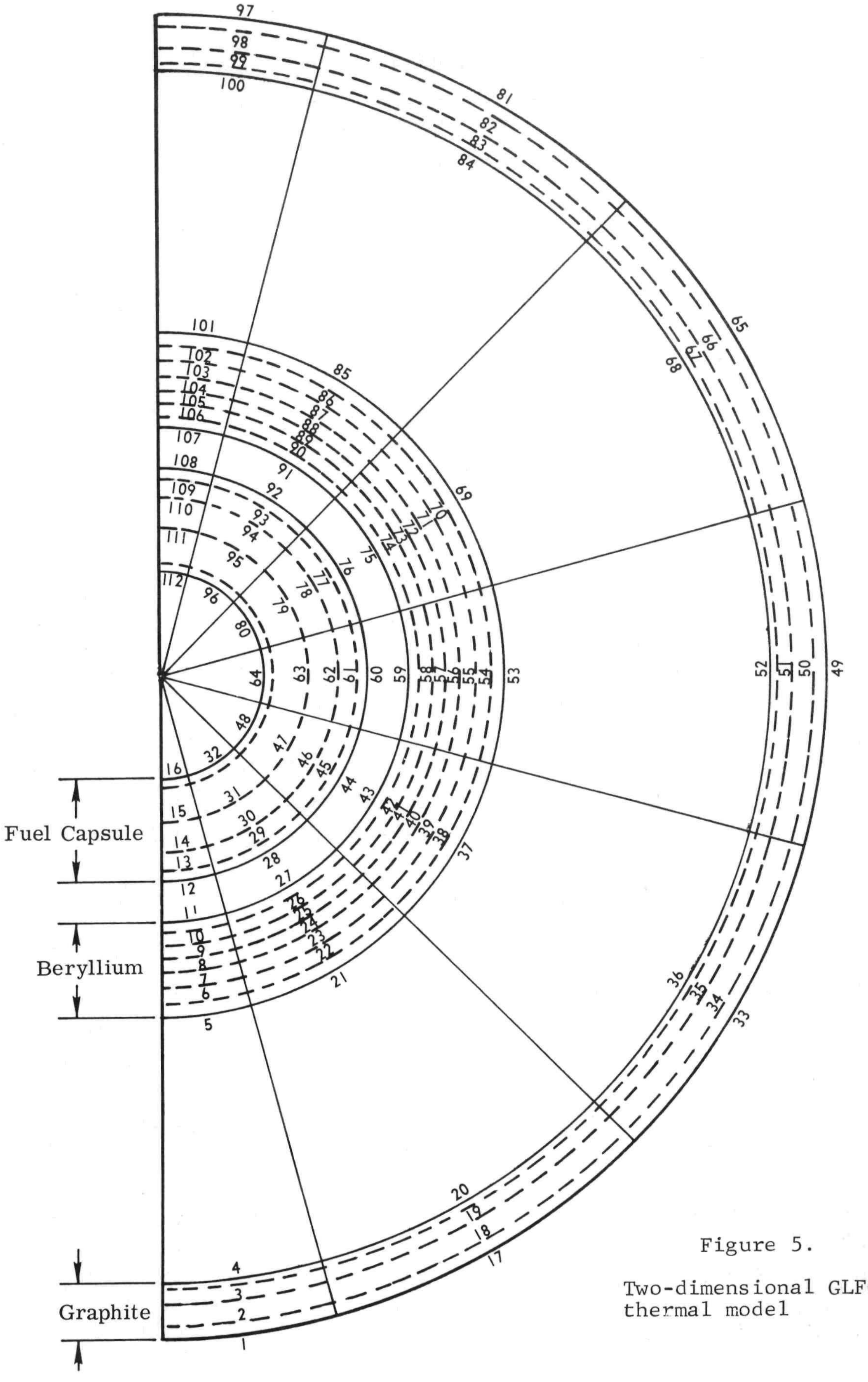

Figure 5.

Two-dimensional GLFC thermal model

TABLE I

GLFC Two-Dimensional
Thermal Model Node Materials

Material	Number of Nodes
Graphite (Pyrocarb 406)	28
Beryllium	49
Haynes 25	21
Fuel ($^{238}PuO_2$ microspheres)	14
Total	112

The radiation view factors across the radiation gaps internal to the GLFC were determined with computer code CONFAC II.[10] CONFAC II is a digital computer program which uses a numerical method to determine the geometric radiant-interchange factor used in radiant heat transfer. The source of flux may be any general plane polygon, and the receiver may be any general plane or nonplanar polygon, the surface of any arbitrary polyhedron, or an arbitrary combination of such surfaces.

Aerodynamic Heating

During reentry into the atmosphere, the GLFC is subjected to high heating rates. The convective heating occurs in both the free-molecular and continuum flow regimes. Radiant heating from the high temperature gas cap formed in front of the reentering GLFC must also be considered. This section of the report describes how the aerodynamic heat input to the GLFC was determined.

The convective heat input to the cask in the free-molecular flow regime is determined by the equation

$$\dot{q}_{FM} = \frac{a \rho_\infty V_\infty^3}{50{,}063} \qquad \text{(Reference 11)}$$

where

$\dot{q}_{FM}$ = free-molecular flow, stagnation point heating rate (Btu/ft^2-sec)

a = thermal accommodation coefficient

ρ_∞ = free stream density (lb/ft^3)

V_∞ = free stream velocity (ft/sec)

In the continuum flow regime, the convective reference heating rate to a 1-foot radius sphere is determined by the equation

$$\dot{q}_c = 865\left(\frac{\rho_\infty}{\rho_{SL}}\right)^{0.5}\left(\frac{V}{10,000}\right)^{3.15} \qquad \text{(Reference 12)}$$

where

$\dot{q}_c$ = continuum convective stagnation point heating rate (Btu/ft^2-sec)

ρ_∞ = local air density

ρ_{SL} = sea level air density

V = free stream velocity (ft/sec)

The convective heating which occurs in the transition flow regime is obtained by extending the free-molecular and continuum heating curves to their intersection. The free-molecular heating rate is used until it intersects the continuum heating rate; then the continuum rate is used at all altitudes below the intersection of the two curves. An example for one pass through the atmosphere of a multiple orbit reentry is shown in Figure 6. The heating rate used for this particular pass can be obtained from Figure 6 by staying on the lower of the two curves. This method gives results which are close to the results obtained from various theories of transition flow heating as well as experimental results.[11]

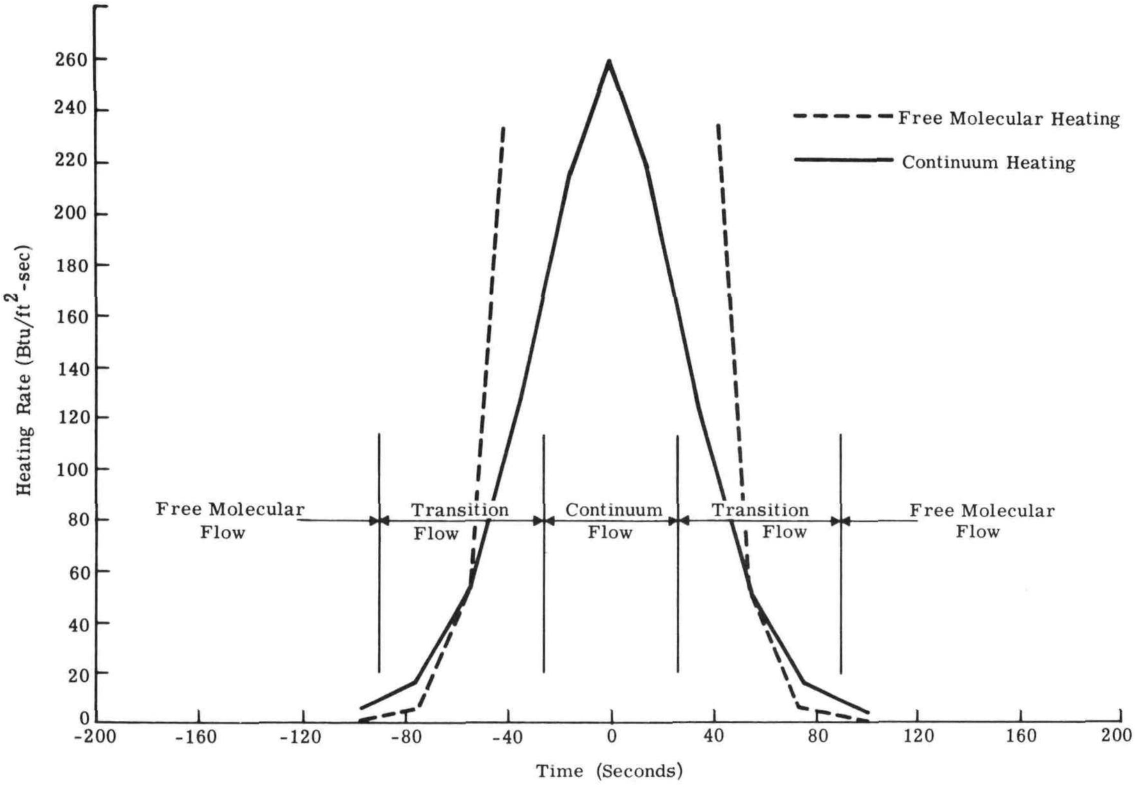

Figure 6. Transition-flow heating to the GLFC

The heating rates determined from the previously mentioned equations are calculated during the multiple orbit reentry trajectory by computer code HRS017-3.[13] This code determines the multiple orbit trajectory by an approximate closed-form solution. In order to determine how this closed-form solution trajectory compares to a more exact trajectory code, two multiple orbit reentry conditions (260,000 and 300,000 feet initial perigees) were run on the TTA computer code, which integrates the equations of motion. The heating rates to the GLFC, however, were still determined by the equations which were described previously. This was done by inputing the time-velocity-altitude history determined from the TTA computer code into computer code HRS017-4, which subsequently calculated the heating rates without going through a trajectory calculation. Code HRS017-4 also provides punched card output in a format compatible with punched card input for the CMA computer code.

The heating rates determined by the equations given previously are reference values equivalent to the rate experienced by the stagnation point of a 1-foot radius sphere flying the same trajectory. To obtain the actual rates, these reference heating rates must be scaled for the size, configuration, and reentry orientation of the GLFC. The size effect is $1/\sqrt{R}$, where R is the GLFC cylindrical radius. The heating ratio scale factor, Fq, which accounts for the GLFC configuration and reentry orientation, was based upon wind tunnel tests conducted on cylinders at Cornell Aeronautical Laboratory and at Rhodes and Bloxom by Sandia Laboratories.[14,15] Figure 7 shows the heating ratio to a cylinder, referenced to a 1-foot radius sphere, as a function of the circumferential angle. The heating ratios shown occur near the centerplane of the GLFC; since the thermal model was two-dimensional only, the axial variations (end effects) were not considered. For the multiple orbit reentry problem, maximum ablation and maximum local temperatures were of interest. Therefore, the heating rates applied to the ablation and thermal models were for the GLFC passing through the atmosphere in a side-on-stable orientation.

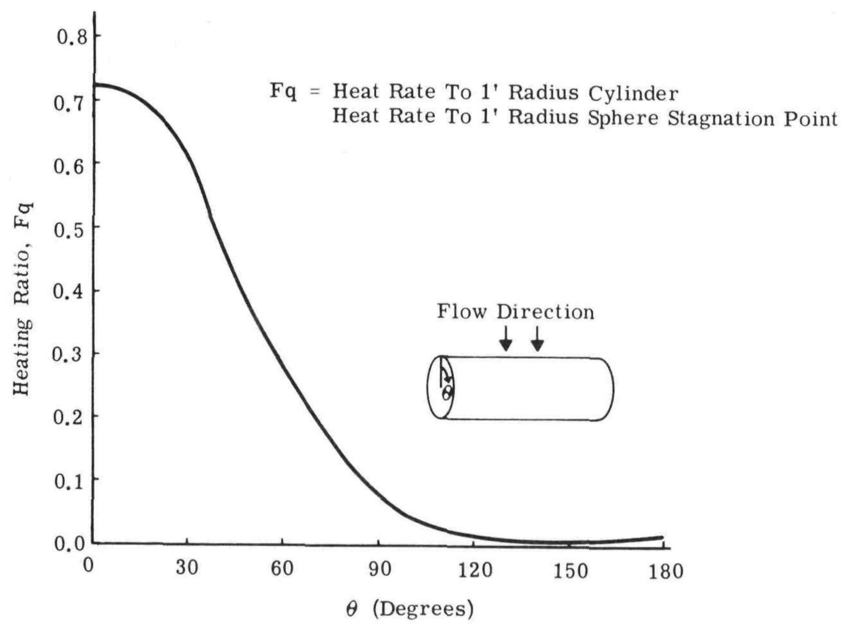

Figure 7. Heating ratio to a cylinder

The radiant heating to the GLFC during a multiple orbit reentry was determined by

$$\dot{q}_R = \left(3.748 \times 10^{-6}\right) \rho_\infty^{1.16} R_N^{0.5} U_\infty^3 \left(\frac{U_\infty}{10^4} - 3.25\right)^{1.337}$$

where

$\dot{q}_R$ = radiative heating to stagnation point (Btu/ft^2-sec)

ρ_∞ = free-stream density (lb/ft^3)

R_N = nose radius (ft)

U_∞ = free-stream velocity (ft/sec)

This equation correlates well with available experimental data.[16] Computer code RADHTG was written to evaluate the above radiant heating equation and the continuum convective heating equation. The code was written for use on the Sandia QUIKTRAN remote terminal, in connection with an IBM 7040-44 computer in Los Angeles. The radiant heating to the GLFC was determined by computer code RADHTG for several passes through the atmosphere during a multiple orbit reentry. Due to the relatively small size of the GLFC, the radiant heating rate for each pass through the atmosphere was less than 2 percent of the continuum convective heating (see Appendix D for the output of computer code RADHTG). Therefore, the radiant heating to the GLFC was ignored.

The aerodynamic heating rates discussed thus far in this section of the report are cold wall heating rates. These cold wall rates are input to the CMA computer code. The CMA code calculates a corrected heat flux based upon the more realistic conditions of a hot wall, with mass injection into the boundary layer and oxidation of the graphite surface. A comparison of the cold wall heating rate and the CMA corrected rate along the GLFC stagnation line for one pass through the atmosphere in a side-on-stable orientation is shown in Figure 8.

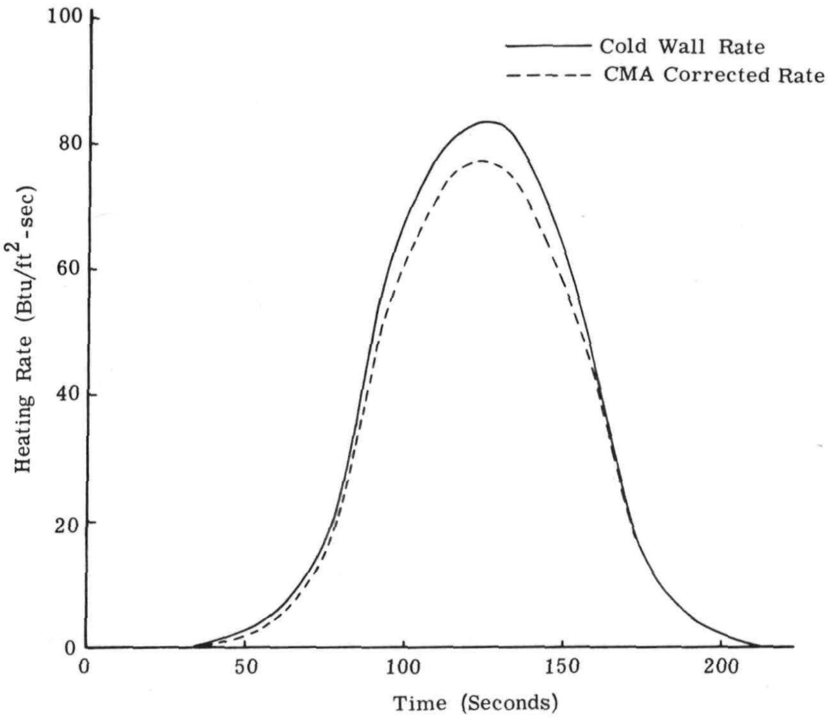

Figure 8. Comparison of cold wall heating and CMA corrected heating to the GLFC stagnation line for one pass through the atmosphere

Results

Ablation Analysis

The results of the ablation analysis are shown in Figures 9, 10, and 11. Figure 9 shows the cumulative ablation which would occur on the GLFC stagnation line for a side-on-stable reentry for eight different initial perigee altitudes. The number of orbits shown on the abscissa is the number of passes through the atmosphere, excluding the final atmospheric reentry which terminates at Earth impact. The relationship between the number of orbits prior to final reentry and the initial perigee altitude is shown in Table II. The relationship shown here between the number of orbits required for the trajectory to decay and the corresponding perigee altitude is based on results obtained with the HRS017 computer code. The dotted line in Figure 9 is the envelope of the curves and shows the maximum expected stagnation line ablation.

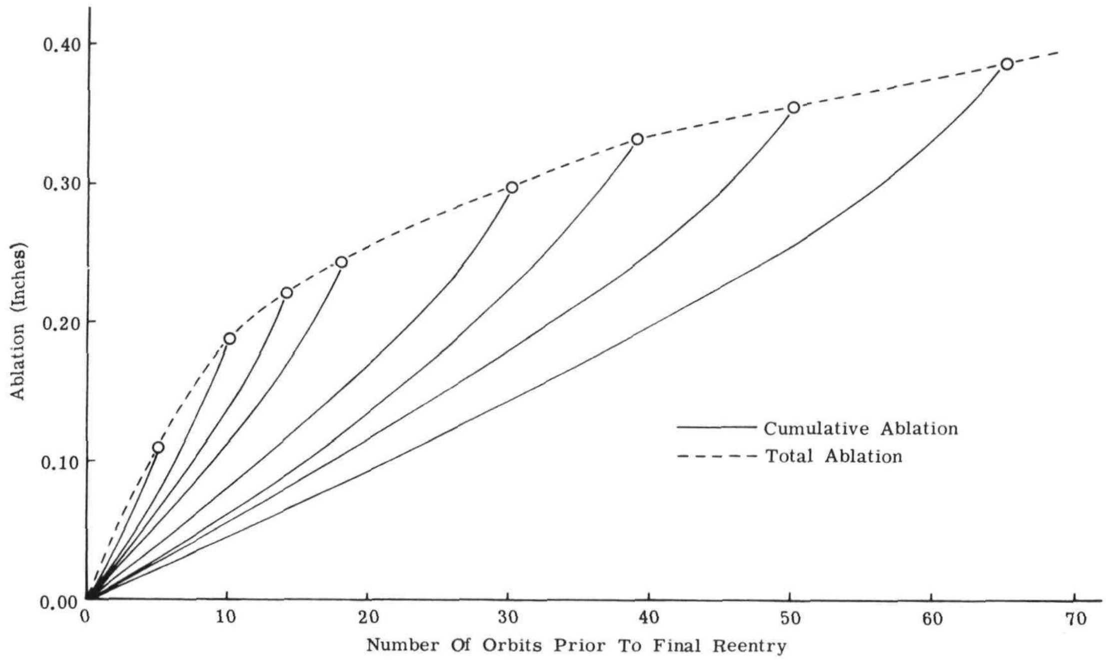

Figure 9. GLFC stagnation line ablation for multiple orbit reentry

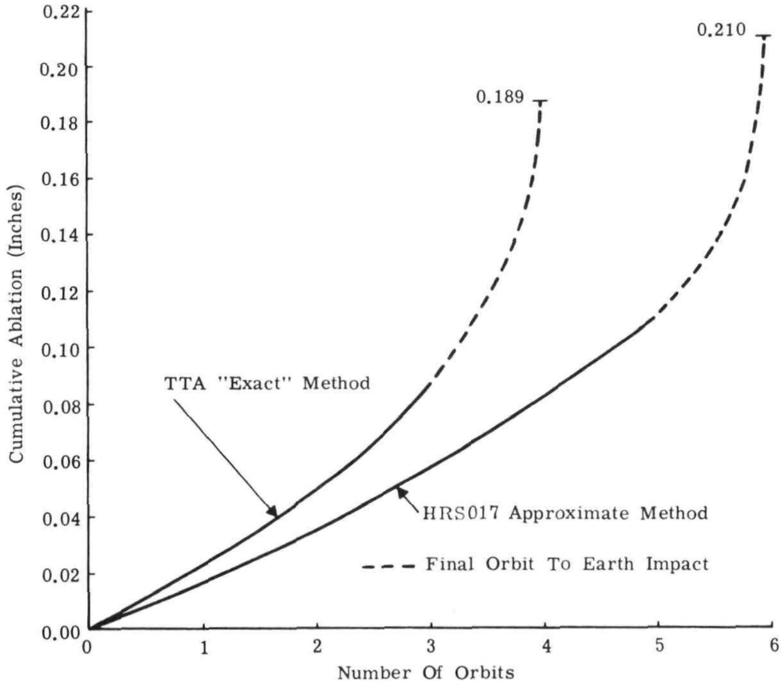

Figure 10. Comparison of ablation resulting from exact and approximate trajector methods for 260,000 feet initial perigee multiple orbit reentry

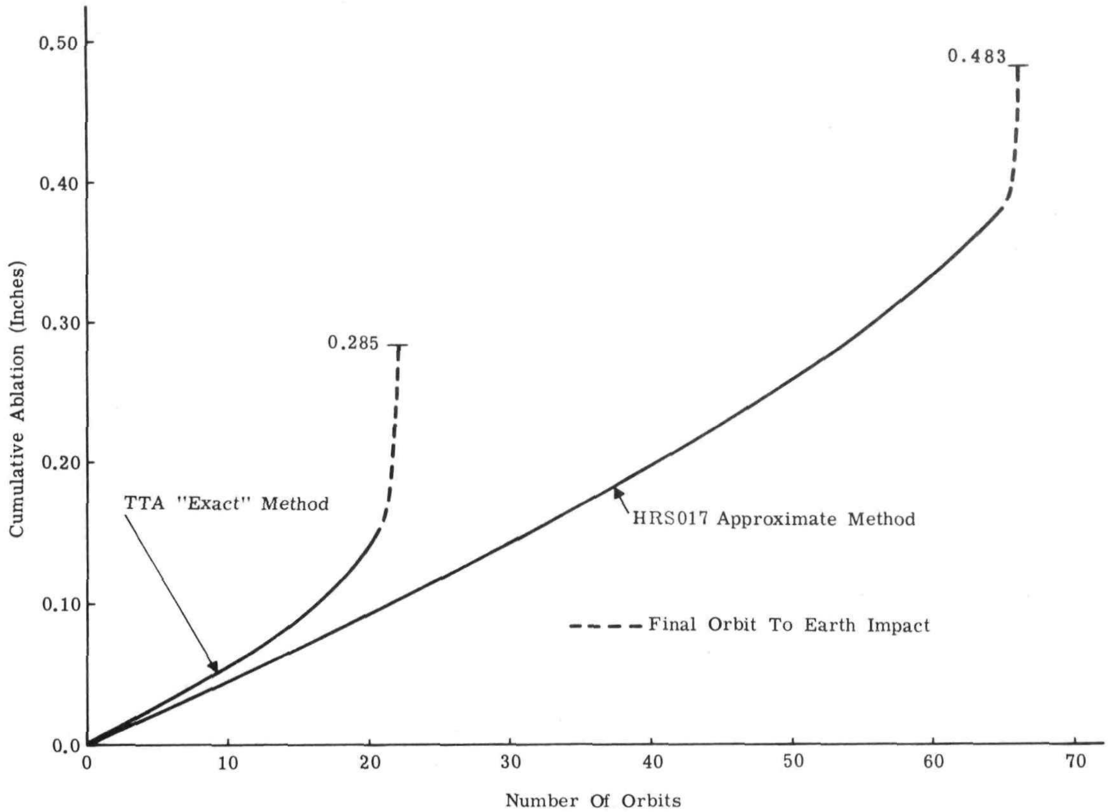

Figure 11. Comparison of ablation resulting from exact and approximate trajectory methods for 280,000 feet initial perigee multiple orbit reentry

TABLE II

Number of Orbits to Decay
and Corresponding Perigee Altitudes

Orbits to Final Reentry	Initial Perigee Altitude (ft)
5	260,000
10	265,000
14	270,000
18	275,000
30	285,000
39	290,000
50	295,000
65	300,000

Two multiple orbit reentry trajectories (260,000 and 300,000 feet initial perigee altitudes) were run on the TTA computer code at a later date to determine how these trajectories compared to those calculated by the HRS017 computer code and to determine how much ablation would occur during these reentry trajectories. The TTA code was not used for calculating all the multiple orbit trajectories since it requires relatively large amounts of computer time. Another factor preventing the use of the TTA computer code is that the output is not compatible with the CMA code input, as is the HRS017 computer code output. This incompatibility created a time delay which could not have been tolerated in the time schedule allowed for the multiple orbit reentry analysis. The results of the comparison are shown in Figures 10 and 11. The difference in the total number of orbits to Earth impact and the difference in total stagnation line ablation obtained from the two methods can be seen in the figures. The total ablation occurring during the TTA computed trajectory was 10 to 40 percent lower than that occurring during the HRS017 computed trajectory.

The ablation results indicate that based on the trajectory determined by the HRS017 code, the 0.35 inch of Pyrocarb graphite can ablate through along the stagnation line of the GLFC if a multiple orbit reentry occurs which has approximately 20 or more passes through the atmosphere (280,000 feet perigee or higher) in a side-on-stable orientation followed by a near orbital decay final reentry. (The near orbital decay final reentry must have the same stagnation line forward, and this results in approximately 0.1 inch of ablation.) It should be noted that the lack of three-dimensional heat transfer in the ablation model maximizes the ablation along the GLFC stagnation line.

Reentry Thermal Analysis

The complete results of the multiple orbit reentry two-dimensional thermal analysis are contained in Appendix C, where the temperature as a function of time is printed for each node for the first atmospheric pass of the five orbit reentry (260,000 feet initial perigee). Figure 12 shows the maximum temperature which occurs along the stagnation line for the outer graphite surface, the beryllium secondary heat shield, and the outer surface of the fuel capsule. As shown, the beryllium secondary heat shield and the Haynes 25 capsule cladding remain well below the melt temperatures of these materials (see Appendix A for melt temperatures). It can also be seen that the GLFC returns to steady-state temperature approximately 3500 seconds after passing through the atmosphere. This prevents the GLFC internal components from building up to a higher temperature on each sequential pass of a multiple orbit reentry. Figures 13 and 14 show the radial and circumferential temperature distribution as a function of time in the graphite portion of the GLFC for the first atmospheric pass of the five orbit reentry case.

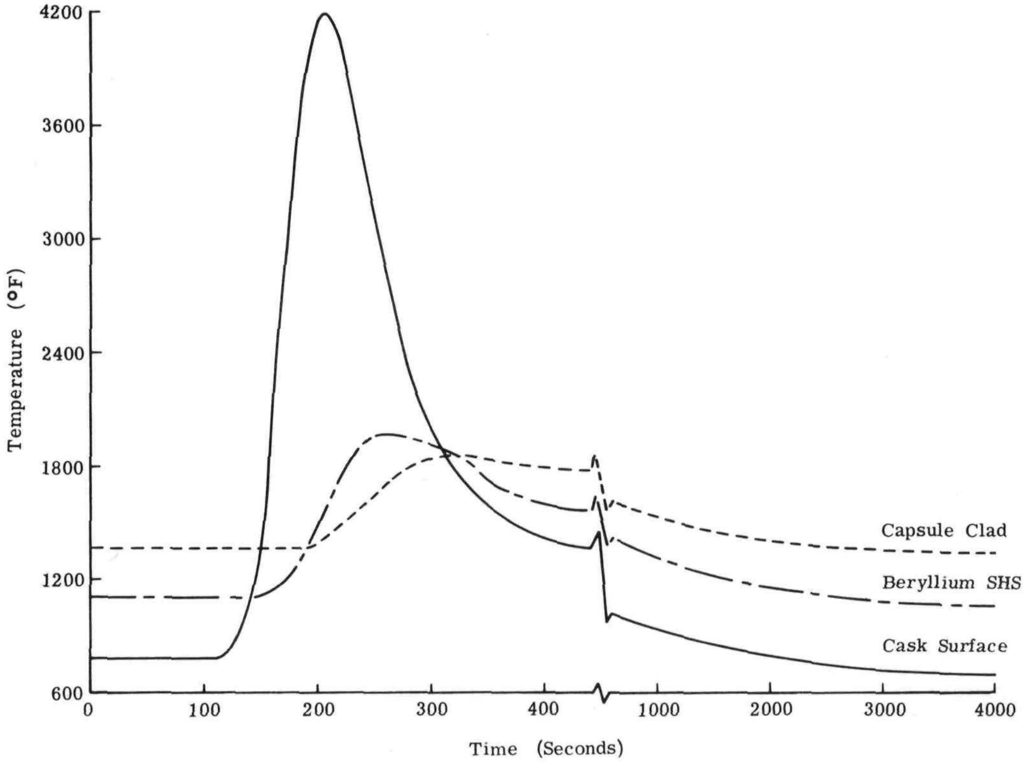

Figure 12. Temperature response of GLFC during one orbit of multiple orbit reentry

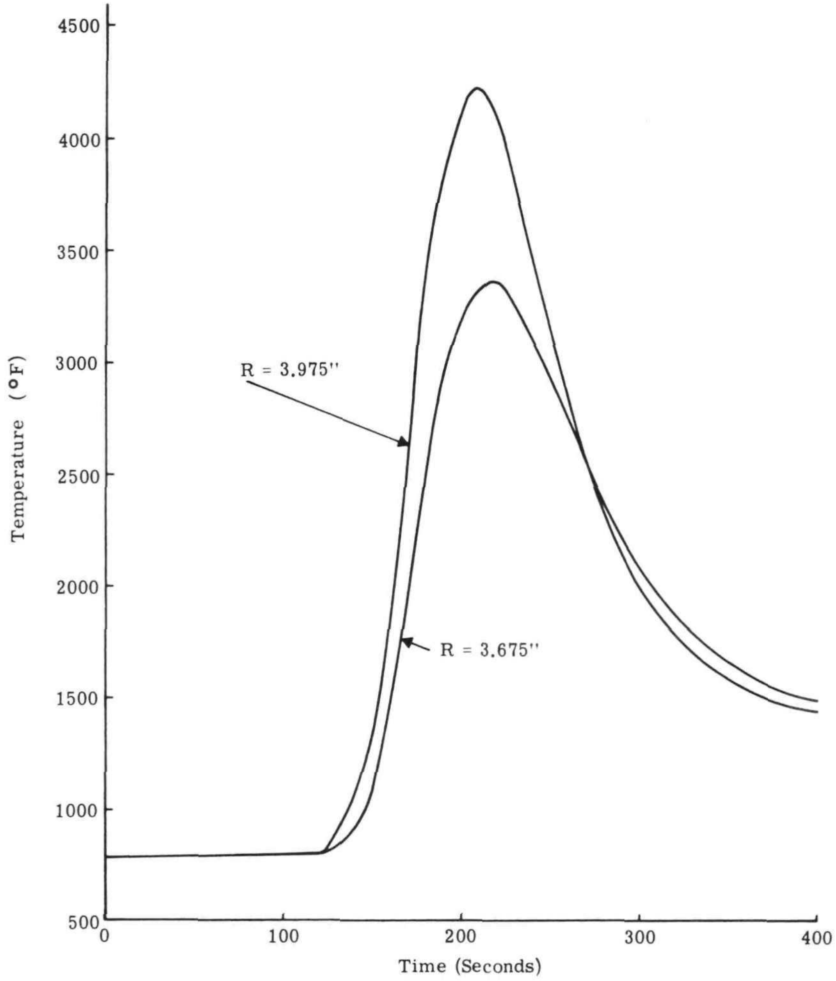

Figure 13. Radial temperature distribution of GLFC graphite shield during one pass of a multiple orbit reentry

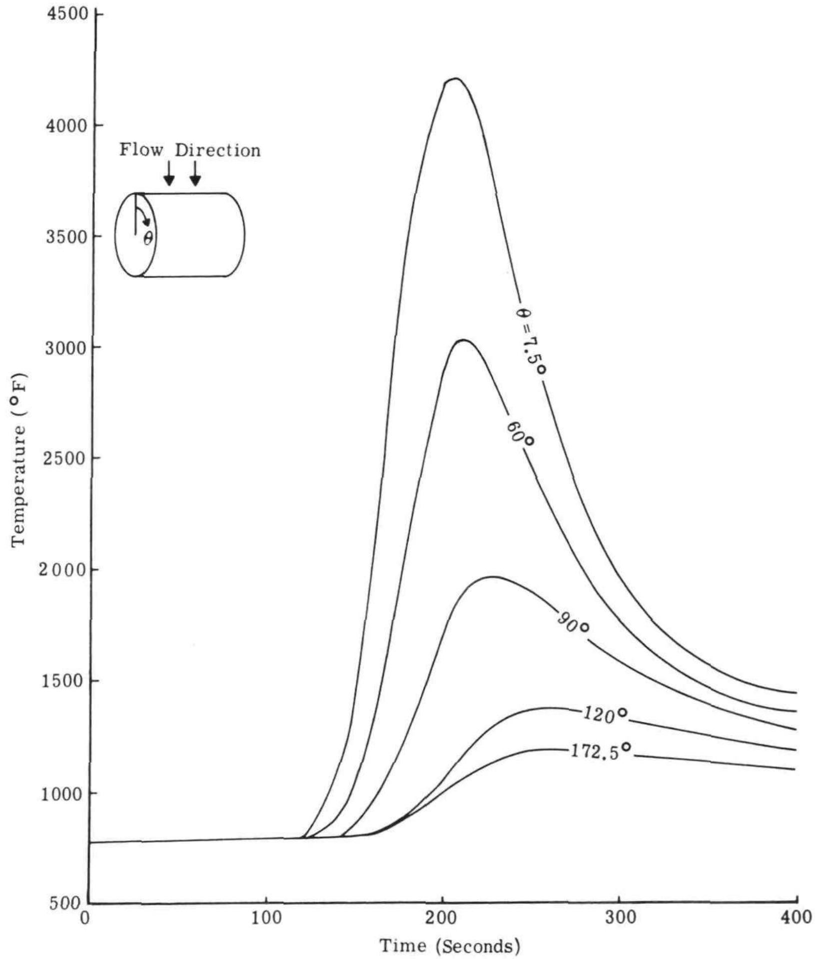

Figure 14. Circumferential temperature distribution of GLFC during one pass of a multiple orbit reentry

The final atmospheric reentry of the various multiple orbit reentries is closely approximated by an orbital decay reentry. The thermal response of the GLFC during this final reentry in a side-on-stable orientation is shown in Figures 15, 16, and 17. Figure 15 shows the maximum temperatures along the stagnation line for the cask surface, the beryllium secondary heat shield, and the fuel capsule outer surface. The beryllium heat shield and Haynes 25 cladding still remain below the melt temperatures of the materials although they reach a higher temperature than for the earlier atmospheric passes. Figures 16 and 17 show the radial and circumferential temperature distributions in the graphite for this final atmospheric reentry environment. The time in Figures 15, 16, and 17 is referenced from an altitude of 400,000 feet. Figure 18 shows the temperature distribution throughout the GLFC during the final reentry when the outer graphite surface is at peak temperature. The thermal results indicate that the GLFC provides adequate thermal protection of the SNAP-27 fuel capsule as long as the graphite cask remains intact.

