

DATA SET CATALOG #33

OGO II Rubidium Magnetometer

65-081A-05B

1 tape

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## **1. INTRODUCTION:**

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

## 2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

***When printing, special settings may be required to make the text box appear on the printed output.***

| Version | Date | Person | Page | Description of Change |
|---------|------|--------|------|-----------------------|
| 01      |      |        |      |                       |
| 02      |      |        |      |                       |

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC  
INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents      To find associated documents you will need to know the document ID number and then click here.  
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

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Rubidium Magnetometer  
Magnetic Field Without Position

65-081A-05B

This data set has been restored. There were originally ten, 7-track, 800 BPI tapes. There are two restored tapes. The DS tapes are 9-track, 6250 BPI and the DR tapes are 3480 cartridges. Each byte has been padded to fill the 7th and 8th bits. The original tapes were created on an IBM 7094 computer. The DR and DS numbers along with the corresponding D numbers, the total number of files, and time spans are as follows:

| DR#     | DS#     | DD#     | FILES | TIME SPAN           |
|---------|---------|---------|-------|---------------------|
| DR03917 | DS03917 | D-00205 | 1-11  | 10/14/65 - 10/24/65 |
|         |         | D-00279 | 12-24 | 10/29/65 - 11/15/65 |
|         |         | D-00586 | 25-40 | 11/16/65 - 12/30/65 |
|         |         | D-00283 | 41-54 | 01/05/66 - 01/22/66 |
|         |         | D-00580 | 55-62 | 01/23/66 - 01/30/66 |
| DR03918 | DS03918 | D-00581 | 1-12  | 01/31/66 - 02/11/66 |
|         |         | D-00582 | 13-23 | 02/12/66 - 02/22/66 |
|         |         | D-00585 | 24-37 | 02/23/66 - 03/08/66 |
|         |         | D-00583 | 38-49 | 03/09/66 - 03/25/66 |
|         |         | D-00584 | 50-57 | 03/26/66 - 04/02/66 |

Data Set Catalog

65-081A-05B

OGO-2  
Rubidium Magnetometer  
Magnetic Field without Position

This data set consists of a single magnetic tape (D-00205) which contains time and magnetic field data for OGO-2. There is also available an ephemeris tape (D-00206) and a program which can interpolate time and position values. Through use of these two tapes and the program, magnetic field and positional data may be obtained.

The tape is recorded at 800 bpi in binary. The experiment is documented in X-612-67-272, portions of which are reproduced here. Data set 65-081A-05A is similar to this except for format and the fact that ephemeris data are merged with magnetic field data.

This data set consists of:

- 1) Octal dump of portion of tape (binary, 800 bpi, 7 track)
- 2) Listing of first and last 5 records of each file
- 3) Program used to produce 2
- 4) Sample output of program to merge ephemeris with data
- 5) Program used to produce 4
- 6) Selected pages from X-612-67-272 giving time and geographic position covered as well as the tape format. (complete x-document)

D-00279  
D-00283  
D-00580  
D-00581  
D-00582  
D-00583  
D-00584  
D-00585  
D-00586

In back of the data set there is a list pertaining to D-00205.

## WORLD MAGNETIC SURVEY ANALYSIS TAPES

These tapes consist of the current best data set from the OGO-2 satellite. The data is in time order and each point appears only once on the tape. The tapes are binary, FORTRAN generated with a standard record length of two hundred (200) words. One full day's data appears in each file, with the number of days on each tape determined at generation time. The tape will end with a double end of file.

### FILE FORMAT

The first record of each file is a label record:

- Word 1: The Modified Julian Day number of the data in this file (Fixed Point)
- Word 2: The Modified Julian Day number on which the file was generated (Fixed Point)
- Word 3: The Good Data tape number from which the data came (Fixed Point)
- Word 4-200: All zero

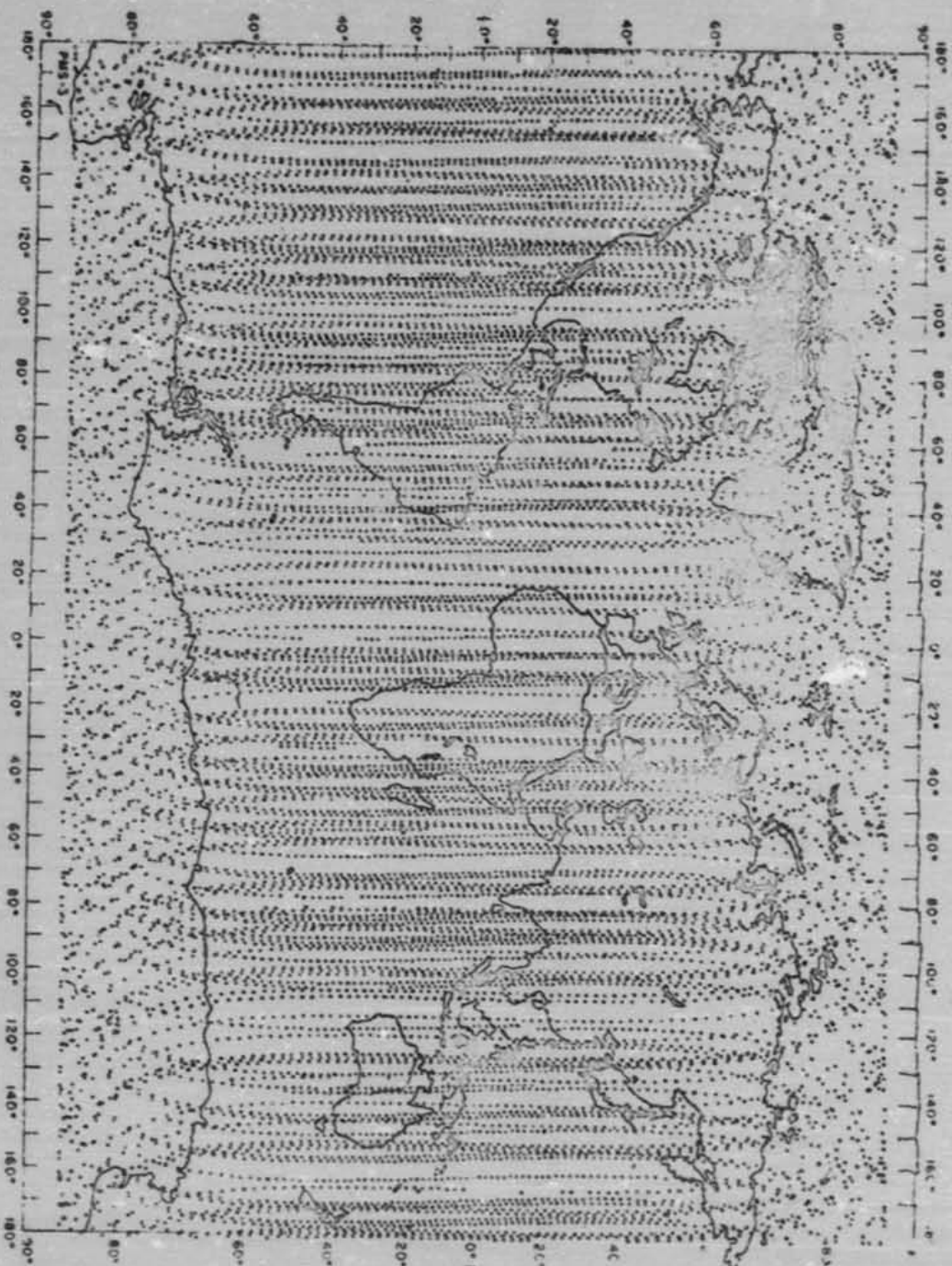
Each data record contains 100 data points, each in two floating point words, the first being the fraction of the day of the data point,\* and the second being the value of the magnetic field in gammas. This might be viewed as an array Data (I,J) where I varies between 1 and 2 and J runs from 1 to 100. Then, Data (1,J) would be the time associated with the field in Data (2,J). The final data record in each file is packed with zeros to make it 200 words in length.

\*The times are in UTC and refer to the middle of the approximately half second over which the field is averaged.

