VOYGER 1

77-084A-00E THRU 00F
VG1-J-6-SPK-V1.0
VG1-S-6-SPK-V1.0

77-084A-05G THRU 05N
MAGNETOMETER DATA

77-084A-06L THRU 06M
PLASMA DATA

77-084A-07D THRU 07G

VOYAGER 2

77-076A-00E [illegible] 00H
VG2-S-6-SPK-V1.0, VG2-J-6-SPK-V1.0, VG2-U-6-SPK-V

77-076A-05J THRU 05U
MAGNETOMETER DATA

77-076A-06G THRU 06L
PLASMA DATA

77-076A-07D THRU 07I
PART. ANALYZER/TELESCOPE DATA

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    b. Core Catalog Materials

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

VOYGER 1

77-084A-00E THRU 00F XXNO-00431
VG1-J-6-SPK-V1.0
VG1-S-6-SPK-V1.0

PSFP-00234 77-084A-05G THRU 05N PSFP-00177
MAGNETOMETER DATA

PSFP-00063 77-084A-06G THRU 06M PSFP-00175
PLASMA DATA

PSFP-00246 77-084A-07D THRU 07G PSFP-00061
PART.ANALYZER/TELESCOPE DATA

VOYAGER 2

XXNO-00431 77-076A-00E, DOG, 00H XXNO-00431
VG2-S-6-SPK-V1.0, VG2-J-6-SPK-V1.0, VG2-U-6-SPK-V1.0

PSFP-00186 77-076A-05J THRU 05U PSFP-00214
MAGNETOMETER DATA

PSFP-00238 77-076A-06G THRU 06Q PSFP-00068
PLASMA DATA

PSFP-00237 77-076A-07D THRU 07I PSFP-00212
PART. ANALYZER/TELESCOPE DATA

THIS CATALOG CONTAINS 53 VOYAGER 1 AND 2 DATA SETS, CONSISTING OF 41 TAPES. ONE TAPE, D79964, IS 1600 BPI ALL OTHER TAPES ARE 6250 BPI, VAX FILES 11 FORMAT, LABELED, AND ARE WRITTEN IN ASCII USING THE DCL COPY COMMAND. THE DATA SET NAMES, AND ID NUMBERS, D AND C NUMBERS, LABEL NAMES AND TIME SPANS FOLLOW:

XXNO-00431 77-084A-00E VG1-J-6-SPK-V1.0
D-79964 C-28036 02/07/79 - 04/08/79 LABEL = VGRSPK

XXNO-00431 77-084A-00F VG1-S-6-SPK-V1.0
D-79964 C-28036 09/02/80 - 12/29/80 LABEL = VGRSPK

PSFP-00234 77-084A-05G VG1_J_POS_4_48.0SEC
D-79993 C-27930 02/28/79 - 03/12/79 LABEL = V1JPOS

PSFP-00139 77-084A-05H VG1_S-POS_4_48.0SEC
D-79994 C-27931 11/10/80 - 11/28/80 LABEL = V1SPOS

PSFP-00179 77-084A-05I VG1_J_MAG_4_48.0SEC
D-79995 C-27932 03/03/79 - 03/10/79 LABEL = V1JMLO

PSFP-00038 77-084A-05J VG1_J_MAG_4_9.60SEC
D-79996 C-27933 03/01/79 - 03/15/79 LABEL = V1JMMD

PSFP-00248 77-084A-05K VG1_J_MAG_4_1.92SEC
D-79997 C-27934 03/03/79 - 03/15/79 LABEL = V1JMHI

PSFP-00178	77-084A-05L	VG1_S_MAG_4_1.92SEC D-79998 C-27935 11/12/80 - 11/20/80 LABEL = V1SMHI
PSFP-00233	77-084A-05M	PDS VG1_S_MAG_4_9.60SEC D-79999 C-27936 11/12/80 - 11/20/80 LABEL = V1SMMD
PSFP-00177	77-084A-05N	VG1_S_MAG_4_48.0SEC D-80000 C-27937 11/12/80 - 11/20/80 LABEL = V1SMLO
PSFP-00063	77-084A-06G 77-084A-06H 77-084A-06I 77-084A-06J 77-084A-06K	VG1-S-PLS-5-ION-MOM-96.0 SEC VG1-S-PLS-5-ION-FIT-96.0 SEC VG1-S-PLS-5-ION-FBR-96.0 SEC VG1-S-PLS-5-ELE-BR-96.0 SEC VG1-S-PLS-5-ELE-PAR-96.0 SEC D-79991 C-28351 11/20/80 - 11/21/80 LABEL = V1SPLS
PSFP-00175	77-084A-06L 77-084A-06M	VG1_J_PLS_5_ION_MOM_96.0SEC VG1_J_PLS/PRA_5_ELE_MOM_96.0SEC D-79992 C-27929 03/01/79 - 03/07/79 LABEL = V1JPLS
PSFP-00246	77-084A-07D	VG1_J_LECP_4_15MIN D-79969 C-27908 02/28/79 - 03/22/79 LABEL = V1JLHI
PSFP-00137	77-084A-07E	VG1_S_LECP_4_BR_15MIN D-79970 C-27909 11/11/80 - 11/16/80 LABEL = V1SLBR
PSFP-00232	77-084A-07F	VG1_S_LECP_4_15MIN D-79971 C-27910 11/11/80 - 11/16/80 LABEL = V1SLHI
PSFP-00061	77-084A-07G	VG1_J_LECP_4_BR_15MIN D-79972 C-27911 02/28/79 - 03/12/79 LABEL = V1JLBR
XXNO-00431	77-076A-00E	VG2-S-6-SPK-V1.0 D-79964 C-28036 07/19/81 - 10/21/81 LABEL = VGRSPK
	77-076A-00G	VG2-J-6-SPK-V1.0 D-79964 C-28036 06/09/79 - 08/28/79 LABEL = VGRSPK
	77-076A-00H	VG2-U-6-SPK-V1.0 D-79964 C-28036 11/05/85 - 02/25/86 LABEL = VGRSPK
PSFP-00186	77-076A-05J	VG2_J_MAG_4_1.92SEC D-79975 C-27914 07/05/79 - 07/25/79 LABEL = V2JMH1 D-79976 C-27915 07/25/79 - 08/12/79 LABEL = V2JMH2
PSFP-00146	77-076A-05K	VG2_J_MAG_4_9.60SEC D-79977 C-27916 07/05/79 - 08/12/79 LABEL = V2JMMD
PSFP-00185	77-076A-05L	VG2_J_MAG_4_48.0SEC D-79978 C-27917 07/05/79 - 08/12/79 LABEL = V2JMLO
PSFP-00128	77-076A-05M	VG2_S_POS_4_48.0SEC D-79979 C-27918 08/23/81 - 08/29/81 LABEL = V2SPOS
PSFP-00190	77-076A-05N	VG2_J_POS_4_48.0SEC D-79980 C-27919 07/03/79 - 08/03/79 LABEL = V2JPOS
PSFP-00127	77-076A-05O	PDS VG2_U_MAG_4_48.0SEC D-79981 C-27920 01/24/86 - 01/25/86 LABEL = V2UMLO

PSFP-00184	77-076A-05P	PDS VG2_U_MAG_4_9.60SEC D-79982 C-27921 01/24/86 - 01/26/86 LABEL = V2UMM3
PSFP-00183	77-076A-05Q	PDS VG2_U_MAG_4_1.92SEC D-79983 C-27922 01/24/86 - 01/26/86 LABEL = V2UMH3
PSFP-00100	77-076A-05R	PDS VG2_S_MAG_4_48.0SEC D-79984 C-27923 08/23/81 - 08/29/81 LABEL = V2SMLO
PSFP-00099	77-076A-05S	PDS VG2_S_MAG_4_9.60SEC D-79985 C-27924 08/23/81 - 08/29/81 LABEL = V2SMMD
PSFP-00215	77-076A-05T	PDS VG2_S_MAG_4_1.92SEC D-79986 C-27925 08/23/81 - 08/29/81 LABEL = V2SMHI
PSFP-00214	77-076A-05U	VG2_U_POS_4_48.0SEC D-79987 C-27926 01/21/86 - 01/30/86 LABEL = V2UPOS
PSFP-00238	77-076A-06G 77-076A-06H 77-076A-06I 77-076A-06J	VG2_U_PLS_5_ION_FIT_48SEC VG2_U_PLS_5_ION_FBR_48SEC VG2_U_PLS_5_ELE_PAR_48SEC VG2_U_PLS_5_ELE_BR_48SEC D-79988 C-27927 01/24/86 - 01/26/86 LABEL = V2UPLS
PSFP-00182	77-076A-06K 77-076A-06L	VG2_J_PLS_5_ION_MOM_96.0SEC VG2_J_PLS_5_ELE_MOM_96.0SEC D-79989 C-27928 07/04/79 - 07/13/79 LABEL = V2JPLS
PSFP-00068	77-076A-06M 77-076A-06N 77-076A-06O 77-076A-06P 77-076A-06Q	VG2-S-PLS-5-ELE-BR-96.0 SEC VG2-S-PLS-5-ION-MOM-96.0 SEC VG2-S-PLS-5-ION-FIT-96.0 SEC VG2-S-PLS-5-ELE-PAR-96.0 SEC VG2-S-PLS-5-ION-FBR-96.0 SEC D-79990 C-29102 08/19/81 - 08/26/81 LABEL= V2SPLS
PSFP-00237	77-076A-07D	VG2_S_LECP_4_BR_15MIN D-79965 C-27904 08/23/81 - 08/29/81 LABEL = V2SLBR
PSFP-00191	77-076A-07E	VG2_S_LECP_4_15MIN D-79966 C-27905 08/23/81 - 08/29/81 LABEL = V2SLHI
PSFP-00213	77-076A-07F	VG2_J_LECP_4_BR_15MIN D-79967 C-27906 07/02/79 - 07/23/79 LABEL = V2JLBR
PSFP-00066	77-076A-07G	VG2_J_LECP_4_15MIN D-79968 C-27907 07/03/79 - 08/03/79 LABEL = V2JLHI
PSFP-00125	77-076A-07H	VG2_U_LECP_4_15MIN D-79973 C-27912 01/24/86 - 01/28/86 LABEL = V2ULHI
PSFP-00212	77-076A-07I	VG2_U_LECP_4_BR_15MIN D-79974 C-27913 01/24/86 - 01/28/86 LABEL = V2ULBR