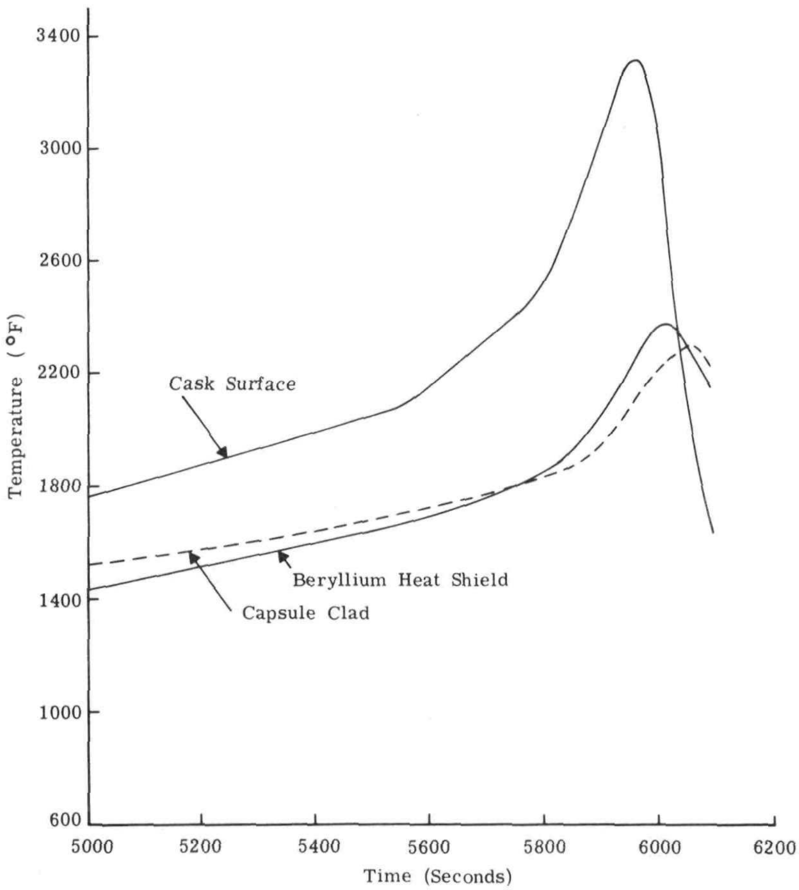

Figure 15. Maximum temperature of GLFC along stagnation line during final reentry

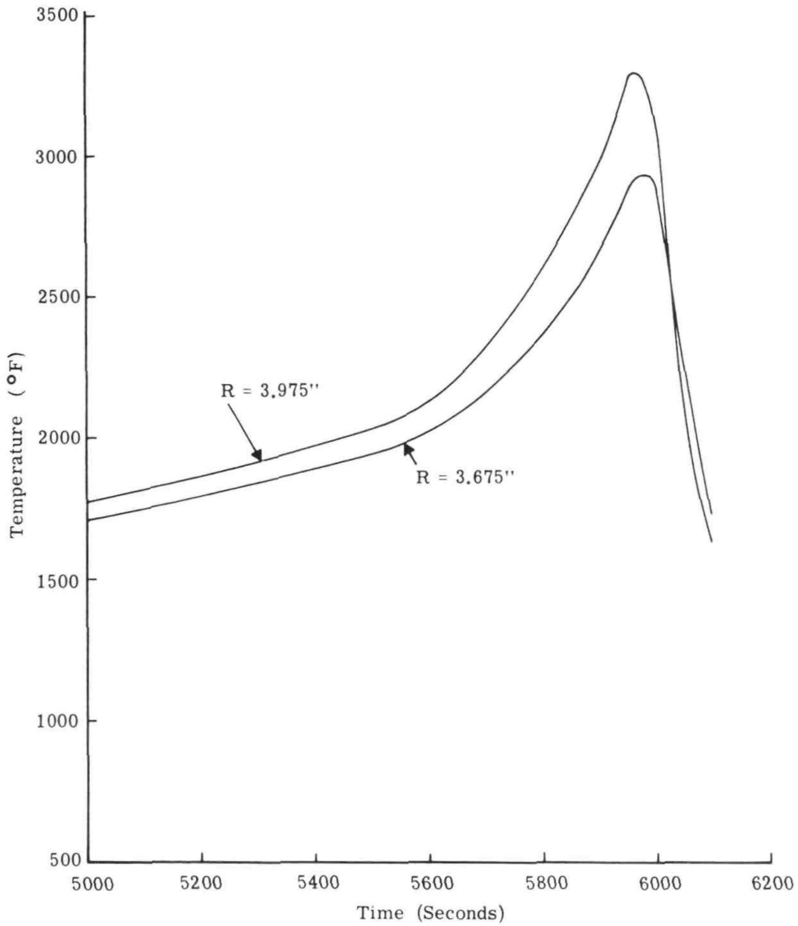

Figure 16. Radial temperature distribution of GLFC graphite shield along stagnation line during final reentry

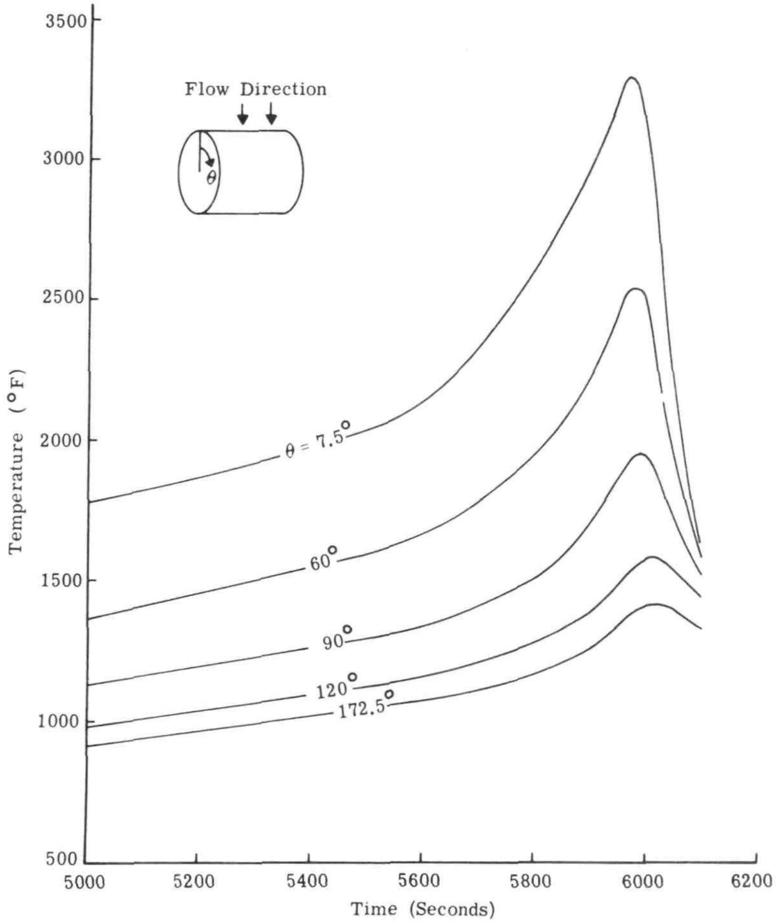

Figure 17. Circumferential temperature distribution of GLFC during final reentry

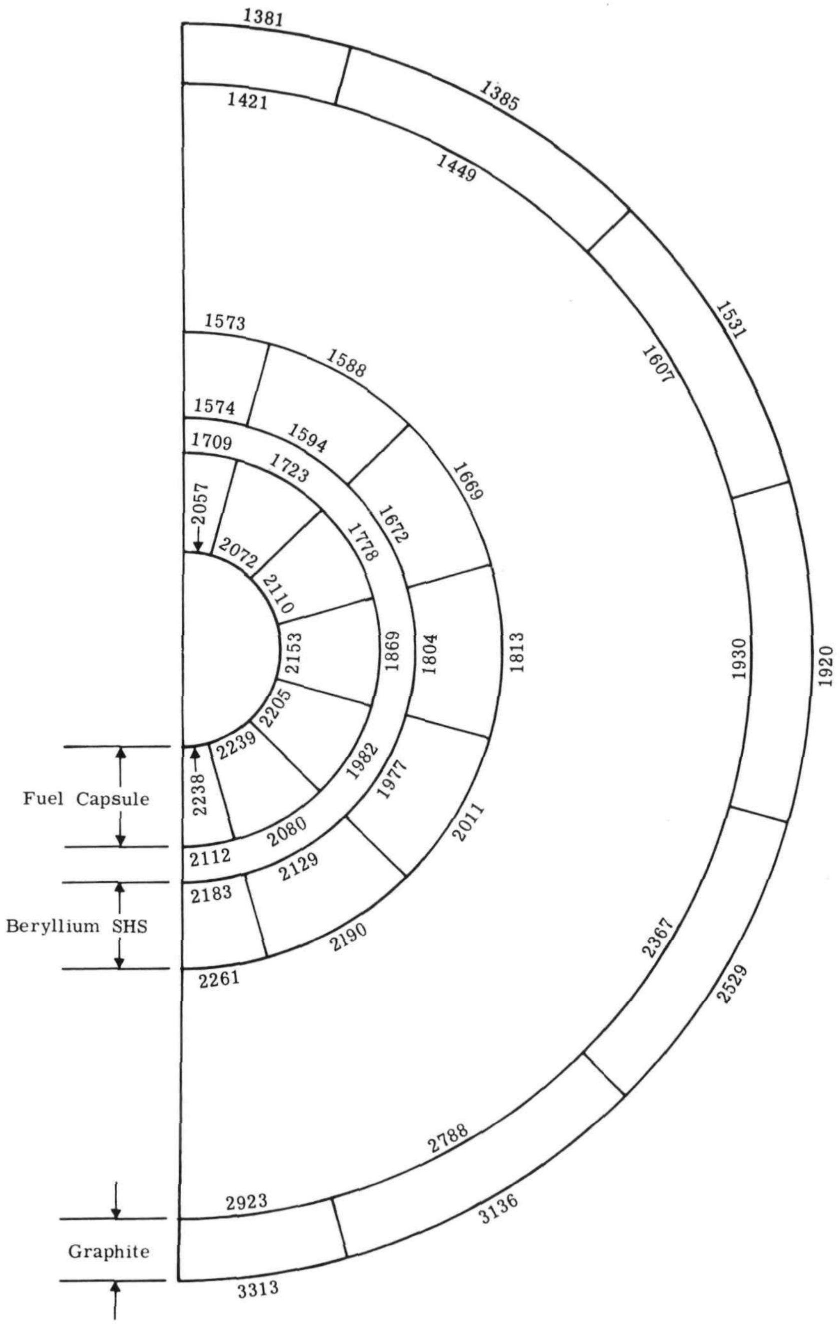

Figure 18. GLFC temperature distribution at maximum graphite temperature during final reentry

Conclusions

Based on the analyses and results documented in this report, the following conclusions are drawn.

1. For a side-on-stable orientation and using the approximate trajectory technique, the GLFC graphite heat shield is predicted to lose all material along the stagnation line by ablation, as the result of 20 or more passes through the atmosphere prior to final reentry.

2. The GLFC cask surface reaches a maximum temperature of 4213°F during a multiple orbit reentry.

3. The capsule cladding reaches a maximum temperature of 1848°F before the final reentry on a multiple orbit reentry, and it reaches a maximum temperature of 2365°F during the final reentry.

4. The GLFC returns to steady-state temperature prior to each pass through the atmosphere for a multiple orbit reentry.

5. The GLFC provides adequate thermal protection of the SNAP-27 fuel capsule provided the graphite heat shield remains intact.

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5. SC-M-66-1, Aerospace Material Properties Handbook (U), Sandia Laboratories, Albuquerque, New Mexico, February 1966 (CRD).

APPENDIX A

Material Properties Used in the Thermal and Ablation Models

Pyrocarb 406 Graphite

Density = 88 lb/ft^3

Emissivity, ϵ

Temperature (°F)	ϵ
0	0.70
400	0.73
800	0.78
1200	0.81
2000	0.86
3200	0.90
4000	0.93
8000	0.96

Specific Heat, C_P

Temperature (°F)	C_P (Btu/lb-°F)
70	0.22
1000	0.39
4000	0.53
8000	0.53

Thermal Conductivity, K

Temperature (°F)	K (Btu/hr-ft-°F)
0	4.50
165	4.85
565	5.22
965	5.50
1365	5.76
1965	6.04
2365	6.15
2965	6.30
4165	6.66
5665	6.92

Beryllium

Density = 114 lb/ft^3

Emissivity (coated), ϵ = 0.85

Specific Heat, C_p

Temperature (°F)	C_p (Btu/lb-°F)
150	0.20
200	0.55
1000	0.70
2600	0.90
5000	0.90

Thermal Conductivity, K

Temperature (°F)	K (Btu/hr-ft-°F)
0	110.0
800	70.0
1600	43.0
2400	30.0
5000	30.0

Melting Point = 2345°F

Plutonium Dioxide ($^{238}PuO_2$) Microspheres

Density = 662 lb/ft^3

Specific Heat, C_p = 0.0633 (Btu/lb-°F)

Thermal Conductivity, K

Temperature (°F)	K (Btu/hr-ft-°F)
1000	0.46
1200	0.52
1400	0.58
1600	0.68
1700	0.75
8000	0.75

Haynes 25

Density = 570 lb/ft^3

Emissivity (coated), ϵ = 0.85

Specific Heat, C_P

Temperature (°F)	C_P (Btu/lb-°F)
500	0.080
1000	0.090
1500	0.105
2000	0.115
2425	0.120

Thermal Conductivity, K

Temperature (°F)	K (Btu/hr-ft-°F)
500	8.1
1000	11.5
1500	14.6
2100	19.5
3000	27.7

Melting Range = 2425° to 2570°F

APPENDIX B

Sample CMA Computer Code Run--Ablation Response During Five Orbit Reentry

6

SNAP 27 GLFC MULTIPLE ORBIT REENTRY STUDY
THIS RUN IS FIVE ORBIT CASE FROM HRS017 TE=5500 K
ORBIT 1 OF 5 D W LARSON, 9513

---REACTION KINETIC EQUATION---

```
DRHO/DTIME = GAMMA ( BA*EXP(-EA/T)RHOOA((RHOA-RHORA)/RHOOA)**PSIA )
           + GAMMA ( BB*EXP(-EB/T)RHOOB((RHOB-RHORB)/RHOOB)**PSIB )
         +(1-GAMMA)( BC*EXP(-EC/T)RHOOC((RHOC-RHORC)/RHOOC)**PSIC )
```

---REACTION KINETIC CONSTANTS---

REACTION	RHOO (LB/CU	RHOR FT)	B (1/SEC)	PSI	E (DEG R)	T REAC (DEG R)
A	88.00	88.00	0.000+000	0.00	0.000+000	90000
B	88.00	88.00	0.000+000	0.00	0.000+000	90000
C	88.00	88.00	0.000+000	0.00	0.000+000	90000

RESIN VOLUME FRACTION, GAMMA = *****(MASS FRACTION = 0.000)

---TIME INCREMENT INFORMATION---

INITIAL TIME (SEC) 0.000 FINAL TIME (SEC) 404.53

OUTPUT INTERVAL =****** SEC FROM INITIAL TIME UNTIL500.000 SEC
OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL500.000 SEC
OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL FINAL TIME

MAXIMUM TIME STEP =5.00 SECONDS

---NODAL DATA---

THE TITLE OF THIS FILE IS 0.35000 -0.00000 0.00000 0.00000

NODE NO.	MATL NO.	TEMPERATURE (DEG.RANKINE)	RELATIVE AREA	THICKNESS (INCHES)	NODAL DEPTH (INCHES)	CONT.RESISTANCE (SQFT-S-DEG/BTU)
1	1	1245.00	1.0000+000	0.01000	0.000000*	0.0000+000
2	1	1245.00	1.0000+000	0.01000	0.015000	0.0000+000
3	1	1245.00	1.0000+000	0.02000	0.030000	0.0000+000
4	1	1245.00	1.0000+000	0.02000	0.050000	0.0000+000
5	1	1245.00	1.0000+000	0.02000	0.070000	0.0000+000
6	1	1245.00	1.0000+000	0.03000	0.095000	0.0000+000
7	1	1245.00	1.0000+000	0.04000	0.130000	0.0000+000
8	1	1245.00	1.0000+000	0.05000	0.175000	0.0000+000
9	1	1245.00	1.0000+000	0.05000	0.225000	0.0000+000
10	1	1245.00	1.0000+000	0.05000	0.275000	0.0000+000
11	1	1245.00	1.0000+000	0.05000	0.325000	0.0000+000

*PLANAR SURFACE

MINIMUM THICKNESS OF LAST ABLATOR NODE (INCHES) 0.0100

THERE ARE 10 NODELETS ASSIGNED TO EACH ABLATING NODE

BACK WALL CONVECTION COEF BTU/FTSQ-HR-DEG R	BACK WALL EMISSIVITY	RESERVOIR TEMPERATURE
-0.0000	-0.000	1245.00

---HEAT OF FORMATION OF MATERIAL CONSTITUENTS---
(BTU/LB)

PLASTIC	CHAR	GAS
-0.00	-0.00	-0.00

ENTHALPY DATUM TEMPERATURE = 536.000 DEG RANKINE

---MATERIAL THERMAL PROPERTY DATA---

MATERIAL NO. 1	MATERIAL NO. 2	MATERIAL NOS. 3 THROUGH20
VIRGIN PLASTIC	CHAR	BACK-UP

MATERIAL NO. 1 DENSITY = 88.000 LB/CU FT

TEMPERATURE (DEG R)	SPECIFIC HEAT (BTU/LB-DEG)	CONDUCTIVITY (BTU/FT-SEC-DEG)	SENSIBLE ENTHALPY (BTU/LB)	EMMISIVITY
0.00	0.0000	0.0013000	-48.24	0.5000
625.00	0.1800	0.0013500	8.01	0.7000
1025.00	0.3200	0.0014500	108.01	0.7500
1425.00	0.3900	0.0015300	250.01	0.8000
1825.00	0.4600	0.0016000	420.01	0.8300
2425.00	0.4800	0.0016700	702.01	0.8500
2825.00	0.5000	0.0017100	898.01	0.8700
3425.00	0.5100	0.0017500	1201.01	0.8900
4625.00	0.5200	0.0018500	1819.01	0.9400
6125.00	0.5200	0.0019200	2599.01	0.9600

MATERIAL NO, 2 DENSITY = 88,000 LB/CU FT

TEMPERATURE (DEG R)	SPECIFIC HEAT (BTU/LB-DEG)	CONDUCTIVITY (BTU/FT-SEC-DEG)	SENSIBLE ENTHALPY (BTU/LB)	EMMISIVITY
0,00	0,0000	0,0013000	-48,24	0,5000
625,00	0,1800	0,0013500	8,01	0,7000
1025,00	0,3200	0,0014500	108,01	0,7500
1425,00	0,3900	0,0015300	250,01	0,8000
1825,00	0,4600	0,0016000	420,01	0,8300
2425,00	0,4800	0,0016700	702,01	0,8500
2825,00	0,5000	0,0017100	898,01	0,8700
3425,00	0,5100	0,0017500	1201,01	0,8900
4625,00	0,5200	0,0018500	1819,01	0,9400
6125,00	0,5200	0,0019200	2599,01	0,9600

---RESIN DECOMPOSITION GAS SENSIBLE ENTHALPY---

TEMPERATURE (DEG R)	500,00	1000,00
ENTHALPY (BTU/LB)	0,00	100,00

---TIME DEPENDENT BOUNDARY CONDITIONS---

THE TITLE OF THIS FILE IS 000000000000000000000000

TIME (SEC)	RECOVERY ENTHALPY (BTU/LB)	RADIATION HEAT RATE (BTU/SQ FT-SEC)	HEAT COEFF (LB/SQ FT-SEC)	PRESSURE (ATMS)
0,00	25359,13	0,00	0,0000	0,00000
21,57	25507,66	0,00	0,0000	0,00000
42,91	25641,04	0,00	0,0000	0,00000
64,03	25759,12	0,00	0,0000	0,00000
84,97	25861,74	0,00	0,0000	0,00000
105,76	25948,79	0,00	0,0000	0,00001
126,40	26020,16	0,00	0,0002	0,00011
146,91	26075,75	0,00	0,0020	0,00107
167,26	26115,51	0,00	0,0049	0,00660
187,25	26139,39	0,00	0,0084	0,01915
202,26	26147,35	0,00	0,0100	0,02707
217,28	26139,39	0,00	0,0084	0,01915
237,27	26115,51	0,00	0,0049	0,00660
257,62	26075,75	0,00	0,0020	0,00107
278,13	26020,16	0,00	0,0002	0,00011
298,77	25948,79	0,00	0,0000	0,00001
319,56	25861,74	0,00	0,0000	0,00000
340,50	25759,12	0,00	0,0000	0,00000
361,62	25641,04	0,00	0,0000	0,00000
382,96	25507,66	0,00	0,0000	0,00000
404,53	25359,13	0,00	0,0000	0,00000

CH/CHO = PHI/(EXP(PHI)-1.) WHERE PHI = 2.*BRP*M DOT/CHO, BRP IS 0.4 FOR STAGNATION AND TURBULENT FLOW, AND 0.5 FOR LAMINAR FLOW.

RATIO OF MASS TO HEAT TRANSFER COEFFICIENTS = 0.930

UNEQUAL DIFFUSION EXPONENT = 0.333
NOMINAL SURFACE VIEW FACTOR = 1.000 (OPTION 1)

---OUTPUT---

0.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
1	0	1	0.0000	0.00	25359.13	0.0000	0.00000	0.00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.00000	0.00000	0.000000	0.000000	0.000000	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0000000/0.0000000	0.0000000/0.0000000	0.0000000/0.0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000
TOTAL	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000
TOTAL	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	1	1245.00	88.000	186.11	7	1	1245.00	88.000	186.11
2	1	1245.00	88.000	186.11	8	1	1245.00	88.000	186.11
3	1	1245.00	88.000	186.11	9	1	1245.00	88.000	186.11
4	1	1245.00	88.000	186.11	10	1	1245.00	88.000	186.11
5	1	1245.00	88.000	186.11	11	1	1245.00	88.000	186.11
6	1	1245.00	88.000	186.11					

SANDIA ABLATION PROGRAM (VERSION TWO)

ORBIT 1 OF 5   D W LARSON, 9513

- - - - - - - - - - - 100.0000 SECONDS - - - - - - - - - - -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
29	2	1	0.0000	12896.69	25924.68	0.0000	0.95564	0.00001	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.16575	0.00000	0.000002	0.000000	0.000026	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0000036/0.0000003	0.0000036/0.0000003	0.0000036/0.0000003

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	2.048-001	0.000+000	8.309-001	1.971-001	-4.280-001
TOTAL	3.699+000	0.000+000	8.824+001	3.578+000	-1.835+001

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-3.533-006	-4.280-001	-3.175-007
TOTAL	0.000+000	0.000+000	-4.755-005	-1.835+001	-5.605-006

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1222.03	88.000	177.96	7	2	1224.68	88.000	178.90
2	2	1222.39	88.000	178.08	8	2	1225.35	88.000	179.13
3	2	1222.73	88.000	178.20	9	2	1225.92	88.000	179.34
4	2	1223.17	88.000	178.36	10	2	1226.30	88.000	179.47
5	2	1223.58	88.000	178.51	11	2	1226.49	88.000	179.54
6	2	1224.07	88.000	178.68					

- - - - - - 200.0000 SECONDS - - - - - -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
101	2	1	0.0075	6850.31	26146.15	0.0091	0.93459	0.02569	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.19569	0.00000	0.001659	0.000000	0.055024	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0075033/0.0002262	0.0075033/0.0002224	0.0075033/0.0002224

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	1.759+002	0.000+000	1.980+002	5.977+001	3.785+001
TOTAL	5.879+003	0.000+000	4.804+003	2.673+003	3.831+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	2.790-001	3.758+001	5.934-005
TOTAL	0.000+000	0.000+000	1.352+001	3.818+003	1.883-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	4576.81	88.000	1794.19	7	2	4387.83	88.000	1696.87
2	2	4551.70	88.000	1781.26	8	2	4340.19	88.000	1672.33
3	2	4527.13	88.000	1768.61	9	2	4300.23	88.000	1651.75
4	2	4495.96	88.000	1752.55	10	2	4273.92	88.000	1638.20
5	2	4466.44	88.000	1737.35	11	2	4262.65	88.000	1632.40
6	2	4431.68	88.000	1719.45					

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300,0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT*SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
144	2	1	0,0165	13416,15	25943,65	0,0000	0,91219	0,00001	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0,17044	0,00000	0,000003	0,000000	0,121335	0,000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0,00)	PYROLYSIS (0,98)
0,0165456/0,0000004	0,0165456/0,0000006	0,0165456/0,0000006

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	2,298-001	0,000+000	2,281+001	2,319-001	-2,173+001
TOTAL	1,207+004	0,000+000	1,574+004	5,477+003	1,925+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	-4,428-004	-2,173+001	3,411-005
TOTAL	0,000+000	0,000+000	1,418+001	1,912+003	7,345-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	2721,16	88,000	847,13	7	2	2835,63	88,000	903,38
2	2	2736,71	88,000	854,75	8	2	2863,35	88,000	917,38
3	2	2751,84	88,000	862,16	9	2	2885,98	88,000	928,80
4	2	2770,89	88,000	871,49	10	2	2900,22	88,000	935,99
5	2	2788,77	88,000	880,26	11	2	2904,99	88,000	938,41
6	2	2809,63	88,000	890,48					

400.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
166	2	1	0.0166	13149.96	25390.31	0.0000	0.92447	0.00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR	M DOT GAS	M CHAR	M GAS
		(LB/SQ FT-SEC)		(LB/ORIG SQ FT)	
0.17039	0.00000	0.000000	0.000000	0.121390	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0165532/0.0000000	0.0165532/0.0000000	0.0165532/0.0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	1.607-003	0.000+000	5.489+000	1.652-003	-5.481+000
TOTAL	1.208+004	0.000+000	1.680+004	5.481+003	8.788+002

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-6.470-007	-5.481+000	1.501-005
TOTAL	0.000+000	0.000+000	1.418+001	8.662+002	9.568-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1923.72	88.000	466.41	7	2	1953.73	88.000	480.51
2	2	1927.84	88.000	468.35	8	2	1960.88	88.000	483.87
3	2	1931.85	88.000	470.23	9	2	1966.68	88.000	486.60
4	2	1936.86	88.000	472.58	10	2	1970.32	88.000	488.31
5	2	1941.55	88.000	474.79	11	2	1971.54	88.000	488.88
6	2	1946.99	88.000	477.35					

- - - - - - - - - - - - - - - - 404,7619 SECONDS -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
167	2	1	0,0166	13142,80	25357,53	0,0000	0,91737	0,00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.17038	0.00000	0.000000	0,000000	0,121390	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0,00)	PYROLYSIS (0,98)
0,0165532/0,0000000	0,0165532/0,0000000	0,0165532/0.0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	1.096-003	0.000+000	5,253+000	1,129-003	-5.246+000
TOTAL	1.208+004	0.000+000	1,682+004	5,481+003	8.538+002

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	-4,675-007	-5,246+000	1.453-005
TOTAL	0.000+000	0,000+000	1.418+001	8,412+002	9,638-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1903,05	88,000	456,69	7	2	1931,82	88,000	470.21
2	2	1907.00	88,000	458,55	8	2	1938,66	88,000	473,43
3	2	1910,84	88,000	460,35	9	2	1944,22	88,000	476,04
4	2	1915.65	88,000	462,61	10	2	1947,71	88,000	477,68
5	2	1920,14	88,000	464,72	11	2	1948,88	88,000	478,23
6	2	1925,35	88,000	467,18					

ORBIT 1 OF 5   D W LARSON, 9513

OPTIONAL OUTPUT OF THERMOCOUPLE TEMPERATURES AND/OR ISOTHERM DEPTHS
DEPTHS MEASURED FROM ORIGINAL SURFACE
TEMPERATURES IN DEGREES RANKINE

EACH OUTPUT BLOCK SHOWS THE TIME IN SECONDS, THE CURRENT SURFACE TEMPERATURE, THE TEMPERATURES OF 1 THERMOCOUPLES, AND THE DEPTHS IN INCHES OF -0 ISOTHERMS

THE FIRST BLOCK SHOWS A SAMPLE TIME AND SURFACE TEMPERATURE, THE SPECIFIED DEPTHS OF THE THERMOCOUPLES (IF ANY) AND THE ISOTHERM TEMPERATURES. THE ARRANGEMENT OF THIS BLOCK CORRESPONDS TO THE ARRANGEMENT OF THE OUTPUT DATA.