Taken from:

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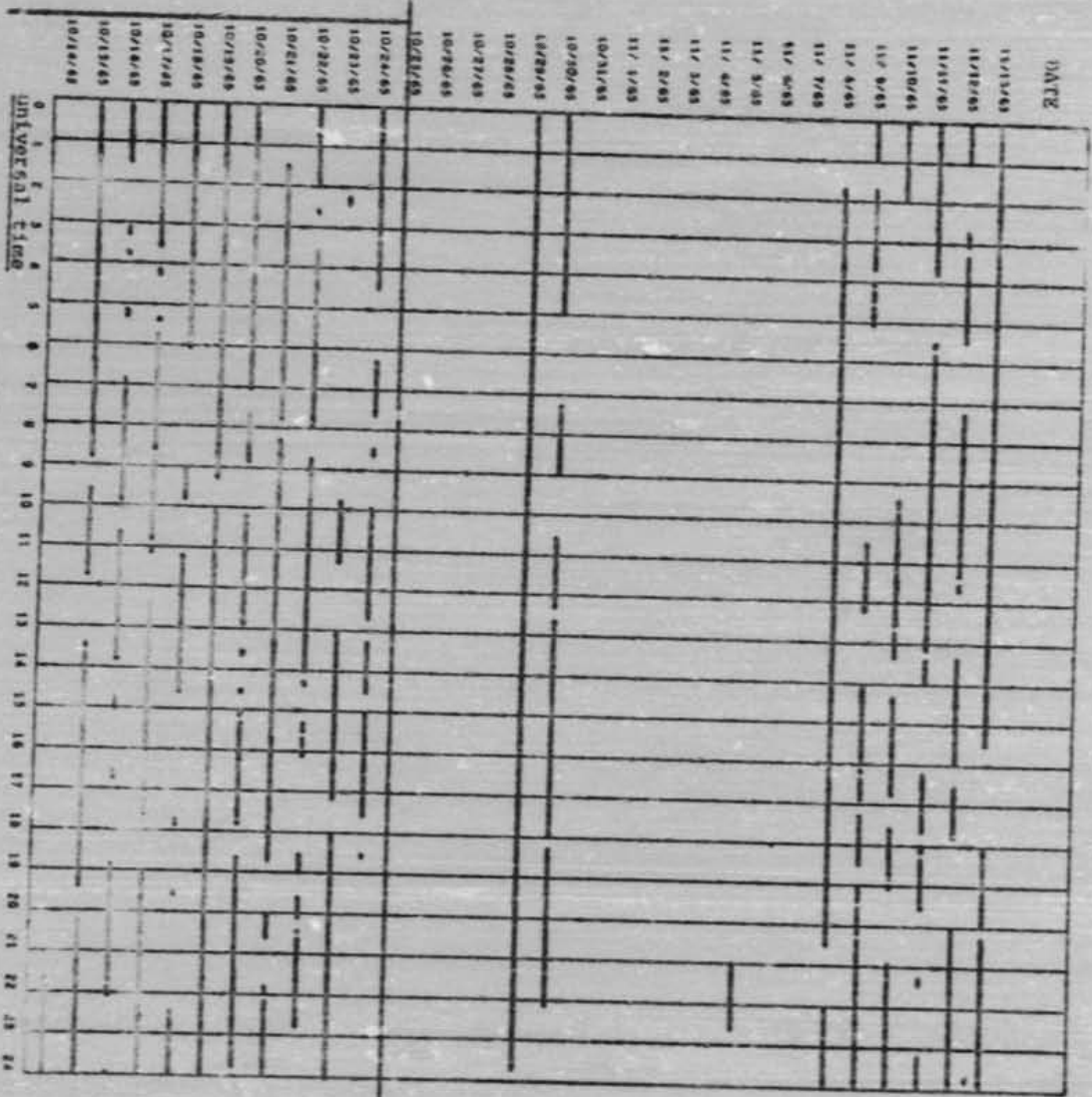
R.A. Langel, "Processing of the Total Field Magnetometer Data from the OGO-2 Satellite," June 1967,  
X-612-67-272



Geographical Distribution of C.S.P. Data, 10/14/65 - 10/24/65  
Essentially the same as on page D-00205  
Figure 10

the data on tape  
D-00205 is  
a subset of  
the time periods  
shown here.

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Combined C.S.P. and R.T. Data Coverage

Figure 11

X-612-67-272

PROCESSING OF THE TOTAL FIELD  
MAGNETOMETER DATA FROM THE  
OGO-2 SATELLITE

R. A. LANGE

JUNE 1967

— GODDARD SPACE FLIGHT CENTER —  
GREENBELT, MARYLAND

### Data Plots of OGO-2 Magnetometer Data

Two quantities are plotted on each frame. The lower half shows a plot of absolute field in gammas vs. latitude. The upper half of each frame shows a plot of  $\Delta$  field vs. latitude, where  $\Delta$  field is defined as measured field minus computed field. The computed field is based on an approximation of the GSFC (12/66)<sup>1</sup> field model. The approximation was derived by fitting a parabola to 3 data points. The three data points were calculated using the GSFC (12/66) coefficient set at 30 seconds intervals updated to a constant time of 1965.84.

The vertical lines which cross both grids are labeled at the bottom of the  $\Delta F$  plot at 30° intervals of latitude. On the upper grid are also placed short vertical 'Tick marks' with which are associated a time, longitude, and altitude. The time is in the form  $nnmmpp$ , where  $nn$  is hours,  $mm$  is minutes, and  $pp$  is seconds. Altitude in kilometers is calculated as geocentric radius  $R$  minus 6371.2.

The beginning of a file of data is indicated by a short line and the letter 'F'. These occur prior to the first data of each UT day. Perigee and apogee of the satellite are marked on the  $\Delta$  field plot.

In the upper left hand corner of each frame the date associated with data and the satellite designation are shown. Moving to the right across the top of the frame the WMS ANALYSIS TAPE number and file number are displayed. Below the ANALYSIS TAPE number, the WMS GOOD TAPE number is given.<sup>2</sup>

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<sup>1</sup>Cain, Hendricks, Langel, Hudson, A Proposed Model for the International Geomagnetic Reference Field-1965, GSFC X-612-67-173.

<sup>2</sup>For the plots of WMS 550 the FILE number and GOOD TAPE number have no meaning.

Moving further to the right the COEFFICIENT SET used and the type orbit tape used are given. For orbit tapes the following code is used:

Type 1 minitrack data only

Type 3 minitrack, range and range rate, and optical data used.

In the far right of the frame the date of the systems\* tape used to generate the SC-4020 is given. Below this date the frame number is shown. Also shown in the extreme upper right corner are a series of "hash" marks. Normally these marks indicate an error condition on a SC-4020 plot, but on these plots the marks have no meaning.

GEOCENTRIC EPHEMERIS TAPE FORMAT

| <u>Word #</u> | <u>Header Record</u>           |                                                                 |
|---------------|--------------------------------|-----------------------------------------------------------------|
| 1-2           | Satellite Identification (BCD) |                                                                 |
| 3-4           | Data Start Time                | Double precision modified Julian day and day fraction           |
| 5-6           | Data Stop Time                 |                                                                 |
| 7             | Data Interval ( $\Delta t$ )   | (Time between data points - floating fraction of day)           |
| 8-454         | Verbal ID                      | (BCD)                                                           |
| <u>Word #</u> | <u>Data Record</u>             |                                                                 |
| 1-2           | Data Start Time                | Double precision modified Julian day and day fraction           |
| 3-4           | Data Stop Time                 |                                                                 |
| 5-154         | X Data (km)                    | First & last 2 points are overlap                               |
| 155-304       | Y Data (km)                    | Start and stop times apply to 3rd and 148th points              |
| 305-454       | Z Data (km)                    | Missing data filled with nines<br>All values are floating point |

X, Y, Z is earth-fixed geocentric coordinate system with X to Greenwich meridian, X-Y in plane of instantaneous equator, Z to instantaneous north pole.

This tape was written on an IBM 7094 with Fortran binary write statements.

Figure 1. Format of Orbital Ephemeris Tape

ZPHM:

EPHM is a subroutine designed to locate orbital data at specified time on a compressed ephemeris tape, and to call an interpolation routine to calculate an X, Y, and Z value (earth fixed geocentric) at the requested time:

Input parameters:

TME - double precision time (Modified\* Julian day and day fraction)

Output parameters:

XC, YC, ZC - floating interpolated value of X, Y, Z respectively (geocentric)

IFLG - error code = 0 data available

= 1 no data (invalid time)

= 2 time not on tape

CALL EPHM (TME, XC, YC, ZC, IFLG)

Notes:

1. The first call to EPHM causes a print-out on normal output unit of header identification from tape.
2. EPHM requires that time requests be sequential since it has no facility for backspacing. Next request may be valid even if prior to previous if it can be located on record used for last request (records cover an interval of  $146 \times \Delta t$  where  $\Delta t$  is normally 2 minutes). IFLG = 1 if TME too early for present record.