DSC #689 D-79964
C-28036
(on tape)
This is a sample of the documentation. Each tape has it's own files of documentation.

```
CCSD1Z000001000058483NJPL1V00PDS100058463 = SFDU_LABEL

OBJECT                          = VOLUME
 NAME                           = VGRSPK
 MEDIA_TYPE                     = TAPE
 TAPE_DENSITY                   = 1600
 TAPES                          = 1
 PROCESS_NAME                   = COPY
 FORMAT                         = ANSI
 HARDWARE_NAME                  = 'VAX 11/780'
 OPERATING_SYSTEM_NAME          = 'VMS 4.7'
 FILES                          = 6
 DATE_TIME                      = 1989-08-31
 DATA_SET_ID                    = {'VG1-S-6-SPK-V1.0',
                                   'VG1-J-6-SPK-V1.0',
                                   'VG2-J-6-SPK-V1.0',
                                   'VG2-S-6-SPK-V1.0',
                                   'VG2-U-6-SPK-V1.0'}
 NOTE                           = "This volume consists of this Volume
  Description Label and five actual datasets.

  The five datasets referenced by this volume label are the archival
  ephemeris and trajectory files for the Voyager 1 and Voyager 2
  flybys of Jupiter, Saturn, and Uranus.  The datasets are in the form
  of Navigation Ancillary Information Facility SPICE kernels; in
  particular, these five datasets are ASCII-format SPK files (SPK
  stands for 'S and P Kernels'). People intending to use these files
  must also order the NAIF Ephemeris System (NESYS) portion of the
  SPICELIB software 'toolkit' (if available separately at the time the
  order is placed), or, better yet, order the entire SPICELIB toolkit.
  All SPICELIB software is available as portable, ANSI standard
  Fortran 77 modules.

  NESYS includes the utility program named SEFU needed to convert any of
  these ASCII-format SPK files (e.g. VG1_JUP.ASP) back to binary format
  appropriate for the user's   host computer.  NESYS also contains the
  subroutines needed to read   binary SPK kernel files, complete with
  appropriate user documentation."

OBJECT                          = DIRECTORY
 NAME                           = ROOT
 NJPL1I00PDS100036920           = SFDU_LABEL

 OBJECT                          = FILE
  NAME                           = 'VOLDESC.SFD'
  RECORD_TYPE                    = STREAM
 END_OBJECT                      = FILE

 OBJECT                          = FILE
  NAME                           = 'VG1_JUP.ASP'
  RECORD_TYPE                    = VARIABLE_LENGTH
  RECORD_BYTES                   = 72
  FILE_RECORDS                   = 45775
  NOTE                           = "Voyager 1 Jupiter data file."

  OBJECT                          = CATALOG

  OBJECT                          = DATASET
   DATA_SET_ID                    = 'VG1-J-6-SPK-V1.0'
```

DSC #689
Voyager

September 01, 1989

NSSDC Digital Data Manager
Code 633
GSFC
Greenbelt, MD. 20771

Attn: Mr. Ralph W. Post

Dear Mr. Post:

Enclosed please find a single 1/2 inch computer mag tape containing Planetary Data System (PDS) datasets for your use and retention. These datasets were produced by the Navigation Ancillary Information Facility (NAIF) at the Jet Propulsion Laboratory (JPL) on behalf of the PDS.

The tape contains one PDS VOLDESC.SFD file in PDS format which describes the remaining five data files on the tape. The five data files are Voyager 1 and Voyager 2 archival trajectory and ephemeris datasets, written in the NAIF S- and P-Kernel (SPK) format. The five files are actually ASCII versions of the SPK files so as to allow ready porting to nearly any environment.

The files are further described below. Be advised that the required AIM and DIF forms for these files were sent to you under separate cover by staff at the central PDS node.