404.7619	1903.0469	0.3500

OUTPUT DATA

0.0000	1245.0000	1245.0000
100.0000	1222.0341	1226.4900
200.0000	4576.8111	4262.6471
300.0000	2721.1571	2904.9945
400.0000	1923.7169	1971.5414
404.7619	1903.0469	1948.8750

THECALCULATIONTIMEIS 57.6680SECONDS

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                    SANDIA ABLATION PROGRAM (VERSION TWO)
                                                                   PAGE  1
6
SNAP 27 GLFC MULTIPLE ORBIT REENTRY STUDY
THIS RUN IS FIVE ORBIT CASE FROM HRS017 TE=5500 K
          ORBIT 4 OF 5      D W LARSON, 9513

                  ---REACTION KINETIC EQUATION---

       DRHO/DTIME = GAMMA ( BA*EXP(-EA/T)RHOOA((RHOA-RHORA)/RHOOA)**PSIA )
                  + GAMMA ( BB*EXP(-EB/T)RHOOB((RHOB-RHORB)/RHOOB)**PSIB )
                +(1-GAMMA)( BC*EXP(-EC/T)RHOOC((RHOC-RHORC)/RHOOC)**PSIC )
         RESIN VOLUME FRACTION, GAMMA = *****(MASS FRACTION = 0.000)

                  ---TIME INCREMENT INFORMATION---

    INITIAL TIME (SEC)  0.000                      FINAL TIME (SEC) 490.09

    OUTPUT INTERVAL =****** SEC FROM INITIAL TIME UNTIL500.000 SEC
    OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL500.000 SEC
    OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL FINAL TIME

    MAXIMUM TIME STEP =5.00 SECONDS
                       ---NODAL DATA---

THE TITLE OF THIS FILE IS        0.35000  -0.00000   0.00000   0.00000
    NODE  MATL  TEMPERATURE  RELATIVE  THICKNESS  NODAL DEPTH  CONT.RESISTANCE
     NO.   NO. (DEG.RANKINE)   AREA    (INCHES)    (INCHES)   (SQFT-S-DEG/BTU)
    *PLANAR SURFACE
        MINIMUM THICKNESS OF LAST ABLATOR NODE (INCHES) 0.0100
        THERE ARE 10 NODELETS ASSIGNED TO EACH ABLATING NODE
```

---TIME DEPENDENT BOUNDARY CONDITIONS---

THE TITLE OF THIS FILE IS 000000000000000000000000

TIME (SEC)	RECOVERY ENTHALPY (BTU/LB)	RADIATION HEAT RATE (BTU/SQ FT-SEC)	HEAT COEFF (LB/SQ FT-SEC)	PRESSURE (ATMS)
0.00	17942.22	0.00	0.0000	0.00000
25.13	18025.93	0.00	0.0000	0.00000
50.10	18101.09	0.00	0.0000	0.00000
74.95	18167.63	0.00	0.0000	0.00000
99.67	18225.47	0.00	0.0001	0.00002
124.29	18274.52	0.00	0.0003	0.00014
148.83	18314.74	0.00	0.0016	0.00075
173.31	18346.07	0.00	0.0033	0.00315
197.73	18368.48	0.00	0.0055	0.00866
222.10	18381.93	0.00	0.0074	0.01566
245.04	18386.42	0.00	0.0082	0.01903
267.99	18381.93	0.00	0.0074	0.01566
292.36	18368.48	0.00	0.0055	0.00866
316.78	18346.07	0.00	0.0033	0.00315
341.25	18314.74	0.00	0.0016	0.00075
365.79	18274.52	0.00	0.0003	0.00014
390.42	18225.47	0.00	0.0001	0.00002
415.14	18167.63	0.00	0.0000	0.00000
439.98	18101.09	0.00	0.0000	0.00000
464.96	18025.93	0.00	0.0000	0.00000
490.09	17942.22	0.00	0.0000	0.00000

CH/CHO = PHI/(EXP(PHI)-1.) WHERE PHI = 2.*BRP*M DOT/CHO. BRP IS 0.4 FOR STAGNATION AND TURBULENT FLOW, AND 0.5 FOR LAMINAR FLOW.

SANDIA ABLATION PROGRAM (VERSION TWO)

ORBIT 4 OF 5 D W LARSON, 9513

----OUTPUT----

- - - - - - - - - - - - - - - 0.0000 SECONDS -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
1	0	1	0.0000	0.00	17942.22	0.0000	0.00000	0.00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.00000	0.00000	0.000000	0.000000	0.000000	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0000000/0.0000000	0.0000000/0.0000000	0.0000000/0.0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000
TOTAL	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000
TOTAL	0.000+000	0.000+000	0.000+000	0.000+000	0.000+000

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	1	1245.00	88.000	186.11	7	1	1245.00	88.000	186.11
2	1	1245.00	88.000	186.11	8	1	1245.00	88.000	186.11
3	1	1245.00	88.000	186.11	9	1	1245.00	88.000	186.11
4	1	1245.00	88.000	186.11	10	1	1245.00	88.000	186.11
5	1	1245.00	88.000	186.11	11	1	1245.00	88.000	186.11
6	1	1245.00	88.000	186.11					

SANDIA ABLATION PROGRAM (VERSION TWO)

ORBIT 4 OF 5 D W LARSON, 9513

- - - - - - - - - - - - - - 100.0000 SECONDS -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
29	2	1	0.0000	12829.37	18226.12	0.0001	0.95483	0.00002	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.15849	0.00000	0.000008	0.000000	0.000139	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0000190/0.0000011	0.0000190/0.0000009	0.0000190/0.0000009

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	2.992-001	0.000+000	8.248-001	6.947-001	1.697-001
TOTAL	6.397+000	0.000+000	8.525+001	1.508+001	-2.417+001

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	7.244-006	1.697-001	-5.633-007
TOTAL	0.000+000	0.000+000	-9.255-005	-2.417+001	-2.386-005

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1219.86	88.000	177.19	7	2	1218.73	88.000	176.79
2	2	1219.72	88.000	177.14	8	2	1218.44	88.000	176.68
3	2	1219.58	88.000	177.08	9	2	1218.20	88.000	176.59
4	2	1219.39	88.000	177.02	10	2	1218.03	88.000	176.54
5	2	1219.21	88.000	176.96	11	2	1217.95	88.000	176.51
6	2	1219.00	88.000	176.88					

SANDIA ABLATION PROGRAM (VERSION TWO)

ORBIT 4 OF 5 D W LARSON, 9513

- - - - - 200,0000 SECONDS - - - - -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
77	2	1	0,0043	8075,20	18369,73	0,0053	0,93795	0,00915	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0,18543	0,00000	0,000919	0,000000	0,031776	0,000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0,00)	PYROLYSIS (0,98)
0,0043331/0,0001253	0,0043331/0,0001228	0,0043331/0,0001228

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	5,485+001	0,000+000	5,963+001	4,298+001	3,833+001
TOTAL	1,730+003	0,000+000	1,430+003	1,981+003	2,328+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	1,502-001	3,818+001	3,640-005
TOTAL	0,000+000	0,000+000	4,652+000	2,323+003	1,103-003

NODE	MAT.	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	3435,02	88,000	1206,17	7	2	3238,13	88,000	1106,64
2	2	3408,33	88,000	1192,59	8	2	3189,90	88,000	1082,28
3	2	3382,34	88,000	1179,47	9	2	3149,73	88,000	1062,00
4	2	3349,63	88,000	1162,95	10	2	3123,23	88,000	1048,61
5	2	3318,91	88,000	1147,43	11	2	3111,09	88,000	1042,48
6	2	3283,00	88,000	1129,30					

SANDIA ABLATION PROGRAM (VERSION TWO)

ORBIT 4 OF 5 D W LARSON, 9513

300.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
105	2	1	0.0199	8892.47	18361.47	0.0045	0.93421	0.00631	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.18544	0.00000	0.000777	0.000000	0.145881	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0198929/0.0001059	0.0198929/0.0001106	0.0198929/0.0001106

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	4.264+001	0.000+000	9.464+001	3.894+001	-1.285+001
TOTAL	8.732+003	0.000+000	1.242+004	6.841+003	3.214+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-3.687-002	-1.281+001	5.419-005
TOTAL	0.000+000	0.000+000	1.037+001	3.205+003	6.341-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	3837.61	88.000	1413.50	7	2	3898.63	88.000	1444.93
2	2	3846.27	88.000	1417.97	8	2	3912.40	88.000	1452.02
3	2	3854.62	88.000	1422.27	9	2	3923.31	88.000	1457.64
4	2	3864.93	88.000	1427.58	10	2	3929.96	88.000	1461.07
5	2	3874.44	88.000	1432.47	11	2	3931.96	88.000	1462.09
6	2	3885.35	88.000	1438.09					

400.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
136	2	1	0.0234	13286.10	18203.05	0.0000	0.93570	0.00001	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.17043	0.00000	0.000006	0.000000	0.171765	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0234225/0.0000008	0.0234225/0.0000008	0.0234225/0.0000008

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	1.736-001	0.000+000	1.357+001	4.450-001	-1.279+001
TOTAL	9.778+003	0.000+000	1.668+004	8.282+003	1.482+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-3.348-004	-1.279+001	2.578-005
TOTAL	0.000+000	0.000+000	8.703+000	1.474+003	1.036-002

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	2400.81	88.000	690.64	7	2	2468.55	88.000	723.35
2	2	2410.12	88.000	695.02	8	2	2484.59	88.000	731.21
3	2	2419.16	88.000	699.26	9	2	2497.45	88.000	737.51
4	2	2430.48	88.000	704.70	10	2	2505.26	88.000	741.34
5	2	2441.06	88.000	709.88	11	2	2507.34	88.000	742.35
6	2	2453.35	88.000	715.90					

490,4762 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
155	2	1	0,0234	13123,76	17940,92	0,0000	0,93115	0,00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0,17038	0,00000	0,000000	0,000000	0,171874	0,000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0,98)
0,0234373/0,0000000	0,0234373/0,0000000	0,0234373/0,0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	3,533-003	0,000+000	4,662+000	9,224-003	-4,646+000
TOTAL	9,781+003	0,000+000	1,737+004	8,289+003	8,067+002

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	-2,706-006	-4,646+000	1,327-005
TOTAL	0,000+000	0,000+000	8,699+000	7,990+002	1,202-002

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1848,15	88,000	430,89	7	2	1873,59	88,000	442,85
2	2	1851,47	88,000	432,54	8	2	1879,56	88,000	445,66
3	2	1855,08	88,000	434,15	9	2	1884,34	88,000	447,90
4	2	1859,33	88,000	436,15	10	2	1887,24	88,000	449,26
5	2	1863,31	88,000	438,01	11	2	1888,01	88,000	449,62
6	2	1867,91	88,000	440,18					

ORBIT 4 OF 5 D W LARSON, 9513

OPTIONAL OUTPUT OF THERMOCOUPLE TEMPERATURES AND/OR ISOTHERM DEPTHS
DEPTHS MEASURED FROM ORIGINAL SURFACE
TEMPERATURES IN DEGREES RANKINE

EACH OUTPUT BLOCK SHOWS THE TIME IN SECONDS, THE CURRENT SURFACE TEMPERATURE,
THE TEMPERATURES OF 1 THERMOCOUPLES, AND THE DEPTHS IN INCHES OF -0 ISOTHERMS

THE FIRST BLOCK SHOWS A SAMPLE TIME AND SURFACE TEMPERATURE, THE SPECIFIED
DEPTHS OF THE THERMOCOUPLES (IF ANY) AND THE ISOTHERM TEMPERATURES. THE
ARRANGEMENT OF THIS BLOCK CORRESPONDS TO THE ARRANGEMENT OF THE OUTPUT DATA.

490.4762	1848.1539	0.3500

OUTPUT DATA

0.0000	1245.0000	1245.0000
100.0000	1219.8612	1217.9514
200.0000	3435.0241	3111.0881
300.0000	3837.6070	3931.9599
400.0000	2400.8110	2507.3350
490.4762	1848.1539	1888.0063

THECALCULATIONTIMEIS 18.0430SECONDS

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6
SNAP 27 GLFC MULTIPLE ORBIT REENTRY STUDY
THIS RUN IS FIVE ORBIT CASE FROM HRS017 TE=5500 K
        ORBIT 5 OF 5        D W LARSON, 9513

             ---REACTION KINETIC EQUATION---

   DRHO/DTIME = GAMMA ( BA*EXP(-EA/T)RHOOA((RHOA-RHORA)/RHOOA)**PSIA )
              + GAMMA ( BB*EXP(-EB/T)RHOOB((RHOB-RHORB)/RHOOB)**PSIB )
            +(1-GAMMA)( BC*EXP(-EC/T)RHOOC((RHOC-RHORC)/RHOOC)**PSIC )
     RESIN VOLUME FRACTION, GAMMA = *****(MASS FRACTION = 0.000)

             ---TIME INCREMENT INFORMATION---

  INITIAL TIME (SEC)  0.000                         FINAL TIME (SEC) 525.00

  OUTPUT INTERVAL =****** SEC FROM INITIAL TIME UNTIL500.000 SEC
  OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL500.000 SEC
  OUTPUT INTERVAL =****** SEC FROM500.000 SEC UNTIL FINAL TIME

  MAXIMUM TIME STEP =5.00 SECONDS

                ---NODAL DATA---

THE TITLE OF THIS FILE IS       0.35000  -0.00000   0.00000   0.00000
     NODE  MATL  TEMPERATURE  RELATIVE  THICKNESS  NODAL DEPTH  CONT.RESISTANCE
      NO.   NO. (DEG.RANKINE)   AREA     (INCHES)    (INCHES)   (SOFT-S-DEG/BTU)
   *PLANAR SURFACE
        MINIMUM THICKNESS OF LAST ABLATOR NODE (INCHES) 0.0100
        THERE ARE 10 NODELETS ASSIGNED TO EACH ABLATING NODE
```

---TIME DEPENDENT BOUNDARY CONDITIONS---

THE TITLE OF THIS FILE IS 000000000000000000000000

TIME (SEC)	RECOVERY ENTHALPY (BTU/LB)	RADIATION HEAT RATE (BTU/SQ FT-SEC)	HEAT COEFF (LB/SQ FT-SEC)	PRESSURE (ATMS)
0.00	15645.82	0.00	0.0000	0.00000
26.68	15695.52	0.00	0.0000	0.00000
53.26	15740.15	0.00	0.0000	0.00002
79.76	15779.66	0.00	0.0001	0.00006
106.19	15814.01	0.00	0.0006	0.00023
132.55	15843.13	0.00	0.0017	0.00082
158.86	15867.01	0.00	0.0029	0.00246
185.13	15885.62	0.00	0.0044	0.00572
211.36	15898.92	0.00	0.0060	0.01036
237.56	15906.91	0.00	0.0071	0.01467
262.50	15909.58	0.00	0.0075	0.01647
287.44	15906.91	0.00	0.0071	0.01467
313.64	15898.92	0.00	0.0060	0.01036
339.87	15885.62	0.00	0.0044	0.00572
366.14	15867.01	0.00	0.0029	0.00246
392.45	15843.13	0.00	0.0017	0.00082
418.81	15814.01	0.00	0.0006	0.00023
445.24	15779.66	0.00	0.0001	0.00006
471.74	15740.15	0.00	0.0000	0.00002
498.32	15695.52	0.00	0.0000	0.00000
525.00	15645.82	0.00	0.0000	0.00000

CH/CHO = PHI/(EXP(PHI)-1.) WHERE PHI = 2.*BRP*M DOT/CHO. BRP IS 0.4 FOR STAGNATION AND TURBULENT FLOW, AND 0.5 FOR LAMINAR FLOW.

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----OUTPUT----

- - - - - - - - - - - - - - - 0,0000 SECONDS -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
1	0	1	0,0000	0,00	15645,82	0,0000	0,00000	0,00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0,00000	0,00000	0,000000	0,000000	0,000000	0,000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0,00)	PYROLYSIS (0,98)
0,0000000/0,0000000	0,0000000/0,0000000	0,0000000/0,0000000

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	0,000+000	0,000+000	0,000+000	0,000+000	0,000+000
TOTAL	0,000+000	0,000+000	0,000+000	0,000+000	0,000+000

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	0,000+000	0,000+000	0,000+000
TOTAL	0,000+000	0,000+000	0,000+000	0,000+000	0,000+000

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	1	1245,00	88,000	186,11	7	1	1245,00	88,000	186,11
2	1	1245,00	88,000	186,11	8	1	1245,00	88,000	186,11
3	1	1245,00	88,000	186,11	9	1	1245,00	88,000	186,11
4	1	1245,00	88,000	186,11	10	1	1245,00	88,000	186,11
5	1	1245,00	88,000	186,11	11	1	1245,00	88,000	186,11
6	1	1245,00	88,000	186,11					

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100.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
29	2	1	0.0001	12480.59	15805.96	0.0004	0.95179	0.00017	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.16877	0.00000	0.000069	0.000000	0.000957	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0001305/0.0000095	0.0001305/0.0000078	0.0001305/0.0000078

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	1.470+000	0.000+000	1.389+000	5.384+000	5.515+000
TOTAL	3.189+001	0.000+000	9.497+001	1.279+002	9.563+001

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	8.099-004	5.514+000	1.203-006
TOTAL	0.000+000	0.000+000	7.741-003	9.562+001	2.809-006

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	1380.81	88.000	234.32	7	2	1349.69	88.000	223.28
2	2	1376.42	88.000	232.76	8	2	1342.50	88.000	220.72
3	2	1372.18	88.000	231.26	9	2	1336.62	88.000	218.63
4	2	1366.94	88.000	229.40	10	2	1332.75	88.000	217.26
5	2	1362.10	88.000	227.68	11	2	1330.83	88.000	216.58
6	2	1356.52	88.000	225.70					

200,0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
70	2	1	0,0056	8295,53	15893,16	0,0050	0,93818	0,00801	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0,18543	0,00000	0,000856	0,000000	0,040916	0,000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0,00)	PYROLYSIS (0,98)
0,0055794/0,0001168	0,0055794/0,0001139	0,0055794/0,0001139

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	3,772+001	0,000+000	5,433+001	4,102+001	2,457+001
TOTAL	1,547+003	0,000+000	1,834+003	2,577+003	2,327+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0,000+000	0,000+000	8,940-002	2,448+001	3,726-005
TOTAL	0,000+000	0,000+000	4,243+000	2,323+003	1,678-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	3358,53	88,000	1167,44	7	2	3232,43	88,000	1103,76
2	2	3341,39	88,000	1158,79	8	2	3201,68	88,000	1088,23
3	2	3324,70	88,000	1150,36	9	2	3176,14	88,000	1075,34
4	2	3303,74	88,000	1139,77	10	2	3159,37	88,000	1066,87
5	2	3284,06	88,000	1129,83	11	2	3151,90	88,000	1063,10
6	2	3261,09	88,000	1118,24					

- - - - - - - - - - - - - - - - - 300.0000 SECONDS -

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
93	2	1	0.0206	7733.29	15903.08	0.0061	0.93488	0.01242	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.18548	0.00000	0.001055	0.000000	0.151274	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0206283/0.0001439	0.0206283/0.0001486	0.0206283/0.0001486

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	4.998+001	0.000+000	1.006+002	4.683+001	-3.455+000
TOTAL	6.917+003	0.000+000	1.116+004	7.397+003	3.210+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-8.691-003	-3.442+000	5.368-005
TOTAL	0.000+000	0.000+000	8.778+000	3.202+003	6.605-003

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	3894.39	88.000	1442.75	7	2	3910.13	88.000	1450.85
2	2	3896.70	88.000	1443.94	8	2	3913.49	88.000	1452.58
3	2	3898.91	88.000	1445.07	9	2	3916.09	88.000	1453.92
4	2	3901.60	88.000	1446.46	10	2	3917.65	88.000	1454.72
5	2	3904.05	88.000	1447.72	11	2	3918.10	88.000	1454.96
6	2	3906.82	88.000	1449.15					

400.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
115	2	1	0.0293	12332.53	15834.79	0.0013	0.93303	0.00057	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.17409	0.00000	0.000204	0.000000	0.215171	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0293416/0.0000279	0.0293416/0.0000316	0.0293416/0.0000316

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	4.420+000	0.000+000	3.360+001	1.481+001	-1.343+001
TOTAL	9.245+003	0.000+000	1.773+004	1.058+004	2.179+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-1.201-002	-1.342+001	3.791-005
TOTAL	0.000+000	0.000+000	6.686+000	2.173+003	1.131-002

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	2988.82	88.000	980.74	7	2	3056.20	88.000	1014.76
2	2	2998.25	88.000	985.50	8	2	3071.64	88.000	1022.56
3	2	3007.37	88.000	990.10	9	2	3083.75	88.000	1028.68
4	2	3018.70	88.000	995.83	10	2	3090.84	88.000	1032.26
5	2	3029.22	88.000	1001.14	11	2	3092.31	88.000	1033.00
6	2	3041.35	88.000	1007.27					

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500.0000 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
137	2	1	0.0300	13186.42	15692.39	0.0000	0.92321	0.00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.17042	0.00000	0.000002	0.000000	0.220143	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0300195/0.0000002	0.0300195/0.0000003	0.0300195/0.0000003

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	2.538-002	0.000+000	7.077+000	1.275-001	-6.829+000
TOTAL	9.323+003	0.000+000	1.928+004	1.089+004	1.063+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-6.047-005	-6.829+000	1.782-005
TOTAL	0.000+000	0.000+000	6.421+000	1.058+003	1.394-002

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	2047.34	88.000	524.51	7	2	2084.02	88.000	541.75
2	2	2052.43	88.000	526.90	8	2	2092.54	88.000	545.76
3	2	2057.36	88.000	529.22	9	2	2099.25	88.000	548.91
4	2	2063.51	88.000	532.11	10	2	2103.18	88.000	550.75
5	2	2069.24	88.000	534.80	11	2	2103.96	88.000	551.12
6	2	2075.87	88.000	537.92					

524.9998 SECONDS

TIME STEP	SURF ITER	PROB OPTN	SURFACE RAD (IN)	H WALL (BTU/LB)	H EDGE (BTU/LB)	HEAT COEFF (LB/SQ FT-SEC)	CH/CHO	PRESSURE (ATM)	SURFACE
137	2	1	0.0300	13186.42	15692.39	0.0000	0.92321	0.00000	C*

---ABLATION RATES---

B PRIME	B PRIME G	M DOT CHAR (LB/SQ FT-SEC)	M DOT GAS (LB/SQ FT-SEC)	M CHAR (LB/ORIG SQ FT)	M GAS (LB/ORIG SQ FT)
0.15733	0.00000	0.000002	0.000000	0.220143	0.000000

---RECESSIONS/RECESSION RATES---
(IN) / (IN/SEC)

SURFACE	CHAR (0.00)	PYROLYSIS (0.98)
0.0300195/0.0000002	0.0300195/0.0000003	0.0300195/0.0000003

---SURFACE ENERGY FLUX TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	CONVECTED IN	RADIATED IN	RADIATED OUT	CHEMICAL GENERATION	CONDUCTION AWAY
RATE	2.538-002	0.000+000	7.077+000	1.275-001	-6.829+000
TOTAL	9.323+003	0.000+000	1.928+004	1.089+004	1.063+003

---INTERIOR ENERGY TERMS---
CURRENT RATES (BTU/SQ FT SURFACE-SEC)
AND INTEGRATED VALUES (BTU/ORIG SQ FT)

	PYROL GAS PICK UP	DECOMP ABSORPTION	CONVECTION WITH SOLIDS	STORAGE IN SOLID	LOSS AT REAR FACE
RATE	0.000+000	0.000+000	-6.047-005	-6.829+000	1.782-005
TOTAL	0.000+000	0.000+000	6.421+000	1.058+003	1.394-002

NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)	NODE	MAT	TEMP (DEG R)	DENSITY (LB/CUFT)	ENTHALPY (BTU/LB)
1	2	2047.34	88.000	524.51	7	2	2084.02	88.000	541.75
2	2	2052.43	88.000	526.90	8	2	2092.54	88.000	545.76
3	2	2057.36	88.000	529.22	9	2	2099.25	88.000	548.91
4	2	2063.51	88.000	532.11	10	2	2103.18	88.000	550.75
5	2	2069.24	88.000	534.80	11	2	2103.96	88.000	551.12
6	2	2075.87	88.000	537.92					

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OPTIONAL OUTPUT OF THERMOCOUPLE TEMPERATURES AND/OR ISOTHERM DEPTHS
DEPTHS MEASURED FROM ORIGINAL SURFACE
TEMPERATURES IN DEGREES RANKINE

EACH OUTPUT BLOCK SHOWS THE TIME IN SECONDS, THE CURRENT SURFACE TEMPERATURE, THE TEMPERATURES OF 1 THERMOCOUPLES, AND THE DEPTHS IN INCHES OF -0 ISOTHERMS

THE FIRST BLOCK SHOWS A SAMPLE TIME AND SURFACE TEMPERATURE, THE SPECIFIED DEPTHS OF THE THERMOCOUPLES (IF ANY) AND THE ISOTHERM TEMPERATURES. THE ARRANGEMENT OF THIS BLOCK CORRESPONDS TO THE ARRANGEMENT OF THE OUTPUT DATA.

524.9998	2047.3437	0.3500

OUTPUT DATA

0.0000	1245.0000	1245.0000
100.0000	1380.8117	1330.8325
200.0000	3358.5343	3151.9014
300.0000	3894.3940	3918.1000
400.0000	2988.8197	3092.3077
500.0000	2047.3437	2103.9601
524.9998	2047.3437	2103.9601

THECALCULATIONTIMEIS 16.3680SECONDS

APPENDIX C

Sample CINDA Computer Runs

1. CINDA Input for Two-Dimensional GLFC Thermal Model
2. CINDA Printout for Orbit One of Five Orbit Reentry

1. CINDA Input for Two-Dimensional GLFC Thermal Model

Blank Page

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BCD 3THERMAL LPCS
BCD 9THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5  MOR
END
BCD 3NODE DATA
      1,785.,0.          $ SECTION 1
      2,789.,0.
      3,793.,0.
      4,797.,0.
      5,1108.,0.
      6,1109.,0.
      7,1110.,0.
      8,1111.,0.
      9,1112.,0.
      10,1113.,0.
      11,1114.,0.
      12,1386.,0.
      13,1387.,0.
      14,1582.,0.
      15,1744.,0.
      16,1744.,0.
      17,785.,0.
      18,789.,0.
      19,793.,0.
      20,797.,0.
      21,1108.,0.
      22,1109.,0.
      23,1110.,0.
      24,1111.,0.
      25,1112.,0.
      26,1113.,0.
      27,1114.,0.
      28,1386.,0.
      29,1387.,0.
      30,1582.,0.
      31,1744.,0.
      32,1744.,0.
      33,785.,0.
      34,789.,0.
      35,793.,0.
      36,797.,0.
      37,1108.,0.
      38,1109.,0.
      39,1110.,0.
      40,1111.,0.
      41,1112.,0.
      42,1113.,0.
      43,1114.,0.
      44,1386.,0.
      45,1387.,0.
      46,1582.,0.
      47,1744.,0.
      48,1744.,0.
      49,785.,0.          $ SECTION 4
      50,789.,0.
      51,793.,0.
      52,797.,0.
```

```
53,1108.,0.
54,1109.,0.
55,1110.,0.
56,1111.,0.
57,1112.,0.
58,1113.,0.
59,1114.,0.
60,1386.,0.
61,1387.,0.
62,1582.,0.
63,1744.,0.
64,1744.,0.
65,785.,0.          $ SECTION 5
66,789.,0.
67,793.,0.
68,797.,0.
69,1108.,0.
70,1109.,0.
71,1110.,0.
72,1111.,0.
73,1112.,0.
74,1113.,0.
75,1114.,0.
76,1386.,0.
77,1387.,0.
78,1582.,0.
79,1744.,0.
80,1744.,0.
81,785.,0.          $ SECTION 6
82,789.,0.
83,793.,0.
84,797.,0.
85,1108.,0.
86,1109.,0.
87,1110.,0.
88,1111.,0.
89,1112.,0.
90,1113.,0.
91,1114.,0.
92,1386.,0.
93,1387.,0.
94,1582.,0.
95,1744.,0.
96,1744.,0.
97,785.,0.          $ SECTION 7
98,789.,0.
99,793.,0.
100,797.,0.
101,1108.,0.
102,1109.,0.
103,1110.,0.
104,1111.,0.
105,1112.,0.
106,1113.,0.
107,1114.,0.
108,1386.,0.
109,1387.,0.
110,1582.,0.
111,1744.,0.
112,1744.,0.
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-113,-60.,0.        S SPACE BOUNDARY NODE
END
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RELATIVE NODE NUMBERS	ACTUAL NODE NUMBERS									
1 THRU 10	1	2	3	4	5	6	7	8	9	10
11 THRU 20	11	12	13	14	15	16	17	18	19	20
21 THRU 30	21	22	23	24	25	26	27	28	29	30
31 THRU 40	31	32	33	34	35	36	37	38	39	40
41 THRU 50	41	42	43	44	45	46	47	48	49	50
51 THRU 60	51	52	53	54	55	56	57	58	59	60
61 THRU 70	61	62	63	64	65	66	67	68	69	70
71 THRU 80	71	72	73	74	75	76	77	78	79	80
81 THRU 90	81	82	83	84	85	86	87	88	89	90
91 THRU 100	91	92	93	94	95	96	97	98	99	100
101 THRU 110	101	102	103	104	105	106	107	108	109	110
111 THRU 113	111	112	113							

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BCD 3CONDUCTOR DATA
REM GRAPHITE CONDUCTORS
    1,1,2,0.,            2,2,3,0.,            3,3,4,0.



    4,1,17,0.,           5,2,18,0.,           6,3,19,0.
    7,4,20,0.,           8,17,18,0.,          9,18,19,0.
    10,19,20,0.,         11,17,33,0.,         12,18,34,0.
    13,19,35,0.,         14,20,36,0.,         15,97,98,0.
    16,98,99,0.,         17,99,100,0.,        18,81,97,0.
    19,82,98,0.,         20,83,99,0.,         21,84,100,0.
    22,33,34,0.,         23,34,35,0.,         24,35,36,0.
    25,33,49,0.,         26,34,50,0.,         27,35,51,0.
    28,36,52,0.,         29,49,50,0.,         30,50,51,0.
    31,51,52,0.,         32,49,65,0.,         33,50,66,0.
    34,51,67,0.,         35,52,68,0.,         36,65,66,0.
    37,66,67,0.,         38,67,68,0.,         39,65,81,0.
    40,66,82,0.,         41,67,83,0.,         42,66,84,0.
    43,81,82,0.,         44,82,83,0.,         45,83,84,0.
REM BERYLLIUM CONDUCTORS
    46,5,6,0.,           47,6,7,0.,           48,7,8,0.
    49,8,9,0.,           50,9,10,0.,          51,10,11,0.
    52,5,21,0.,          53,6,22,0.,          54,7,23,0.
    55,8,24,0.,          56,9,25,0.,          57,10,26,0.
    58,11,27,0.,         59,101,102,0.,       60,102,103,0.
    61,103,104,0.,       62,104,105,0.,       63,105,106,0.
    64,106,107,0.,       65,85,101,0.,        66,86,102,0.
    67,87,103,0.,        68,88,104,0.,        69,89,105,0.
    70,90,106,0.,        71,91,107,0.,        72,21,22,0.
    73,22,23,0.,         74,23,24,0.,         75,24,25,0.
    76,25,26,0.,         77,26,27,0.,         78,21,37,0.
    79,22,38,0.,         80,23,39,0.,         81,24,40,0.
    82,25,41,0.,         83,26,42,0.,         84,27,43,0.
    85,37,38,0.,         86,38,39,0.,         87,39,40,0.
    88,40,41,0.,         89,41,42,0.,         90,42,43,0.
    91,37,53,0.,         92,38,54,0.,         93,39,55,0.
    94,40,56,0.,         95,41,57,0.,         96,42,58,0.
    97,43,59,0.,         98,53,54,0.,         99,54,55,0.
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    100,55,56,0.,        101,56,57,0.,        102,57,58,0.
    103,58,59,0.,        104,53,69,0.,        105,54,70,0.
    106,55,71,0.,        107,56,72,0.,        108,57,73,0.
    109,58,74,0.,        110,59,75,0.,        111,69,70,0.
    112,70,71,0.,        113,71,72,0.,        114,72,73,0.
    115,73,74,0.,        116,74,75,0.,        117,69,85,0.
    118,70,86,0.,        119,71,87,0.,        120,72,88,0.
    121,73,89,0.,        122,74,90,0.,        123,75,91,0.
    124,85,86,0.,        125,86,87,0.,        126,87,88,0.
    127,88,89,0.,        128,89,90,0.,        129,90,91,0.
REM HAYNES 25 CONDUCTORS
    130,12,13,0.,        131,12,28,0.,        132,13,29,0.
    133,28,29,0.,        134,28,44,0.,        135,29,45,0.
    136,16,32,0.,        137,32,48,0.,        138,108,109,0.
    139,92,108,0.,       140,93,109,0.,       141,44,45,0.
    142,44,60,0.,        143,45,61,0.,        144,96,112,0.
    145,48,64,0.,        146,60,61,0.,        147,60,76,0.
    148,61,77,0.,        149,64,80,0.,        150,76,77,0.
    151,76,92,0.,        152,77,93,0.,        153,80,96,0.
    154,92,93,0.
REM FUEL CONDUCTORS
    155,13,14,0.,        156,14,15,0.
    157,15,16,0.,        158,14,30,0.,        159,15,31,0.
    160,29,30,0.,        161,30,31,0.,        162,31,32,0.
    163,30,46,0.,        164,31,47,0.,        165,109,110,0.
    166,110,111,0.,      167,111,112,0.,      168,94,110,0.
    169,95,111,0.,       170,45,46,0.,        171,46,47,0.
    172,47,48,0.,        173,46,62,0.,        174,47,63,0.
    175,61,62,0.,        176,62,63,0.,        177,63,64,0.
    178,62,78,0.,        179,63,79,0.,        180,77,78,0.
    181,78,79,0.,        182,79,80,0.,        183,78,94,0.

    184,79,95,0.,        185,93,94,0.,        186,94,95,0.
    187,95,96,0.
    -188,1,113,97,113,2.767E-15$
    -189,17,113,33,113,49,113,65,113,81,113,5.535E-15$
REM RADIATION CONDUCTORS FOR OUTER ANNULUS
    -190,4,20,8.45E-17,           -191,4,36,1.57E-16$
    -192,4,52,2.13E-16$
    -193,4,68,1.24E-16,           -194,4,5,4.27E-16$
    -195,4,21,4.90E-16,           -196,4,37,4.19E-17$
    -197,20,36,1.87E-16,          -198,20,52,3.66E-16$
    -199,20,68,4.22E-16,          -200,20,84,2.36E-16$
    -201,20,5,4.83E-16,           -202,20,21,1.42E-15$
    -203,20,37,7.00E-16,          -204,20,53,3.96E-17$
    -205,36,52,1.87E-16,          -206,36,68,3.36E-16$
    -207,36,84,4.22E-16,          -208,36,100,2.36E-16$
    -209,36,5,4.91E-17,           -210,36,21,7.00E-16$
    -211,36,37,1.42E-15,          -212,36,53,7.00E-16$
    -213,36,69,3.96E-17,          -214,52,68,1.87E-16$
    -215,52,84,3.36E-16,          -216,52,100,2.13E-16$
    -217,52,21,3.96E-17,          -218,52,37,7.00E-16$
    -219,52,53,1.42E-15,          -220,52,69,7.00E-16$
    -221,52,85,3.96E-17,          -222,68,84,1.87E-16$
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   -223,68,100,1.57E-16,       -224,68,37,3.96E-17$
   -225,68,53,7.00E-16,        -226,68,69,1.42E-15$
   -227,68,85,7.00E-16,        -228,68,101,4.91E-17$
   -229,84,100,8.45E-17,       -230,84,53,3.96E-17$
   -231,84,69,7.00E-16,        -232,84,85,1.42E-15$
   -233,84,101,4.83E-16,       -234,100,69,4.19E-17$
   -235,100,85,4.90E-16,       -236,100,101,4.27E-16$
REM RADIATION CONDUCTORS FOR INNER ANNULUS
   -237,11,27,3.27E-17,        -238,11,43,4.43E-17$
   -239,11,12,4.23E-16,        -240,11,28,2.07E-16$
   -241,27,43,6.66E-17,        -242,27,59,1.11E-16$
   -243,27,12,2.13E-16,        -244,27,28,1.27E-15$
   -245,27,44,2.27E-16,        -246,43,59,6.66E-17$
   -247,43,75,1.11E-16,        -248,43,28,2.27E-16$
   -249,43,44,1.27E-15,        -250,43,60,2.27E-16$
   -251,59,75,6.66E-17,        -252,59,91,1.11E-16$
   -253,59,44,2.27E-16,        -254,59,60,1.27E-15$
   -255,59,76,2.27E-16,        -256,75,91,6.66E-17$
   -257,75,107,4.43E-17,       -258,75,60,2.27E-16$
   -259,75,76,1.27E-15,        -260,75,92,2.27E-16$
   -261,91,107,3.27E-17,       -262,91,76,2.27E-16$
   -263,91,92,1.27E-15,        -264,91,108,2.13E-16$
   -265,107,92,2.07E-16,       -266,107,108,4.23E-16$
REM RADIATION CONDUTORS FOR EDGE SYMMETRY
   -267,4,5,3.57E-16,          -268,4,21,3.00E-17$
   -269,20,5,3.50E-17,         -270,20,21,3.96E-17$
   -271,4,37,2.00E-17,         -272,100,101,3.57E-16$
   -273,100,85,3.00E-17,       -274,84,101,3.50E-17$
   -275,100,69,2.00E-17$
   -276,11,12,1.96E-16,        -277,107,108,1.96E-16
END
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RELATIVE CONDUCTOR NUMBERS — ACTUAL CONDUCTOR NUMBERS

1	THRU	10	1	2	3	4	5	6	7	8	9	10
11	THRU	20	11	12	13	14	15	16	17	18	19	20
21	THRU	30	21	22	23	24	25	26	27	28	29	30
31	THRU	40	31	32	33	34	35	36	37	38	39	40
41	THRU	50	41	42	43	44	45	46	47	48	49	50
51	THRU	60	51	52	53	54	55	56	57	58	59	60
61	THRU	70	61	62	63	64	65	66	67	68	69	70
71	THRU	80	71	72	73	74	75	76	77	78	79	80
81	THRU	90	81	82	83	84	85	86	87	88	89	90
91	THRU	100	91	92	93	94	95	96	97	98	99	100
101	THRU	110	101	102	103	104	105	106	107	108	109	110
111	THRU	120	111	112	113	114	115	116	117	118	119	120
121	THRU	130	121	122	123	124	125	126	127	128	129	130
131	THRU	140	131	132	133	134	135	136	137	138	139	140
141	THRU	150	141	142	143	144	145	146	147	148	149	150
151	THRU	160	151	152	153	154	155	156	157	158	159	160
161	THRU	170	161	162	163	164	165	166	167	168	169	170
171	THRU	180	171	172	173	174	175	176	177	178	179	180
181	THRU	190	181	182	183	184	185	186	187	188	189	190
191	THRU	200	191	192	193	194	195	196	197	198	199	200
201	THRU	210	201	202	203	204	205	206	207	208	209	210
211	THRU	220	211	212	213	214	215	216	217	218	219	220
221	THRU	230	221	222	223	224	225	226	227	228	229	230
231	THRU	240	231	232	233	234	235	236	237	238	239	240
241	THRU	250	241	242	243	244	245	246	247	248	249	250
251	THRU	260	251	252	253	254	255	256	257	258	259	260