\*MJD = JD - 2400000.5

```

$IBFTC ORBT   NODECK
      SUBROUTINE EPHM (TME,XG,YG,ZG,IFLG)
C *** SUBROUTINE EPHM
C *** INPUT PARAMETER
C *** TME - DOUBLE PRECISION JULIAN DAY AND DAY FRACTION
C *** OUTPUT PARAMETERS
C *** XG,YG,ZG - INTERPOLATED VALUES OF X,Y,Z AT REQUESTED TIME
C *** IFLG - ERROR CODE =0 RESULTS OK
C ***                      1 INVALID TIME REQUESTED
C ***                      OR DATA NOT AVAILABLE
C ***                      2 TIME REQUESTED IS NOT ON TAPE
      COMMON/STOR/X(150),Y(150),Z(150),DELT
      EQUIVALENCE (VID,X)
      DIMENSION SATID(2),VID(447)
      DOUBLE PRECISION TME,STME,DTME,STT,DTT
      DATA IX/0/
      DATA BLNK/1H /
      IF (IX.EQ.99) GO TO 1
      READ (10) SATID,STT,DTT,DELT,VID
      DEL2=DELT*86400.
C *** WRITE OUT INFORMATION FROM HEADER RECORD
C *** ON FIRST PASS ONLY
      WRITE (6,2) SATID,STT,DTT,DELT,DEL2
2     FORMAT (13H SATELLITE 10,5X,2A6/16H DATA START TIME,5X,D27.16/
13H DATA STOP TIME,6X,D27.16/14H TIME INTERVAL,5X,E16.8,
13H DAYS = ,E16.8,4H SEC)
      DO 3 I=1,37
      N2=12*I
      N1=N2-11
      IF (VID(N1).EQ.BLNK) GO TO 4
      WRITE (6,5) (VID(N),N=N1,N2)
5     FORMAT (1X,12A6)
      CONTINUE
      IX=99
      READ (10) STME,DTME,X,Y,Z
      IFLG=
      IS T. REQUESTED WITHIN TIME LIMITS OF THIS TAPE
      IF (T.LT.STT.OR.TME.GT.DTT) GO TO 9
      IS T REQUESTED IN THIS RECORD
      IF (TME.GT.(DTME+DELT)) GO TO 6
      IS T REQUESTED INVALID
      I.E. IS TIME PRIOR TO THIS RECORD
      IF (TME.LT.STME) GO TO 7
      DT=TME-STME
      CALL STIRLING INTERPOLATION SUBROUTINE
      CALL STIR (DT,XG,YG,ZG,IFLG)
      RETURN
C *** INVALID TIME REQUESTED
C *** SET IFLG TO 1
7     IFLG=1
      RETURN
C *** TIME REQUESTED IS NOT ON THIS TAPE
C *** SET IFLG TO 2
      IFLG=2
      RETURN
      END

```

STIR:

Stirling five-point interpolation subroutine used to calculate a value of XG, YG, ZG from tables of X, Y, and Z previously used by APMX.

Input parameter:

$$IT = (\text{requested time}) - (\text{data start time})$$

Output parameters:

XG, YG, ZG - floating interpolated value of X, Y, Z

IFLG - error code = 0 data available

= 1 data missing

CALL STIR (IT, XG, YG, ZG, IFLG)

Notes:

1. For POGO orbital data spaced at 2 minute intervals it has been found that these interpolated values are accurate to better than 10 meters.
2. STIRLING'S INTERPOLATION FORMULA

$$y = y_0 + \frac{u(2y_1 + 2y_2)}{2} + \frac{u^2(y_2 - y_1)}{2} + \frac{u(u^2 - 1)(y_2 - y_1 - y_0)}{2(3!)} + \frac{u^2(u^2 - 1)(y_2 - y_0)}{4!}$$

$$u = \frac{X - X_0}{H} \quad H = \Delta X$$

X = Desired Time

X<sub>0</sub> = Time at Y<sub>0</sub>

ΔX = Time between data points (equidistant points)

ΔY = Forward differences according to table as follows:

|                |                 |                               |                               |                    |
|----------------|-----------------|-------------------------------|-------------------------------|--------------------|
| Y-2            | ΔY-2            | Δ <sup>2</sup> Y-2            | Δ <sup>3</sup> Y-2            | Δ <sup>4</sup> Y-2 |
| Y-1            | ΔY-1            | Δ <sup>2</sup> Y-1            | Δ <sup>3</sup> Y-1            |                    |
| Y <sub>0</sub> | ΔY <sub>0</sub> | Δ <sup>2</sup> Y <sub>0</sub> | Δ <sup>3</sup> Y <sub>0</sub> |                    |
| Y <sub>1</sub> | ΔY <sub>1</sub> |                               |                               |                    |
| Y <sub>2</sub> |                 |                               |                               |                    |

SIBFTC STIRL NODECK

SUBROUTINE STIR (DT,XG,YG,ZG,IFLG)

C \*\*\* STIRLING FIVE POINT INTERPOLATION SUBROUTINE

COMMON/STOR/X(150),Y(150),Z(150),DELT

DIMENSION DFX(5,5),DFY(5,5),DFZ(5,5)

XT=DT/DELT

N=XT

U=XT-FLOAT(N)

U2=U/2.

U3=U\*U2

U4=(U2/3.)\*(U3-0.5)

U5=U2\*U4

N=N+1

IF (NN.EQ.N.AND.IFLG.NE.99) GO TO 3

NN=N

N2=N+4

II=0

C \*\*\* CALCULATE FIRST THRU FIFTH DIFFERENCES

DO 1 I=N,N2

C \*\*\* IS DATA VALID

IF (X(I).GE.999999.) GO TO 4

II=II+1

DFX(II,1)=X(I)

DFY(II,1)=Y(I)

1 DFZ(II,1)=Z(I)

DO 2 L=2,5

N2=6-L

DO 2 N=1,N2

DFX(N,L)=DFX(N+1,L-1)-DFX(N,L-1)

DFY(N,L)=DFY(N+1,L-1)-DFY(N,L-1)

2 DFZ(N,L)=DFZ(N+1,L-1)-DFZ(N,L-1)

C \*\*\* CALCULATE X, Y, Z VALUES FOR TIME REQUESTED

3 G=DFX(3,1)+U2\*(DFX(2,2)+DFX(3,2))+U3\*DFX(2,3)

U4=DFY(1,4)+DFX(2,4))+U5\*DFX(1,5)

G=DFY(3,1)+U2\*(DFY(2,2)+DFY(3,2))+U3\*DFY(2,3)

U4\*DFY(1,4)+DFY(2,4))+U5\*DFY(1,5)

1 G=DFZ(3,1)+U2\*(DFZ(2,2)+DFZ(3,2))+U3\*DFZ(2,3)

1+U4\*(DFZ(1,4)+DFZ(2,4))+U5\*DFZ(1,5)