FILE NUMBER	FILE NAME	APPROXIMATE SIZE (Mbytes)	NO. OF RECORDS
1	VOLDESC.SFD	0.1	1247
2	VG1_JUP.ASP-	0.85	45,775
3	VG1_SAT.ASP-	1.84	99,273
4	VG2_JUP.ASP-	0.91	48,975
5	VG2_SAT.ASP-	1.97	106,358
6	VG2_URA.ASP-	0.22	11,842

The tape was written as an ANSI labeled tape

Label = "VGRSPK"

using the $ COPY command on a DEC VAX 11/780 with VMS 4.7. A copy of the command procedure used to write the tape is included with this letter.

You may contact me as noted below if you have questions regarding this tape.

Very truly yours,

Charles Acton

C. H. Acton
Task Manager
Navigation Ancillary Information Facility

cc:

E. Dobinson	PDS Central Node
T. Martin	" " "
G. Woodward	" " "

C. H. Acton
Mail Stop 301-125L
Jet Propulsion Laboratory
4800 Oak Grove Dr.
Pasadena, CA 91109

FTS 792-3869
(818) 354-3869

SPAN: NAIF::CHA
NASAMAIL: CACTON

01 SEP 1989
C. H. ACTON

[CHA.PDS.TEMPLATES.DATASETS]MAKE_NSSDC_TAPE.COM

```
!
!  NAIF PDS Vers 1.0 Delivery to NSSDC
!  C.H. Acton      01 SEP 1989
!  Tape will be written at 1600 bpi
!
$init     mta0: vgrspk
$mount    mta0: vgrspk
$copy/log                          voldesc.sfd    mta0:*.*
$copy/log libdisk:[nesys.merge]vg1_jup.asp    mta0:*.*
$copy/log libdisk:[nesys.merge]vg1_sat.asp    mta0:*.*
$copy/log libdisk:[nesys.merge]vg2_jup.asp    mta0:*.*
$copy/log libdisk:[nesys.merge]vg2_sat.asp    mta0:*.*
$copy/log libdisk:[nesys.merge]vg2_ura.asp    mta0:*.*
```

Tape Label = "VGRSPK"

01 SEP 1989
C.H. ACTON
NAIF
PDS
J.P.L.

```
$ @make_nssdc_tape
%MOUNT-I-MOUNTED, VGRSPK mounted on _NAIF$MTA0:
%COPY-S-COPIED, USER$DISK:[CHA.PDS.TEMPLATES.DATASETS]VOLDESC.SFD;8 copied to MT
A0:[]VOLDESC.SFD;8 (1247 records)
%COPY-S-COPIED, LIBDISK:[NESYS.MERGE]VG1_JUP.ASP;1 copied to MTA0:[]VG1_JUP.ASP;
1 (45775 records)
%COPY-S-COPIED, LIBDISK:[NESYS.MERGE]VG1_SAT.ASP;1 copied to MTA0:[]VG1_SAT.ASP;
1 (99273 records)
%COPY-S-COPIED, LIBDISK:[NESYS.MERGE]VG2_JUP.ASP;1 copied to MTA0:[]VG2_JUP.ASP;
1 (48975 records)
%COPY-S-COPIED, LIBDISK:[NESYS.MERGE]VG2_SAT.ASP;1 copied to MTA0:[]VG2_SAT.ASP;
1 (106358 records)
%COPY-S-COPIED, LIBDISK:[NESYS.MERGE]VG2_URA.ASP;1 copied to MTA0:[]VG2_URA.ASP;
1 (11842 records)
$
$ dismount mta0:
$
$
$
$
$
$
$
```