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 261  THRU   270          261     262     263     264     265     266     267     268     269     270
 271  THRU   277          271     272     273     274     275     276     277
BCD 3CONSTANTS DATA
    TIMEND,3600.,OUTPUT,5.0,DTIMEI,1.0,DRLXCA,1.0,NLOOP,500
    ARLXCA,5.0,DTIMEH,10.
REM NODE WEIGHTS LBS
    1,0.00265,      2,0.00647,      3,0.00626,      4,0.00244
    5,0.00106,      6,0.00343,      7,0.00323,      8,0.00307
    9,0.00289,      10,0.00272,     11,0.00132,     12,0.0021
    13,0.0062,      14,0.0125,      15,0.0125,      16,0.0012
    17,0.0053,      18,0.0129,      19,0.0125,      20,0.0048
    21,0.0021,      22,0.00686,     23,0.00646,     24,0.00614
    25,0.00578,     26,0.00544,     27,0.00264,     28,0.0042
    29,0.0124,      30,0.025,       31,0.025,       32,0.0024
REM CONDUCTOR CONSTANTS
    33,11.76,       34,8.01,        35,11.13,       36,0.03
    37,0.082,       38,0.065,       39,0.035,       40,23.52
    41,16.02,       42,22.26,       43,0.024,       44,0.062
    45,0.064,       46,0.026,       47,8.08,        48,5.04
    49,4.78,        50,4.51,        51,4.25,        52,5.93
    53,0.037,       54,0.129,       55,0.136,       56,0.143
    57,0.152,       58,0.162,       59,0.059,       60,16.16
    61,10.06,       62,9.56,        63,9.02,        64,8.50
    65,11.86,       66,0.028,       67,0.097,       68,0.102
    69,0.107,       70,0.114,       71,0.122,       72,0.044
    73,7.98,        74,0.041,       75,0.127,       76,15.96
    77,0.031,       78,0.095,       79,0.074,       80,0.056
    81,1.48,        82,0.889,       83,6.24,        84,0.520
    85,0.872,       86,2.96,        87,1.778,       88,12.48
    89,0.39,        90,0.654
REM ADDITIONAL CONSTANTS
    91,2.01E-5 $THERMAL CONDUCTIVITY CONVERSION
    92,4,           93,7,           94,2 $INTEGERS FOR INCREMENTING
    95,50,          96,0,           97,0.5,         98,3
    99,6,           100,7,          101,11,         102,46
REM MULTIPLIERS TO CONVECTIVE HEATED NODES -NOT 0.0
    110,1.247,      111,1.039,      112,0.485,      113,0.152
    114,0.035,      115,0.024,      116,0.036
REM LOCATIONS FOR HEATING
    141,0.0,        142,0.0,        143,0.0,        144,0.0
    145,0.0,        146,0.0,        147,0.0,        148,0.0
    149,130.0,      150,0.0,        151,0.0,        152,0.0
    153,0.0,        154,0.0,        155,0.0,        156,0.0
    157,0.0
    161,0.0,        162,0.0,        163,0.0,        164,0.0
    165,0.0,        166,0.0,        167,0.0
REM RADIANT MULTIPLIERS   NOT 0.0 EXCEPT ORB DECAY  171-177
    171,0.293,      172,0.117,      173,0.013,      174,0.0
    175,0.0,        176,0.0,        177,0.0
    181,0.0,        182,0.0,        183,0.0,        184,0.0
    185,0.0,        186,0.0,        187,0.0
REM AREA OF SURFACE NODES (SQ FT)
    188,0.0072,     189,0.0144
REM LOCATION FOR TOTAL AEROHEATING RATES
    191,0.0,        192,0.0,        193,0.0,        194,0.0
    195,0.0,        196,0.0,        197,0.0
    198,1,          199,499
REM CONSTANT FOR SCALING CMA HEAT BACK TO 1 FT RAD SPHERE
    200,2.5126
END
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BCD 3ARRAY DATA
REM GRAPHITE SPECIFIC HEAT AS A FUNCTION OF TEMPERATURE BTU/LB-F
    1
    -460.,0.22,70.,0.22,1000.,0.39,4000.,0.53,8000,0.53,END
REM GRAPHITE THERMAL CONDUCTIVITY AS A FUNCTION OF TEMPERATURE
REM BTU/HR-FT-F
    2
    0.0,4.5,165.,4.85,565.,5.22,965.,5.5,1365.,5.76,1965.,6.04
    2365.,6.15,2965.,6.3,4165.,6.66,5665.,6.92,END
REM BERYLLIUM SPECIFIC HEAT VERSUS TEMPERATURE  BTU/LB-F
    3
    150.,0.2,200.,0.55,1000.,0.7,2600.,0.9,5000.,0.9,END
REM BERYLLIUM THERMAL CONDUCTIVITY VERSUS TEMPERATURE BTU/HR-FT-F
    4
    0.,110.,800.,70.,1600.,43.,2400.,30.,5000.,30.,END
REM HAYNES 25 SPECIFIC HEAT VERSUS TEMPERATURE BTU/LB-F
    5
    500.,0.08,1000.,0.09,1500.,0.105,2000.,0.115,2425.,0.12,END
REM HAYNES 25 THERMAL CONDUCTIVITY VS. TEMPERATURE  BTU/HR-FT-F
    6
    500.,8.1,1000.,11.5,1500.,14.6,2100.,19.5,3000.,27.7,END
REM FUEL SPECIFIC HEAT AS A FUNCTION OF TEMPERATURE BTU/LB-F
    7
    -460.,0.0633,8000.,0.0633,END
REM FUEL THERMAL CONDUCTIVITY VS TEMPERATURE  BTU/HR-FT-F
    8
    -460.,0.46,1000.,0.46,1200.,0.57,1400.,0.58, 1600.,0.68
    1700.,0.75,8000.,0.75,END
REM INTERNAL GENERATION OF NODES  14,15,110,111
    9
    0.0,0.00215,10000.0,0.00215,END
REM INTERNAL GENERATION OF NODES 30,31,46,47,62,63,78,79,94,95
    10
    0.0,0.0043,10000.0,0.0043,END
REM ADDITIONAL ARRAYS
REM NODAL WEIGHT ARRAY
    11
    0.00265,0.00647,0.00626,0.00244,0.00106,0.00343,0.00323
    0.00307,0.00289,0.00272,0.00132,0.00210,0.00620,0.0125
    0.0125,0.0012,0.0053,0.0129,0.0125,0.0048,0.0021
    0.00686,0.00646,0.00614,0.00578,0.00544,0.00264,0.0042
    0.0124,0.025,0.0024,END
REM LINEAR ARRAY TO PUT TEMP IN AN ADDRESSABLE ARRAY
    12
    0.0,0.0,10000.,10000.,END
REM SPACE FOR AVERAGE TEMPERATURE ARRAYS
    13
    SPACE,50,END
    14
    SPACE,50,END
    15
    SPACE,50,END
    16
    SPACE,50,END
REM CONDUCTOR CONSTANTS ARRAYS  (17AND 24)
    17
    11.76,8.01,11.13,0.03,0.082,0.085,0.035,23.52
    16.02,22.26,0.024,0.062,0.064,0.026,8.08,5.04
    4.78,4.51,4.25,5.93,0.037,0.129,0.136,0.143
    0.152,0.162,0.059,16.16,10.08,9.56,9.02,8.50
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        11.86,0.028,0.097,0.102,0.107,0.114,0.122,0.044
        7.98,0.041,0.127,15.96,0.031,0.095,0.074,0.056,END
        24
        1.48,0.889,6.24,0.52,0.872,2.96,1.778,12.48,0.39,0.654,END
        18
        SPACE,12,END
        19
        SPACE,12,END
        20
        SPACE,50,END
        21
        SPACE,50,END
        22
        SPACE,46,END
        23
        SPACE,46,END
    REM TTA CONVECTIVE COLD WALL INPUT  BTU/SQ-FT-SEC
        40
        0.,0.00,22.,0.004,43.,0.009,64.,0.023,85.,0.063,106.,0.32
        127.,3.17,147.,30.3,167.,105.,187.,179.,202.,213.,217.,179.
        227.,105.,258.,30.3,278.,3.17,299.,0.32,320.,0.063
        341.,0.023,362.,0.009,383.,0.004,405.,0.0,3600.,0.0,END
    REM STAGNATION ENTHALPY + LOCAL VS TIME BTU/LB
        41
        0.,25358.,43.,25640.,106.,25947.,202.,26147.,299.,25947.
        362.,25640.,405.,25358.,END
    REM WALL ENTHALPY VS TEMPERATURE  BTU/LB
        42
        -460.,0.0,0.0,100.,1000.,360.,2000.,650.,4000.,1320.
        5000.,1800.,7000.,3510.,END
    REM A LABEL ARRAY
        -43,HWCOR1,HWC017,HWC033,HWC049,HWC065,HWC081,HWC097
        Q1,Q17,Q33,Q49,Q65,Q81,Q97,LOOPCT,END
    REM RADIANT HEAT VS TIME BTU/SQ FT-SEC
        45
        0.0,0.0,10.0,0.0,20.0,0.0,30.0,0.0,40.0,0.0,50.0,0.0,
        60.0,0.0,70.0,0.0,80.0,0.0,90.0,0.0,100.0,0.0,END
    REM ARRAY FOR DTIMEI
        46
        0.0,1.0,10.,1.0,10.1,5.0,120.,5.0,120.1,0.5,280.,0.5
        280.1,5.0,400.,5.0,401.,30.,END
    REM ARRAY FOR OUTPUT
        47
        0.,30.,150.,30.,150.1,5.0,200.,5.0,200.1,2.0
        210.,2.0,210.1,5.0,270.,5.0,270.1,30.,450.,30.,450.,300.,END
        48
        0.0,30.0,6000.0,30.0,END
    END
    BCD 3EXECUTION
   DIMENSION X(1000)                                           F
   NDIM = 1000                                                 F
   NTH = 0                                                     F
        SCLDEP(A2,K91)      $CONVERT UNITS ON THERMAL CONDUCTIVITY
        SCLDEP(A4,K91)
        SCLDEP(A6,K91)
        SCLDEP(A8,K91)
    REM SCALE CMA HEAT IN A40 TO 1 FT RADIUS SPHERE
        CNFRBK
    END
    BCD 3VARIABLES 1
```