IFLG=0

RETURN

C \*\*\* DATA IS INVALID

C \*\*\* SET IFLG TO 1

4 NN=0

IFLG=1

RETURN

END

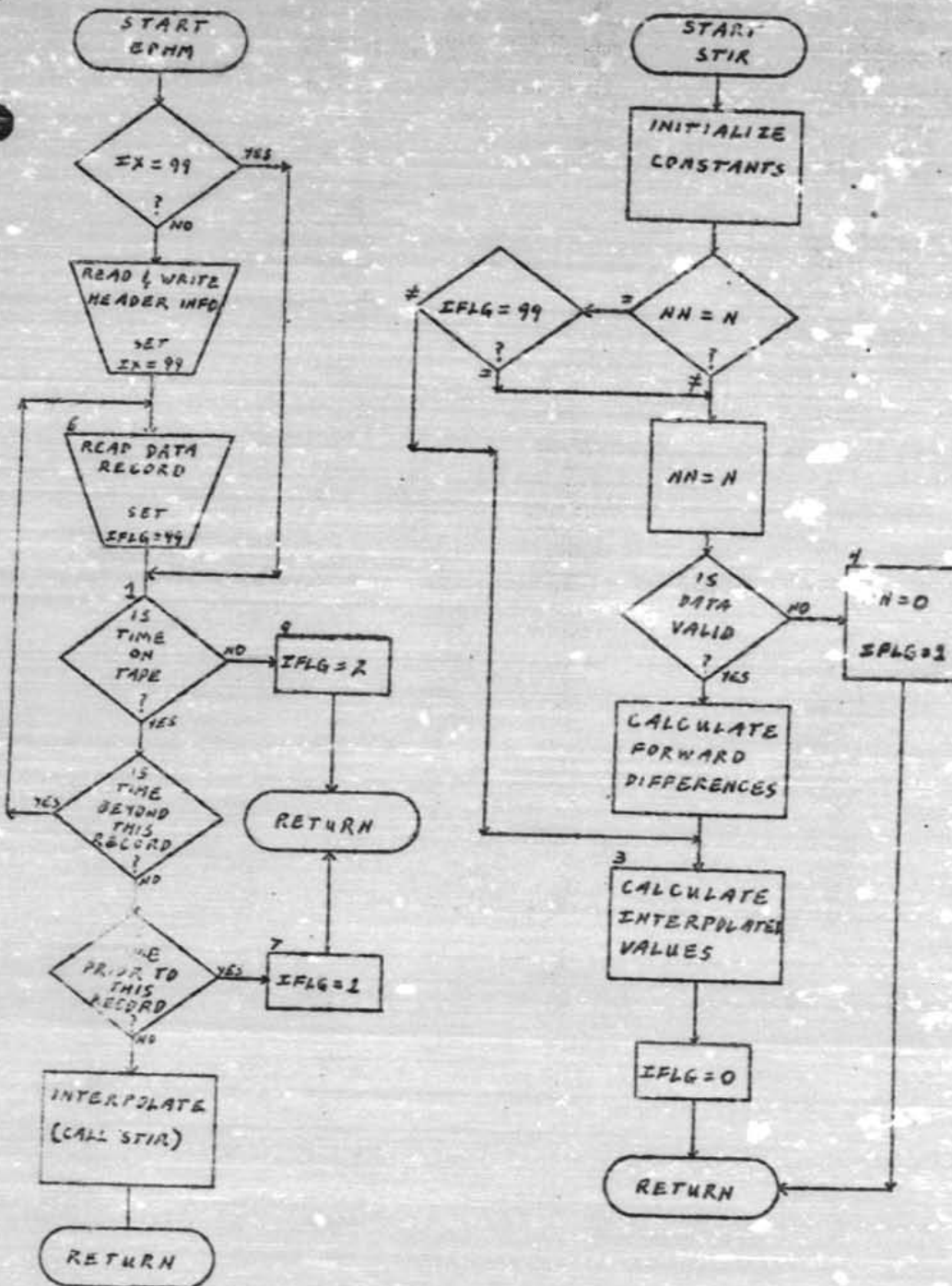


Figure 2. Flowcharts of subroutines EPHM and STIR

| START<br>YRMOYDHRMN | STOP<br>YRMOYDHRMN |
|---------------------|--------------------|
| 6510142132          | 6510222233         |
| 6510230544          | 6510242147         |
| 6510292000          | 6510310000         |
| 6511012251          | 6511020430         |
| 6511032005          | 6511032156         |
| 6511052051          | 6511172004         |
| 6511182023          | 6511192049         |
| 6511250029          | 6511260050         |
| 6511261151          | 6511281136         |
| 6511292249          | 6512010452         |
| 6512020506          | 6512022212         |
| 6512040911          | 6512041240         |
| 6512112016          | 6512112200         |
| 6512131723          | 6512140215         |
| 6512151956          | 6512152142         |
| 6512172230          | 6512180011         |
| 6512200952          | 6512201135         |
| 6512231550          | 6512231735         |
| 6512252150          | 6512252340         |
| 6512272234          | 6512280027         |
| 6512301636          | 6512302016         |
| 6601050002          | 6601050138         |
| 6601071602          | 6601072311         |
| 6601091500          | 6601100000         |
| 6601112100          | 6601120234         |
| 6601141207          | 6601151541         |
| 6601170247          | 6604022256         |
| 6606110751          | 6606121359         |
| 6606240533          | 6606241730         |
| 6606270114          | 6606280514         |
| 6606291255          | 6607010433         |
| 6607081200          | 6607240000         |
| 6607250000          | 6608022008         |
| 6608031438          | 6608041143         |
| 6608061357          | 6608071603         |
| 6611221618          | 6612222148         |

TABLE 1. TIME INTERVALS INCLUDED ON ORBITAL EPHEMERIS TAPE  
(LISTED BY YEAR, MONTH, DAY, HOUR, AND MINUTE)

| START            | STOP             |
|------------------|------------------|
| 0.3904739722D 05 | 0.3905592958D 05 |
| 0.3905623888D 05 | 0.3905790764D 05 |
| 0.3906283333D 05 | 0.3906400000D 05 |
| 0.3906595208D 05 | 0.3906618750D 05 |
| 0.3906783680D 05 | 0.3906791389D 05 |
| 0.3906966875D 05 | 0.3908183611D 05 |
| 0.3908284930D 05 | 0.3908386736D 05 |
| 0.3908902013D 05 | 0.3909003472D 05 |
| 0.3909049375D 05 | 0.3909248333D 05 |
| 0.3909395069D 05 | 0.3909520277D 05 |
| 0.3909621250D 05 | 0.3909692500D 05 |
| 0.3909633264D 05 | 0.3909852777D 05 |
| 0.3910584444D 05 | 0.3910591666D 05 |
| 0.3910772430D 05 | 0.3910809375D 05 |
| 0.391098374D 05  | 0.3910990417D 05 |
| 0.3911195700D 05 | 0.3911200764D 05 |
| 0.3911441110D 05 | 0.3911448264D 05 |
| 0.3911765972D 05 | 0.3911773264D 05 |
| 0.3911990972D 05 | 0.3911998611D 05 |
| 0.391219407D 05  | 0.3912201875D 05 |
| 0.391246976D 05  | 0.3912484444D 05 |
| 0.3913000138D 05 | 0.3913006605D 05 |
| 0.3913266805D 05 | 0.3913296597D 05 |
| 0.3913462500D 05 | 0.3913500000D 05 |
| 0.3913687500D 05 | 0.3913710694D 05 |
| 0.3913950486D 05 | 0.3914065347D 05 |
| 0.3914211597D 05 | 0.3921795555D 05 |
| 0.3928732708D 05 | 0.3928858264D 05 |
| 0.3930023125D 05 | 0.3930072917D 05 |
| 0.3930305138D 05 | 0.3930421805D 05 |
| 0.3930553819D 05 | 0.3930718958D 05 |
| 0.3931450000D 05 | 0.3933000000D 05 |
| 0.3933100000D 05 | 0.3933983888D 05 |
| 0.3934060972D 05 | 0.3934148819D 05 |
| 0.3934358125D 05 | 0.3934466875D 05 |
| 0.3945167916D 05 | 0.3948190833D 05 |

TABLE 2. TIME INTERVALS INCLUDED ON ORBITAL EPHEMERIS TAPE  
(LISTED BY MODIFIED JULIAN DAY AND DAY FRACTION)

Dr. Friedrich O. Vonbun, Chief  
Mission and Trajectory Analysis Division

Dr. Joseph C. Cain  
Fields and Plasmas Branch

August 7, 1967

RECEIVED

AUG 9 1967

October 14-24, 1965 Orbit for OGO-2

This is to request an evaluation of the quality of the OGO-2 orbit supplied us for October 14-24, 1965. We have recently sent the Space Sciences Data Center our final magnetometer data for this interval and there appear to be a number of orbits where the field deviations appear high and we have not yet been able to ascertain any physical reason for the variations.

As discussed previously a possible suitable quality index might be a daily summary of the goodness of fit between the orbit and the tracking data.

The dates in October and times near when the magnetic field deviations seem largest (50 - 100γ) are as follows:

| <u>Day</u> | <u>Hour</u> | <u>Day</u> | <u>Hour</u>        |
|------------|-------------|------------|--------------------|
| 14         | 22          | 19         | 5, 12              |
| 15         | 22          | 22         | 4, 9, 21           |
| 18         | 4           | 23         | 11, 15, 20, 22, 24 |
|            |             | 24         | 1, 3, 15, 17       |

Joseph C. Cain

cc: Dr. James I. Vette - Code 601

JCC:dac (612)

SEP 26 1967

UNITED STATES GOVERNMENT

# Memorandum

OFFICIAL FILE COPY-NSSDC

TO : National Space Science Data Center

DATE: September 21, 1967

FROM : Robert A. Langel  
Fields and Plasmas Branch

SUBJECT: OGO-2, Experiment 6, Data Note #2

We have previously forwarded a copy of our final data tape (WMS 550) for the period 10/14 through 10/24/65. With the tape was included one copy of a report (Langel, GSFC Report X-612-67-272, 1967) describing the data processing procedures followed when generating the tape.

I would like to take this opportunity to point out that a complete discussion of data accuracy is contained in that report and, in particular, a list of error sources and their contributions is contained on Page 55. This information applies not only to the October 14-24, 1965 data, but also to all future OGO-2 data which we will forward to your center.