DSC #689 D-79964
C-28036
(on tape)
This is a sample of the documentation. Each tape has it's own files of documentation.

```
CCSD1Z000001000058483NJPL1V00PDS100058463 = SFDU_LABEL

OBJECT                              = VOLUME
 NAME                               = VGRSPK
 MEDIA_TYPE                         = TAPE
 TAPE_DENSITY                       = 1600
 TAPES                              = 1
 PROCESS_NAME                       = COPY
 FORMAT                             = ANSI
 HARDWARE_NAME                      = 'VAX 11/780'
 OPERATING_SYSTEM_NAME              = 'VMS 4.7'
 FILES                              = 6
 DATE_TIME                          = 1989-08-31
 DATA_SET_ID                        = {'VG1-S-6-SPK-V1.0',
                                       'VG1-J-6-SPK-V1.0',
                                       'VG2-J-6-SPK-V1.0',
                                       'VG2-S-6-SPK-V1.0',
                                       'VG2-U-6-SPK-V1.0'}
 NOTE                               = "This volume consists of this Volume
  Description Label and five actual datasets.

  The five datasets referenced by this volume label are the archival
  ephemeris and trajectory files for the Voyager 1 and Voyager 2
  flybys of Jupiter, Saturn, and Uranus.  The datasets are in the form
  of Navigation Ancillary Information Facility SPICE kernels; in
  particular, these five datasets are ASCII-format SPK files (SPK
  stands for 'S and P Kernels'). People intending to use these files
  must also order the NAIF Ephemeris System (NESYS) portion of the
  SPICELIB software 'toolkit' (if available separately at the time the
  order is placed), or, better yet, order the entire SPICELIB toolkit.
  All SPICELIB software is available as portable, ANSI standard
  Fortran 77 modules.

  NESYS includes the utility program named SEFU needed to convert any of
  these ASCII-format SPK files (e.g. VG1_JUP.ASP) back to binary format
  appropriate for the user's   host computer.  NESYS also contains the
  subroutines needed to read   binary SPK kernel files, complete with
  appropriate user documentation."

 OBJECT                              = DIRECTORY
  NAME                               = ROOT
  NJPL1I00PDS100036920               = SFDU_LABEL

  OBJECT                              = FILE
   NAME                               = 'VOLDESC.SFD'
   RECORD_TYPE                        = STREAM
  END_OBJECT                          = FILE

  OBJECT                              = FILE
   NAME                               = 'VG1_JUP.ASP'
   RECORD_TYPE                        = VARIABLE_LENGTH
   RECORD_BYTES                       = 72
   FILE_RECORDS                       = 45775
   NOTE                               = "Voyager 1 Jupiter data file."

  OBJECT                              = CATALOG

   OBJECT                             = DATASET
    DATA_SET_ID                       = 'VG1-J-6-SPK-V1.0'
```

```
OBJECT                          = DATASETINFO
 DATA_SET_NAME                  = "VOYAGER 1 JUPITER SPICE S- AND
  P-ephem. KERNELS"
 EVENT_START_TIME               = 1979-02-07T00:00:00Z
 EVENT_STOP_TIME                = 1979-04-08T00:00:00Z
 NATIVE_START_TIME              = 'N/A'
 NATIVE_STOP_TIME               = 'N/A'
 DATA_OBJECT_TYPE               = "SPK FILE, CONTAINING TRAJECTORY
  AND EPHEMERIS DATA"
 DATA_SET_RELEASE_DATE          = 1989-11-01
 PROCESSING_LEVEL_ID            = 6
 PRODUCER_FULL_NAME             = "NAIF STAFF"
 PRODUCER_INSTITUTION_NAME      = "JET PROPULSION LABORATORY"
 SOFTWARE_FLAG                  = Y
 DETAILED_CATALOG_FLAG          = N
 PROCESSING_START_TIME          = 1987-03-26
 PROCESSING_STOP_TIME           = 1989-08-29
 DATA_SET_DESC                  = "This data set is a NAIF SPK
  file, which is the realization of the SPICE S and P-ephemeris
  kernels.  The SPICE S kernel is the logical component of the
  SPICE kernel concept which contains spacecraft trajectory data
  (position and velocity in a Cartesian inertial reference frame).
  The SPICE P-ephemeris kernel is the logical component of the
  SPICE kernel concept which contains target (one or more of
  planet, satellite, comet, asteroid)  ephemeris data (position
  and velocity in a Cartesian inertial reference frame).

  NAIF provides a software toolkit, called SPICELIB, containing
  the Fortran 77 source code subroutines which a user needs to
  read SPK files. Those intending to use SPK kernel files should
  order this SPICELIB toolkit from the PDS (if it is not already
  on hand) and integrate appropriate modules into their own
  applications program. Users should NOT attempt to write their
  own software to read SPK kernels files.

  SPICELIB software is highly documented via internal headers, and
  some additional documentation is available in separate SPICELIB
  ASCII text files called Required Reading files.  The NAIF
  Ephemeris System (NESYS) Required Reading File, identified as
  NESYS.REQ, describes use of the SPK kernel readers.

  This particular data set is a merge of five SPK source files.
  Four of these were made from standard Voyager NAV Team archival
  products which were made for SEDR production.  The fifth source
  file was made from a post-encounter satellite ephemeris file
  which contains ephemeris data for satellites which were not
  included in the standard Voyager NAV Team archival products.
  These source files are summarized below.

  'NAV ID              START TIME                STOP TIME         '\n
  'NAIF_ID FOR EACH BODY INCLUDED (See key below)                    '\n
  '-------------------------------------------------------------------'\n
  'T790210      1979 FEB 06 00:00:00     1979 FEB 13 00:00:00       '\n
  '1 thru 10, 301, 399, 501 thru 505, 599, -31                       '\n
  '                                                                  '\n
  'T790213      1979 FEB 13 00:00:00     1979 FEB 19 00:00:00       '\n
  '1 thru 10, 301, 399, 501 thru 505, 599, -31                       '\n
  '                                                                  '\n
  'T790303      1979 FEB 19 00:00:00     1979 MAR 03 00:00:00       '\n
  '1 thru 10, 301, 399, 501 thru 505, 599, -31                       '\n
```

```
  '                                                                '\n
  'T790318       1979 MAR 03 00:00:00      1979 APR 09 00:00:00   '\n
  '1 thru 10, 301, 399, 501 thru 505, 599, -31                     '\n
  '                                                                '\n
  'JUP024-VGR    1979 FEB 01 00:00:00      1979 NOV 03 00:00:00   '\n
  '505, 514, 515, 516, 599                                         '
```