```
          D1DEGI(TIMEN,A46,DTIMEI)
          D1DEGI(TIMEN,A47,OUTPUT)
      REM THE FOLLOWING APPLIES INTERNAL GENERATION TO THE FUEL
          D1DEGI(TIMEN,A9,Q14)
          D1DEGI(TIMEN,A9,Q15)
          D1DEGI(TIMEN,A9,Q110)
          D1DEGI(TIMEN,A9,Q111)
          D1DEGI(TIMEN,A10,Q30)
          D1DEGI(TIMEN,A10,Q31)
          D1DEGI(TIMEN,A10,Q46)
          D1DEGI(TIMEN,A10,Q47)
          D1DEGI(TIMEN,A10,Q62)
          D1DEGI(TIMEN,A10,Q63)
          D1DEGI(TIMEN,A10,Q78)
          D1DEGI(TIMEN,A10,Q79)
          D1DEGI(TIMEN,A10,Q94)
          D1DEGI(TIMEN,A10,Q95)
      REM THE FOLLOWING EVALUATES THERMAL CAPACITANCE
          D1D1MI(K92,T1,A1,A11+1,C1)
          D1D1MI(K93,T5,A3,A11+5,C5)
          D1D1MI(K94,T12,A5,A11+12,C12)
          D1D1MI(K94,T14,A7,A11+14,C14)
          D1D1WM(T16,A5,K16,C16)
          D1D1MI(K92,T17,A1,A11+17,C17)
          D1D1MI(K93,T21,A3,A11+21,C21)
          D1D1MI(K94,T28,A5,A11+28,C28)
          D1D1MI(K94,T30,A7,A11+30,C30)
          D1D1WM(T32,A5,K32,C32)
          D1D1MI(K92,T33,A1,A11+17,C33)
          D1D1MI(K93,T37,A3,A11+21,C37)
          D1D1MI(K94,T44,A5,A11+28,C44)
          D1D1MI(K94,T46,A7,A11+30,C46)
          D1D1WM(T48,A5,K32,C48)
          D1D1MI(K92,T49,A1,A11+17,C49)
          D1D1MI(K93,T53,A3,A11+21,C53)
          D1D1MI(K94,T60,A5,A11+28,C60)
          D1D1MI(K94,T62,A7,A11+30,C62)
          D1D1WM(T64,A5,K32,C64)
          D1D1MI(K92,T65,A1,A11+17,C65)
          D1D1MI(K93,T69,A3,A11+21,C69)
          D1D1MI(K94,T76,A5,A11+28,C76)
          D1D1MI(K94,T78,A7,A11+30,C78)
          D1D1WM(T80,A5,K32,C80)
          D1D1MI(K92,T81,A1,A11+17,C81)
          D1D1MI(K93,T85,A3,A11+21,C85)
          D1D1MI(K94,T92,A5,A11+28,C92)
          D1D1MI(K94,T94,A7,A11+30,C94)
          D1D1WM(T96,A5,K32,C96)
          D1D1MI(K92,T97,A1,A11+1,C97)
          D1D1MI(K93,T101,A3,A11+5,C101)
          D1D1MI(K94,T108,A5,A11+12,C108)
          D1D1MI(K94,T110,A7,A11+14,C110)
          D1D1WM(T112,A5,K16,C112)
      REM THE FOLLOWING 88 CARDS EVALUATE THE LINEAR CONDUCTORS AND
      REM CAN BE DIRECTLY REPLACED BY 107 D1M1WM CARDS
          D1DGII(K95,T1,A12,A13+1)
          D1DGII(K95,T2,A12,A14+1)
          D1DGII(K95,T51,A12,A15+1)
          D1DGII(K95,T52,A12,A16+1)
          D1DGII(K101,T101,A12,A18+1)
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    D1DG1I(K101,T102,A12,A19+1)
    D1DG1I(K95,T1,A12,A20+1)
    D1DG1I(K95, T17,A12,A21+1)
    D1DG1I(K102,T51,A12,A22+1)
    D1DG1I(K102,T67,A12,A23+1)
    ADDARY(K95,A13+1,A14+1,A13+1)
    ADDARY(K95,A15+1,A16+1,A15+1)
    ADDARY(K101,A18+1,A19+1,A18+1)
    ADDARY(K95,A20+1,A21+1,A20+1)
    ADDARY(K102,A22+1,A23+1,A22+1)
    ARYMPY(K95,A13+1,K97,A13+1)    $ AVG TEMP OF RADIALLY ADJACENT
    ARYMPY(K95,A15+1,K97,A15+1)    $ NODES
    ARYMPY(K101,A18+1,K97,A18+1)   $
    ARYMPY(K95,A20+1,K97,A20+1)    $AVG TEMP OF CIRCUMFERENTIAL
    ARYMPY(K102,A22+1,K97,A22+1)   $ADJACENT NODES
REM EVALUATE GRAPHITE CONDUCTORS
    D1D1MI(K98,A13+1,A2,A17+1,G1)
    D1D1MI(K92,A20+1,A2,A17+4,G4)
    D1D1MI(K98,A15+47,A2,A17+1,G15)
    D1D1MI(K92,A22+31,A2,A17+4,G18)
    D1D1MI(K98,A13+17,A2,A17+8,G8)
    D1D1MI(K92,A20+17,A2,A17+11,G11)
    D1D1MI(K98,A13+33,A2,A17+8,G22)
    D1D1MI(K92,A20+33,A2,A17+11,G25)
    D1D1MI(K98,A13+49,A2,A17+8,G29)
    D1D1MI(K92,A20+49,A2,A17+11,G32)
    D1D1MI(K98,A15+15,A2,A17+8,G36)
    D1D1MI(K92,A22+15,A2,A17+11,G39)
    D1D1MI(K98,A15+31,A2,A17+8,G43)
REM EVALUATE BERYLLIUM CONDUCTORS
    D1D1MI(K99,A13+5,A4,A17+15,G46)
    D1D1MI(K100,A20+5,A4,A17+21,G52)
    D1D1MI(K99,A18+1,A4,A17+15,G59)
    D1D1MI(K100,A22+35,A4,A17+21,G65)
    D1D1MI(K99,A13+21,A4,A17+28,G72)
    D1D1MI(K100,A20+21,A4,A17+34,G78)
    D1D1MI(K99,A13+37,A4,A17+28,G85)
    D1D1MI(K100,A20+37,A4,A17+34,G91)
    D1D1MI(K99,A15+3, A4,A17+28,G98)
    D1D1MI(K100,A22+3, A4,A17+34,G104)
    D1D1MI(K99,A15+19,A4,A17+28,G111)
    D1D1MI(K100,A22+19,A4,A17+34,G117)
    D1D1MI(K99,A15+35,A4,A17+28,G124)
REM EVALUATE HAYNES 25 CONDUCTORS
    D1M1WM(T12,T13,A6,K73,G130)
    D1M1WM(T12,T28,A6,K74,G131)
    D1M1WM(T13,T29,A6,K75,G132)
    D1M1WM(T28,T29,A6,K76,G133)
    D1M1WM(T28,T44,A6,K77,G134)
    D1M1WM(T29,T45,A6,K78,G135)
    D1M1WM(T16,T32,A6,K79,G136)
    D1M1WM(T32,T48,A6,K80,G137)
    D1M1WM(T108,T109,A6,K73,G138)
    D1M1WM(T92,T108,A6,K74,G139)
    D1M1WM(T93,T109,A6,K75,G140)
    D1M1WM(T44,T45,A6,K76,G141)
    D1M1WM(T44,T60,A6,K77,G142)
    D1M1WM(T45,T61,A6,K78,G143)
    D1M1WM(T96,T112,A6,K79,G144)
    D1M1WM(T48,T64,A6,K80,G145)
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          DIMIWM(T60,T61,A6,K76,G146)
          DIMIWM(T60,T76,A6,K77,G147)
          DIMIWM(T61,T77,A6,K78,G148)
          DIMIWM(T64,T80,A6,K79,G149)
          DIMIWM(T76,T77,A6,K76,G150)
          DIMIWM(T76,T92,A6,K77,G151)
          DIMIWM(T77,T93,A6,K78,G152)
          DIMIWM(T80,T96,A6,K80,G153)
          DIMIWM(T92,T93,A6,K76,G154)
     REM  EVALUATE FUEL CONDUCTORS
          DIDIMI(K98,A13+13,A8,A24+1,G155)
          DIDIMI(K94,A20+14,A8,A24+4,G158)
          DIDIMI(K98,A13+29,A8,A24+6,G160)
          DIDIMI(K94,A20+30,A8,A24+9,G163)
          DIDIMI(K98,A18+9,A8,A24+1,G165)
          DIDIMI(K94,A22+44,A8,A24+4,G168)
          DIDIMI(K98,A13+45,A8,A24+6,G170)
          DIDIMI(K94,A20+46,A8,A24+9,G173)
          DIDIMI(K98,A15+11,A8,A24+6,G175)
          DIDIMI(K94,A22+12,A8,A24+9,G178)
          DIDIMI(K98,A15+27,A8,A24+6,G180)
          DIDIMI(K94,A22+28,A8,A24+9,G183)
          DIDIMI(K98,A15+43,A8,A24+6,G185)
     REM  THE FOLLOWING 58 CARDS APPLIES ALL AEROHEATING
          DIDIWM(TIMEN,A40,K110,K141) $CONVECTIVE COLD WALL TO NODE 1
          DIDIWM(TIMEN,A40,K111,K142) $CONVECTIVE COLD WALL TO NODE 17
          DIDIWM(TIMEN,A40,K112,K143) $CONVECTIVE COLD WALL TO NODE 33
          DIDIWM(TIMEN,A40,K113,K144) $CONVECTIVE COLD WALL TO NODE 49
          DIDIWM(TIMEN,A40,K114,K145) $CONVECTIVE COLD WALL TO NODE 65
          DIDIWM(TIMEN,A40,K115,K146) $CONVECTIVE COLD WALL TO NODE 81
          DIDIWM(TIMEN,A40,K116,K147) $CONVECTIVE COLD WALL TO NODE 97
          DIDEGI(TIMEN,A41,K148)      $FIND STAGNATION ENTHALPY +LOCAL
          DIDEGI(T1,A42,K151)         $FIND NODE 1 WALL ENTHALPY
          DIDEGI(T17,A42,K152)        $FIND NODE 17 WALL ENTHALPY
          DIDEGI(T33,A42,K153)        $FIND NODE 33 WALL ENTHALPY
          DIDEGI(T49,A42,K154)        $FIND NODE 49 WALL ENTHALPY
          DIDEGI(T65,A42,K155)        $FIND NODE 65 WALL ENTHALPY
          DIDEGI(T81,A42,K156)        $FIND NODE 81 WALL ENTHALPY
          DIDEGI(T97,A42,K157)        $FIND NODE 97 WALL ENTHALPY
          SUB(K148,K151,K151)
          SUB(K148,K152,K152)
          SUB(K148,K153,K153)
          SUB(K148,K154,K154)
          SUB(K148,K155,K155)
          SUB(K148,K156,K156)
          SUB(K148,K157,K157)
          SUB(K148,K149,K150)  $K149 CONTAINS ENTHALPY AT 540 R
          DIVIDE(K151,K150,K151)      $NODE 1 HOT WALL CORRECTION
          DIVIDE(K152,K150,K152)      $NODE 17 HOT WALL CORRECTION
          DIVIDE(K153,K150,K153)      $NODE 33 HOT WALL CORRECTION
          DIVIDE(K154,K150,K154)      $NODE 49 HOT WALL CORRECTION
          DIVIDE(K155,K150,K155)      $NODE 65 HOT WALL CORRECTION
          DIVIDE(K156,K150,K156)      $NODE 81 HOT WALL CORRECTION
          DIVIDE(K157,K150,K157)      $NODE 97 HOT WALL CORRECTION
          MLTPLY(K141,K151,K161)      $HOT WALL HEATING TO NODE 1
          MLTPLY(K142,K152,K162)      $HOT WALL HEATING TO NODE 17
          MLTPLY(K143,K153,K163)      $HOT WALL HEATING TO NODE 33
          MLTPLY(K144,K154,K164)      $HOT WALL HEATING TO NODE 49
          MLTPLY(K145,K155,K165)      $HOT WALL HEATING TO NODE 65
          MLTPLY(K146,K156,K166)      $HOT WALL HEATING TO NODE 81
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      MLTPLY(K147,K157,K167)       $HOT WALL HEATING TO NODE 97
      DIDIWM(TIMEN,A45,K171,K181) $RADIANT HEAT TO NODE 1
      DIDIWM(TIMEN,A45,K172,K182) $RADIANT HEAT TO NODE 17
      DIDIWM(TIMEN,A45,K173,K183) $RADIANT HEAT TO NODE 33
      DIDIWM(TIMEN,A45,K174,K184) $RADIANT HEAT TO NODE 49
      DIDIWM(TIMEN,A45,K175,K185) $RADIANT HEAT TO NODE 65
      DIDIWM(TIMEN,A45,K176,K186) $RADIANT HEAT TO NODE 81
      DIDIWM(TIMEN,A45,K177,K187) $RADIANT HEAT TO NODE 97
      ADD(K161,K181,K191) $TOTAL AEROHEATING RATE PER NODE
      ADD(K162,K182,K192) $BTU/SQ-FT-SEC
      ADD(K163,K183,K193)
      ADD(K164,K184,K194)
      ADD(K165,K185,K195)
      ADD(K166,K186,K196)
      ADD(K167,K187,K197)
      MLTPLY(K191,K188,Q1)  $APPLY TOTAL AEROHEATING RATE TO
      MLTPLY(K192,K189,Q17) $ THE APPROPRIATE NODAL AREA
      MLTPLY(K193,K189,Q33)
      MLTPLY(K194,K189,Q49)
      MLTPLY(K195,K189,Q65)
      MLTPLY(K196,K189,Q81)
      MLTPLY(K197,K188,Q97)
END
BCD 3VARIABLES 2
END
BCD 3OUTPUT CALLS
      PRNTMP
      PRINTL(A43,K151,K152,K153,K154,K155,K156,K157
      Q1,Q17,Q33,Q49,Q65,Q81,Q97,LOOPCT)
END
```

2. CINDA printout for Orbit One of Five Orbit Reentry

TIME is the time in seconds.

Nodal numbers are the two columns of numbers on the left of the page.

Nodal temperatures, in degrees Fahrenheit, are the columns of numbers immediately following the nodal numbers.

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THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

TIME 0.00000 DTIMEU 0.00000 CSGMIN(0) 0.00000 DTMPCC(0) 0.00000 ARLXCC(0) 0.00000

1	THRU	5	7.850000+02	7.890000+02	7.930000+02	7.970000+02	1.108000+03
6	THRU	10	1.109000+03	1.110000+03	1.111000+03	1.112000+03	1.113000+03
11	THRU	15	1.114000+03	1.386000+03	1.387000+03	1.582000+03	1.744000+03
16	THRU	20	1.744000+03	7.850000+02	7.890000+02	7.930000+02	7.970000+02
21	THRU	25	1.108000+03	1.109000+03	1.110000+03	1.111000+03	1.112000+03
26	THRU	30	1.113000+03	1.114000+03	1.386000+03	1.387000+03	1.582000+03
31	THRU	35	1.744000+03	1.744000+03	7.850000+02	7.890000+02	7.930000+02
36	THRU	40	7.970000+02	1.108000+03	1.109000+03	1.110000+03	1.111000+03
41	THRU	45	1.112000+03	1.113000+03	1.114000+03	1.386000+03	1.387000+03
46	THRU	50	1.582000+03	1.744000+03	1.744000+03	7.850000+02	7.890000+02
51	THRU	55	7.930000+02	7.970000+02	1.108000+03	1.109000+03	1.110000+03
56	THRU	60	1.111000+03	1.112000+03	1.113000+03	1.114000+03	1.386000+03
61	THRU	65	1.387000+03	1.582000+03	1.744000+03	1.744000+03	7.850000+02
66	THRU	70	7.890000+02	7.930000+02	7.970000+02	1.108000+03	1.109000+03
71	THRU	75	1.110000+03	1.111000+03	1.112000+03	1.113000+03	1.114000+03
76	THRU	80	1.386000+03	1.387000+03	1.582000+03	1.744000+03	1.744000+03
81	THRU	85	7.850000+02	7.890000+02	7.930000+02	7.970000+02	1.108000+03
86	THRU	90	1.109000+03	1.110000+03	1.111000+03	1.112000+03	1.113000+03
91	THRU	95	1.114000+03	1.386000+03	1.387000+03	1.582000+03	1.744000+03
96	THRU	100	1.744000+03	7.850000+02	7.890000+02	7.930000+02	7.970000+02
101	THRU	105	1.108000+03	1.109000+03	1.110000+03	1.111000+03	1.112000+03
106	THRU	110	1.113000+03	1.114000+03	1.386000+03	1.387000+03	1.582000+03
111	THRU	113	1.744000+03	1.744000+03	-6.000000+01		

HWC001	9.93099-01	HWC017	9.93099-01	HWC033	9.93099-01	HWC049	9.93099-01	HWC065	9.93099-01	HWC081	9.93099-01
HWC097	9.93099-01	Q1	0.00000	Q17	0.00000	Q33	0.00000	Q49	0.00000	Q65	0.00000
Q81	0.00000	Q97	0.00000	LOOPCT	1.00000+00						

TIME 3.00000+01 DTIMEU 4.50000+00 CSGMIN(85) 1.53940-01 DTMPCC(5) 3.04054+00 ARLXCC(6) 5.35110-01

1	THRU	5	7.779986+02	7.828472+02	7.893409+02	7.935504+02	1.104994+03
6	THRU	10	1.105887+03	1.107303+03	1.108587+03	1.109730+03	1.110727+03
11	THRU	15	1.111388+03	1.369878+03	1.371788+03	1.593126+03	1.749705+03
16	THRU	20	1.749963+03	7.779083+02	7.827592+02	7.892387+02	7.934441+02
21	THRU	25	1.107857+03	1.108295+03	1.109063+03	1.109872+03	1.110739+03
26	THRU	30	1.111595+03	1.112206+03	1.368794+03	1.370735+03	1.593515+03
31	THRU	35	1.752576+03	1.752098+03	7.786556+02	7.835689+02	7.902545+02
36	THRU	40	7.946927+02	1.107612+03	1.108088+03	1.108780+03	1.109648+03
41	THRU	45	1.110535+03	1.111471+03	1.112080+03	1.367897+03	1.369869+03
46	THRU	50	1.593537+03	1.753657+03	1.753244+03	7.784519+02	7.833685+02
51	THRU	55	7.900396+02	7.953164+02	1.107254+03	1.107724+03	1.108621+03
56	THRU	60	1.109482+03	1.110331+03	1.111251+03	1.111863+03	1.367737+03
61	THRU	65	1.369704+03	1.593544+03	1.753898+03	1.753502+03	7.786074+02

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

66	THRU	70	7.835332+02	7.902284+02	7.946692+02	1.107397+03	1.107864+03
71	THRU	75	1.108732+03	1.109573+03	1.110435+03	1.111341+03	1.111951+03
76	THRU	80	1.367860+03	1.369832+03	1.593520+03	1.753644+03	1.753231+03
81	THRU	85	7.776346+02	7.825038+02	7.869668+02	7.931340+02	1.107967+03
86	THRU	90	1.108361+03	1.109106+03	1.109922+03	1.110791+03	1.111673+03
91	THRU	95	1.112293+03	1.368643+03	1.370606+03	1.593445+03	1.752513+03
96	THRU	100	1.752039+03	7.778667+02	7.827489+02	7.892682+02	7.935048+02
101	THRU	105	1.107988+03	1.108395+03	1.109111+03	1.109913+03	1.110774+03
106	THRU	110	1.111606+03	1.112215+03	1.370075+03	1.371971+03	1.593144+03
111	THRU	113	1.749623+03	1.749884+03	-6.000000+01		

HWC081	9.93217-01	HWC017	9.93218-01	HWC033	9.93211-01	HWC049	9.93213-01	HWC065	9.93212-01	HWC081	9.93220-01
HWC097	9.93218-01	Q1	7.73059-01	Q17	1.54600+00	Q33	1.54681+00	Q49	1.54653+00	Q65	1.54671+00
Q81	1.54560+00	Q97	7.72932-01	LOOPCT	8.00000+00						

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TIME 6.00000+01 DTIMEU 5.00000+00 CSGMIN(21) 1.53640-01 DTMPCC(21) 1.01268+00 ARLXCC(39) 2.20779-01

1	THRU	5	7.737376+02	7.784360+02	7.848160+02	7.890308+02	1.105448+03
6	THRU	10	1.106136+03	1.106970+03	1.107663+03	1.108505+03	1.109305+03
11	THRU	15	1.109985+03	1.365735+03	1.367642+03	1.595358+03	1.754959+03
16	THRU	20	1.755163+03	7.735375+02	7.782522+02	7.846323+02	7.888310+02
21	THRU	25	1.106046+03	1.105713+03	1.106874+03	1.107592+03	1.108380+03
26	THRU	30	1.109245+03	1.109852+03	1.364314+03	1.366271+03	1.595712+03
31	THRU	35	1.756875+03	1.756636+03	7.749043+02	7.797291+02	7.863481+02
36	THRU	40	7.907750+02	1.105345+03	1.106110+03	1.106663+03	1.107526+03
41	THRU	45	1.108451+03	1.109280+03	1.109936+03	1.363415+03	1.365378+03
46	THRU	50	1.595704+03	1.757710+03	1.757528+03	7.745687+02	7.794202+02
51	THRU	55	7.860484+02	7.913224+02	1.105835+03	1.106332+03	1.107203+03
56	THRU	60	1.108026+03	1.108828+03	1.109705+03	1.110298+03	1.363266+03
61	THRU	65	1.365232+03	1.595715+03	1.757910+03	1.757739+03	7.747244+02
66	THRU	70	7.795943+02	7.862564+02	7.907006+02	1.106032+03	1.106911+03
71	THRU	75	1.107351+03	1.108182+03	1.109027+03	1.109896+03	1.110509+03
76	THRU	80	1.363510+03	1.365478+03	1.595704+03	1.757702+03	1.757510+03
81	THRU	85	7.727881+02	7.775910+02	7.840201+02	7.882010+02	1.106549+03
86	THRU	90	1.107037+03	1.107886+03	1.108697+03	1.109563+03	1.110435+03
91	THRU	95	1.111024+03	1.364939+03	1.366838+03	1.595724+03	1.756859+03
96	THRU	100	1.756618+03	7.732231+02	7.780403+02	7.845230+02	7.887729+02
101	THRU	105	1.106587+03	1.107085+03	1.107882+03	1.108686+03	1.109489+03
106	THRU	110	1.110309+03	1.110897+03	1.366047+03	1.367935+03	1.595444+03
111	THRU	113	1.754965+03	1.755166+03	-6.000000+01		

HWC081	9.93305-01	HWC017	9.93307-01	HWC033	9.93294-01	HWC049	9.93297-01	HWC065	9.93295-01	HWC081	9.93314-01
HWC097	9.93310-01	Q1	6.93495-01	Q17	1.38671+00	Q33	1.38803+00	Q49	1.38757+00	Q65	1.38771+00
Q81	1.38562+00	Q97	6.93047-01	LOOPCT	6.00000+00						

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TIME 9.00000+01 DTIMEU 5.00000+00 CSGMIN(21) 1.53522-01 DTMPCC(21) 8.81363-01 ARLXCC(90) 7.07443-01

1	THRU	5	7.717157+02	7.756563+02	7.815787+02	7.857152+02	1.104532+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

6	THRU	10	1.104959+03	1.105456+03	1.106330+03	1.107241+03	1.108079+03
11	THRU	15	1.108731+03	1.364904+03	1.366803+03	1.596420+03	1.757866+03
16	THRU	20	1.757978+03	7.711228+02	7.751995+02	7.811922+02	7.853269+02
21	THRU	25	1.104944+03	1.104754+03	1.105802+03	1.106368+03	1.106908+03
26	THRU	30	1.107718+03	1.108360+03	1.363756+03	1.365767+03	1.596505+03
31	THRU	35	1.758963+03	1.758731+03	7.721406+02	7.766505+02	7.830688+02
36	THRU	40	7.874608+02	1.103807+03	1.104476+03	1.105064+03	1.106202+03
41	THRU	45	1.107013+03	1.107814+03	1.108439+03	1.362753+03	1.364582+03
46	THRU	50	1.596227+03	1.759223+03	1.759139+03	7.711900+02	7.759183+02
51	THRU	55	7.824592+02	7.877134+02	1.104231+03	1.104861+03	1.105597+03
56	THRU	60	1.106538+03	1.107317+03	1.108184+03	1.108774+03	1.362683+03
61	THRU	65	1.364688+03	1.596362+03	1.759342+03	1.759272+03	7.711402+02
66	THRU	70	7.759548+02	7.825700+02	7.870112+02	1.104506+03	1.105244+03
71	THRU	75	1.105831+03	1.106743+03	1.107570+03	1.108443+03	1.109064+03
76	THRU	80	1.363045+03	1.364978+03	1.596445+03	1.759257+03	1.759185+03
81	THRU	85	7.683801+02	7.731283+02	7.795151+02	7.837011+02	1.105446+03
86	THRU	90	1.105783+03	1.106535+03	1.107139+03	1.108104+03	1.108345+03
91	THRU	95	1.108975+03	1.363842+03	1.365913+03	1.596540+03	1.758894+03
96	THRU	100	1.758773+03	7.689774+02	7.737329+02	7.801716+02	7.844248+02
101	THRU	105	1.105239+03	1.105742+03	1.106597+03	1.107425+03	1.108149+03
106	THRU	110	1.108939+03	1.109518+03	1.365131+03	1.367035+03	1.596572+03
111	THRU	113	1.757950+03	1.758044+03	-6.000000+01		

HWCOR1	9.93374-01	HWC017	9.93378-01	HWC033	9.93364-01	HWC049	9.93371-01	HWC065	9.93370-01	HWC081	9.93397-01
HWC097	9.93391-01	Q1	6.93292-01	Q17	1.38555+00	Q33	1.38564+00	Q49	1.38397+00	Q65	1.38371+00
Q81	1.38066+00	Q97	6.90672-01	LOOPCT	5.00000+00						

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TIME 1.20000+02 DTIMEU 5.00000+00 CSGMIN(21) 1.53387-01 DTMPCC(1) 1.43697+01 ARLXCC(108) 8.32565-01

1	THRU	5	8.076224+02	7.986677+02	7.951009+02	7.972956+02	1.103393+03
6	THRU	10	1.103737+03	1.104350+03	1.105196+03	1.106035+03	1.106903+03
11	THRU	15	1.107531+03	1.364995+03	1.366918+03	1.597327+03	1.759449+03
16	THRU	20	1.759494+03	8.004580+02	7.937696+02	7.918484+02	7.943753+02
21	THRU	25	1.103639+03	1.103588+03	1.104591+03	1.105144+03	1.106030+03
26	THRU	30	1.106964+03	1.107606+03	1.363774+03	1.365810+03	1.597169+03
31	THRU	35	1.759955+03	1.759883+03	7.843583+02	7.838057+02	7.865033+02
36	THRU	40	7.901430+02	1.102622+03	1.103312+03	1.103954+03	1.104938+03
41	THRU	45	1.105756+03	1.106599+03	1.107208+03	1.362690+03	1.364573+03
46	THRU	50	1.596752+03	1.760055+03	1.760019+03	7.727396+02	7.758405+02
51	THRU	55	7.812019+02	7.861967+02	1.102228+03	1.102990+03	1.103987+03
56	THRU	60	1.104818+03	1.105677+03	1.106580+03	1.107165+03	1.362457+03
61	THRU	65	1.364494+03	1.596777+03	1.760104+03	1.760063+03	7.688923+02
66	THRU	70	7.732893+02	7.796131+02	7.840168+02	1.102883+03	1.103505+03
71	THRU	75	1.104216+03	1.104950+03	1.105812+03	1.106700+03	1.107328+03
76	THRU	80	1.362820+03	1.364794+03	1.596911+03	1.760121+03	1.760063+03
81	THRU	85	7.650884+02	7.695221+02	7.756966+02	7.798614+02	1.103085+03
86	THRU	90	1.103817+03	1.104362+03	1.105180+03	1.106398+03	1.107094+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

91	THRU	95	1.107697+03	1.363908+03	1.365940+03	1.597276+03	1.760040+03
96	THRU	100	1.759960+03	7.662107+02	7.705070+02	7.766226+02	7.808234+02
101	THRU	105	1.103185+03	1.103670+03	1.104608+03	1.105378+03	1.106098+03
106	THRU	110	1.106922+03	1.107499+03	1.360977+03	1.363407+03	1.597299+03
111	THRU	113	1.759559+03	1.759603+03	-6.000000+01		

HWCOR1	9.93181-01	HWC017	9.93228-01	HWC033	9.93324-01	HWC049	9.93401-01	HWC065	9.93425-01	HWC081	9.93461-01
HWC097	9.93451-01	Q1	7.30596-01	Q17	1.44704+00	Q33	1.41266+00	Q49	1.38986+00	Q65	1.38212+00
Q81	1.37759+00	Q97	6.89629-01	LOOPCT	6.00000+00						

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TIME 1.50000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53260-01 DTMPCC(1) 2.73739+01 ARLXCC(1) 8.52509-02

1	THRU	5	1.441527+03	1.249026+03	1.110356+03	1.083386+03	1.104935+03
6	THRU	10	1.105053+03	1.105385+03	1.105850+03	1.106441+03	1.107152+03
11	THRU	15	1.107715+03	1.365050+03	1.366962+03	1.597984+03	1.760502+03
16	THRU	20	1.760522+03	1.334362+03	1.171898+03	1.056040+03	1.034260+03
21	THRU	25	1.104322+03	1.104522+03	1.104953+03	1.105494+03	1.106145+03
26	THRU	30	1.106901+03	1.107486+03	1.363810+03	1.365750+03	1.597673+03
31	THRU	35	1.760760+03	1.760717+03	1.039471+03	9.625300+02	9.103749+02
36	THRU	40	9.026600+02	1.102752+03	1.103105+03	1.103719+03	1.104400+03
41	THRU	45	1.105152+03	1.105972+03	1.106573+03	1.362451+03	1.364405+03
46	THRU	50	1.597122+03	1.760711+03	1.760704+03	8.526990+02	8.311654+02
51	THRU	55	8.193071+02	8.206252+02	1.101722+03	1.102186+03	1.102928+03
56	THRU	60	1.103707+03	1.104526+03	1.105387+03	1.105997+03	1.362157+03
61	THRU	65	1.364112+03	1.597039+03	1.760697+03	1.760696+03	7.855124+02
66	THRU	70	7.841972+02	7.867723+02	7.909054+02	1.101426+03	1.101940+03
71	THRU	75	1.102742+03	1.103566+03	1.104416+03	1.105296+03	1.105912+03
76	THRU	80	1.362384+03	1.364340+03	1.597178+03	1.760714+03	1.760703+03
81	THRU	85	7.747503+02	7.752443+02	7.788290+02	7.827773+02	1.101936+03
86	THRU	90	1.102423+03	1.103188+03	1.103980+03	1.104805+03	1.105669+03
91	THRU	95	1.106279+03	1.363448+03	1.365391+03	1.597549+03	1.760686+03
96	THRU	100	1.760646+03	7.830774+02	7.811268+02	7.829432+02	7.864309+02
101	THRU	105	1.101922+03	1.102413+03	1.103180+03	1.103969+03	1.104786+03
106	THRU	110	1.105634+03	1.106228+03	1.364452+03	1.366366+03	1.597587+03
111	THRU	113	1.760393+03	1.760423+03	-6.000000+01		

HWCOR1	9.86487-01	HWC017	9.87641-01	HWC033	9.90809-01	HWC049	9.92638-01	HWC065	9.93284-01	HWC081	9.93389-01
HWC097	9.93308-01	Q1	1.09801+01	Q17	2.06549+01	Q33	1.70763+01	Q49	1.48206+01	Q65	1.40110+01
Q81	1.38851+01	Q97	6.99265+00	LOOPCT	4.00000+00						

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TIME 1.55000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53234-01 DTMPCC(1) 3.40022+01 ARLXCC(1) 1.25793-01

1	THRU	5	1.755628+03	1.484730+03	1.280380+03	1.237846+03	1.107351+03
6	THRU	10	1.107179+03	1.107165+03	1.107371+03	1.107781+03	1.108379+03
11	THRU	15	1.108915+03	1.365130+03	1.367037+03	1.598072+03	1.760617+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

16	THRU	20	1.760628+03	1.602931+03	1.372288+03	1.199705+03	1.164834+03
21	THRU	25	1.106229+03	1.106209+03	1.106374+03	1.106715+03	1.107226+03
26	THRU	30	1.107894+03	1.108458+03	1.363865+03	1.365802+03	1.597731+03
31	THRU	35	1.760819+03	1.760777+03	1.173480+03	1.060291+03	9.794353+02
36	THRU	40	9.655975+02	1.103764+03	1.103994+03	1.104459+03	1.105029+03
41	THRU	45	1.105701+03	1.106472+03	1.107061+03	1.362452+03	1.364404+03
46	THRU	50	1.597154+03	1.760737+03	1.760731+03	8.965351+02	8.627849+02
51	THRU	55	8.417659+02	8.412124+02	1.101934+03	1.102359+03	1.103053+03
56	THRU	60	1.103796+03	1.104589+03	1.105434+03	1.106040+03	1.362105+03
61	THRU	65	1.364059+03	1.597051+03	1.760707+03	1.760707+03	7.957639+02
66	THRU	70	7.915938+02	7.922286+02	7.963344+02	1.101296+03	1.101798+03
71	THRU	75	1.102587+03	1.103401+03	1.104245+03	1.105121+03	1.105736+03
76	THRU	80	1.362317+03	1.364274+03	1.597188+03	1.760730+03	1.760720+03
81	THRU	85	7.814258+02	7.799503+02	7.821837+02	7.860715+02	1.101721+03
86	THRU	90	1.102203+03	1.102963+03	1.103752+03	1.104575+03	1.105437+03
91	THRU	95	1.106047+03	1.363438+03	1.365383+03	1.597585+03	1.760739+03
96	THRU	100	1.760701+03	7.935240+02	7.884352+02	7.879490+02	7.910653+02
101	THRU	105	1.101703+03	1.102190+03	1.102952+03	1.103738+03	1.104553+03
106	THRU	110	1.105400+03	1.105994+03	1.364514+03	1.366430+03	1.597693+03
111	THRU	113	1.760498+03	1.760520+03	-6.000000+01		

HWCOR1	9.83052-01	HWC017	9.84708-01	HWC033	9.89351-01	HWC049	9.92213-01	HWC065	9.93187-01	HWC081	9.93326-01
HWC097	9.93209-01	Q1	1.28901+01	Q17	2.39128+01	Q33	1.86917+01	Q49	1.53469+01	Q65	1.41338+01
Q81	1.39653+01	Q97	7.05557+00	LOOPCT	4.00000+00						

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TIME 1.60000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53212-01 DTMPCC(1) 3.70672+01 ARLXCC(1) 1.59088-01

1	THRU	5	2.114986+03	1.781789+03	1.514067+03	1.453669+03	1.112026+03
6	THRU	10	1.111292+03	1.110618+03	1.110333+03	1.110402+03	1.110790+03
11	THRU	15	1.111277+03	1.365312+03	1.367211+03	1.598164+03	1.760721+03
16	THRU	20	1.760725+03	1.916094+03	1.627840+03	1.399286+03	1.349290+03
21	THRU	25	1.109915+03	1.109474+03	1.109143+03	1.109112+03	1.109363+03
26	THRU	30	1.109871+03	1.110396+03	1.364011+03	1.365941+03	1.597793+03
31	THRU	35	1.760862+03	1.760841+03	1.336140+03	1.189169+03	1.077749+03
36	THRU	40	1.056756+03	1.105761+03	1.105767+03	1.105965+03	1.106335+03
41	THRU	45	1.106867+03	1.107550+03	1.108118+03	1.362512+03	1.364460+03
46	THRU	50	1.597186+03	1.760769+03	1.760763+03	9.511956+02	9.053839+02
51	THRU	55	8.743852+02	8.718791+02	1.102496+03	1.102853+03	1.103468+03
56	THRU	60	1.104149+03	1.104900+03	1.105717+03	1.106317+03	1.362083+03
61	THRU	65	1.364036+03	1.597059+03	1.760723+03	1.760724+03	8.089117+02
66	THRU	70	8.019006+02	8.005525+02	8.049107+02	1.101281+03	1.101766+03
71	THRU	75	1.102533+03	1.103330+03	1.104163+03	1.105032+03	1.105645+03
76	THRU	80	1.362263+03	1.364220+03	1.597192+03	1.760751+03	1.760743+03
81	THRU	85	7.900270+02	7.865809+02	7.874013+02	7.913665+02	1.101553+03
86	THRU	90	1.102027+03	1.102778+03	1.103560+03	1.104379+03	1.105239+03
91	THRU	95	1.105849+03	1.363423+03	1.365369+03	1.597618+03	1.760791+03
96	THRU	100	1.760756+03	8.067177+02	7.984666+02	7.954375+02	7.981670+02

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

101	THRU	105	1.101521+03	1.102000+03	1.102754+03	1.103534+03	1.104344+03
106	THRU	110	1.105189+03	1.105783+03	1.364546+03	1.366463+03	1.597789+03
111	THRU	113	1.760594+03	1.760609+03	-6.000000+01		

HWCOR1	9.78939-01	HWC017	9.81249-01	HWC033	9.87565-01	HWC049	9.91679-01	HWC065	9.93060-01	HWC081	9.93245-01
HWC097	9.93082-01	Q1	1.50624+01	Q17	2.76839+01	Q33	2.06332+01	Q49	1.59958+01	Q65	1.42892+01
Q81	1.40673+01	Q97	7.13403+00	LOOPCT	4.00000+00						

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TIME 1.65000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53197-01 DTMPCC(1) 3.75840+01 ARLXCC(1) 1.71051-01

1	THRU	5	2.491228+03	2.115148+03	1.798299+03	1.718949+03	1.120746+03
6	THRU	10	1.119002+03	1.117135+03	1.115956+03	1.115402+03	1.115406+03
11	THRU	15	1.115803+03	1.365687+03	1.367568+03	1.598270+03	1.760816+03
16	THRU	20	1.760815+03	2.251550+03	1.921344+03	1.646113+03	1.579966+03
21	THRU	25	1.116755+03	1.115571+03	1.114354+03	1.113656+03	1.113439+03
26	THRU	30	1.113656+03	1.114112+03	1.364325+03	1.366240+03	1.597869+03
31	THRU	35	1.760948+03	1.760906+03	1.521350+03	1.344616+03	1.204795+03
36	THRU	40	1.176486+03	1.109458+03	1.109080+03	1.108819+03	1.108841+03
41	THRU	45	1.109130+03	1.109661+03	1.110191+03	1.362677+03	1.364617+03
46	THRU	50	1.597225+03	1.760805+03	1.760799+03	1.015740+03	9.584193+02
51	THRU	55	9.178823+02	9.139450+02	1.103629+03	1.103881+03	1.104366+03
56	THRU	60	1.104949+03	1.105630+03	1.106404+03	1.106992+03	1.362110+03
61	THRU	65	1.364060+03	1.597067+03	1.760742+03	1.760744+03	8.250059+02
66	THRU	70	8.152727+02	8.123172+02	8.175078+02	1.101444+03	1.101901+03
71	THRU	75	1.102635+03	1.103408+03	1.104224+03	1.105082+03	1.105692+03
76	THRU	80	1.362229+03	1.364165+03	1.597193+03	1.760773+03	1.760767+03
81	THRU	85	8.005449+02	7.951910+02	7.947898+02	7.991325+02	1.101452+03
86	THRU	90	1.101915+03	1.102654+03	1.103426+03	1.104239+03	1.105094+03
91	THRU	95	1.105703+03	1.363406+03	1.365352+03	1.597649+03	1.760841+03
96	THRU	100	1.760808+03	8.224593+02	8.111000+02	8.055763+02	8.080113+02
101	THRU	105	1.101390+03	1.101859+03	1.102601+03	1.103372+03	1.104176+03
106	THRU	110	1.105018+03	1.105611+03	1.364560+03	1.366477+03	1.597875+03
111	THRU	113	1.760681+03	1.760690+03	-6.000000+01		

HWCOR1	9.74095-01	HWC017	9.77145-01	HWC033	9.85522-01	HWC049	9.91034-01	HWC065	9.92905-01	HWC081	9.93144-01
HWC097	9.92930-01	Q1	1.73351+01	Q17	3.17140+01	Q33	2.28301+01	Q49	1.67560+01	Q65	1.44777+01
Q81	1.41908+01	Q97	7.22683+00	LOOPCT	4.00000+00						

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TIME 1.70000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53192-01 DTMPCC(1) 3.54128+01 ARLXCC(5) 2.57126-01

1	THRU	5	2.857039+03	2.460258+03	2.109157+03	2.009614+03	1.135940+03
6	THRU	10	1.132547+03	1.128713+03	1.126049+03	1.124452+03	1.123810+03
11	THRU	15	1.124054+03	1.366411+03	1.368262+03	1.598412+03	1.760908+03
16	THRU	20	1.760902+03	2.589091+03	2.232876+03	1.923539+03	1.840112+03
21	THRU	25	1.128673+03	1.126278+03	1.123609+03	1.121809+03	1.120814+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

26	THRU	30	1.120545+03	1.120884+03	1.364943+03	1.366832+03	1.597978+03
31	THRU	35	1.761018+03	1.760975+03	1.724088+03	1.522146+03	1.357480+03
36	THRU	40	1.321895+03	1.115870+03	1.114879+03	1.113881+03	1.113341+03
41	THRU	45	1.113233+03	1.113515+03	1.113985+03	1.363031+03	1.364955+03
46	THRU	50	1.597283+03	1.760846+03	1.760840+03	1.089830+03	1.021795+03
51	THRU	55	9.726772+02	9.682087+02	1.105660+03	1.105751+03	1.106039+03
56	THRU	60	1.106471+03	1.107045+03	1.107751+03	1.108321+03	1.362224+03
61	THRU	65	1.364168+03	1.597081+03	1.760764+03	1.760768+03	8.443779+02
66	THRU	70	8.321215+02	8.282079+02	8.350951+02	1.101872+03	1.102291+03
71	THRU	75	1.102778+03	1.103716+03	1.104506+03	1.105349+03	1.105955+03
76	THRU	80	1.362226+03	1.364181+03	1.597195+03	1.760796+03	1.760792+03
81	THRU	85	8.131370+02	8.059822+02	8.047005+02	8.098739+02	1.101450+03
86	THRU	90	1.101898+03	1.102618+03	1.103377+03	1.104181+03	1.105031+03
91	THRU	95	1.105638+03	1.363392+03	1.365339+03	1.597677+03	1.760888+03
96	THRU	100	1.760857+03	8.407102+02	8.263382+02	8.184683+02	8.207689+02
101	THRU	105	1.101331+03	1.101787+03	1.102513+03	1.103272+03	1.104068+03
106	THRU	110	1.104904+03	1.105496+03	1.364564+03	1.366482+03	1.597950+03
111	THRU	113	1.760761+03	1.760765+03	-6.000000+01		

HWC001	9.69355-01	HWC017	9.72786-01	HWC033	9.83278-01	HWC049	9.90221-01	HWC065	9.92717-01	HWC081	9.93023-01
HWC097	9.92752-01	Q1	1.95540+01	Q17	3.57757+01	Q33	2.52260+01	Q49	1.76232+01	Q65	1.47026+01
Q81	1.43374+01	Q97	7.33370+00	LOOPCT	4.00000+00						

TIME 1.75000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53201-01 DTMPCC(2) 3.20632+01 ARLXCC(5) 3.96469-01

1	THRU	5	3.190839+03	2.792566+03	2.420276+03	2.297553+03	1.160194+03
6	THRU	10	1.154401+03	1.147672+03	1.142804+03	1.139645+03	1.138032+03
11	THRU	15	1.138044+03	1.367741+03	1.369538+03	1.598627+03	1.761001+03
16	THRU	20	1.760991+03	2.908606+03	2.543074+03	2.209961+03	2.107180+03
21	THRU	25	1.147852+03	1.143685+03	1.138866+03	1.135420+03	1.133255+03
26	THRU	30	1.132253+03	1.132412+03	1.366086+03	1.367930+03	1.598154+03
31	THRU	35	1.761103+03	1.761053+03	1.937789+03	1.716613+03	1.530828+03
36	THRU	40	1.487727+03	1.126250+03	1.124359+03	1.122268+03	1.120891+03
41	THRU	45	1.120187+03	1.120094+03	1.120471+03	1.363709+03	1.365606+03
46	THRU	50	1.597381+03	1.760898+03	1.760889+03	1.173232+03	1.095487+03
51	THRU	55	1.039070+03	1.035169+03	1.109043+03	1.108899+03	1.108900+03
56	THRU	60	1.109111+03	1.109528+03	1.110132+03	1.110677+03	1.362484+03
61	THRU	65	1.364417+03	1.597113+03	1.760792+03	1.760795+03	8.675538+02
66	THRU	70	8.530368+02	8.490386+02	8.586772+02	1.102697+03	1.103062+03
71	THRU	75	1.103684+03	1.104372+03	1.105128+03	1.105949+03	1.106549+03
76	THRU	80	1.362276+03	1.364228+03	1.597200+03	1.760820+03	1.760818+03
81	THRU	85	8.280709+02	8.192562+02	8.175672+02	8.241531+02	1.101588+03
86	THRU	90	1.102017+03	1.102713+03	1.103454+03	1.104245+03	1.105087+03
91	THRU	95	1.105693+03	1.363392+03	1.365338+03	1.597703+03	1.760933+03
96	THRU	100	1.760902+03	8.614911+02	8.442250+02	8.342347+02	8.366326+02
101	THRU	105	1.101373+03	1.101812+03	1.102517+03	1.103260+03	1.104046+03
106	THRU	110	1.104875+03	1.105465+03	1.364569+03	1.366487+03	1.598017+03

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THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

111	THRU	113	1.760834+03	1.760834+03	-6.000000+01

HWCOR1	9.65010-01	HWC017	9.68641-01	HWC033	9.80907-01	HWC049	9.89303-01	HWC065	9.92492-01	HWC081	9.92878-01
HWC097	9.92550-01	Q1	2.15961+01	Q17	3.96412+01	Q33	2.77475+01	Q49	1.85949+01	Q65	1.49700+01
Q81	1.45101+01	Q97	7.45473+00	LOOPCT	4.00000+00						

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TIME 1.80000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53230-01 DTMPCC(2) 2.83996+01 ARLXCC(5) 5.55344-01

1	THRU	5	3.481169+03	3.093924+03	2.709118+03	2.560865+03	1.195477+03
6	THRU	10	1.186564+03	1.176036+03	1.168250+03	1.163008+03	1.160093+03
11	THRU	15	1.159792+03	1.370046+03	1.371757+03	1.598975+03	1.761104+03
16	THRU	20	1.761090+03	3.196338+03	2.834046+03	2.485543+03	2.360800+03
21	THRU	25	1.176172+03	1.169667+03	1.161987+03	1.156334+03	1.152588+03
26	THRU	30	1.150589+03	1.150503+03	1.368078+03	1.369849+03	1.598447+03
31	THRU	35	1.761215+03	1.761154+03	2.155747+03	1.921380+03	1.718725+03
36	THRU	40	1.667433+03	1.141872+03	1.138769+03	1.135195+03	1.132674+03
41	THRU	45	1.131153+03	1.130542+03	1.130790+03	1.364909+03	1.366763+03
46	THRU	50	1.597551+03	1.760971+03	1.760956+03	1.265825+03	1.179483+03
51	THRU	55	1.117137+03	1.114773+03	1.114348+03	1.113877+03	1.113479+03
56	THRU	60	1.113381+03	1.113579+03	1.114043+03	1.114549+03	1.362977+03
61	THRU	65	1.364892+03	1.597176+03	1.760830+03	1.760832+03	8.952201+02
66	THRU	70	8.767352+02	8.755982+02	8.890201+02	1.104100+03	1.104391+03
71	THRU	75	1.104924+03	1.105544+03	1.106254+03	1.107045+03	1.107636+03
76	THRU	80	1.362410+03	1.364357+03	1.597216+03	1.760847+03	1.760846+03
81	THRU	85	8.457268+02	8.354114+02	8.338605+02	8.424896+02	1.101927+03
86	THRU	90	1.102329+03	1.102993+03	1.103711+03	1.104486+03	1.105318+03
91	THRU	95	1.105921+03	1.363417+03	1.365362+03	1.597730+03	1.760974+03
96	THRU	100	1.760946+03	8.849148+02	8.648803+02	8.530508+02	8.558466+02
101	THRU	105	1.101553+03	1.101970+03	1.102649+03	1.103372+03	1.104144+03
106	THRU	110	1.104965+03	1.105553+03	1.364584+03	1.366502+03	1.598076+03
111	THRU	113	1.760901+03	1.760897+03	-6.000000+01		

HWCOR1	9.61221-01	HWC017	9.64896-01	HWC033	9.78250-01	HWC049	9.88284-01	HWC065	9.92223-01	HWC081	9.92707-01
HWC097	9.92321-01	Q1	2.33950+01	Q17	4.31541+01	Q33	3.03198+01	Q49	1.96699+01	Q65	1.52873+01
Q81	1.47132+01	Q97	7.59058+00	LOOPCT	4.00000+00						

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TIME 1.85000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53288-01 DTMPCC(18) 2.44109+01 ARLXCC(5) 7.11670-01

1	THRU	5	3.726969+03	3.354780+03	2.961809+03	2.787028+03	1.242525+03
6	THRU	10	1.229938+03	1.214907+03	1.203642+03	1.195900+03	1.191415+03
11	THRU	15	1.190730+03	1.373795+03	1.375379+03	1.599545+03	1.761231+03
16	THRU	20	1.761213+03	3.445789+03	3.094040+03	2.735150+03	2.586779+03
21	THRU	25	1.214671+03	1.205362+03	1.194227+03	1.185890+03	1.180209+03
26	THRU	30	1.176985+03	1.176593+03	1.371331+03	1.372994+03	1.598939+03
31	THRU	35	1.761380+03	1.761296+03	2.371299+03	2.128819+03	1.913459+03

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THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

36	THRU	40	1.853001+03	1.163775+03	1.159168+03	1.153739+03	1.149779+03
41	THRU	45	1.147224+03	1.145955+03	1.146036+03	1.366892+03	1.368682+03
46	THRU	50	1.597845+03	1.761084+03	1.761056+03	1.367159+03	1.273467+03
51	THRU	55	1.206464+03	1.206155+03	1.122214+03	1.121312+03	1.120383+03
56	THRU	60	1.119876+03	1.119783+03	1.120060+03	1.120516+03	1.363827+03
61	THRU	65	1.365717+03	1.597294+03	1.760887+03	1.760885+03	9.280270+02
66	THRU	70	9.098800+02	9.084466+02	9.264207+02	1.106313+03	1.106506+03
71	THRU	75	1.106920+03	1.107451+03	1.108100+03	1.108851+03	1.109430+03
76	THRU	80	1.362675+03	1.364614+03	1.597251+03	1.760881+03	1.760881+03
81	THRU	85	8.665088+02	8.548670+02	8.540029+02	8.652489+02	1.102545+03
86	THRU	90	1.102912+03	1.103536+03	1.104223+03	1.104978+03	1.105797+03
91	THRU	95	1.106396+03	1.363484+03	1.365427+03	1.597759+03	1.761015+03
96	THRU	100	1.760988+03	9.111251+02	8.884706+02	8.751414+02	8.786911+02
101	THRU	105	1.101923+03	1.102312+03	1.102958+03	1.103657+03	1.104412+03
106	THRU	110	1.105222+03	1.105807+03	1.364622+03	1.366539+03	1.598130+03
111	THRU	113	1.760963+03	1.760955+03	-6.000000+01		

HWC081	9.58011-01	HWC017	9.61644-01	HWC033	9.75472-01	HWC049	9.87167-01	HWC065	9.91903-01	HWC081	9.92506-01
HWC097	9.92064-01	Q1	2.49428+01	Q17	4.62374+01	Q33	3.28684+01	Q49	2.08433+01	Q65	1.56621+01
Q81	1.49512+01	Q97	7.74203+00	LOOPCT	4.00000+00						

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TIME 1.90000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53385-01 DTMPCC(19) 1.95876+01 ARLXCC(5) 8.45169-01

1	THRU	5	3.917310+03	3.568864+03	3.172706+03	2.972897+03	1.300782+03
6	THRU	10	1.284190+03	1.264231+03	1.249142+03	1.238640+03	1.232414+03
11	THRU	15	1.231294+03	1.379523+03	1.380932+03	1.600460+03	1.761404+03
16	THRU	20	1.761382+03	3.644016+03	3.313280+03	2.949922+03	2.778221+03
21	THRU	25	1.263339+03	1.250914+03	1.235917+03	1.224569+03	1.216706+03
26	THRU	30	1.212095+03	1.211347+03	1.376327+03	1.377840+03	1.599738+03
31	THRU	35	1.761633+03	1.761511+03	2.569172+03	2.329530+03	2.106011+03
36	THRU	40	2.035291+03	1.192547+03	1.186196+03	1.178606+03	1.172960+03
41	THRU	45	1.169188+03	1.167143+03	1.167024+03	1.369975+03	1.371675+03
46	THRU	50	1.598331+03	1.761263+03	1.761213+03	1.473456+03	1.375680+03
51	THRU	55	1.305785+03	1.307525+03	1.133251+03	1.131809+03	1.130215+03
56	THRU	60	1.129192+03	1.128733+03	1.128773+03	1.129166+03	1.365193+03
61	THRU	65	1.367044+03	1.597501+03	1.760979+03	1.760969+03	9.657223+02
66	THRU	70	9.467021+02	9.477239+02	9.706227+02	1.109611+03	1.109677+03