With regard to WMS 550, particular quality parameters are given in Table 2 of Langel, 1967. An explanation of their significance is contained in the text. (Similar tables will be forwarded for each final data tape which becomes available to the center.) A description of the tape format is contained on Page 71. You will find a short table enclosed with this data note containing a brief description of WMS 550. Please direct any questions, comments, or suggestions to myself.

*Robert A. Langel*  
Robert A. Langel

Enclosure

SEP 27 RECD  
# 1147

File Content Summary: WMS 550: 11 Files October 14-24, 1965

| <u>File</u> | <u>Modified<br/>Julian Day</u> | <u>Start<br/>Fraction</u> | <u>Stop<br/>Fraction</u> | <u>Number<br/>Of Records</u> |
|-------------|--------------------------------|---------------------------|--------------------------|------------------------------|
| 1           | 39047                          | .8976235 6                | 1.000128776              | 123                          |
| 2           | 39048                          | .000325769                | .999662325               | 1359                         |
| 3           | 39049                          | -.000001989               | 1.000054657              | 820                          |
| 4           | 39050                          | .060055712                | .999845207               | 1240                         |
| 5           | 39051                          | .000244536                | .985376477               | 720                          |
| 6           | 39052                          | .000168160                | .999837145               | 1347                         |
| 7           | 39053                          | .000276975                | .991838336               | 1254                         |
| 8           | 39054                          | .060350999                | .999516569               | 1211                         |
| 9           | 39055                          | .000153176                | .939324431               | 1022                         |
| 10          | 39056                          | .405111060                | 1.000040919              | 808                          |
| 11          | 39057                          | .000312947                | .732592188               | 760                          |

BJOB C01Y GIBSON BLDG 26 ROOM 118-A PHONE 2251

```
SPAUSE
SEXECUTE      IBJOB
$IBJOB        MAP,G0
$IBFTC 0G02   FULIST,NODECK
              DIMENSION X(200),IX(1)
              EQUIVALENCE (X(1),IX(1))
              COMMON /SYSEOF/EOF
              COMMON /AWAERR/REDUND
              DOUBLE PRECISION XIME,YIME,DDAY,DFD
              LOGICAL EOF,REDUND
              ICOUNT = 0
              IFIRST = 1
              CALL SYSGO (34)
              CALL SYSGO (35)
              EOF = .FALSE.
              REDUND = .FALSE.
1 READ(5) Y
  ICOUNT = ICOUNT + 1
  IF (IFIRST.EQ.1) GO TO 11
  IF (EOF) GO TO 10
  IF (REDUND) GO TO 1
  IF (X(1).LT.0.)GO TO 1
  IF (X(101).LT.0.)GO TO 1
  DFD = X(1)
  XIME = DDAY + DFD
  CALL EPHMIXIME,XG,YG,ZG,IFLG)
  X2G = XG
  Y2G = YG
  Z2G = ZG
  DFD = X(101)
  XIME = DDAY+DFD
  CALL EPHMIXIME,XG,YG,ZG,IFLG)
  WRITE(15,5)X(1),X(2),X2G,Y2G,Z2G,X(101),X(102),XG,YG,ZG
5 FORMAT(2(1P5E13.6))
  IF(ICOUNT.EQ.100) GO TO 30
  GO TO 1
10 EOF = .FALSE.
  READ(5) X
  IF (EOF) GO TO 30
11 DDAY =IX(1)
  XX= IX(1)
  IFIRST = 0
  WRITE(15,12) XX
12 FORMAT(1PE13.6,117X)
  GO TO 1
```

Listing of 4  
used to produce  
output (Eph)

118-A PHONE 2251

DFD

Listing of the program  
used to produce merge  
output (Ephemeris + Data)

X(101),X(102),XG,YG,ZG

52737

```

30 END FILE 15
   RETURN
   END
$IBFTC @RBT   NODECK
      SUBROUTINE EPHM (TME,XG,YG,ZG,IFLG)
C *** SUBROUTINE EPHM
C *** INPUT PARAMETER
C *** TME - DOUBLE PRECISION JULIAN DAY AND DAY FRACTION
C *** OUTPUT PARAMETERS
C *** XG,YG,ZG - INTERPOLATED VALUES OF X,Y,Z AT REQUESTED TIME
C *** IFLG - ERROR CODE =0 RESULTS OK
C ***              1 INVALID TIME REQUESTED
C ***              OR DATA NOT AVAILABLE
C ***              2 TIME REQUESTED IS NOT ON TAPE
      COMMON/STOR/X(150),Y(150),Z(150),DELT
      EQUIVALENCE (VID,X)
      DIMENSION SATID(2),VID(447)
      DOUBLE PRECISION TME,STIME,DTIME,STI,DTI
      DATA IX/0/
      DATA BLNK/1H /
      IF (IX.EQ.99) GO TO 1
      READ (10) SATID,STI,DTI,DELT,VID
      DEL2=DELT*86400.
C *** WRITE OUT INFORMATION FROM HEADER RECORD
C *** ON FIRST PASS ONLY
      WRITE (6,2) SATID,STI,DTI,DELT,DEL2
2     FORMAT (13H SATELLITE ID,5X,2A6/16H DATA START TIME,5X,D27.16/
115H DATA STOP TIME,6X,D27.16/14H TIME INTERVAL,5X,E16.8,
28H DAYS = ,E16.8,4H SEC)
      DO 3 I=1,37
      N2=12*I
      N1=N2-11
      IF (VID(N1).EQ.BLNK) GO TO 4
      WRITE (6,5) (VID(N),N=N1,N2)
5     FORMAT (1X,12A6)
3     CONTINUE
4     IX=99
6     READ (10) STIME,DTIME,X,Y,Z
      IFLG=99
C *** IS TIME REQUESTED WITHIN TIME LIMITS OF THIS TAPE
1     IF (TME.LT.STI.OR.TME.GT.DTI) GO TO 9
C *** IS TIME REQUESTED IN THIS RECORD
      IF (TME.GT.(DTIME+DELT)) GO TO 6
C *** IS TIME REQUESTED INVALID
C *** I.E. IS TIME PRIOR TO THIS RECORD
      IF (TME.LT.STIME) GO TO 7

```

TIME,XG,YG,ZG,IFLG)

PRECISION JULIAN DAY AND DAY FRACTION

RPOLATED VALUES OF X,Y,Z AT REQUESTED TIME  
DE #0 RESULTS OK

1 INVALID TIME REQUESTED

OR DATA NOT AVAILABLE

2 TIME REQUESTED IS NOT ON TAPE

1,Y(150),Z(150),DELT

K)

1,VIB(447)

TIME,STIME,DIME,STI,DII

TO 1

IT,DII,DELT,VIO

ION FROM HEADER RECORD

STI,DII,DELT,DEL2

ITE ID:5X:2A6/16H DATA START TIME:5X:D27.16/

:6X:D27.16/14H TIME INTERVAL:5X:E16.8

H SEC)

K) GO TO 4

1,N=N1,N2)

E,X,Y,Z

WITHIN TIME LIMITS OF THIS TAPE

TIME,GT,DII) GO TO 9

IN THIS RECORD

ELT)) GO TO 6

INVALID

TO THIS RECORD

GO TO 7

EPHM0001

EPHM0002

EPHM0003

EPHM0004

EPHM0005

EPHM0006

EPHM0007

EPHM0008

EPHM0009

EPHM0010

EPHM0011

EPHM0012

EPHM0013

EPHM0014

EPHM0015

EPHM0016

EPHM0017

EPHM0018

EPHM0019

EPHM0020

EPHM0021

EPHM0022

EPHM0023

EPHM0024

EPHM0025

EPHM0026

EPHM0027

EPHM0028

EPHM0029

EPHM0030

EPHM0031

EPHM0032

EPHM0033

EPHM0034

EPHM0035

EPHM0036

EPHM0037

EPHM0038

EPHM0039

EPHM0040

EPHM0041

EPHM0042

EPHM0043

```

DT=TIME-SIME
C *** CALL STIRLING INTERPOLATION SUBROUTINE
CALL STIR (DI,XG,YG,ZG,IFLG)
RETURN
C *** INVALID TIME REQUESTED
C *** SET IFLG TO 1
7 IFLG=1
RETURN
C *** TIME REQUESTED IS NOT ON THIS TAPE
C *** SET IFLG TO 2
9 IFLG=2
RETURN
END
$IBFTC STIRL N0DECK
SUBROUTINE STIR (DI,XG,YG,ZG,IFLG)
C *** STIRLING FIVE POINT INTERPOLATION SUBROUTINE
COMMON/STOR/X(150),Y(150),Z(150),DELT
DIMENSION DFX(5,5),DFY(5,5),DFZ(5,5)
XT=DI/DELT
N=XT
U=XT-FLOAT(N)
U2=U/2.
U3=U*U2
U4=(U2/3.)*(U3-U.5)
U5=U2*U4
N=N+1
IF (INN.EQ.N.AND.IFLG.NE.99) GO TO 3
NN=N
N2=N+4
I1=0
C *** CALCULATE FIRST THRU FIFTH DIFFERENCES
DO 1 I=N,N2
1 IS DATA VALID
IF (X(I).GE.9999999.) GO TO 4
I1=I1+1
DFX(I1,1)=X(I)
DFY(I1,1)=Y(I)
1 DFZ(I1,1)=Z(I)
DO 2 L=2,5
N2=6-L
DO 2 N=1,N2
DFX(N,L)=DFX(N+1,L-1)-DFX(N,L-1)
DFY(N,L)=DFY(N+1,L-1)-DFY(N,L-1)
2 DFZ(N,L)=DFZ(N+1,L-1)-DFZ(N,L-1)
C *** CALCULATE X, Y, Z VALUES FOR TIME REQUESTED
3 XG=DFX(3,1)+U2*(DFX(2,1)+DFX(3,1))+U3*DFX(2,3)