NAIF body IDs are used within SPICE kernels to label data for a specific body. These IDs must be employed as arguments in the SPICELIB SPK kernel readers.

Users might note that not all those bodies for which data are available in this file are listed in the Data Set Target Template below.

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Satellites which may be found in this particular SPK file are:

```
  '501=IO, 502=EUROPA, 503=GANYMEDE, 504=CALLISTO, 505=AMALTHEA,'\n
  '514=THEBE, 515=ADRASTEA, 516=METIS.                             '
```

Spacecraft are identified using the numeric IDs assigned by JPL's Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32."

```
 CONFIDENCE_LEVEL_NOTE          = "There is essentially no loss in
  accuracy when an SPK file is made from one or several NAV source
  files.
```

Statistics on ephemeris accuracy are not available, but errors are very small compared to normal uncertainties in reconstructed pointing knowledge for the Voyager science instruments."

```
END_OBJECT                      = DATASETINFO

OBJECT                          = DATASETTARG
 TARGET_NAME                    = EARTH
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = SUN
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = JUPITER
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = IO
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
```

```
 TARGET_NAME                          = EUROPA
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = GANYMEDE
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = CALLISTO
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = AMALTHEA
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = THEBE
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = ADRASTEA
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = METIS
END_OBJECT                            = DATASETTARG

OBJECT                                = DSPARMINFO
 SAMPLING_PARAMETER_NAME              = 'N/A'
 SAMPLING_PARAMETER_RESOLUTION        = 'N/A'
 MINIMUM_SAMPLING_PARAMETER           = 'N/A'
 MAXIMUM_SAMPLING_PARAMETER           = 'N/A'
 SAMPLING_PARAMETER_INTERVAL          = 'N/A'
 MINIMUM_AVAILABLE_SAMPLING_INT       = 'N/A'
 SAMPLING_PARAMETER_UNIT              = 'N/A'
 DATA_SET_PARAMETER_NAME              = 'N/A'
 NOISE_LEVEL                          = 'N/A'
 DATA_SET_PARAMETER_UNIT              = 'N/A'
END_OBJECT                            = DSPARMINFO

OBJECT                                = SCDATASET
 INSTRUMENT_HOST_ID                   = 'VG1'
 INSTRUMENT_ID                        = 'N/A'
END_OBJECT                            = SCDATASET

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = 'NAIF 18'
 SOFTWARE_NAME                        = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                  = 'VG1-J-6-SPK-V1.0'
END_OBJECT                            = DSPROCESSING

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = "NAIF 19"
 SOFTWARE_NAME                        = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                  = 'VG1-J-6-SPK-V1.0'
END_OBJECT                            = DSPROCESSING

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = 'NAIF 20'
 SOFTWARE_NAME                        = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
```

```
   PRODUCT_DATA_SET_ID                = 'VG1-J-6-SPK-V1.0'
  END_OBJECT                          = DSPROCESSING

  OBJECT                              = DSPROCESSING
   SOURCE_DATA_SET_ID                 = 'NAIF 21'
   SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
   PRODUCT_DATA_SET_ID                = 'VG1-J-6-SPK-V1.0'
  END_OBJECT                          = DSPROCESSING

  OBJECT                              = DSPROCESSING
   SOURCE_DATA_SET_ID                 = 'NAIF 121'
   SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
   PRODUCT_DATA_SET_ID                = 'VG1-J-6-SPK-V1.0'
  END_OBJECT                          = DSPROCESSING

 END_OBJECT                           = DATASET

END_OBJECT                            = CATALOG

END_OBJECT                            = FILE

OBJECT                                = FILE
 NAME                                 = 'VG1_SAT.ASP'
 RECORD_TYPE                          = VARIABLE_LENGTH
 RECORD_BYTES                         = 72
 FILE_RECORDS                         = 99273
 NOTE                                 = "Voyager 1 Saturn data file."

 OBJECT                               = CATALOG

 OBJECT                               = DATASET
  DATA_SET_ID                         = 'VG1-S-6-SPK-V1.0'

  OBJECT                              = DATASETINFO
   DATA_SET_NAME                      = "VOYAGER 1 SATURN SPICE S- AND
    P-ephem. KERNELS"
   EVENT_START_TIME                   = 1980-09-02T00:00:00Z
   EVENT_STOP_TIME                    = 1980-12-29T00:00:00Z
   NATIVE_START_TIME                  = 'N/A'
   NATIVE_STOP_TIME                   = 'N/A'
   DATA_OBJECT_TYPE                   = "SPK FILE, CONTAINING TRAJECTORY
    AND EPHEMERIS DATA"
   DATA_SET_RELEASE_DATE              = 1989-11-01
   PROCESSING_LEVEL_ID                = 6
   PRODUCER_FULL_NAME                 = "NAIF TEAM"
   PRODUCER_INSTITUTION_NAME          = "JET PROPULSION LABORATORY"
   SOFTWARE_FLAG                      = Y
   DETAILED_CATALOG_FLAG              = N
   PROCESSING_START_TIME              = 1987-03-27
   PROCESSING_STOP_TIME               = 1989-08-29
   DATA_SET_DESC                      = "This data set is a NAIF SPK
    file, which is the realization of the SPICE S and P-ephemeris
    kernels.  The SPICE S kernel is the logical component of the
    SPICE kernel concept which contains spacecraft trajectory data
    (position and velocity in a Cartesian inertial reference frame).
    The SPICE P-ephemeris kernel is the logical component of the
    SPICE kernel concept which contains target (one or more of
    planet, satellite, comet, asteroid)  ephemeris data (position
    and velocity in a Cartesian inertial reference frame).
```