71	THRU	75	1.109939+03	1.110356+03	1.110926+03	1.111626+03	1.112190+03
76	THRU	80	1.363135+03	1.365061+03	1.597317+03	1.760929+03	1.760928+03
81	THRU	85	8.902900+02	8.778427+02	8.782521+02	8.925483+02	1.103542+03
86	THRU	90	1.103866+03	1.104438+03	1.105088+03	1.105818+03	1.106621+03
91	THRU	95	1.107215+03	1.363620+03	1.365559+03	1.597797+03	1.761058+03
96	THRU	100	1.761032+03	9.395280+02	9.149670+02	9.006985+02	9.053938+02
101	THRU	105	1.102548+03	1.102903+03	1.103508+03	1.104176+03	1.104911+03
106	THRU	110	1.105708+03	1.106289+03	1.364698+03	1.366614+03	1.598184+03
111	THRU	113	1.761020+03	1.761011+03	-6.000000+01		

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

HWCOR1	9.55486-01	HWC017	9.59020-01	HWC033	9.72893-01	HWC049	9.85987-01	HWC065	9.91533-01	HWC081	9.92273-01
HWC097	9.91785-01	Q1	2.61465+01	Q17	4.86935+01	Q33	3.52003+01	Q49	2.20670+01	Q65	1.60903+01
Q81	1.52218+01	Q97	7.90502+00	LOOPCT	4.00000+00						

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TIME 1.95000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53536-01 DTMPCC(35) 1.68803+01 ARLXCC(5) 9.33624-01

1	THRU	5	4.054823+03	3.728505+03	3.335510+03	3.115654+03	1.368258+03
6	THRU	10	1.347656+03	1.322729+03	1.303768+03	1.290447+03	1.282436+03
11	THRU	15	1.280853+03	1.387790+03	1.388973+03	1.601877+03	1.761653+03
16	THRU	20	1.761626+03	3.790187+03	3.481160+03	3.120636+03	2.929276+03
21	THRU	25	1.320869+03	1.305265+03	1.286302+03	1.271841+03	1.261702+03
26	THRU	30	1.255636+03	1.254503+03	1.383575+03	1.384893+03	1.600989+03
31	THRU	35	1.762025+03	1.761843+03	2.737509+03	2.508205+03	2.283994+03
36	THRU	40	2.202781+03	1.228030+03	1.219817+03	1.209902+03	1.202430+03
41	THRU	45	1.197328+03	1.194431+03	1.194088+03	1.374505+03	1.376086+03
46	THRU	50	1.599103+03	1.761546+03	1.761461+03	1.579806+03	1.481143+03
51	THRU	55	1.411210+03	1.414751+03	1.147884+03	1.145812+03	1.143439+03
56	THRU	60	1.141811+03	1.140918+03	1.140678+03	1.140994+03	1.367259+03
61	THRU	65	1.369058+03	1.597842+03	1.761126+03	1.761101+03	1.007498+03
66	THRU	70	9.884100+02	9.926671+02	1.020389+03	1.114280+03	1.114190+03
71	THRU	75	1.114265+03	1.114540+03	1.115014+03	1.115651+03	1.116197+03
76	THRU	80	1.363869+03	1.365778+03	1.597433+03	1.761001+03	1.760998+03
81	THRU	85	9.166590+02	9.039611+02	9.063472+02	9.239056+02	1.105038+03
86	THRU	90	1.105309+03	1.105819+03	1.106423+03	1.107123+03	1.107907+03
91	THRU	95	1.108495+03	1.363854+03	1.365787+03	1.597849+03	1.761107+03
96	THRU	100	1.761081+03	9.692802+02	9.436109+02	9.293945+02	9.356527+02
101	THRU	105	1.103510+03	1.103823+03	1.104380+03	1.105013+03	1.105723+03
106	THRU	110	1.106504+03	1.107080+03	1.364836+03	1.366748+03	1.598242+03
111	THRU	113	1.761075+03	1.761064+03	-6.000000+01		

HWCOR1	9.53450-01	HWC017	9.57107-01	HWC033	9.70704-01	HWC049	9.84808-01	HWC065	9.91120-01	HWC081	9.92016-01
HWC097	9.91493-01	Q1	2.70222+01	Q17	5.05127+01	Q33	3.71791+01	Q49	2.32851+01	Q65	1.65628+01
Q81	1.55202+01	Q97	8.07467+00	LOOPCT	4.00000+00						

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TIME 2.00000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53756-01 DTMPCC(35) 1.46549+01 ARLXCC(5) 9.77585-01

1	THRU	5	4.165202+03	3.851783+03	3.458303+03	3.222102+03	1.442284+03
6	THRU	10	1.417842+03	1.388176+03	1.365524+03	1.349507+03	1.339776+03
11	THRU	15	1.337726+03	1.399117+03	1.400023+03	1.603983+03	1.762022+03
16	THRU	20	1.761992+03	3.907637+03	3.612445+03	3.251845+03	3.043991+03
21	THRU	25	1.385145+03	1.366464+03	1.343662+03	1.326181+03	1.313823+03
26	THRU	30	1.306331+03	1.304803+03	1.393556+03	1.394635+03	1.602862+03
31	THRU	35	1.762621+03	1.762349+03	2.883366+03	2.664622+03	2.440601+03
36	THRU	40	2.348541+03	1.269379+03	1.259296+03	1.247035+03	1.237714+03
41	THRU	45	1.231257+03	1.227489+03	1.226911+03	1.380828+03	1.382260+03
46	THRU	50	1.600275+03	1.761986+03	1.761848+03	1.687098+03	1.588595+03
51	THRU	55	1.519123+03	1.523283+03	1.166236+03	1.163479+03	1.160252+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - COD045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

56	THRU	60	1.157958+03	1.156587+03	1.156036+03	1.156267+03	1.370224+03
61	THRU	65	1.371957+03	1.598375+03	1.761358+03	1.761311+03	1.053721+03
66	THRU	70	1.034747+03	1.042159+03	1.074081+03	1.120570+03	1.120297+03
71	THRU	75	1.120152+03	1.120262+03	1.120623+03	1.121186+03	1.121709+03
76	THRU	80	1.364973+03	1.366857+03	1.597624+03	1.761112+03	1.761105+03
81	THRU	85	9.461120+02	9.332964+02	9.378227+02	9.585161+02	1.107164+03
86	THRU	90	1.107373+03	1.107810+03	1.108361+03	1.109026+03	1.109788+03
91	THRU	95	1.110369+03	1.364227+03	1.366152+03	1.597926+03	1.761168+03
96	THRU	100	1.761142+03	1.001225+03	9.746324+02	9.608945+02	9.688992+02
101	THRU	105	1.104903+03	1.105169+03	1.105669+03	1.106260+03	1.106943+03
106	THRU	110	1.107706+03	1.108276+03	1.365062+03	1.366969+03	1.598310+03
111	THRU	113	1.761130+03	1.761119+03	-6.000000+01		

HWC001	9.51392-01	HWC017	9.55581-01	HWC033	9.68809-01	HWC049	9.83618-01	HWC065	9.90613-01	HWC081	9.91728-01
HWC097	9.91179-01	Q1	2.77416+01	Q17	5.20032+01	Q33	3.89042+01	Q49	2.45144+01	Q65	1.70854+01
Q81	1.58533+01	Q97	8.25654+00	LOOPCT	4.00000+00						

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TIME 2.02000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53866-01 DTMPCC(34) 1.37953+01 ARLXCC(5) 9.85291-01

1	THRU	5	4.204078+03	3.893785+03	3.499086+03	3.257200+03	1.473279+03
6	THRU	10	1.447338+03	1.415836+03	1.391761+03	1.374704+03	1.364308+03
11	THRU	15	1.362069+03	1.404602+03	1.405384+03	1.605065+03	1.762215+03
16	THRU	20	1.762184+03	3.948707+03	3.657209+03	3.295671+03	3.081981+03
21	THRU	25	1.412340+03	1.392455+03	1.368158+03	1.349505+03	1.336284+03
26	THRU	30	1.328233+03	1.326546+03	1.398406+03	1.399377+03	1.603829+03
31	THRU	35	1.762935+03	1.762617+03	2.935853+03	2.721082+03	2.497004+03
36	THRU	40	2.400574+03	1.287348+03	1.276522+03	1.263330+03	1.253273+03
41	THRU	45	1.246277+03	1.242160+03	1.241486+03	1.383930+03	1.385295+03
46	THRU	50	1.600884+03	1.762220+03	1.762055+03	1.729931+03	1.631737+03
51	THRU	55	1.562439+03	1.566453+03	1.174605+03	1.171561+03	1.167979+03
56	THRU	60	1.165406+03	1.163835+03	1.163155+03	1.163349+03	1.371707+03
61	THRU	65	1.373409+03	1.598657+03	1.761482+03	1.761424+03	1.073347+03
66	THRU	70	1.054454+03	1.063022+03	1.096413+03	1.123587+03	1.123233+03
71	THRU	75	1.122991+03	1.123028+03	1.123340+03	1.123871+03	1.124384+03
76	THRU	80	1.365540+03	1.367412+03	1.597729+03	1.761171+03	1.761162+03
81	THRU	85	9.587454+02	9.459072+02	9.512731+02	9.731475+02	1.108222+03
86	THRU	90	1.108403+03	1.108807+03	1.109335+03	1.109985+03	1.110737+03
91	THRU	95	1.111315+03	1.364426+03	1.366347+03	1.597966+03	1.761198+03
96	THRU	100	1.761171+03	1.014657+03	9.877342+02	9.742430+02	9.829582+02
101	THRU	105	1.105606+03	1.105850+03	1.106325+03	1.106898+03	1.107570+03
106	THRU	110	1.108325+03	1.108892+03	1.365184+03	1.367089+03	1.598343+03
111	THRU	113	1.761152+03	1.761143+03	-6.000000+01		

HWC001	9.50671-01	HWC017	9.55050-01	HWC033	9.68128-01	HWC049	9.83143-01	HWC065	9.90397-01	HWC081	9.91604-01
HWC097	9.91034-01	Q1	2.79991+01	Q17	5.25319+01	Q33	3.95281+01	Q49	2.50055+01	Q65	1.73073+01
Q81	1.59961+01	Q97	8.33296+00	LOOPCT	4.00000+00						

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

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TIME 2.04000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.53991-01 DTMPCC(35) 1.26096+01 ARLXCC(5) 9.87457-01

1 THRU 5	4.213421+03	3.925093+03	3.534945+03	3.288558+03	1.504906+03
6 THRU 10	1.477487+03	1.444178+03	1.418704+03	1.400625+03	1.389573+03
11 THRU 15	1.387145+03	1.410667+03	1.411318+03	1.606304+03	1.762441+03
16 THRU 20	1.762409+03	3.962997+03	3.691902+03	3.334452+03	3.115983+03
21 THRU 25	1.440226+03	1.419157+03	1.393387+03	1.373580+03	1.359508+03
26 THRU 30	1.350907+03	1.349058+03	1.403779+03	1.404637+03	1.604939+03
31 THRU 35	1.763300+03	1.762930+03	2.971584+03	2.770706+03	2.549387+03
36 THRU 40	2.448967+03	1.306035+03	1.294475+03	1.280359+03	1.269573+03
41 THRU 45	1.262039+03	1.257575+03	1.256804+03	1.387386+03	1.388679+03
46 THRU 50	1.601588+03	1.762493+03	1.762298+03	1.767571+03	1.673590+03
51 THRU 55	1.605458+03	1.609225+03	1.183541+03	1.180208+03	1.176264+03
56 THRU 60	1.173408+03	1.171632+03	1.170819+03	1.170977+03	1.373376+03
61 THRU 65	1.375045+03	1.598986+03	1.761629+03	1.761558+03	1.092341+03
66 THRU 70	1.074485+03	1.084376+03	1.119138+03	1.126904+03	1.126466+03
71 THRU 75	1.126123+03	1.126083+03	1.126343+03	1.126840+03	1.127343+03
76 THRU 80	1.366189+03	1.368048+03	1.597852+03	1.761242+03	1.761230+03
81 THRU 85	9.710056+02	9.588075+02	9.651546+02	9.881762+02	1.109411+03
86 THRU 90	1.109562+03	1.109933+03	1.110437+03	1.111071+03	1.111813+03
91 THRU 95	1.112387+03	1.364658+03	1.366575+03	1.598013+03	1.761231+03
96 THRU 100	1.761204+03	1.027140+03	1.000932+03	9.879629+02	9.974090+02
101 THRU 105	1.106402+03	1.106623+03	1.107072+03	1.107627+03	1.108286+03
106 THRU 110	1.109033+03	1.109597+03	1.365329+03	1.367231+03	1.598379+03
111 THRU 113	1.761175+03	1.761167+03	-6.000000+01		

HWC001	9.50328-01	HWC017	9.54755-01	HWC033	9.67596-01	HWC049	9.82701-01	HWC065	9.90181-01	HWC081	9.91478-01
HWC097	9.90889-01	Q1	2.00283+01	Q17	5.26577+01	Q33	3.99211+01	Q49	2.54265+01	Q65	1.75196+01
Q81	1.61330+01	Q97	8.40265+00	LOOPCT	4.00000+00						

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TIME 2.06000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.54132-01 DTMPCC(35) 1.10033+01 ARLXCC(5) 9.79340-01

1 THRU 5	4.210791+03	3.941972+03	3.562686+03	3.314163+03	1.536887+03
6 THRU 10	1.508079+03	1.473045+03	1.446225+03	1.427154+03	1.415462+03
11 THRU 15	1.412844+03	1.417332+03	1.417844+03	1.607714+03	1.762704+03
16 THRU 20	1.762670+03	3.965108+03	3.712835+03	3.365344+03	3.144222+03
21 THRU 25	1.468568+03	1.446386+03	1.419210+03	1.398290+03	1.383390+03
26 THRU 30	1.374248+03	1.372238+03	1.409694+03	1.410432+03	1.606206+03
31 THRU 35	1.763723+03	1.763294+03	2.996631+03	2.810437+03	2.595874+03
36 THRU 40	2.492504+03	1.325302+03	1.313042+03	1.298035+03	1.286538+03
41 THRU 45	1.278477+03	1.273671+03	1.272803+03	1.391212+03	1.392429+03
46 THRU 50	1.602394+03	1.762812+03	1.762581+03	1.801257+03	1.712600+03
51 THRU 55	1.647299+03	1.650964+03	1.193009+03	1.189390+03	1.185085+03
56 THRU 60	1.181945+03	1.179962+03	1.179016+03	1.179137+03	1.375244+03
61 THRU 65	1.376877+03	1.599367+03	1.761802+03	1.761715+03	1.110905+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

66	THRU	70	1.094420+03	1.105986+03	1.142019+03	1.130528+03	1.130003+03
71	THRU	75	1.129554+03	1.129435+03	1.129640+03	1.130102+03	1.130594+03
76	THRU	80	1.366926+03	1.368772+03	1.597997+03	1.761325+03	1.761310+03
81	THRU	85	9.830421+02	9.717221+02	9.793196+02	1.003459+03	1.110740+03
86	THRU	90	1.110861+03	1.111196+03	1.111673+03	1.112292+03	1.113023+03
91	THRU	95	1.113594+03	1.364927+03	1.366839+03	1.598068+03	1.761269+03
96	THRU	100	1.761242+03	1.038943+03	1.013823+03	1.001858+03	1.012098+03
101	THRU	105	1.107298+03	1.107496+03	1.107919+03	1.108453+03	1.109099+03
106	THRU	110	1.109838+03	1.110399+03	1.365498+03	1.367397+03	1.598419+03
111	THRU	113	1.761200+03	1.761193+03	-6.000000+01		

HWCOR1	9.50332-01	HWC017	9.54693-01	HWC033	9.67241-01	HWC049	9.82314-01	HWC065	9.89972-01	HWC081	9.91356-01
HWC097	9.90755-01	Q1	2.79801+01	Q17	5.26275+01	Q33	4.01824+01	Q49	2.57993+01	Q65	1.77262+01
Q81	1.62668+01	Q97	8.46802+00	LOOPCT	4.00000+00						

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TIME 2.08000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.54289-01 DTMPCC(51) 9.80850+00 ARLXCC(5) 9.59946-01

1	THRU	5	4.202199+03	3.949549+03	3.582015+03	3.332997+03	1.568819+03
6	THRU	10	1.538777+03	1.502181+03	1.474124+03	1.454129+03	1.441831+03
11	THRU	15	1.439026+03	1.424611+03	1.424979+03	1.609311+03	1.763009+03
16	THRU	20	1.762975+03	3.960866+03	3.724474+03	3.387954+03	3.165706+03
21	THRU	25	1.497030+03	1.473855+03	1.445404+03	1.423456+03	1.407781+03
26	THRU	30	1.398128+03	1.395958+03	1.416167+03	1.416779+03	1.607643+03
31	THRU	35	1.764212+03	1.763715+03	3.014942+03	2.842262+03	2.635694+03
36	THRU	40	2.530143+03	1.344945+03	1.332049+03	1.316220+03	1.304059+03
41	THRU	45	1.295499+03	1.290365+03	1.289402+03	1.395421+03	1.396559+03
46	THRU	50	1.603313+03	1.763181+03	1.762911+03	1.832258+03	1.749036+03
51	THRU	55	1.687308+03	1.690865+03	1.202946+03	1.199053+03	1.194400+03
56	THRU	60	1.190984+03	1.188799+03	1.187721+03	1.187804+03	1.377320+03
61	THRU	65	1.378916+03	1.599805+03	1.762003+03	1.761899+03	1.129310+03
66	THRU	70	1.114256+03	1.127612+03	1.164724+03	1.134454+03	1.133841+03
71	THRU	75	1.133286+03	1.133087+03	1.133236+03	1.133661+03	1.134142+03
76	THRU	80	1.367758+03	1.369590+03	1.598166+03	1.761422+03	1.761404+03
81	THRU	85	9.950580+02	9.846631+02	9.936214+02	1.018785+03	1.112214+03
86	THRU	90	1.112304+03	1.112602+03	1.113054+03	1.113655+03	1.114375+03
91	THRU	95	1.114942+03	1.365237+03	1.367142+03	1.598132+03	1.761313+03
96	THRU	100	1.761284+03	1.050416+03	1.026463+03	1.015760+03	1.026807+03
101	THRU	105	1.108302+03	1.108476+03	1.108870+03	1.109385+03	1.110018+03
106	THRU	110	1.110747+03	1.111306+03	1.365695+03	1.367591+03	1.598465+03
111	THRU	113	1.761225+03	1.761221+03	-6.000000+01		

HWCOR1	9.50459-01	HWC017	9.54723-01	HWC033	9.66981-01	HWC049	9.81958-01	HWC065	9.89765-01	HWC081	9.91235-01
HWC097	9.90625-01	Q1	2.78968+01	Q17	5.25226+01	Q33	4.03655+01	Q49	2.61412+01	Q65	1.79309+01
Q81	1.64003+01	Q97	8.53143+00	LOOPCT	4.00000+00						

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TIME 2.10000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.54464-01 DTMPCC(51) 9.24622+00 ARLXCC(5) 9.32220-01

1	THRU	5	4.189455+03	3.950478+03	3.594100+03	3.345716+03	1.600396+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

6	THRU	10	1.569285+03	1.531323+03	1.502169+03	1.481343+03	1.468493+03
11	THRU	15	1.465509+03	1.432513+03	1.432733+03	1.611109+03	1.763361+03
16	THRU	20	1.763326+03	3.952101+03	3.729282+03	3.403281+03	3.180986+03
21	THRU	25	1.525340+03	1.501306+03	1.471734+03	1.448873+03	1.432499+03
26	THRU	30	1.422377+03	1.420055+03	1.423207+03	1.423690+03	1.609265+03
31	THRU	35	1.764771+03	1.764200+03	3.027928+03	2.867547+03	2.669024+03
36	THRU	40	2.561834+03	1.364779+03	1.351324+03	1.334760+03	1.321997+03
41	THRU	45	1.312981+03	1.307545+03	1.306491+03	1.400026+03	1.401080+03
46	THRU	50	1.604355+03	1.763606+03	1.763292+03	1.860938+03	1.783102+03
51	THRU	55	1.725150+03	1.728449+03	1.213283+03	1.209134+03	1.204154+03
56	THRU	60	1.200477+03	1.198098+03	1.196894+03	1.196942+03	1.379615+03
61	THRU	65	1.381171+03	1.600307+03	1.762237+03	1.762114+03	1.147591+03
66	THRU	70	1.133977+03	1.149069+03	1.187015+03	1.138677+03	1.137976+03
71	THRU	75	1.137315+03	1.137035+03	1.137129+03	1.137517+03	1.137987+03
76	THRU	80	1.368692+03	1.370507+03	1.598362+03	1.761536+03	1.761514+03
81	THRU	85	1.007092+03	9.976340+02	1.007946+03	1.033995+03	1.113840+03
86	THRU	90	1.113897+03	1.114158+03	1.114583+03	1.115168+03	1.115876+03
91	THRU	95	1.116440+03	1.365591+03	1.367490+03	1.598207+03	1.761363+03
96	THRU	100	1.761333+03	1.061662+03	1.038904+03	1.029568+03	1.041382+03
101	THRU	105	1.109418+03	1.109567+03	1.109933+03	1.110428+03	1.111048+03
106	THRU	110	1.111768+03	1.112323+03	1.365922+03	1.367814+03	1.598517+03
111	THRU	113	1.761253+03	1.761252+03	-6.000000+01		

HWC001	9.50669-01	HWC017	9.54816-01	HWC033	9.66792-01	HWC049	9.81629-01	HWC065	9.89559-01	HWC081	9.91108-01
HWC097	9.90497-01	Q1	2.77894+01	Q17	5.23652+01	Q33	4.04873+01	Q49	2.64567+01	Q65	1.81342+01
Q81	1.65339+01	Q97	8.59352+00	LOOPCT	4.00000+00						

TIME 2.15000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.54980-01 DTMPCC(51) 7.74579+00 ARLXCC(5) 8.56354-01

1	THRU	5	4.145029+03	3.932803+03	3.600895+03	3.357432+03	1.675882+03
6	THRU	10	1.643475+03	1.603071+03	1.571706+03	1.549189+03	1.535190+03
11	THRU	15	1.531798+03	1.454979+03	1.454815+03	1.616570+03	1.764486+03
16	THRU	20	1.764453+03	3.916242+03	3.720189+03	3.417386+03	3.198284+03
21	THRU	25	1.594327+03	1.568673+03	1.536953+03	1.512311+03	1.494542+03
26	THRU	30	1.483454+03	1.480786+03	1.443289+03	1.443435+03	1.614210+03
31	THRU	35	1.766532+03	1.765735+03	3.042051+03	2.907673+03	2.727524+03
36	THRU	40	2.618145+03	1.414329+03	1.399787+03	1.381776+03	1.367811+03
41	THRU	45	1.357863+03	1.351799+03	1.350544+03	1.413295+03	1.414130+03
46	THRU	50	1.607556+03	1.764954+03	1.764506+03	1.923268+03	1.858332+03
51	THRU	55	1.809402+03	1.811266+03	1.240456+03	1.235759+03	1.230073+03
56	THRU	60	1.225825+03	1.223023+03	1.221540+03	1.221506+03	1.386353+03
61	THRU	65	1.387801+03	1.601872+03	1.762988+03	1.762805+03	1.192482+03
66	THRU	70	1.182379+03	1.201152+03	1.240160+03	1.150451+03	1.149542+03
71	THRU	75	1.148626+03	1.148152+03	1.148113+03	1.148414+03	1.148857+03
[illegible]							
81	THRU	85	1.037159+03	1.030001+03	1.043334+03	1.070952+03	1.118587+03
86	THRU	90	1.118564+03	1.118733+03	1.119092+03	1.119635+03	1.120316+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

91	THRU	95	1.120870+03	1.366691+03	1.368572+03	1.598448+03	1.761523+03
96	THRU	100	1.761490+03	1.088961+03	1.069199+03	1.063253+03	1.076673+03
101	THRU	105	1.112733+03	1.112822+03	1.113117+03	1.113561+03	1.114150+03
106	THRU	110	1.114849+03	1.115395+03	1.366642+03	1.368523+03	1.598680+03
111	THRU	113	1.761333+03	1.761343+03	-6.000000+01		

HWCOR1	9.51441-01	HWC017	9.55238-01	HWC033	9.66566-01	HWC049	9.80912-01	HWC065	9.89052-01	HWC081	9.90769-01
HWC097	9.90188-01	Q1	2.74487+01	Q17	5.18111+01	Q33	4.05825+01	Q49	2.71398+01	Q65	1.86337+01
Q81	1.68679+01	Q97	8.74412+00	LOOPCT	4.00000+00						

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TIME 2.20000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.55614-01 DTMPCC(1) 1.71842+01 ARLXCC(5) 7.63031-01

1	THRU	5	4.035067+03	3.877983+03	3.581670+03	3.348422+03	1.744950+03
6	THRU	10	1.712364+03	1.671381+03	1.639055+03	1.615392+03	1.600429+03
11	THRU	15	1.596649+03	1.481119+03	1.480567+03	1.623570+03	1.766039+03
16	THRU	20	1.766010+03	3.819506+03	3.674703+03	3.404599+03	3.193791+03
21	THRU	25	1.659041+03	1.632859+03	1.599868+03	1.574003+03	1.555245+03
26	THRU	30	1.543436+03	1.540463+03	1.466757+03	1.466563+03	1.620580+03
31	THRU	35	1.768905+03	1.767822+03	3.009483+03	2.913481+03	2.756071+03
36	THRU	40	2.647827+03	1.462612+03	1.447394+03	1.428439+03	1.413662+03
41	THRU	45	1.403059+03	1.396536+03	1.395115+03	1.429032+03	1.429643+03
46	THRU	50	1.611723+03	1.766786+03	1.766170+03	1.962891+03	1.916566+03
51	THRU	55	1.878011+03	1.878081+03	1.268814+03	1.263703+03	1.257474+03
56	THRU	60	1.252782+03	1.249645+03	1.247939+03	1.247836+03	1.394560+03
61	THRU	65	1.395894+03	1.603953+03	1.764028+03	1.763769+03	1.232924+03
66	THRU	70	1.227872+03	1.249927+03	1.288905+03	1.163778+03	1.162680+03
71	THRU	75	1.161534+03	1.160886+03	1.160725+03	1.160946+03	1.161364+03
76	THRU	80	1.375064+03	1.376785+03	1.599849+03	1.762430+03	1.762379+03
81	THRU	85	1.065016+03	1.061256+03	1.077373+03	1.105795+03	1.124337+03
86	THRU	90	1.124235+03	1.124315+03	1.124611+03	1.125115+03	1.125771+03
91	THRU	95	1.126315+03	1.368144+03	1.370003+03	1.598786+03	1.761747+03
96	THRU	100	1.761709+03	1.112291+03	1.097355+03	1.095118+03	1.109730+03
101	THRU	105	1.116855+03	1.116882+03	1.117109+03	1.117506+03	1.118066+03
106	THRU	110	1.118744+03	1.119281+03	1.367619+03	1.369485+03	1.598905+03
111	THRU	113	1.761436+03	1.761462+03	-6.000000+01		

HWCOR1	9.53230-01	HWC017	9.56324-01	HWC033	9.66875-01	HWC049	9.80422-01	HWC065	9.88587-01	HWC081	9.90449-01
HWC097	9.89915-01	Q1	2.66290+01	Q17	5.03902+01	Q33	4.00715+01	Q49	2.75451+01	Q65	1.90789+01
Q81	1.71741+01	Q97	8.86986+00	LOOPCT	4.00000+00						

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TIME 2.25000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.56369-01 DTMPCC(1) 2.23722+01 ARLXCC(5) 6.36353-01

1	THRU	5	3.833112+03	3.745639+03	3.513584+03	3.303063+03	1.804615+03
6	THRU	10	1.773294+03	1.733352+03	1.701468+03	1.677856+03	1.662722+03
11	THRU	15	1.658719+03	1.510522+03	1.509596+03	1.632263+03	1.768127+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

16	THRU	20	1.768107+03	3.637079+03	3.556858+03	3.345445+03	3.154297+03
21	THRU	25	1.715987+03	1.690674+03	1.658310+03	1.632422+03	1.613251+03
26	THRU	30	1.600956+03	1.597716+03	1.493245+03	1.492724+03	1.628527+03
31	THRU	35	1.772008+03	1.770578+03	2.913220+03	2.864385+03	2.745325+03
36	THRU	40	2.645016+03	1.507399+03	1.492171+03	1.473028+03	1.457978+03
41	THRU	45	1.447084+03	1.440314+03	1.438774+03	1.447060+03	1.447451+03
46	THRU	50	1.616978+03	1.769200+03	1.768360+03	1.969291+03	1.946700+03
51	THRU	55	1.924558+03	1.924162+03	1.297223+03	1.291911+03	1.285386+03
56	THRU	60	1.280432+03	1.277083+03	1.275230+03	1.275077+03	1.404220+03
61	THRU	65	1.405437+03	1.606631+03	1.765422+03	1.765070+03	1.264738+03
66	THRU	70	1.266377+03	1.292614+03	1.330492+03	1.178299+03	1.177058+03
71	THRU	75	1.175732+03	1.174944+03	1.174685+03	1.174843+03	1.175239+03
76	THRU	80	1.379409+03	1.381076+03	1.600990+03	1.763146+03	1.763077+03
81	THRU	85	1.087751+03	1.088602+03	1.108151+03	1.136617+03	1.131066+03
86	THRU	90	1.130895+03	1.130896+03	1.131138+03	1.131608+03	1.132242+03
91	THRU	95	1.132776+03	1.369999+03	1.371834+03	1.599246+03	1.762058+03
96	THRU	100	1.762013+03	1.127816+03	1.119706+03	1.122891+03	1.138503+03
101	THRU	105	1.121815+03	1.121788+03	1.121954+03	1.122311+03	1.122845+03
106	THRU	110	1.123506+03	1.124034+03	1.368898+03	1.370747+03	1.599210+03
111	THRU	113	1.761573+03	1.761623+03	-6.000000+01		

HWC001	9.56041-01	HWC017	9.58597-01	HWC033	9.68050-01	HWC049	9.80315-01	HWC065	9.88219-01	HWC081	9.90187-01
HWC097	9.89731-01	Q1	2.51949+01	Q17	4.78419+01	Q33	3.87636+01	Q49	2.75517+01	Q65	1.94221+01
Q81	1.74193+01	Q97	8.94874+00	LOOPCT	4.00000+00						

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TIME 2.30000+02 DTIMEU 5.00000-01 CSGMIN(85) 1.57237-01 DTMPCC(1) 1.43765+01 ARLXCC(21) 5.11780-01

1	THRU	5	3.642619+03	3.582844+03	3.403089+03	3.220307+03	1.851484+03
6	THRU	10	1.822933+03	1.785949+03	1.756016+03	1.733547+03	1.718924+03
11	THRU	15	1.714877+03	1.542487+03	1.541238+03	1.642719+03	1.770890+03
16	THRU	20	1.770878+03	3.461857+03	3.408903+03	3.245645+03	3.078894+03
21	THRU	25	1.762226+03	1.739011+03	1.708885+03	1.684450+03	1.666095+03
26	THRU	30	1.654129+03	1.650813+03	1.522191+03	1.521377+03	1.638123+03
31	THRU	35	1.776085+03	1.774189+03	2.809208+03	2.784821+03	2.698156+03
36	THRU	40	2.608960+03	1.546234+03	1.531764+03	1.513368+03	1.498771+03
41	THRU	45	1.488104+03	1.481410+03	1.479826+03	1.467039+03	1.467228+03
46	THRU	50	1.623409+03	1.772302+03	1.771241+03	1.962453+03	1.955184+03
51	THRU	55	1.946812+03	1.945871+03	1.324326+03	1.319081+03	1.312594+03
56	THRU	60	1.307637+03	1.304261+03	1.302376+03	1.302202+03	1.415230+03
61	THRU	65	1.416334+03	1.609976+03	1.767238+03	1.766776+03	1.291539+03
66	THRU	70	1.297832+03	1.326735+03	1.362038+03	1.193498+03	1.192180+03
71	THRU	75	1.190758+03	1.189895+03	1.189581+03	1.189702+03	1.190085+03
76	THRU	80	1.384551+03	1.386163+03	1.602459+03	1.764100+03	1.764009+03
81	THRU	85	1.107866+03	1.111963+03	1.133908+03	1.161309+03	1.138671+03
86	THRU	90	1.138450+03	1.138393+03	1.138596+03	1.139045+03	1.139664+03
91	THRU	95	1.140191+03	1.372294+03	1.374101+03	1.599857+03	1.762477+03
96	THRU	100	1.762425+03	1.140287+03	1.137026+03	1.144891+03	1.160846+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

101	THRU	105	1.127587+03	1.127519+03	1.127641+03	1.127969+03	1.128488+03
106	THRU	110	1.129137+03	1.129657+03	1.370520+03	1.372350+03	1.599617+03
111	THRU	113	1.761756+03	1.761840+03	-6.000000+01		

HWCOR1 9.58585-01 HWC017 9.60930-01 HWC033 9.69417-01 HWC049 9.80384-01 HWC065 9.87913-01 HWC081 9.89958-01
HWC097 9.89588-01 Q1 2.39248+01 Q17 4.55379+01 Q33 3.74376+01 Q49 2.74293+01 Q65 1.97139+01
Q81 1.76384+01 Q97 9.01292+00 LOOPCT 4.00000+00

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TIME 2.35000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.58140-01 DTMPCC(1) 1.30046+01 ARLXCC(21) 4.12048-01

1	THRU	5	3.508505+03	3.453753+03	3.294428+03	3.132585+03	1.887446+03
6	THRU	10	1.861920+03	1.828557+03	1.801296+03	1.780606+03	1.766940+03
11	THRU	15	1.762980+03	1.575869+03	1.574375+03	1.654955+03	1.774475+03
16	THRU	20	1.774483+03	3.336279+03	3.288859+03	3.144989+03	2.997018+03
21	THRU	25	1.799015+03	1.778163+03	1.750880+03	1.728560+03	1.711617+03
26	THRU	30	1.700407+03	1.697145+03	1.552669+03	1.551628+03	1.649376+03
31	THRU	35	1.781226+03	1.778806+03	2.728658+03	2.712012+03	2.639428+03
36	THRU	40	2.559153+03	1.579183+03	1.565769+03	1.548604+03	1.534885+03
41	THRU	45	1.524779+03	1.518376+03	1.516807+03	1.488424+03	1.488444+03
46	THRU	50	1.631049+03	1.776245+03	1.774884+03	1.956110+03	1.956093+03
51	THRU	55	1.953420+03	1.950859+03	1.349507+03	1.344476+03	1.338240+03
56	THRU	60	1.333462+03	1.330198+03	1.328376+03	1.328206+03	1.427379+03
61	THRU	65	1.428381+03	1.614037+03	1.769545+03	1.768957+03	1.315831+03
66	THRU	70	1.324528+03	1.353353+03	1.385386+03	1.208937+03	1.207596+03
71	THRU	75	1.206147+03	1.205264+03	1.204938+03	1.205049+03	1.205426+03
76	THRU	80	1.390455+03	1.392012+03	1.604296+03	1.765335+03	1.765221+03
81	THRU	85	1.127055+03	1.132833+03	1.155159+03	1.180801+03	1.147022+03
86	THRU	90	1.146765+03	1.146673+03	1.146855+03	1.147295+03	1.147907+03
91	THRU	95	1.148429+03	1.375050+03	1.376828+03	1.600646+03	1.763032+03
96	THRU	100	1.762971+03	1.153132+03	1.152417+03	1.162362+03	1.177867+03
101	THRU	105	1.134121+03	1.134023+03	1.134118+03	1.134431+03	1.134945+03
106	THRU	110	1.135588+03	1.136101+03	1.372519+03	1.374327+03	1.600149+03
111	THRU	113	1.762002+03	1.762131+03	-6.000000+01		

HWCOR1 9.60318-01 HWC017 9.62552-01 HWC033 9.70451-01 HWC049 9.80441-01 HWC065 9.87632-01 HWC081 9.89737-01
HWC097 9.89438-01 Q1 2.30655+01 Q17 4.39492+01 Q33 3.64494+01 Q49 2.73355+01 Q65 1.99833+01
Q81 1.78512+01 Q97 9.08228+00 LOOPCT 4.00000+00

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TIME 2.40000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.58983-01 DTMPCC(1) 1.29293+01 ARLXCC(12) 3.76678-01

1	THRU	5	3.379376+03	3.336062+03	3.196799+03	3.052898+03	1.916087+03
6	THRU	10	1.893249+03	1.863207+03	1.838483+03	1.819547+03	1.806873+03
11	THRU	15	1.803043+03	1.609401+03	1.607744+03	1.668742+03	1.778974+03
16	THRU	20	1.779016+03	3.215535+03	3.178727+03	3.053330+03	2.921591+03
21	THRU	25	1.829052+03	1.810343+03	1.785709+03	1.765412+03	1.749864+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

26	THRU	30	1.739435+03	1.736264+03	1.583550+03	1.582353+03	1.662185+03
31	THRU	35	1.787465+03	1.784477+03	2.648648+03	2.640459+03	2.579796+03
36	THRU	40	2.507806+03	1.607577+03	1.595217+03	1.579333+03	1.566580+03
41	THRU	45	1.557130+03	1.551096+03	1.549568+03	1.510583+03	1.510472+03
46	THRU	50	1.639847+03	1.781191+03	1.779480+03	1.943035+03	1.949340+03
51	THRU	55	1.950809+03	1.947217+03	1.372789+03	1.368021+03	1.362103+03
56	THRU	60	1.357567+03	1.354468+03	1.352742+03	1.352587+03	1.440392+03
61	THRU	65	1.441306+03	1.618837+03	1.772419+03	1.771694+03	1.335301+03
66	THRU	70	1.346115+03	1.374386+03	1.403491+03	1.224355+03	1.223020+03
71	THRU	75	1.221581+03	1.220708+03	1.220391+03	1.220507+03	1.220883+03
76	THRU	80	1.397046+03	1.398550+03	1.606534+03	1.766897+03	1.766760+03
81	THRU	85	1.143514+03	1.150780+03	1.172998+03	1.196906+03	1.155999+03
86	THRU	90	1.155719+03	1.155606+03	1.155778+03	1.156217+03	1.156827+03
91	THRU	95	1.157345+03	1.378273+03	1.380020+03	1.601639+03	1.763749+03
96	THRU	100	1.763679+03	1.163799+03	1.165375+03	1.176634+03	1.191499+03
101	THRU	105	1.141358+03	1.141241+03	1.141319+03	1.141626+03	1.142141+03
106	THRU	110	1.142782+03	1.143290+03	1.374914+03	1.376699+03	1.600827+03
111	THRU	113	1.762329+03	1.762514+03	-6.000000+01		

HWCOR1 9.61971-01 HWC017 9.64098-01 HWC033 9.71471-01 HWC049 9.80572-01 HWC065 9.87403-01 HWC081 9.89545-01
HWC097 9.89312-01 Q1 2.22371+01 Q17 4.24203+01 Q33 3.54700+01 Q49 2.71666+01 Q65 2.01988+01
Q81 1.60336+01 Q97 9.13964+00 LOOPCT 4.00000+00

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TIME 2.45000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.59910-01 DTMPCC(1) 1.33142+01 ARLXCC(12) 3.65540-01

1	THRU	5	3.248266+03	3.220585+03	3.103604+03	2.976440+03	1.938656+03
6	THRU	10	1.918292+03	1.891308+03	1.868931+03	1.851635+03	1.839911+03
11	THRU	15	1.836231+03	1.642020+03	1.640269+03	1.683928+03	1.784453+03
16	THRU	20	1.784540+03	3.093415+03	3.070694+03	2.965508+03	2.849024+03
21	THRU	25	1.853364+03	1.836649+03	1.814481+03	1.796078+03	1.781846+03
26	THRU	30	1.772173+03	1.769113+03	1.613881+03	1.612591+03	1.676365+03
31	THRU	35	1.794804+03	1.791222+03	2.566627+03	2.567749+03	2.519364+03
36	THRU	40	2.455526+03	1.631868+03	1.620670+03	1.606122+03	1.594330+03
41	THRU	45	1.585544+03	1.579894+03	1.578421+03	1.532960+03	1.532755+03
46	THRU	50	1.649736+03	1.787095+03	1.785020+03	1.923435+03	1.935556+03
51	THRU	55	1.941072+03	1.937236+03	1.394178+03	1.389703+03	1.384146+03
56	THRU	60	1.379884+03	1.376975+03	1.375364+03	1.375231+03	1.453993+03
61	THRU	65	1.454833+03	1.624373+03	1.775908+03	1.775039+03	1.35[illegible]21+03
66	THRU	70	1.362819+03	1.390662+03	1.417200+03	1.239546+03	1.238240+03
71	THRU	75	1.236839+03	1.235997+03	1.235701+03	1.235832+03	1.236209+03
76	THRU	80	1.404231+03	1.405686+03	1.609195+03	1.768828+03	1.768670+03
81	THRU	85	1.157079+03	1.165758+03	1.187851+03	1.210155+03	1.165481+03
86	THRU	90	1.165187+03	1.165065+03	1.165236+03	1.165678+03	1.166291+03
91	THRU	95	1.166805+03	1.381952+03	1.383668+03	1.602860+03	1.764655+03
96	THRU	100	1.764576+03	1.171922+03	1.175684+03	1.188090+03	1.202313+03
101	THRU	105	1.149224+03	1.149094+03	1.149165+03	1.149473+03	1.149993+03
106	THRU	110	1.150636+03	1.151139+03	1.377715+03	1.379474+03	1.601673+03

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

111	THRU	113	1.762754+03	1.763011+03	-6.000000+01

HWCOR1	9.63645-01	HWC017	9.65658-01	HWC033	9.72516-01	HWC049	9.80776-01	HWC065	9.87229-01	HWC081	9.89386-01
HWC097	9.89214-01	Q1	2.13985+01	Q17	4.08775+01	Q33	3.44685+01	Q49	2.69240+01	Q65	2.03608+01
Q81	1.81835+01	Q97	9.18273+00	LOOPCT	4.00000+00						

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TIME 2.50000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.60805-01 DTMPCC(1) 1.39996+01 ARLXCC(12) 9.55353-01

1	THRU	5	3.111722+03	3.102773+03	3.009935+03	2.899031+03	1.954350+03
6	THRU	10	1.936487+03	1.912566+03	1.892525+03	1.876852+03	1.866165+03
11	THRU	15	1.862708+03	1.670673+03	1.669057+03	1.700160+03	1.790953+03
16	THRU	20	1.791094+03	2.966903+03	2.960871+03	2.877432+03	2.775697+03
21	THRU	25	1.871018+03	1.856369+03	1.836737+03	1.820267+03	1.807370+03
26	THRU	30	1.798564+03	1.795888+03	1.640846+03	1.639671+03	1.691626+03
31	THRU	35	1.803226+03	1.799037+03	2.481783+03	2.492956+03	2.457251+03
36	THRU	40	2.401427+03	1.650691+03	1.640809+03	1.627861+03	1.617267+03
41	THRU	45	1.609255+03	1.604129+03	1.602782+03	1.553507+03	1.553363+03
46	THRU	50	1.660549+03	1.793958+03	1.791506+03	1.898177+03	1.915732+03
51	THRU	55	1.925287+03	1.921692+03	1.411762+03	1.407792+03	1.402842+03
56	THRU	60	1.399034+03	1.396416+03	1.395066+03	1.395021+03	1.466950+03
61	THRU	65	1.467811+03	1.630569+03	1.780171+03	1.779100+03	1.360341+03
66	THRU	70	1.375013+03	1.402559+03	1.426762+03	1.252688+03	1.251583+03
71	THRU	75	1.250419+03	1.249751+03	1.249557+03	1.249817+03	1.250248+03
76	THRU	80	1.411362+03	1.412818+03	1.612281+03	1.771204+03	1.771020+03
81	THRU	85	1.167827+03	1.177869+03	1.199873+03	1.220660+03	1.174134+03
86	THRU	90	1.173944+03	1.173947+03	1.174212+03	1.174710+03	1.175402+03
91	THRU	95	1.175950+03	1.385771+03	1.387481+03	1.604326+03	1.765799+03
96	THRU	100	1.765707+03	1.177485+03	1.183359+03	1.196863+03	1.210455+03
101	THRU	105	1.156576+03	1.156535+03	1.156714+03	1.157105+03	1.157676+03
106	THRU	110	1.158388+03	1.158916+03	1.380691+03	1.382444+03	1.602702+03
111	THRU	113	1.763301+03	1.763646+03	-6.000000+01		

HWCOR1	9.65386-01	HWC017	9.67272-01	HWC033	9.73598-01	HWC049	9.81045-01	HWC065	9.87103-01	HWC081	9.89259-01
HWC097	9.89145-01	Q1	2.05297+01	Q17	3.92859+01	Q33	3.34353+01	Q49	2.66172+01	Q65	2.04731+01
Q81	1.83018+01	Q97	9.21145+00	LOOPCT	3.00000+00						

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TIME 2.55000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.61722-01 DTMPCC(1) 1.49789+01 ARLXCC(12) 8.98926-01

1	THRU	5	2.966542+03	2.979097+03	2.912424+03	2.817811+03	1.965026+03
6	THRU	10	1.949456+03	1.928395+03	1.910582+03	1.896507+03	1.886770+03
11	THRU	15	1.883507+03	1.697031+03	1.695402+03	1.716932+03	1.798453+03
16	THRU	20	1.798652+03	2.833275+03	2.846249+03	2.786217+03	2.699133+03
21	THRU	25	1.884034+03	1.871240+03	1.853933+03	1.839284+03	1.827694+03
26	THRU	30	1.819661+03	1.816937+03	1.665857+03	1.664663+03	1.707500+03
31	THRU	35	1.812576+03	1.807813+03	2.393066+03	2.415057+03	2.392568+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

36	THRU	40	2.344708+03	1.666160+03	1.657398+03	1.645863+03	1.636380+03
41	THRU	45	1.629171+03	1.624522+03	1.623268+03	1.573125+03	1.572943+03
46	THRU	50	1.671960+03	1.801654+03	1.798857+03	1.867841+03	1.890561+03
51	THRU	55	1.904158+03	1.901218+03	1.427577+03	1.423940+03	1.419423+03
56	THRU	60	1.415962+03	1.413602+03	1.412409+03	1.412397+03	1.479734+03
61	THRU	65	1.480553+03	1.637268+03	1.785118+03	1.783868+03	1.366654+03
66	THRU	70	1.383062+03	1.410334+03	1.432366+03	1.265290+03	1.264243+03
71	THRU	75	1.263168+03	1.262577+03	1.262446+03	1.262747+03	1.263187+03
76	THRU	80	1.418649+03	1.420073+03	1.615738+03	1.774000+03	1.773816+03
81	THRU	85	1.175929+03	1.187256+03	1.209156+03	1.228479+03	1.182899+03
86	THRU	90	1.182713+03	1.182737+03	1.183026+03	1.183548+03	1.184259+03
91	THRU	95	1.184810+03	1.389826+03	1.391512+03	1.606020+03	1.767172+03
96	THRU	100	1.767079+03	1.180589+03	1.188491+03	1.203033+03	1.216009+03
101	THRU	105	1.164180+03	1.164141+03	1.164340+03	1.164754+03	1.165347+03
106	THRU	110	1.166074+03	1.166603+03	1.383910+03	1.385643+03	1.603906+03
111	THRU	113	1.763990+03	1.764441+03	-6.000000+01		

HWCOR1	9.67237-01	HWC017	9.68976-01	HWC033	9.74729-01	HWC049	9.81372-01	HWC065	9.87023-01	HWC081	9.89161-01
HWC097	9.89103-01	Q1	1.96130+01	Q17	3.76157+01	Q33	3.23592+01	Q49	2.62532+01	Q65	2.05402+01
Q81	1.83901+01	Q97	9.22630+00	LOOPCT	3.00000+00						

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TIME 2.60000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.62686-01 DTMPCC(1) 1.34675+01 ARLXCC(17) 8.98315-01

1	THRU	5	2.818506+03	2.848960+03	2.808733+03	2.730421+03	1.971071+03
6	THRU	10	1.957778+03	1.939553+03	1.923951+03	1.911470+03	1.902698+03
11	THRU	15	1.899658+03	1.721511+03	1.719915+03	1.734072+03	1.806895+03
16	THRU	20	1.807149+03	2.697422+03	2.726272+03	2.689772+03	2.617282+03
21	THRU	25	1.892798+03	1.881846+03	1.866843+03	1.853993+03	1.843703+03
26	THRU	30	1.836452+03	1.833903+03	1.689286+03	1.688114+03	1.723791+03
31	THRU	35	1.822730+03	1.817425+03	2.303177+03	2.334097+03	2.324613+03
36	THRU	40	2.284617+03	1.678609+03	1.670974+03	1.660847+03	1.652466+03
41	THRU	45	1.646053+03	1.641881+03	1.640731+03	1.592039+03	1.591846+03
46	THRU	50	1.683858+03	1.810076+03	1.806954+03	1.834053+03	1.860871+03
51	THRU	55	1.878293+03	1.876269+03	1.441819+03	1.438541+03	1.434471+03
56	THRU	60	1.431360+03	1.429254+03	1.428214+03	1.428239+03	1.492492+03
61	THRU	65	1.493283+03	1.644431+03	1.790655+03	1.789235+03	1.369510+03
66	THRU	70	1.387317+03	1.414264+03	1.434242+03	1.277445+03	1.276475+03
71	THRU	75	1.275497+03	1.274982+03	1.274907+03	1.275243+03	1.275692+03
76	THRU	80	1.426188+03	1.427584+03	1.619560+03	1.777203+03	1.777032+03
81	THRU	85	1.181679+03	1.194075+03	1.215816+03	1.233716+03	1.191831+03
86	THRU	90	1.191659+03	1.191705+03	1.192016+03	1.192556+03	1.193279+03
91	THRU	95	1.193832+03	1.394180+03	1.395844+03	1.607949+03	1.768788+03
96	THRU	100	1.768699+03	1.181608+03	1.191234+03	1.206714+03	1.219088+03
101	THRU	105	1.172080+03	1.172053+03	1.172271+03	1.172705+03	1.173315+03
106	THRU	110	1.174054+03	1.174582+03	1.387426+03	1.389139+03	1.605297+03
111	THRU	113	1.764838+03	1.765411+03	-6.000000+01		

CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

HWC001	9.69159-01	HWC017	9.70738-01	HWC033	9.75890-01	HWC049	9.81742-01	HWC065	9.86983-01	HWC081	9.89090-01
HWC097	9.89086-01	Q1	1.86931+01	Q17	3.59415+01	Q33	3.12794+01	Q49	2.58529+01	Q65	2.05689+01
Q81	1.84524+01	Q97	9.22975+00	LOOPCT	3.00000+00						

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TIME 2.65000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.63687-01 DTMPCC(1) 1.28596+01 ARLXCC(1) 9.34906-01

1	THRU	5	2.688417+03	2.727402+03	2.704599+03	2.640280+03	1.972938+03
6	THRU	10	1.961810+03	1.946337+03	1.932917+03	1.922036+03	1.914257+03
11	THRU	15	1.911469+03	1.743821+03	1.742291+03	1.751345+03	1.816207+03
16	THRU	20	1.816505+03	2.577439+03	2.613885+03	2.593019+03	2.533098+03
21	THRU	25	1.897689+03	1.888494+03	1.875728+03	1.864657+03	1.855670+03
26	THRU	30	1.849226+03	1.846877+03	1.710805+03	1.709684+03	1.740346+03
31	THRU	35	1.833577+03	1.827765+03	2.221867+03	2.256945+03	2.256105+03
36	THRU	40	2.222908+03	1.688223+03	1.681678+03	1.672936+03	1.665652+03
41	THRU	45	1.660040+03	1.656359+03	1.655325+03	1.609979+03	1.609797+03
46	THRU	50	1.696122+03	1.819124+03	1.815700+03	1.800843+03	1.829670+03
51	THRU	55	1.849290+03	1.848032+03	1.454477+03	1.451569+03	1.447964+03
56	THRU	60	1.445720+03	1.443381+03	1.442505+03	1.442570+03	1.505066+03
61	THRU	65	1.505839+03	1.652008+03	1.796723+03	1.795143+03	1.370081+03