```

SUBROUTINE

TAPE

FLG)  
ION SUBROUTINE  
Q)\*DELT  
Z(5\*5)

0 To J

REFERENCES

ME REQUESTED  
Z(1)+U3\*DFX(2\*3)

EPHM0044  
EPHM0045  
EPHM0046  
EPHM0047  
EPHM0048  
EPHM0049  
EPHM0050  
EPHM0051  
EPHM0052  
EPHM0053  
EPHM0054  
EPHM0055  
EPHM0056  
STIR0001  
STIR0002  
STIR0003  
STIR0004  
STIR0006  
STIP0007  
STIR0008  
STIR0009  
STIR0010  
STIR0011  
STIR0012  
STIR0013  
STIR0014  
STIR0015  
STIR0016  
STIR0017  
STIR0018  
STIR0019  
STIR0020  
STIR0021  
STIR0022  
STIR0023  
STIR0024  
STIR0025  
STIR0026  
STIR0027  
STIR0028  
STIR0029  
STIR0030  
STIR0031  
STIR0032  
STIR0033  
STIR0034

```
1+U4*(DFA(1,4)+DFA(2,4))+U5*DFA(1,5)
YG=DFY(3,1)+U2*(DFY(2,2)+DFY(3,2))+U3*DFY(2,3)
1+U4*(DFY(1,4)+DFY(2,4))+U5*DFY(1,5)
ZG=DFZ(3,1)+U2*(DFZ(2,2)+DFZ(3,2))+U3*DFZ(2,3)
1+U4*(DFZ(1,4)+DFZ(2,4))+U5*DFZ(1,5)
IFLG=0
RETURN
C *** DATA IS INVALID
C *** SET IFLG TO 1
4 NN=0
IFLG=1
RETURN
END
```

+U5\*DFX(1,5)  
1+DFY(3,2))+U3\*DFY(2,3)  
+U5\*DFY(1,5)  
1+DFZ(3,2))+U3\*DFZ(2,3)  
+U5\*DFZ(1,5)

STIR0035  
STIR0036  
STIR0037  
STIR0038  
STIR0039  
STIR0040  
STIR0041  
STIR0042  
STIR0043  
STIR0044  
STIR0045  
STIR0046  
STIR0047

CARD TOTAL 151

FILE 0001 REC 0001 CH 1206

Octal dump  
of portion of  
tape D-00205

65-081A-05B

|      |              |              |              |              |    |
|------|--------------|--------------|--------------|--------------|----|
| 0001 | 000310000001 | 000000114207 | 000000115176 | 000000000000 | 00 |
| 0049 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0097 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0145 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0193 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0241 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0289 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0337 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0385 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0433 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0481 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0529 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0577 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0625 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0673 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0721 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0769 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0817 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0865 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0913 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 0961 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 1009 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 1057 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 1105 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 1153 | 000000000000 | 000000000000 | 000000000000 | 000000000000 | 00 |
| 1201 | 000000000000 |              |              |              |    |

FILE 0001 REC 0002 CH 1206

|      |              |              |              |              |    |
|------|--------------|--------------|--------------|--------------|----|
| 0001 | 000310000001 | 200713452505 | 220400552664 | 200713455527 | 22 |
| 0049 | 220401022645 | 200713466613 | 220401113304 | 200713471635 | 22 |
| 0097 | 220401363265 | 200713502721 | 220401452147 | 200713505742 | 22 |
| 0145 | 220401720352 | 200713517027 | 220402011011 | 200713522050 | 22 |
| 0193 | 220402255437 | 200713533134 | 220402346076 | 200713536156 | 22 |
| 0241 | 220402612524 | 200713547242 | 220402677630 | 200713552264 | 22 |
| 0289 | 220403146033 | 200713563350 | 220403233140 | 200713566371 | 22 |
| 0337 | 220403476010 | 200713577456 | 220403554672 | 200713602500 | 22 |
| 0385 | 220404025764 | 200713613564 | 220404114646 | 200713616606 | 22 |
| 0433 | 220404357516 | 200713627672 | 220404444622 | 200713632713 | 22 |
| 0481 | 220404704137 | 200713644000 | 220404773021 | 200713647021 | 22 |
| 0529 | 220405230560 | 200713660105 | 220405317442 | 200713663127 | 22 |
| 0577 | 220405555201 | 200713674213 | 220405642306 | 200713677235 | 22 |
| 0625 | 220406100045 | 200713710321 | 220406163374 | 200713713342 | 22 |
| 0673 | 220406417355 | 200713724427 | 220406502704 | 200713727450 | 22 |
| 0721 | 220406736666 | 200713740534 | 220407022215 | 200713743556 | 22 |
| 0769 | 220407256176 | 200713754640 | 220407341525 | 200713757662 | 22 |
| 0817 | 220407570376 | 200713770746 | 220407652147 | 200713773770 | 22 |
| 0865 | 220410102576 | 200714005054 | 220410164347 | 200714010075 | 22 |
| 0913 | 220410416553 | 200714021162 | 220410500325 | 200714024203 | 22 |
| 0961 | 220410727176 | 200714035267 | 220411010747 | 200714040311 | 22 |
| 1009 | 220411237620 | 200714051375 | 220411321371 | 200714054417 | 22 |
| 1057 | 220411546465 | 200714065503 | 220411630230 | 200714070524 | 22 |
| 1105 | 220412053554 | 200714101611 | 220412135325 | 200714104632 | 22 |
| 1153 | 220412360643 | 200714115716 | 220412437061 | 200714120740 | 22 |
| 1201 | 220412662377 |              |              |              |    |

FILE 0001 REC 0003 CH 1206

|      |              |              |              |              |    |
|------|--------------|--------------|--------------|--------------|----|
| 0001 | 000310000001 | 200714132026 | 220412744150 | 200714135047 | 22 |
| 0049 | 220413164133 | 200714146134 | 220413244127 | 200714151155 | 22 |
| 0097 | 220413465667 | 200714162241 | 220413544105 | 200714165263 | 22 |
| 0145 | 220413764070 | 200714176347 | 220414044064 | 200714201371 | 22 |
| 0193 | 220414264047 | 200714212455 | 220414342265 | 200714215476 | 22 |
| 0241 | 220414560472 | 200714226563 | 220414636710 | 200714231604 | 22 |
| 0289 | 220415055115 | 200714242671 | 220415133333 | 200714245712 | 22 |
| 0337 | 220415346205 | 200714256776 | 220415424424 | 200714262020 | 22 |