NAIF provides a software toolkit, called SPICELIB, containing the Fortran 77 source code subroutines which a user needs to read SPK files. Those intending to use SPK kernel files should order this SPICELIB toolkit from the PDS (if it is not already on hand) and integrate appropriate modules into their own applications program. Users should NOT attempt to write their own software to read SPK kernels files.

SPICELIB software is highly documented via internal headers, and some additional documentation is available in separate SPICELIB ASCII text files called Required Reading files. The NAIF Ephemeris System (NESYS) Required Reading File, identified as NESYS.REQ, describes use of the SPK kernel readers.

This particular data set is a merge of ten SPK source files. Six of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The remaining four were made from post-encounter satellite ephemeris files which contain ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

```
'NAV ID                START TIME                STOP TIME       '\n
'NAIF_ID FOR EACH BODY INCLUDED  (Sey key below)                    '\n
'-------------------------------------------------------------------'\n
'T801012       1980 AUG 23 00:00:00      1980 OCT 24 00:00:00 '\n
'1 thru 10, 301, 399, 601 thru 608, 699, -31                    '\n
'                                                               '\n
'T801107       1980 OCT 24 00:00:00      1980 NOV 03 00:00:00 '\n
'1 thru 10, 301, 399, 601 thru 608, 699, -31                    '\n
'                                                               '\n
'T801119       1980 NOV 03 00:00:00      1980 NOV 12 00:00:00 '\n
'1 thru 10, 301, 399, 601 thru 608, 699, -31                    '\n
'                                                               '\n
'T801202-1     1980 NOV 12 00:00:00      1980 DEC 29 23:59:00 '\n
'1 thru 10, 301, 399, 601 thru 608, 699, -31                    '\n
'                                                               '\n
'T801202-2     1980 DEC 29 23:59:00      1981 JAN 01 00:00:00 '\n
'1 thru 10, 301, 399, -31                                       '\n
'                                                               '\n
'T810307       1981 JAN 01 00:00:00      1981 FEB 01 00:00:00 '\n
'1 thru 10, 301, 399, -31                                       '\n
'                                                               '\n
'SAT021-RCKT   1980 SEP 01 00:00:00      1981 JAN 01 00:00:00 '\n
'613, 615, 616, 617, 699                                        '\n
'                                                               '\n
'SAT023        1980 SEP 01 00:00:00      1981 OCT 31 00:00:00 '\n
'610, 611, 699                                                  '\n
'                                                               '\n
'SAT024        1980 SEP 01 00:00:00      1981 OCT 31 00:00:00 '\n
'612, 699                                                       '\n
'                                                               '\n
'SAT025        1980 SEP 01 00:00:00      1981 OCT 31 00:00:00 '\n
'614, 699                                                       '
```

NAIF body IDs are used within SPICE kernels to label data for a specific body. These IDs must be employed as arguments in the SPICELIB SPK kernel readers.