66	THRU	70	1.388662+03	1.414884+03	1.432904+03	1.289055+03	1.288175+03
71	THRU	75	1.287308+03	1.286883+03	1.286874+03	1.287251+03	1.287710+03
76	THRU	80	1.433908+03	1.435280+03	1.623729+03	1.780832+03	1.780664+03
81	THRU	85	1.185827+03	1.198868+03	1.220154+03	1.236659+03	1.200835+03
86	THRU	90	1.200684+03	1.200761+03	1.201099+03	1.201662+03	1.202400+03
91	THRU	95	1.202955+03	1.398809+03	1.400451+03	1.610119+03	1.770654+03
96	THRU	100	1.770574+03	1.181653+03	1.192366+03	1.208296+03	1.220027+03
101	THRU	105	1.180194+03	1.180183+03	1.180428+03	1.180886+03	1.181517+03
106	THRU	110	1.182268+03	1.182797+03	1.391225+03	1.392918+03	1.606884+03
111	THRU	113	1.765861+03	1.766570+03	-6.000000+01		

HWC001	9.70838-01	HWC017	9.72287-01	HWC033	9.76938-01	HWC049	9.82106-01	HWC065	9.86969-01	HWC081	9.89037-01
HWC097	9.89080-01	Q1	1.79021+01	Q17	3.44924+01	Q33	3.03177+01	Q49	2.54656+01	Q65	2.05734+01
Q81	1.84977+01	Q97	9.22853+00	LOOPCT	3.00000+00						

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TIME 2.70000+02 DTIMEU 5.00000-01 CSGMIN(101) 1.64768-01 DTMPCC(1) 1.30733+01 ARLXCC(12) 2.47955-01

1	THRU	5	2.559033+03	2.609421+03	2.603365+03	2.551616+03	1.971561+03
6	THRU	10	1.962384+03	1.949450+03	1.938075+03	1.928726+03	1.921903+03
11	THRU	15	1.919375+03	1.764595+03	1.763017+03	1.768524+03	1.826297+03
16	THRU	20	1.826628+03	2.458674+03	2.505018+03	2.499014+03	2.450387+03
21	THRU	25	1.899629+03	1.891978+03	1.881249+03	1.871834+03	1.864094+03
26	THRU	30	1.858417+03	1.856272+03	1.731009+03	1.729827+03	1.756945+03
31	THRU	35	1.844989+03	1.838718+03	2.142034+03	2.182071+03	2.189122+03
36	THRU	40	2.162068+03	1.695784+03	1.690174+03	1.682666+03	1.676392+03
41	THRU	45	1.671549+03	1.668311+03	1.667378+03	1.627386+03	1.627115+03
46	THRU	50	1.708623+03	1.828687+03	1.824993+03	1.766376+03	1.797154+03
51	THRU	55	1.818621+03	1.818202+03	1.466278+03	1.463610+03	1.460360+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

56	THRU	60	1.457923+03	1.456339+03	1.455575+03	1.455651+03	1.517772+03
61	THRU	65	1.518451+03	1.659942+03	1.803260+03	1.801542+03	1.368141+03
66	THRU	70	1.387392+03	1.412864+03	1.429166+03	1.300797+03	1.299875+03
71	THRU	75	1.299013+03	1.298614+03	1.298655+03	1.299017+03	1.299453+03
76	THRU	80	1.442021+03	1.443318+03	1.628203+03	1.784915+03	1.784750+03
81	THRU	85	1.188164+03	1.201782+03	1.222572+03	1.237819+03	1.210495+03
86	THRU	90	1.210246+03	1.210255+03	1.210561+03	1.211129+03	1.211832+03
91	THRU	95	1.212359+03	1.403862+03	1.405449+03	1.612535+03	1.772777+03
96	THRU	100	1.772717+03	1.180274+03	1.191995+03	1.208232+03	1.219364+03
101	THRU	105	1.189063+03	1.188959+03	1.169137+03	1.189563+03	1.190197+03
106	THRU	110	1.190913+03	1.191413+03	1.395436+03	1.397082+03	1.608678+03
111	THRU	113	1.767072+03	1.767931+03	-6.000000+01		

HWCOR1	9.72498-01	HWC017	9.73812-01	HWC033	9.77963-01	HWC049	9.82484-01	HWC065	9.86983-01	HWC081	9.89005-01
HWC097	9.89089-01	Q1	1.71171+01	Q17	3.30608+01	Q33	2.93748+01	Q49	2.50648+01	Q65	2.05496+01
Q81	1.85226+01	Q97	9.21935+00	LOOPCT	4.00000+00						

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TIME 1.00000+02 DTIMEU 4.75000+00 CSGMIN(12) 1.65518-01 DTMPCC(69) 1.37959+02 ARLXCC(101) 9.41788-01

1	THRU	5	1.975389+03	2.030498+03	2.066016+03	2.060101+03	1.919189+03
6	THRU	10	1.917512+03	1.914876+03	1.912243+03	1.909663+03	1.907524+03
11	THRU	15	1.906577+03	1.838601+03	1.838049+03	1.861072+03	1.897208+03
16	THRU	20	1.897455+03	1.921146+03	1.971410+03	2.002640+03	1.995574+03
21	THRU	25	1.866952+03	1.865608+03	1.863437+03	1.861259+03	1.859079+03
26	THRU	30	1.857264+03	1.856444+03	1.806941+03	1.806676+03	1.848259+03
31	THRU	35	1.918902+03	1.910990+03	1.769641+03	1.809172+03	1.835014+03
36	THRU	40	1.831234+03	1.704762+03	1.703730+03	1.702027+03	1.700417+03
41	THRU	45	1.699116+03	1.698294+03	1.698096+03	1.703536+03	1.703736+03
46	THRU	50	1.783328+03	1.892275+03	1.887504+03	1.578387+03	1.607542+03
51	THRU	55	1.631193+03	1.635341+03	1.511674+03	1.519909+03	1.513575+03
56	THRU	60	1.514774+03	1.515259+03	1.515660+03	1.516041+03	1.585255+03
61	THRU	65	1.586015+03	1.712188+03	1.849912+03	1.847539+03	1.328467+03
66	THRU	70	1.347459+03	1.368573+03	1.378561+03	1.305187+03	1.436508+03
71	THRU	75	1.346169+03	1.369947+03	1.380847+03	1.385531+03	1.386770+03
76	THRU	80	1.494361+03	1.495490+03	1.661495+03	1.816921+03	1.816800+03
81	THRU	85	1.179301+03	1.193428+03	1.211164+03	1.221419+03	1.271762+03
86	THRU	90	1.272498+03	1.273531+03	1.274315+03	1.275136+03	1.275995+03
91	THRU	95	1.276526+03	1.440917+03	1.442477+03	1.632947+03	1.791742+03
96	THRU	100	1.791736+03	1.157942+03	1.171142+03	1.186941+03	1.195638+03
101	THRU	105	1.243146+03	1.244815+03	1.246956+03	1.248189+03	1.249185+03
106	THRU	110	1.250106+03	1.250587+03	1.427892+03	1.429384+03	1.624766+03
111	THRU	113	1.779085+03	1.781093+03	-6.000000+01		

HWCOR1	9.79362-01	HWC017	9.80084-01	HWC033	9.81956-01	HWC049	9.84310-01	HWC065	9.87314-01	HWC081	9.89043-01
HWC097	9.89270-01	Q1	1.45863+00	Q17	2.85051+00	Q33	2.66210+00	Q49	2.42542+00	Q65	2.11988+00
Q81	1.94064+00	Q97	9.58030-01	LOOPCT	1.80000+01						

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

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TIME 3.30000+02 DTIMEU 5.00000+00 CSGMIN(12) 1.64763-01 DTMPCC(69) 1.33023+02 ARLXCC(86) 3.32474-01

1	THRU	5	1.711773+03	1.748985+03	1.779270+03	1.783960+03	1.850346+03
6	THRU	10	1.851790+03	1.854597+03	1.848146+03	1.854331+03	1.852103+03
11	THRU	15	1.851892+03	1.848511+03	1.848729+03	1.919811+03	1.968009+03
16	THRU	20	1.967677+03	1.672018+03	1.706557+03	1.733968+03	1.737348+03
21	THRU	25	1.808747+03	1.813012+03	1.813752+03	1.811950+03	1.814119+03
26	THRU	30	1.813190+03	1.813010+03	1.822325+03	1.822770+03	1.907723+03
31	THRU	35	1.984599+03	1.977107+03	1.574073+03	1.603041+03	1.626589+03
36	THRU	40	1.630213+03	1.685917+03	1.686461+03	1.686935+03	1.687288+03
41	THRU	45	1.687521+03	1.687892+03	1.688143+03	1.734001+03	1.734679+03
46	THRU	50	1.841087+03	1.951596+03	1.946920+03	1.451384+03	1.474662+03
51	THRU	55	1.495832+03	1.502821+03	1.530195+03	1.537019+03	1.534646+03
56	THRU	60	1.536215+03	1.536759+03	1.537274+03	1.537801+03	1.627417+03
61	THRU	65	1.628431+03	1.760738+03	1.898943+03	1.896508+03	1.278797+03
66	THRU	70	1.295728+03	1.314163+03	1.322926+03	1.338980+03	1.438143+03
71	THRU	75	1.392681+03	1.409239+03	1.412013+03	1.409137+03	1.409856+03
76	THRU	80	1.536837+03	1.538123+03	1.700005+03	1.855917+03	1.855960+03
81	THRU	85	1.156988+03	1.170181+03	1.186089+03	1.194983+03	1.322838+03
86	THRU	90	1.323755+03	1.323880+03	1.323867+03	1.324544+03	1.325972+03
91	THRU	95	1.326595+03	1.479642+03	1.481158+03	1.660955+03	1.819811+03
96	THRU	100	1.819881+03	1.132461+03	1.144874+03	1.159606+03	1.167716+03
101	THRU	105	1.297971+03	1.299866+03	1.298263+03	1.305903+03	1.300103+03
106	THRU	110	1.303045+03	1.303893+03	1.464701+03	1.466143+03	1.648678+03
111	THRU	113	1.800385+03	1.803559+03	-6.000000+01		

HWC001	9.82612-01	HWC017	9.83081-01	HWC033	9.84258-01	HWC049	9.85734-01	HWC065	9.87797-01	HWC081	9.89220-01
HWC097	9.89495-01	Q1	1.22942+00	Q17	2.41312+00	Q33	2.29968+00	Q49	2.15753+00	Q65	1.95828+00
Q81	1.81917+00	Q97	8.95804-01	LOOPCT	1.30000+01						

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TIME 3.60000+02 DTIMEU 5.00000+00 CSGMIN(12) 1.65399-01 DTMPCC(69) 1.05287+02 ARLXCC(70) 5.94452-01

1	THRU	5	1.555941+03	1.584673+03	1.611204+03	1.619131+03	1.780100+03
6	THRU	10	1.790955+03	1.788507+03	1.788548+03	1.792204+03	1.791631+03
11	THRU	15	1.792092+03	1.834302+03	1.834912+03	1.949288+03	2.022520+03
16	THRU	20	2.021406+03	1.523749+03	1.550689+03	1.575145+03	1.582020+03
21	THRU	25	1.750449+03	1.761137+03	1.758672+03	1.759893+03	1.762218+03
26	THRU	30	1.762579+03	1.763003+03	1.813231+03	1.814067+03	1.937811+03
31	THRU	35	2.031000+03	2.024866+03	1.451289+03	1.474766+03	1.496441+03
36	THRU	40	1.503025+03	1.657070+03	1.658730+03	1.660072+03	1.661178+03
41	THRU	45	1.662289+03	1.663259+03	1.663810+03	1.740498+03	1.741537+03
46	THRU	50	1.876502+03	1.995293+03	1.991358+03	1.361833+03	1.381422+03
51	THRU	55	1.400852+03	1.409908+03	1.531861+03	1.538052+03	1.537075+03
56	THRU	60	1.538660+03	1.539807+03	1.540786+03	1.541283+03	1.649180+03
61	THRU	65	1.650396+03	1.797544+03	1.939592+03	1.937466+03	1.233927+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

66	THRU	70	1.249383+03	1.266643+03	1.275278+03	1.375295+03	1.447729+03
71	THRU	75	1.423502+03	1.432043+03	1.433342+03	1.432696+03	1.433818+03
76	THRU	80	1.567400+03	1.568822+03	1.734171+03	1.892585+03	1.892910+03
81	THRU	85	1.133356+03	1.145866+03	1.161009+03	1.169631+03	1.358294+03
86	THRU	90	1.357712+03	1.358227+03	1.357654+03	1.357176+03	1.362147+03
91	THRU	95	1.362720+03	1.512918+03	1.514532+03	1.691250+03	1.851258+03
96	THRU	100	1.851476+03	1.109362+03	1.121172+03	1.135484+03	1.143647+03
101	THRU	105	1.348847+03	1.336599+03	1.337081+03	1.344183+03	1.340936+03
106	THRU	110	1.343739+03	1.344260+03	1.498498+03	1.499951+03	1.676711+03
111	THRU	113	1.828345+03	1.832210+03	-6.000000+01		

HWC081	9.84424-01	HWC017	9.84802-01	HWC033	9.85662-01	HWC049	9.86730-01	HWC065	9.88250-01	HWC081	9.89429-01
HWC097	9.97704-01	Q1	1.13844+00	Q17	2.24008+00	Q33	2.15676+00	Q49	2.05451+00	Q65	1.90716+00
Q81	1.79242+00	Q97	8.82668-01	LOOPCT	1.00000+01						

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TIME 3.90000+02 DTIMEU 5.00000+00 CSGMIN(12) 1.66504-01 DTMPCC(69) 7.13879+01 ARLXCC(102) 2.03979-01

1	THRU	5	1.450086+03	1.473862+03	1.497592+03	1.506736+03	1.725993+03
6	THRU	10	1.732109+03	1.732852+03	1.733934+03	1.735962+03	1.736650+03
11	THRU	15	1.737336+03	1.812467+03	1.813480+03	1.959953+03	2.057623+03
16	THRU	20	2.055860+03	1.423108+03	1.445565+03	1.467764+03	1.476086+03
21	THRU	25	1.702692+03	1.709670+03	1.709895+03	1.711422+03	1.712818+03
26	THRU	30	1.714392+03	1.714967+03	1.795268+03	1.796456+03	1.948804+03
31	THRU	35	2.058885+03	2.054212+03	1.366064+03	1.386102+03	1.406306+03
36	THRU	40	1.414327+03	1.628132+03	1.629569+03	1.631312+03	1.632960+03
41	THRU	45	1.634263+03	1.635466+03	1.636165+03	1.735876+03	1.737227+03
46	THRU	50	1.894693+03	2.023146+03	2.020102+03	1.295453+03	1.312856+03
51	THRU	55	1.331132+03	1.341328+03	1.527484+03	1.532663+03	1.532343+03
56	THRU	60	1.534102+03	1.535759+03	1.536617+03	1.537583+03	1.659542+03
61	THRU	65	1.660954+03	1.822903+03	1.969351+03	1.967631+03	1.196424+03
66	THRU	70	1.210743+03	1.227278+03	1.236143+03	1.406483+03	1.455887+03
71	THRU	75	1.440956+03	1.446344+03	1.447055+03	1.447499+03	1.448675+03
76	THRU	80	1.589226+03	1.590748+03	1.761807+03	1.922956+03	1.923533+03
81	THRU	85	1.112064+03	1.124020+03	1.138760+03	1.147397+03	1.382678+03
86	THRU	90	1.382900+03	1.384441+03	1.385537+03	1.386023+03	1.388326+03
91	THRU	95	1.386521+03	1.540565+03	1.542195+03	1.719431+03	1.881296+03
96	THRU	100	1.881694+03	1.089951+03	1.101311+03	1.115429+03	1.123797+03
101	THRU	105	1.375113+03	1.365909+03	1.367539+03	1.371547+03	1.370697+03
106	THRU	110	1.371868+03	1.372476+03	1.527396+03	1.528885+03	1.704786+03
111	THRU	113	1.858204+03	1.862227+03	-6.000000+01		

HWC081	9.85590-01	HWC017	9.85907-01	HWC033	9.86585-01	HWC049	9.87423-01	HWC065	9.88603-01	HWC081	9.89597-01
HWC097	9.89854-01	Q1	1.07727+00	Q17	2.12361+00	Q33	2.05853+00	Q49	1.97781+00	Q65	1.86433+00
Q81	1.76822+00	Q97	8.71586-01	LOOPCT	1.20000+01						

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TIME 4.25000+02 DTIMEU 1.00000+01 CSGMIN(12) 1.67720-01 DTMPCC(69) 5.93024+01 ARLXCC(5) 6.25854-01

1	THRU	5	1.360802+03	1.380885+03	1.402202+03	1.411678+03	1.675709+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

6	THRU	10	1.673861+03	1.676510+03	1.678438+03	1.681930+03	1.682273+03
11	THRU	15	1.683292+03	1.785142+03	1.786872+03	1.958322+03	2.078395+03
16	THRU	20	2.076190+03	1.338478+03	1.357615+03	1.377804+03	1.386730+03
21	THRU	25	1.657968+03	1.656467+03	1.662706+03	1.662250+03	1.662287+03
26	THRU	30	1.663895+03	1.664921+03	1.771590+03	1.773001+03	1.947535+03
31	THRU	35	2.073840+03	2.070602+03	1.293523+03	1.310994+03	1.329813+03
36	THRU	40	1.338531+03	1.594067+03	1.597394+03	1.598904+03	1.600556+03
41	THRU	45	1.606095+03	1.602898+03	1.603809+03	1.724534+03	1.725846+03
46	THRU	50	1.901747+03	2.040228+03	2.038118+03	1.237224+03	1.252782+03
51	THRU	55	1.270118+03	1.280949+03	1.522324+03	1.519948+03	1.522970+03
56	THRU	60	1.524000+03	1.525282+03	1.526840+03	1.527495+03	1.663333+03
61	THRU	65	1.664865+03	1.840534+03	1.991805+03	1.990576+03	1.160756+03
66	THRU	70	1.174073+03	1.190099+03	1.198971+03	1.476919+03	1.437517+03
71	THRU	75	1.454740+03	1.453065+03	1.454891+03	1.455522+03	1.455988+03
76	THRU	80	1.607089+03	1.607160+03	1.785767+03	1.949562+03	1.950341+03
81	THRU	85	1.090839+03	1.102236+03	1.116673+03	1.125480+03	1.405673+03
86	THRU	90	1.398758+03	1.407317+03	1.408240+03	1.407998+03	1.407503+03
91	THRU	95	1.411095+03	1.565368+03	1.567006+03	1.747299+03	1.911306+03
96	THRU	100	1.911878+03	1.071352+03	1.082243+03	1.096444+03	1.104933+03
101	THRU	105	1.381997+03	1.390685+03	1.390490+03	1.391627+03	1.393333+03
106	THRU	110	1.394996+03	1.395586+03	1.553984+03	1.555537+03	1.733843+03
111	THRU	113	1.890539+03	1.894295+03	-6.000000+01		

HWC001	9.86474-01	HWC017	9.86744-01	HWC033	9.87296-01	HWC049	9.87983-01	HWC065	9.88927-01	HWC081	9.89774-01
HWC097	9.90007-01	Q1	5.14480-01	Q17	1.01611+00	Q33	9.90015-01	Q49	9.57446-01	Q65	9.13081-01
Q81	8.72908-01	Q97	4.30889-01	LOOPCT	1.30000+01						

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TIME 7.25000+02 DTIMEU 1.00000+01 CSGMIN(12) 1.77202-01 DTMPCC(21) 2.97572+01 ARLXCC(70) 7.96494-01

1	THRU	5	1.052878+03	1.063249+03	1.076573+03	1.084751+03	1.434269+03
6	THRU	10	1.430744+03	1.440987+03	1.433326+03	1.440040+03	1.439083+03
11	THRU	15	1.441268+03	1.622274+03	1.624824+03	1.833261+03	2.000137+03
16	THRU	20	1.998999+03	1.047108+03	1.057402+03	1.070556+03	1.078587+03
21	THRU	25	1.447049+03	1.424530+03	1.434015+03	1.433965+03	1.435677+03
26	THRU	30	1.438912+03	1.437096+03	1.619190+03	1.620993+03	1.828636+03
31	THRU	35	1.993076+03	1.993354+03	1.041700+03	1.051976+03	1.065131+03
36	THRU	40	1.073689+03	1.420362+03	1.420610+03	1.422742+03	1.424288+03
41	THRU	45	1.425902+03	1.427552+03	1.428427+03	1.606537+03	1.613039+03
46	THRU	50	1.818614+03	1.983653+03	1.983904+03	1.027983+03	1.037876+03
51	THRU	55	1.050891+03	1.061123+03	1.408701+03	1.408616+03	1.411773+03
56	THRU	60	1.413062+03	1.415044+03	1.415750+03	1.417591+03	1.600698+03
61	THRU	65	1.602301+03	1.807787+03	1.973731+03	1.974158+03	1.013281+03
66	THRU	70	1.022800+03	1.035661+03	1.044090+03	1.406468+03	1.388935+03
71	THRU	75	1.396882+03	1.398962+03	1.401247+03	1.403324+03	1.403874+03
76	THRU	80	1.592416+03	1.593786+03	1.798707+03	1.966556+03	1.967272+03
81	THRU	85	9.920013+02	1.001080+03	1.013407+03	1.021507+03	1.396795+03
86	THRU	90	1.391822+03	1.396540+03	1.396869+03	1.398390+03	1.399652+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

91	THRU	95	1.401362+03	1.587202+03	1.589322+03	1.793479+03	1.961776+03
96	THRU	100	1.962495+03	9.883577+02	9.973915+02	1.009766+03	1.018039+03
101	THRU	105	1.388407+03	1.392915+03	1.396084+03	1.391487+03	1.400710+03
106	THRU	110	1.397871+03	1.398691+03	1.585525+03	1.589543+03	1.792974+03
111	THRU	113	1.962136+03	1.962363+03	-6.000000+01		

HWCOR1	9.90216-01	HWC017	9.90284-01	HWC033	9.90352-01	HWC049	9.90517-01	HWC065	9.90696-01	HWC081	9.90941-01
HWC097	9.90981-01	Q1	4.25720-01	Q17	8.48045-01	Q33	8.44693-01	Q49	8.36981-01	Q65	8.28670-01
Q81	8.16443-01	Q97	4.07149-01	LOOPCT	1.50000+01						

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TIME 1.02500+03 DTIMEU 1.00000+01 CSGMIN(69) 1.79616-01 DTMPCC(21) 2.59469+02 ARLXCC(24) 7.95532-01

1	THRU	5	9.400378+02	9.478481+02	9.583921+02	9.651297+02	1.316418+03
6	THRU	10	1.322958+03	1.290984+03	1.328810+03	1.316213+03	1.321868+03
11	THRU	15	1.307869+03	1.526986+03	1.529638+03	1.745196+03	1.912700+03
16	THRU	20	1.912298+03	9.393321+02	9.471761+02	9.577548+02	9.644431+02
21	THRU	25	1.184766+03	1.384608+03	1.269433+03	1.313479+03	1.323174+03
26	THRU	30	1.332038+03	1.306393+03	1.525433+03	1.527879+03	1.743564+03
31	THRU	35	1.909300+03	1.909753+03	9.432366+02	9.512015+02	9.619369+02
36	THRU	40	9.689257+02	1.313109+03	1.312750+03	1.313527+03	1.316811+03
41	THRU	45	1.316938+03	1.318378+03	1.319446+03	1.528229+03	1.525388+03
46	THRU	50	1.742189+03	1.907280+03	1.907710+03	9.404264+02	9.483292+02
51	THRU	55	9.589587+02	9.674765+02	1.310912+03	1.315554+03	1.314949+03
56	THRU	60	1.316975+03	1.318062+03	1.318895+03	1.320911+03	1.524456+03
61	THRU	65	1.526242+03	1.741634+03	1.906454+03	1.906873+03	9.377629+02
66	THRU	70	9.456349+02	9.563174+02	9.633783+02	1.329109+03	1.311551+03
71	THRU	75	1.313833+03	1.320293+03	1.317992+03	1.319858+03	1.320242+03
76	THRU	80	1.524492+03	1.525836+03	1.741740+03	1.906667+03	1.907076+03
81	THRU	85	9.267173+02	9.343350+02	9.446398+02	9.514138+02	1.309099+03
86	THRU	90	1.313042+03	1.311978+03	1.319933+03	1.317298+03	1.317840+03
91	THRU	95	1.320888+03	1.526385+03	1.528329+03	1.742993+03	1.908143+03
96	THRU	100	1.908551+03	9.268512+02	9.344848+02	9.448842+02	9.518032+02
101	THRU	105	1.298686+03	1.320516+03	1.317350+03	1.316537+03	1.319632+03
106	THRU	110	1.320155+03	1.321387+03	1.526714+03	1.530080+03	1.744332+03
111	THRU	113	1.910906+03	1.910596+03	-6.000000+01		

HWCOR1	9.91474-01	HWC017	9.91482-01	HWC033	9.91442-01	HWC049	9.91472-01	HWC065	9.91501-01	HWC081	9.91617-01
HWC097	9.91617-01	Q1	3.93710-01	Q17	7.86918-01	Q33	7.89014-01	Q49	7.87401-01	Q65	7.85857-01
Q81	7.79622-01	Q97	3.89841-01	LOOPCT	1.20000+01						

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TIME 1.32500+03 DTIMEU 1.00000+01 CSGMIN(69) 1.71241-01 DTMPCC(21) 1.55540+02 ARLXCC(74) 6.94580-01

1	THRU	5	8.789944+02	8.856448+02	8.947821+02	9.009306+02	1.254382+03
6	THRU	10	1.255067+03	1.253793+03	1.260591+03	1.255892+03	1.263543+03
11	THRU	15	1.258563+03	1.482029+03	1.480600+03	1.701653+03	1.865310+03

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16	THRU	20	1.865038+03	8.788276+02	8.854502+02	8.945586+02	9.006794+02
21	THRU	25	1.179046+03	1.285518+03	1.245722+03	1.258460+03	1.262503+03
26	THRU	30	1.261597+03	1.255811+03	1.477687+03	1.479900+03	1.700272+03
31	THRU	35	1.863245+03	1.863460+03	8.834201+02	8.905287+02	8.996611+02
36	THRU	40	9.059765+02	1.251819+03	1.251937+03	1.253086+03	1.254663+03
41	THRU	45	1.255807+03	1.256623+03	1.259496+03	1.476848+03	1.476796+03
46	THRU	50	1.698336+03	1.861494+03	1.861771+03	8.815116+02	8.882168+02
51	THRU	55	8.974511+02	9.049169+02	1.245022+03	1.254370+03	1.250618+03
56	THRU	60	1.252815+03	1.255109+03	1.255183+03	1.256387+03	1.473909+03
61	THRU	65	1.475856+03	1.697200+03	1.860554+03	1.860828+03	8.804232+02
66	THRU	70	8.871512+02	8.963971+02	9.025814+02	1.252361+03	1.243844+03
71	THRU	75	1.247703+03	1.248226+03	1.252767+03	1.253426+03	1.254029+03
76	THRU	80	1.473668+03	1.475425+03	1.697065+03	1.860560+03	1.860844+03
81	THRU	85	8.715473+02	8.781042+02	8.869735+02	8.930161+02	1.250608+03
86	THRU	90	1.251628+03	1.251815+03	1.254404+03	1.253645+03	1.255666+03
91	THRU	95	1.256695+03	1.475073+03	1.477067+03	1.698166+03	1.861655+03
96	THRU	100	1.861923+03	8.723451+02	8.789088+02	8.877354+02	8.939579+02
101	THRU	105	1.246084+03	1.253241+03	1.251788+03	1.252780+03	1.255028+03
106	THRU	110	1.255117+03	1.256343+03	1.475854+03	1.478563+03	1.699347+03
111	THRU	113	1.863590+03	1.863363+03	-6.000000+01		

HWC001	9.92114-01	HWC017	9.92116-01	HWC033	9.92063-01	HWC049	9.92088-01	HWC065	9.92099-01	HWC081	9.92191-01
HWC097	9.92183-01	Q1	3.76387-01	Q17	7.52730-01	Q33	7.54331-01	Q49	7.54174-01	Q65	7.53478-01
Q81	7.48428-01	Q97	3.74468-01	LOOPCT	1.30000+01						

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TIME 1.62500+03 DTIMEU 1.00000+01 CSGMIN(69) 1.65572-01 DTMPCC(21) 1.26215+02 ARLXCC(88) 8.31528-01

1	THRU	5	8.360076+02	8.419153+02	8.500882+02	8.555954+02	1.211062+03
6	THRU	10	1.209729+03	1.209819+03	1.213288+03	1.211996+03	1.215966+03
11	THRU	15	1.211360+03	1.444902+03	1.446017+03	1.670023+03	1.832610+03
16	THRU	20	1.832401+03	8.363859+02	8.415791+02	8.500346+02	8.553679+02
21	THRU	25	1.144911+03	1.238665+03	1.199110+03	1.210880+03	1.210491+03
26	THRU	30	1.214139+03	1.212807+03	1.441491+03	1.445029+03	1.668947+03
31	THRU	35	1.831029+03	1.831375+03	8.412241+02	8.473008+02	8.556265+02
36	THRU	40	8.612566+02	1.186416+03	1.222634+03	1.194553+03	1.200619+03
41	THRU	45	1.202300+03	1.221914+03	1.205049+03	1.440068+03	1.442221+03
46	THRU	50	1.667321+03	1.829950+03	1.830136+03	8.406106+02	8.466686+02
51	THRU	55	8.549508+02	8.617760+02	1.202888+03	1.206743+03	1.206613+03
56	THRU	60	1.208334+03	1.209233+03	1.210277+03	1.211110+03	1.439452+03
61	THRU	65	1.441980+03	1.666889+03	1.829459+03	1.829693+03	8.402659+02
66	THRU	70	8.461734+02	8.545591+02	8.602479+02	1.212623+03	1.202533+03
71	THRU	75	1.208913+03	1.207607+03	1.209871+03	1.209662+03	1.210487+03
76	THRU	80	1.439838+03	1.442351+03	1.667079+03	1.829722+03	1.829892+03
81	THRU	85	8.319273+02	8.377588+02	8.456558+02	8.515092+02	1.221452+03
86	THRU	90	1.184118+03	1.214420+03	1.211575+03	1.209595+03	1.211240+03
91	THRU	95	1.208200+03	1.441224+03	1.443605+03	1.668326+03	1.830783+03
96	THRU	100	1.830956+03	8.328440+02	8.386963+02	8.468026+02	8.523529+02

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

101	THRU	105	1.206272+03	1.205086+03	1.207184+03	1.207284+03	1.208188+03
106	THRU	110	1.208646+03	1.209551+03	1.442879+03	1.444912+03	1.669363+03
111	THRU	113	1.832266+03	1.832083+03	-6.000000+01		

HWC081	9.92561-01	HWC017	9.92567-01	HWC033	9.92506-01	HWC049	9.92512-01	HWC065	9.92518-01	HWC081	9.92603-01
HWC097	9.92593-01	Q1	3.64238-01	Q17	7.30514-01	Q33	7.31178-01	Q49	7.30865-01	Q65	7.31066-01
Q81	7.26156-01	Q97	3.63340-01	LOOPCT	1.50000+01						

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TIME 1.92500+03 DTIMEU 1.00000+01 CSGMIN(85) 1.60490-01 DTMPCC(21) 1.73029+02 ARLXCC(24) 4.58267-01

1	THRU	5	8.066950+02	8.121116+02	8.196740+02	8.248386+02	1.172703+03
6	THRU	10	1.172902+03	1.173963+03	1.174854+03	1.175438+03	1.177296+03
11	THRU	15	1.176588+03	1.419294+03	1.421129+03	1.648398+03	1.810507+03
16	THRU	20	1.810316+03	8.071363+02	8.124431+02	8.199110+02	8.250800+02
21	THRU	25	1.087304+03	1.208963+03	1.162050+03	1.176640+03	1.177205+03
26	THRU	30	1.176639+03	1.176732+03	1.417139+03	1.419637+03	1.647248+03
31	THRU	35	1.809106+03	1.809226+03	8.116840+02	8.171820+02	8.249223+02
36	THRU	40	8.302327+02	1.160180+03	1.177641+03	1.171200+03	1.175200+03
41	THRU	45	1.174393+03	1.179336+03	1.172632+03	1.416053+03	1.417365+03
46	THRU	50	1.645671+03	1.807734+03	1.807886+03	8.097749+02	8.152603+02
51	THRU	55	8.229250+02	8.292196+02	1.168955+03	1.171293+03	1.173344+03
56	THRU	60	1.172768+03	1.174102+03	1.174109+03	1.177662+03	1.414236+03
61	THRU	65	1.416338+03	1.644572+03	1.806819+03	1.806986+03	8.083558+02
66	THRU	70	8.138211+02	8.214977+02	8.267588+02	1.172862+03	1.168291+03
71	THRU	75	1.171258+03	1.171499+03	1.173176+03	1.173612+03	1.174463+03
76	THRU	80	1.413675+03	1.415798+03	1.644175+03	1.806587+03	1.806769+03
81	THRU	85	7.999235+02	8.051985+02	8.125589+02	8.175732+02	1.179904+03
86	THRU	90	1.165860+03	1.171074+03	1.170807+03	1.173089+03	1.170721+03
91	THRU	95	1.178032+03	1.414484+03	1.416741+03	1.644798+03	1.807134+03
96	THRU	100	1.807298+03	8.004936+02	8.058263+02	8.132621+02	8.183532+02
101	THRU	105	1.168123+03	1.168738+03	1.170166+03	1.170767+03	1.170228+03
106	THRU	110	1.173552+03	1.173635+03	1.415711+03	1.417902+03	1.645634+03
111	THRU	113	1.808283+03	1.808154+03	-6.000000+01		

HWC081	9.92865-01	HWC017	9.92863-01	HWC033	9.92814-01	HWC049	9.92834-01	HWC065	9.92849-01	HWC081	9.92935-01
HWC097	9.92929-01	Q1	3.55967-01	Q17	7.12031-01	Q33	7.14769-01	Q49	7.13620-01	Q65	7.12829-01
Q81	7.08082-01	Q97	3.54206-01	LOOPCT	1.20000+01						

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TIME 2.22500+03 DTIMEU 1.00000+01 CSGMIN(69) 1.57901-01 DTMPCC(21) 1.03222+02 ARLXCC(53) 8.36914-01

1	THRU	5	7.774473+02	7.812427+02	7.887678+02	7.932330+02	1.141478+03
6	THRU	10	1.141358+03	1.142095+03	1.144193+03	1.146493+03	1.138545+03
11	THRU	15	1.147672+03	1.403660+03	1.395660+03	1.628350+03	1.790160+03
16	THRU	20	1.790018+03	7.787292+02	7.836777+02	7.906379+02	7.954314+02
21	THRU	25	1.089973+03	1.154978+03	1.138520+03	1.145550+03	1.135157+03

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

26	THRU	30	1.152797+03	1.145447+03	1.394585+03	1.396948+03	1.627443+03
31	THRU	35	1.789076+03	1.789166+03	7.836268+02	7.895814+02	7.963711+02
36	THRU	40	8.014289+02	1.132379+03	1.143913+03	1.137732+03	1.148752+03
41	THRU	45	1.141337+03	1.144581+03	1.143738+03	1.390913+03	1.396064+03
46	THRU	50	1.626206+03	1.788108+03	1.788210+03	7.839523+02	7.890559+02
51	THRU	55	7.960764+02	8.023432+02	1.099815+03	1.165522+03	1.129958+03
56	THRU	60	1.141080+03	1.142264+03	1.153221+03	1.136866+03	1.393956+03
61	THRU	65	1.394516+03	1.625783+03	1.787661+03	1.787809+03	7.829276+02
66	THRU	70	7.880047+02	7.951800+02	8.001407+02	1.143224+03	1.142089+03
71	THRU	75	1.143590+03	1.144435+03	1.143827+03	1.145869+03	1.146980+03
76	THRU	80	1.393368+03	1.395337+03	1.625999+03	1.787810+03	1.787922+03
81	THRU	85	7.747491+02	7.796765+02	7.865820+02	7.913211+02	1.141225+03
86	THRU	90	1.143723+03	1.145111+03	1.145054+03	1.147111+03	1.146456+03
91	THRU	95	1.145646+03	1.390545+03	1.398472+03	1.626950+03	1.788511+03
96	THRU	100	1.788589+03	7.747337+02	7.796217+02	7.866853+02	7.914168+02
101	THRU	105	1.152074+03	1.140958+03	1.144436+03	1.146136+03	1.145530+03
106	THRU	110	1.147201+03	1.147542+03	1.396301+03	1.398402+03	1.627797+03
111	THRU	113	1.789412+03	1.789295+03	-6.000000+01		

HWC001	9.93188-01	HWC017	9.93155-01	HWC033	9.93091-01	HWC049	9.93101-01	HWC065	9.93113-01	HWC081	9.93197-01
HWC097	9.93198-01	Q1	3.49194-01	Q17	6.96241-01	Q33	6.96679-01	Q49	6.99001-01	Q65	6.98480-01
Q81	6.93878-01	Q97	3.46991-01	LOOPCT	1.00000+01						

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TIME 2.52500+03 DTIMEU 1.00000+01 CSGMIN(69) 1.55964-01 DTMPCC(21) 5.94583+01 ARLXCC(69) 6.54922-01

1	THRU	5	7.589734+02	7.635894+02	7.703018+02	7.749021+02	1.124959+03
6	THRU	10	1.124918+03	1.125307+03	1.126698+03	1.128062+03	1.128746+03
11	THRU	15	1.133302+03	1.386086+03	1.384700+03	1.616317+03	1.777724+03
16	THRU	20	1.777627+03	7.593559+02	7.639319+02	7.706629+02	7.752698+02
21	THRU	25	1.096126+03	1.134865+03	1.124125+03	1.130558+03	1.124470+03
26	THRU	30	1.135313+03	1.121976+03	1.381105+03	1.384333+03	1.615525+03
31	THRU	35	1.777034+03	1.777071+03	7.648690+02	7.698832+02	7.765324+02
36	THRU	40	7.817710+02	1.116750+03	1.127595+03	1.124146+03	1.126577+03
41	THRU	45	1.128336+03	1.128009+03	1.128367+03	1.379803+03	1.382708+03
46	THRU	50	1.614754+03	1.776266+03	1.776350+03	7.649354+02	7.697237+02
51	THRU	55	7.765673+02	7.822666+02	1.103041+03	1.133723+03	1.121147+03
56	THRU	60	1.129018+03	1.125821+03	1.131516+03	1.124411+03	1.380008+03
61	THRU	65	1.381610+03	1.613826+03	1.775967+03	1.776067+03	7.642107+02
66	THRU	70	7.690550+02	7.759033+02	7.807279+02	1.126901+03	1.123825+03
71	THRU	75	1.126648+03	1.127146+03	1.127475+03	1.128793+03	1.131333+03
76	THRU	80	1.379790+03	1.382353+03	1.614179+03	1.776147+03	1.776216+03
81	THRU	85	7.564932+02	7.611612+02	7.677688+02	7.723338+02	1.122577+03
86	THRU	90	1.127123+03	1.127652+03	1.128439+03	1.130609+03	1.128855+03
91	THRU	95	1.128303+03	1.380830+03	1.384678+03	1.615239+03	1.776739+03
96	THRU	100	1.776782+03	7.570160+02	7.616681+02	7.683482+02	7.729627+02
101	THRU	105	1.133072+03	1.125101+03	1.128637+03	1.127149+03	1.127850+03
106	THRU	110	1.129631+03	1.130161+03	1.383360+03	1.385669+03	1.616112+03

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THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5  MOR

   111  THRU   113      1.777344+03      1.777255+03     -6.000000+01

HWC081    9.93362-01 HWC017   9.93358-01 HWC033   9.93299-01 HWC049   9.93300-01 HWC065   9.93307-01 HWC081   9.93387-01
HWC097    9.93383-01 Q1       3.42549-01 Q17      6.85364-01 Q33      6.88033-01 Q49      6.88339-01 Q65      6.87806-01
Q81       6.83565-01 Q97      3.41966-01 LOOPCT   7.00000+00

* * * *
TIME  2.82500+03 DTIMEU  1.00000+01 CSGMIN(  69)  1.53128-01 DTMPCC(  85)  1.84891+02 ARLXCC(  85)  8.79700-01

     1  THRU     5      7.412503+02      7.458611+02      7.520273+02      7.564455+02      1.101007+03
     6  THRU    10      1.099521+03      1.101147+03      1.101234+03      1.102579+03      1.103175+03
    11  THRU    15      1.105078+03      1.368795+03      1.369407+03      1.603513+03      1.766842+03
    16  THRU    20      1.766732+03      7.415501+02      7.459874+02      7.522406+02      7.565661+02
    21  THRU    25      1.080354+03      1.107476+03      1.098261+03      1.102958+03      1.100963+03
    26  THRU    30      1.105602+03      1.100646+03      1.366116+03      1.368428+03      1.602614+03
    31  THRU    35      1.766068+03      1.766122+03      7.473304+02      7.518784+02      7.583246+02
    36  THRU    40      7.628313+02      1.093926+03      1.100746+03      1.100293+03      1.100895+03
    41  THRU    45      1.102549+03      1.103226+03      1.103984+03      1.364541+03      1.366692+03
    46  THRU    50      1.601383+03      1.765274+03      1.765360+03      7.472593+02      7.518257+02
    51  THRU    55      7.582635+02      7.635553+02      1.088155+03      1.103962+03      1.097989+03
    56  THRU    60      1.101562+03      1.100931+03      1.103786+03      1.101689+03      1.361338+03
    61  THRU    65      1.367128+03      1.600921+03      1.764903+03      1.764992+03      7.469762+02
    66  THRU    70      7.515437+02      7.580535+02      7.625594+02      1.098048+03      1.099629+03
    71  THRU    75      1.099353+03      1.103985+03      1.104492+03      1.100387+03      1.103140+03
    76  THRU    80      1.362514+03      1.367326+03      1.601140+03      1.764996+03      1.765074+03
    81  THRU    85      7.400951+02      7.444524+02      7.507759+02      7.551629+02      1.011751+03
    86  THRU    90      1.141653+03      1.091199+03      1.087830+03      1.113499+03      1.109288+03
    91  THRU    95      1.108330+03      1.366013+03      1.368606+03      1.602132+03      1.765528+03
    96  THRU   100      1.765571+03      7.402820+02      7.449531+02      7.510154+02      7.587461+02
   101  THRU   105      1.099742+03      1.098259+03      1.132020+03      1.060614+03      1.135461+03
   106  THRU   110      1.102345+03      1.099894+03      1.368206+03      1.370440+03      1.602891+03
   111  THRU   113      1.766080+03      1.766002+03     -6.000000+01

HWC081    9.93542-01 HWC017   9.93541-01 HWC033   9.93481-01 HWC049   9.93482-01 HWC065   9.93485-01 HWC081   9.93558-01
HWC097    9.93556-01 Q1       3.37513-01 Q17      6.75201-01 Q33      6.78443-01 Q49      6.78394-01 Q65      6.78162-01
Q81       6.74523-01 Q97      3.37197-01 LOOPCT   1.00000+01

* * * *
TIME  3.12500+03 DTIMEU  1.00000+01 CSGMIN(  69)  1.51224-01 DTMPCC(  85)  1.16123+02 ARLXCC(   5)  7.35809-01

     1  THRU     5      7.241798+02      7.283553+02      7.343370+02      7.384699+02      1.091063+03
     6  THRU    10      1.075514+03      1.084043+03      1.079778+03      1.078547+03      1.083080+03
    11  THRU    15      1.083657+03      1.355715+03      1.357047+03      1.592363+03      1.757035+03
    16  THRU    20      1.756969+03      7.246857+02      7.289409+02      7.349028+02      7.391265+02
    21  THRU    25      1.069032+03      1.087161+03      1.081866+03      1.066959+03      1.114710+03
    26  THRU    30      1.070822+03      1.084457+03      1.353925+03      1.355918+03      1.591648+03
    31  THRU    35      1.756564+03      1.756596+03      7.309816+02      7.353124+02      7.414815+02
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CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER - C00045 (FORTRAN V VERSION)

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

36	THRU	40	7.458237+02	1.079082+03	1.083385+03	1.082884+03	1.083328+03
41	THRU	45	1.085840+03	1.085018+03	1.086996+03	1.352747+03	1.354675+03
46	THRU	50	1.590905+03	1.756174+03	1.756241+03	7.321079+02	7.364486+02
51	THRU	55	7.426084+02	7.477281+02	1.076856+03	1.085323+03	1.082999+03
56	THRU	60	1.085060+03	1.085407+03	1.087204+03	1.086663+03	1.351796+03
61	THRU	65	1.354975+03	1.590837+03	1.756205+03	1.756303+03	7.326359+02
66	THRU	70	7.369963+02	7.431899+02	7.475607+02	1.083605+03	1.084232+03
71	THRU	75	1.084078+03	1.085121+03	1.085212+03	1.086282+03	1.088119+03
76	THRU	80	1.352701+03	1.355721+03	1.591668+03	1.756690+03	1.756772+03
81	THRU	85	7.261630+02	7.304119+02	7.363886+02	7.405729+02	1.025971+03
86	THRU	90	1.107718+03	1.080630+03	1.086302+03	1.085867+03	1.088598+03
91	THRU	95	1.086782+03	1.355225+03	1.357235+03	1.593012+03	1.757571+03
96	THRU	100	1.757605+03	7.265346+02	7.308102+02	7.368152+02	7.410328+02
101	THRU	105	1.083308+03	1.081133+03	1.091628+03	1.071106+03	1.098454+03
106	THRU	110	1.080673+03	1.083968+03	1.356753+03	1.358607+03	1.593981+03
111	THRU	113	1.758266+03	1.758157+03	-6.000000+01		

HWC001	9.93721-01	HWC017	9.93715-01	HWC033	9.93651-01	HWC049	9.93639-01	HWC065	9.93633-01	HWC081	9.93700-01
HWC097	9.93695-01	Q1	3.32710-01	Q17	6.65589-01	Q33	6.69180-01	Q49	6.69806-01	Q65	6.70171-01
Q81	6.66580-01	Q97	3.33318-01	LOOPCT	1.90000+01						

* * * *

TIME 3.42500+03 DTIMEU 1.00000+01 CSGMIN(21) 1.47389-01 DTMPCC(85) 1.95511+02 ARLXCC(85) 8.85910-01

1	THRU	5	7.119539+02	7.160030+02	7.217404+02	7.257755+02	1.073304+03
6	THRU	10	1.065398+03	1.069672+03	1.069049+03	1.070338+03	1.073648+03
11	THRU	15	1.073204+03	1.346721+03	1.348253+03	1.584621+03	1.750026+03
16	THRU	20	1.749931+03	7.123127+02	7.163770+02	7.221002+02	7.261221+02
21	THRU	25	1.104952+03	1.066507+03	1.067044+03	1.066649+03	1.081066+03
26	THRU	30	1.068284+03	1.078170+03	1.345277+03	1.346878+03	1.583747+03
31	THRU	35	1.749459+03	1.749466+03	7.180546+02	7.221947+02	7.281374+02
36	THRU	40	7.322949+02	1.064340+03	1.068711+03	1.067583+03	1.068817+03
41	THRU	45	1.070188+03	1.070518+03	1.071804+03	1.342634+03	1.344648+03
46	THRU	50	1.582296+03	1.748621+03	1.748671+03	7.180834+02	7.222151+02
51	THRU	55	7.281011+02	7.329756+02	1.061160+03	1.065665+03	1.065867+03
56	THRU	60	1.065317+03	1.067181+03	1.068210+03	1.068320+03	1.341096+03
61	THRU	65	1.343364+03	1.581430+03	1.748049+03	1.748113+03	7.179738+02
66	THRU	70	7.221205+02	7.280152+02	7.321494+02	1.059414+03	1.061998+03
71	THRU	75	1.060065+03	1.061258+03	1.062976+03	1.062857+03	1.063987+03
76	THRU	80	1.338841+03	1.343305+03	1.581182+03	1.747894+03	1.747965+03
81	THRU	85	7.114097+02	7.154594+02	7.211567+02	7.251006+02	9.616190+02
86	THRU	90	1.094817+03	1.045666+03	1.060821+03	1.058025+03	1.062131+03
91	THRU	95	1.060651+03	1.341747+03	1.343747+03	1.581773+03	1.748169+03
96	THRU	100	1.748217+03	7.114932+02	7.154901+02	7.212216+02	7.252251+02
101	THRU	105	1.062793+03	1.059235+03	1.065102+03	1.054970+03	1.072747+03
106	THRU	110	1.058906+03	1.064651+03	1.343130+03	1.345044+03	1.582439+03
111	THRU	113	1.748594+03	1.748538+03	-6.000000+01		

THERMAL RESPONSE OF THE GLFC FOR ORBIT 1 OF 5 MOR

HWC001	9.93849-01	HWC017	9.93845-01	HWC033	9.93785-01	HWC049	9.93784-01	HWC065	9.93784-01	HWC081	9.93852-01
HWC097	9.93852-01	Q1	3.29236-01	Q17	6.58671-01	Q33	6.61935-01	Q49	6.61963-01	Q65	6.61926-01
Q81	6.58262-01	Q97	3.29163-01	LOOPCT	9.00000+00						

* * * *

TIME 3.72500+03 DTIMEU 1.00000+01 CSGMIN(21) 1.47825-01 DTMPCC(85) 1.47846+02 ARLXCC(104) 6.50253-01

1	THRU	5	7.016569+02	7.055805+02	7.111901+02	7.151342+02	1.057832+03
6	THRU	10	1.057641+03	1.058099+03	1.059192+03	1.059704+03	1.061059+03
11	THRU	15	1.060900+03	1.339120+03	1.341095+03	1.578564+03	1.744893+03
16	THRU	20	1.744818+03	7.020497+02	7.059680+02	7.115630+02	7.154810+02
21	THRU	25	1.066932+03	1.053847+03	1.059271+03	1.058109+03	1.061859+03
26	THRU	30	1.058078+03	1.063266+03	1.337027+03	1.339841+03	1.577788+03
31	THRU	35	1.744435+03	1.744448+03	7.077913+02	7.117978+02	7.175688+02
36	THRU	40	7.216491+02	1.054161+03	1.056585+03	1.058125+03	1.057280+03
41	THRU	45	1.058738+03	1.059668+03	1.060435+03	1.335906+03	1.337777+03
46	THRU	50	1.576636+03	1.743816+03	1.743866+03	7.079401+02	7.119436+02
51	THRU	55	7.176909+02	7.224829+02	1.056225+03	1.054851+03	1.057075+03
56	THRU	60	1.057195+03	1.057204+03	1.059335+03	1.059465+03	1.334904+03
61	THRU	65	1.337107+03	1.576119+03	1.743497+03	1.743560+03	7.080594+02
66	THRU	70	7.120741+02	7.178616+02	7.219502+02	1.057379+03	1.052697+03
71	THRU	75	1.056035+03	1.055662+03	1.056425+03	1.058691+03	1.058791+03
76	THRU	80	1.334122+03	1.337332+03	1.576200+03	1.743568+03	1.743630+03
81	THRU	85	7.017409+02	7.056529+02	7.112463+02	7.151608+02	9.824110+02
86	THRU	90	1.088216+03	1.046327+03	1.058857+03	1.059887+03	1.058952+03
91	THRU	95	1.057250+03	1.336367+03	1.338580+03	1.577170+03	1.744057+03
96	THRU	100	1.744089+03	7.019553+02	7.059054+02	7.115301+02	7.154880+02
101	THRU	105	1.044709+03	1.056265+03	1.058737+03	1.054479+03	1.058891+03
106	THRU	110	1.055360+03	1.059715+03	1.337821+03	1.339889+03	1.577942+03
111	THRU	113	1.744521+03	1.744451+03	-6.000000+01		

HWC001	9.93954-01	HWC017	9.93951-01	HWC033	9.93891-01	HWC049	9.93890-01	HWC065	9.93888-01	HWC081	9.93953-01
HWC097	9.93951-01	Q1	3.26345-01	Q17	6.52927-01	Q33	6.56152-01	Q49	6.56235-01	Q65	6.56310-01
Q81	6.52754-01	Q97	3.26406-01	LOOPCT	1.20000+01						

END OF DATA

APPENDIX D

Printout of RADHTG for First
Atmospheric Pass of Five Orbit Reentry