[illegible]

|    |              |              |              |              |              |
|----|--------------|--------------|--------------|--------------|--------------|
| 53 | 200713455527 | 220400643324 | 200713460550 | 220400733763 | 200713463572 |
| 54 | 200713471635 | 220401203744 | 200713474655 | 220401274403 | 200713477677 |
| 57 | 200713505742 | 220401541031 | 200713510764 | 220401631470 | 200713514005 |
| 61 | 200713522050 | 220402077673 | 200713525072 | 220402166555 | 200713530113 |
| 66 | 200713536156 | 220402433203 | 200713541177 | 220402523642 | 200713544221 |
| 70 | 200713552264 | 220402770270 | 200713556305 | 220403057152 | 200713560326 |
| 70 | 200713566371 | 220403322022 | 200713571414 | 220403407126 | 200713574435 |
| 72 | 200713602500 | 220403651776 | 200713605521 | 220403740660 | 200713610543 |
| 76 | 200713616606 | 220404201752 | 200713621627 | 220404267056 | 200713624650 |
| 82 | 200713632713 | 220404531726 | 200713635735 | 220404620610 | 200713640756 |
| 81 | 200713647021 | 220405056350 | 200713652043 | 220405145231 | 200713655064 |
| 82 | 200713663127 | 220405404546 | 200713666150 | 220405470075 | 200713671172 |
| 86 | 200713677235 | 220405724057 | 200713702256 | 220406011163 | 200713705300 |
| 84 | 200713713342 | 220406246722 | 200713716364 | 220406334027 | 200713721405 |
| 84 | 200713727450 | 220406570010 | 200713732472 | 220406653337 | 200713735513 |
| 85 | 200713743556 | 220407105543 | 200713746576 | 220407172650 | 200713751617 |
| 85 | 200713757662 | 220407425054 | 200713762703 | 220407510403 | 200713765725 |
| 87 | 200713773770 | 220407735476 | 200713777011 | 220410017247 | 200714002032 |
| 87 | 200714010075 | 220410251454 | 200714013117 | 220410333225 | 200714016140 |
| 85 | 200714024203 | 220410563653 | 200714027225 | 220410645425 | 200714032246 |
| 87 | 200714040311 | 220411074276 | 200714043332 | 220411156047 | 200714046354 |
| 91 | 200714054417 | 220411403142 | 200714057440 | 220411464714 | 200714062462 |
| 86 | 200714070524 | 220411710232 | 200714073546 | 220411772003 | 200714076567 |
| 85 | 200714104632 | 220412215321 | 200714107654 | 220412277072 | 200714112675 |
| 81 | 200714120740 | 220412522410 | 200714123751 | 220412602403 | 200714127000 |

|    |              |              |              |              |              |
|----|--------------|--------------|--------------|--------------|--------------|
| 50 | 200714135047 | 220413024144 | 200714140071 | 220413104137 | 200714143112 |
| 57 | 200714151155 | 220413324122 | 200714154177 | 220413405674 | 200714157220 |
| 55 | 200714165263 | 220413624101 | 200714170304 | 220413704074 | 200714173326 |
| 54 | 200714201371 | 220414122302 | 200714204412 | 220414202275 | 200714207434 |
| 55 | 200714215476 | 220414422260 | 200714220520 | 220414500476 | 200714223541 |
| 60 | 200714231604 | 220414715126 | 200714234626 | 220414775122 | 200714237647 |
| 63 | 200714245712 | 220415207774 | 200714250733 | 220415267767 | 200714253755 |
| 64 | 200714262020 | 220415502642 | 200714265041 | 220415561060 | 200714270060 |

FILE 0001 REC 0003 CH 1206

|      |              |              |              |              |
|------|--------------|--------------|--------------|--------------|
| 0385 | 220415637276 | 200714273104 | 220415715514 | 200714276125 |
| 0433 | 220416123255 | 200714307213 | 220416201473 | 200714312234 |
| 0481 | 220416412570 | 200714323320 | 220416471006 | 200714326342 |
| 0529 | 220416702103 | 200714337426 | 220416756543 | 200714342447 |
| 0577 | 220417165062 | 200714353534 | 220417244300 | 200714356555 |
| 0625 | 220417450264 | 200714367642 | 220417524725 | 200714372663 |
| 0673 | 220417732466 | 200714403747 | 220420007127 | 200714406771 |
| 0721 | 220420213113 | 200714420055 | 220420267553 | 200714423077 |
| 0769 | 220420473537 | 200714434163 | 220420546422 | 200714437204 |
| 0817 | 220420750631 | 200714450271 | 220421023513 | 200714453312 |
| 0865 | 220421225722 | 200714464376 | 220421300605 | 200714467417 |
| 0913 | 220421477460 | 200714503524 | 220421625226 | 200714506546 |
| 0961 | 220422025657 | 200714517632 | 220422076764 | 200714522653 |
| 1009 | 220422274062 | 200714533740 | 220422346745 | 200714536761 |
| 1057 | 220422545620 | 200714550046 | 220422616726 | 200714553067 |
| 1105 | 220423014023 | 200714564153 | 220423065131 | 200714567175 |
| 1153 | 220423262226 | 200714600261 | 220423331556 | 200714603303 |
| 1201 | 220423525076 |              |              |              |

FILE 0001 REC 0004 CH 1206

|      |              |              |              |              |
|------|--------------|--------------|--------------|--------------|
| 0001 | 000410000001 | 200714614367 | 220423576204 | 200714617410 |
| 0049 | 220423773301 | 200714630475 | 220424042531 | 200714633516 |
| 0097 | 220424234374 | 200714644602 | 220424305501 | 200714647624 |
| 0145 | 220424475466 | 200714660710 | 220424545016 | 200714663731 |
| 0193 | 220424705003 | 200714675016 | 220425004333 | 200714700037 |
| 0241 | 220425172543 | 200714711123 | 220425242072 | 200714714145 |
| 0289 | 220425432057 | 200714725231 | 220425501407 | 200714730253 |
| 0337 | 220425666041 | 200714741337 | 220425735371 | 200714744360 |
| 0385 | 220426122023 | 200714755445 | 220426171353 | 200714760466 |
| 0433 | 220426352452 | 200714771552 | 220426420224 | 200714774574 |
| 0481 | 220426604656 | 200715005660 | 220426652430 | 200715010702 |
| 0529 | 220427033527 | 200715021766 | 220427103057 | 200715025007 |
| 0577 | 220427262400 | 200715036074 | 220427330152 | 200715041116 |
| 0625 | 220427511251 | 200715052202 | 220427557023 | 200715055224 |
| 0673 | 220427740122 | 200715066310 | 220430004117 | 200715071331 |
| 0721 | 220430165216 | 200715102416 | 220430231212 | 200715105437 |
| 0769 | 220430410534 | 200715116523 | 220430454530 | 200715121545 |
| 0817 | 220430632274 | 200715132631 | 220430676271 | 200715135653 |
| 0865 | 220431054035 | 200715146737 | 220431120031 | 200715151760 |
| 0913 | 220431274017 | 200715163045 | 220431341572 | 200715166066 |
| 0961 | 220431514002 | 200715177152 | 220431557777 | 200715202174 |
| 1009 | 220431733765 | 200715213260 | 220431777762 | 200715216301 |
| 1057 | 220432150415 | 200715227366 | 220432214412 | 200715232407 |
| 1105 | 220432366622 | 200715243473 | 220432431041 | 200715246515 |
| 1153 | 220432601474 | 200715257601 | 220432645471 | 200715262623 |
| 1201 | 220433016124 |              |              |              |

FILE 0001 REC 0005 CH 1206

|      |              |              |              |              |
|------|--------------|--------------|--------------|--------------|
| 0001 | 000310000001 | 200715273707 | 220433062121 | 200715276730 |
| 0049 | 220433230776 | 200715310015 | 220433273215 | 200715313036 |
| 0097 | 220433442073 | 200715324123 | 220433506070 | 200715327144 |
| 0145 | 220433653170 | 200715340230 | 220433717164 | 200715343252 |
| 0193 | 220434064264 | 200715354336 | 220434126503 | 200715357357 |
| 0241 | 220434273603 | 200715370445 | 220434336022 | 200715373466 |
| 0289 | 220434503122 | 200715404552 | 220434545341 | 200715407574 |
| 0337 | 220434710664 | 200715420660 | 220434753103 | 200715423701 |
| 0385 | 220435116425 | 200715434766 | 220435160644 | 200715440007 |
| 0433 | 220435324167 | 200715451074 | 220435366406 | 200715454115 |
| 0481 | 220435526375 | 200715465201 | 220435570614 | 200715470223 |
| 0529 | 220435734137 | 200715501307 | 220435774600 | 200715504331 |
| 0577 | 220436136345 | 200715515415 | 220436205064 | 200715520436 |
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| 0673 | 220436542752 | 200715545627 | 220436605201 | 200715550650 |
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~~(# - INSERTIONS OR DELETIONS MADE IN THIS DECK)~~

23710 THRU 77767

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Sample merge output  
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| DAY | DATE | MAG | ST | RA | DEC | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 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| 9.601812E-01 | 1.885200E | 04 | 5.992937E | 02-7.801388E | 03        | 8.686940E | 02        | 9.604706E |           |
| 9.607599E-01 | 1.964043E | 04 | 5.826075E | 02-7.749345E | 03        | 1.277184E | 03        | 9.610493E |           |
| 9.613386E-01 | 2.048370E | 04 | 5.655713E | 02-7.681397E | 03        | 1.543193E | 03        | 9.616280E |           |
| 9.619173E-01 | 2.137497E | 04 | 5.477331E | 02-7.597613E | 03        | 1.876011E | 03        | 9.622067E |           |
| 9.624960E-01 | 2.230566E | 04 | 5.294380E | 02-7.498110E | 03        | 2.204955E | 03        | 9.627854E |           |
| 9.630747E-01 | 2.326848E | 04 | 5.108356E | 02-7.383022E | 03        | 2.529306E | 03        | 9.633641E |           |
| 9.636534E-01 | 2.425444E | 04 | 4.920703E | 02-7.252510E | 03        | 2.848370E | 03        | 9.639428E |           |
| 9.642321E-01 | 2.525494E | 04 | 4.732881E | 02-7.106765E | 03        | 3.161476E | 03        | 9.645215E |           |
| 9.648108E-01 | 2.626365E | 04 | 4.546333E | 02-6.946014E | 03        | 3.467896E | 03        | 9.651002E |           |
| 9.653895E-01 | 2.727061E | 04 | 4.362474E | 02-6.770509E | 03        | 3.766950E | 03        | 9.656789E |           |
| 9.659682E-01 | 2.826900E | 04 | 4.182703E | 02-6.580525E | 03        | 4.057962E | 03        | 9.662576E |           |
| 9.665469E-01 | 2.925153E | 04 | 4.008381E | 02-6.376384E | 03        | 4.340240E | 03        | 9.668363E |           |
| 9.671256E-01 | 3.021007E | 04 | 3.840841E | 02-6.158418E | 03        | 4.613124E | 03        | 9.674150E |           |
| 9.677043E-01 | 3.113648E | 04 | 3.681374E | 02-5.927013E | 03        | 4.875938E | 03        | 9.679937E |           |
| 9.682830E-01 | 3.202432E | 04 | 3.531229E | 02-5.682571E | 03        | 5.128032E | 03        | 9.685724E |           |
| 9.688617E-01 | 3.286631E | 04 | 3.391610E | 02-5.425529E | 03        | 5.368761E | 03        | 9.691511E |           |
| 9.694404E-01 | 3.365602E | 04 | 3.263654E | 02-5.156369E | 03        | 5.597484E | 03        | 9.697298E |           |
| 9.700191E-01 | 3.438746E | 04 | 3.148459E | 02-4.875589E | 03        | 5.813582E | 03        | 9.703085E |           |
| 9.706036E-01 | 3.506238E | 04 | 3.046089E | 02-4.580752E | 03        | 6.018418E | 03        | 9.708930E |           |
| 9.711823E-01 | 3.565360E | 04 | 2.959539E | 02-4.278272E | 03        | 6.207336E | 03        | 9.714717E |           |
| 9.717610E-01 | 3.619453E | 04 | 2.888603E | 02-3.965903E | 03        | 6.381855E | 03        | 9.720504E |           |
| 9.723397E-01 | 3.665691E | 04 | 2.834068E | 02-3.644272E | 03        | 6.541431E | 03        | 9.726291E |           |
| 9.729184E-01 | 3.705629E | 04 | 2.796657E | 02-3.314052E | 03        | 6.685531E | 03        | 9.732078E |           |
| 9.734971E-01 | 3.739910E | 04 | 2.776976E | 02-2.975958E | 03        | 6.813652E | 03        | 9.737865E |           |
| 9.740758E-01 | 3.769435E | 04 | 2.775562E | 02-2.630736E | 03        | 6.925309E | 03        | 9.743652E |           |
| 9.746545E-01 | 3.795532E | 04 | 2.792831E | 02-2.279130E | 03        | 7.020065E | 03        | 9.749439E |           |
| 9.752332E-01 | 3.819572E | 04 | 2.829102E | 02-1.921972E | 03        | 7.097493E | 03        | 9.755226E |           |
| 9.758119E-01 | 3.843398E | 04 | 2.884589E | 02-1.560096E | 03        | 7.157206E | 03        | 9.761013E |           |
| 9.763906E-01 | 3.868681E | 04 | 2.959379E | 02-1.194352E | 03        | 7.198863E | 03        | 9.766800E |           |
| 9.769693E-01 | 3.897049E | 04 | 3.053461E | 02-8.256535E | 02        | 7.222146E | 03        | 9.772587E |           |
| 9.775480E-01 | 3.929831E | 04 | 3.166680E | 02-4.549207E | 02        | 7.226793E | 03        | 9.778374E |           |
| 9.781268E-01 | 3.968012E | 04 | 3.298774E | 02-8.309234E | 01        | 7.212576E | 03        | 9.784161E |           |
| 9.787055E-01 | 4.012192E | 04 | 3.449345E | 02           | 2.888439E | 02        | 7.179318E | 03        | 9.789948E |
| 9.792842E-01 | 4.062415E | 04 | 3.617863E | 02           | 6.598984E | 02        | 7.126896E | 03        | 9.795735E |
| 9.798630E-01 | 4.119365E | 04 | 3.809511E | 02           | 1.040083E | 03        | 7.052779E | 03        | 9.801596E |
| 9.804417E-01 | 4.177554E | 04 | 4.012310E | 02           | 1.406202E | 03        | 6.961273E | 03        | 9.807483E |
| 9.810204E-01 | 4.235701E | 04 | 4.230658E | 02           | 1.768302E | 03        | 6.850542E | 03        | 9.813270E |
| 9.816163E-01 | 4.292347E | 04 | 4.463513E | 02           | 2.125352E | 03        | 6.720682E | 03        | 9.819057E |
| 9.821950E-01 | 4.345009E | 04 | 4.709665E | 02           | 2.476257E | 03        | 6.571862E | 03        | 9.824844E |
| 9.827737E-01 | 4.390087E | 04 | 4.967813E | 02           | 2.819969E | 03        | 6.404300E | 03        | 9.830631E |
| 9.833524E-01 | 4.424581E | 04 | 5.235513E | 02           | 3.155419E | 03        | 6.218294E | 03        | 9.836418E |
| 9.839311E-01 | 4.445877E | 04 | 5.514210E | 02           | 3.481557E | 03        | 6.014187E | 03        | 9.842205E |
| 9.845098E-01 | 4.452047E | 04 | 5.799242E | 02           | 3.797345E | 03        | 5.792409E | 03        | 9.847992E |
| 9.850885E-01 | 4.441463E | 04 | 6.089793E | 02           | 4.101723E | 03        | 5.553471E | 03        | 9.853779E |
| 9.856672E-01 | 4.412926E | 04 | 6.384014E | 02           | 4.393717E | 03        | 5.297910E | 03        | 9.859566E |

|         |    |              |           |    |           |              |    |           |    |
|---------|----|--------------|-----------|----|-----------|--------------|----|-----------|----|
| 596940E | 02 | 9.604706E-01 | 1.923850E | 04 | 5.911535E | 02-7.777359E | 03 | 1.038207E | 03 |
| 207184E | 03 | 9.610493E-01 | 2.005606E | 04 | 5.742739E | 02-7.717354E | 03 | 1.375541E | 03 |
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| 529306E | 03 | 9.633641E-01 | 2.375868E | 04 | 5.014640E | 02-7.319680E | 03 | 2.689550E | 03 |
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| 161476E | 03 | 9.645215E-01 | 2.575846E | 04 | 4.639360E | 02-7.028251E | 03 | 3.315563E | 03 |
| 467896E | 03 | 9.651002E-01 | 2.676756E | 04 | 4.453978E | 02-6.860088E | 03 | 3.618388E | 03 |
| 766950E | 03 | 9.656789E-01 | 2.777195E | 04 | 4.271993E | 02-6.677309E | 03 | 3.913502E | 03 |
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| 875938E | 03 | 9.679937E-01 | 3.158597E | 04 | 3.605058E | 02-5.806395E | 03 | 5.003367E | 03 |
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| 368761E | 03 | 9.691511E-01 | 3.326823E | 04 | 3.326104E | 02-5.292432E | 03 | 5.484663E | 03 |
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| 381855E | 03 | 9.720504E-01 | 3.643408E | 04 | 2.859237E | 02-3.806204E | 03 | 6.463545E | 03 |
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| 226793E | 03 | 9.778374E-01 | 3.948214E | 04 | 3.230389E | 02-2.690788E | 02 | 7.222055E | 03 |
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| 216294E | 03 | 9.836418E-01 | 4.437007E | 04 | 5.374337E | 02 3.319715E | 03 | 6.118479E | 03 |
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| 297910E | 03 | 9.859566E-01 | 4.391844E | 04 | 6.531886E | 02 4.534759E | 03 | 5.164097E | 03 |