```
101. -READY     LOAD[RADHTG]
131. +READY     START(0)
102. =0 10               PROGRAM FOR CALCULATING CONVECTIVE AND RADIATIVE STAGNATION HEATING TO A REENTERING SPHERE
102. =   2
102. =   3                      (BASED ON EQUATIONS PROVIDED BY GENERAL ELECTRIC, PHILADELPHIA)
102. =   4
102. =   5
103. =0 15                                     WRITTEN BY D W LARSON, 9513
103. =   2
103. =   3                                         SANDIA LABORATORY
103. =   4
103. =   5                                      ALBUQUERQUE, NEW MEXICO
103. =   6
103. =   7
103. =   8
106. =0 20    RADIUS      ALTITUDE      VELOCITY        RADIANT          CONVECTIVE         TOTAL
106. =   2                                               HEATING           HEATING          HEATING
106. =   3    (FEET)       (FEET)       (FT/SEC)    (BTU/SQ-FT-SEC)  (BTU/SQ-FT-SEC)  (BTU/SQ-FT-SEC)
108. =I 30
109. =I 40
126. =0 50    0.333      907300.0       35630.0         0.000              0.48            0.485
109. =I 40
126. =0 50    0.333      782300.0       35735.0         0.000              0.73            0.731
109. =I 40
126. =0 50    0.333      671300.0       35828.0         0.000              1.12            1.117
109. =I 40
126. =0 50    0.333      573000.0       35910.0         0.000              1.71            1.709
109. =I 40
126. =0 50    0.333      490000.0       35928.0         0.000              2.85            2.853
109. =I 40
126. =0 50    0.333      419400.0       36042.0         0.000              6.34            6.339
109. =I 40
126. =0 50    0.333      361800.0       36092.0         0.007             20.23           20.232
109. =I 40
126. =0 50    0.333      317200.0       36130.0         0.102             63.15           63.248
109. =I 40
126. =0 50    0.333      285400.0       36158.0         0.843            156.17          157.013
109. =I 40
126. =0 50    0.333      266300.0       36175.0         3.023            270.37          273.395
109. =I 40
126. =0 50    0.333      260000.0       36180.0         4.392            317.44          321.834
109. =I 40
126. =0 50    0.333      266300.0       36175.0         3.023            270.37          273.395
109. =I 40
126. =0 50    0.333      285400.0       36158.0         0.843            156.17          157.013
109. =I 40
126. =0 50    0.333      317200.0       36130.0         0.102             63.15           63.248
109. =I 40
126. =0 50    0.333      361800.0       36092.0         0.007             20.23           20.232
109. =I 40
126. =0 50    0.333      419400.0       36042.0         0.000              6.34            6.339
109. =I 40
126. =0 50    0.333      490000.0       35928.0         0.000              2.85            2.853
109. =I 40
```

126. =0 50	0.333	573900.0	35910.0	0.000	1.71	1.709
109. =I 40						
126. =0 50	0.333	671300.0	35828.0	0.000	1.12	1.117
109. =I 40						
126. =0 50	0.333	782300.0	35735.0	0.000	0.73	0.731
109. =I 40						
126. =0 50	0.333	907300.0	35630.0	0.000	0.48	0.485
109. =I 40						
109. =BREAK 109.						

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