Users might note that not all those bodies for which data are

```
  available in this file are listed in the Data Set Target
  Template below.

  Key to NAIF_IDs:

  1 thru 9 are planet-satellite system barycenters for Mercury
  thru Pluto respectively.

  199 thru 999 are planet mass centers for Mercury thru Pluto.

  10 is the SUN.

  nxx are satellites, where n is the parent planet number.  Thus,
  n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc.  Satellites
  which may be found in this particular SPK file are:

  '601=MIMAS, 602=ENCELADUS, 603=TETHYS, 604=DIONE, 605=RHEA,  '\n
  '606=TITAN,607=HYPERION,608=IAPETUS,610=JANUS,611=EPIMETHEUS,'\n
  '612=HELENE(formerly called DIONE-B),613=TELESTO,614=CALYPSO,'\n
  '615=ATLAS, 616=PROMETHEUS, 617=PANDORA.                     '

  Spacecraft are identified using the numeric IDs assigned by
  JPL's Deep Space Network (DSN), but with a minus sign preceding
  the number.  Thus Voyager 1 is -31 and Voyager 2 is -32."
 CONFIDENCE_LEVEL_NOTE          = "There is essentially no loss in
  accuracy when an SPK file is made from one or several NAV source
  files.

  Statistics on ephemeris accuracy are not available, but errors
  are very small compared to normal uncertainties in reconstructed
  pointing knowledge for the Voyager science instruments."
END_OBJECT                      = DATASETINFO

OBJECT                          = DATASETTARG
 TARGET_NAME                    = EARTH
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = SUN
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = SATURN
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = MIMAS
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = ENCELADUS
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = TETHYS
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = DIONE
END_OBJECT                      = DATASETTARG
```

```
OBJECT                                  = DATASETTARG
 TARGET_NAME                            = RHEA
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = TITAN
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = HYPERION
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = IAPETUS
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = JANUS
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = EPIMETHEUS
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = HELENE
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = TELESTO
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = CALYPSO
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = ATLAS
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = PROMETHEUS
END_OBJECT                              = DATASETTARG

OBJECT                                  = DATASETTARG
 TARGET_NAME                            = PANDORA
END_OBJECT                              = DATASETTARG

OBJECT                                  = DSPARMINFO
 SAMPLING_PARAMETER_NAME                = 'N/A'
 SAMPLING_PARAMETER_RESOLUTION          = 'N/A'
 MINIMUM_SAMPLING_PARAMETER             = 'N/A'
 MAXIMUM_SAMPLING_PARAMETER             = 'N/A'
 SAMPLING_PARAMETER_INTERVAL            = 'N/A'
 MINIMUM_AVAILABLE_SAMPLING_INT         = 'N/A'
 SAMPLING_PARAMETER_UNIT                = 'N/A'
 DATA_SET_PARAMETER_NAME                = 'N/A'
 NOISE_LEVEL                            = 'N/A'
 DATA_SET_PARAMETER_UNIT                = 'N/A'
```

```
END_OBJECT                          = DSPARMINFO

OBJECT                              = SCDATASET
 INSTRUMENT_HOST_ID                 = 'VG1'
 INSTRUMENT_ID                      = 'N/A'
END_OBJECT                          = SCDATASET

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = "NAIF 36"
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = "NAIF 37"
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 38'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 39'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 40'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 41'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 116'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 118'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING

OBJECT                              = DSPROCESSING
 SOURCE_DATA_SET_ID                 = 'NAIF 119'
 SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
END_OBJECT                          = DSPROCESSING
```

```
  OBJECT                              = DSPROCESSING
   SOURCE_DATA_SET_ID                 = 'NAIF 120'
   SOFTWARE_NAME                      = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
   PRODUCT_DATA_SET_ID                = 'VG1-S-6-SPK-V1.0'
  END_OBJECT                          = DSPROCESSING

 END_OBJECT                          = DATASET

 END_OBJECT                         = CATALOG

END_OBJECT                          = FILE

OBJECT                              = FILE
 NAME                               = 'VG2_JUP.ASP'
 RECORD_TYPE                        = VARIABLE_LENGTH
 RECORD_BYTES                       = 72
 FILE_RECORDS                       = 48975
 NOTE                               = "Voyager 2 Jupiter data file."

 OBJECT                              = CATALOG

 OBJECT                              = DATASET
  DATA_SET_ID                        = 'VG2-J-6-SPK-V1.0'

  OBJECT                              = DATASETINFO
   DATA_SET_NAME                      = "VOYAGER 2 JUPITER SPICE S- AND
    P-ephem. KERNELS"
   EVENT_START_TIME                   = 1979-06-09T00:00:00Z
   EVENT_STOP_TIME                    = 1979-08-28T00:00:00Z
   NATIVE_START_TIME                  = 'N/A'
   NATIVE_STOP_TIME                   = 'N/A'
   DATA_OBJECT_TYPE                   = "SPK FILE, CONTAINING TRAJECTORY
    AND EPHEMERIS DATA"
   DATA_SET_RELEASE_DATE              = 1989-11-01
   PROCESSING_LEVEL_ID                = 6
   PRODUCER_FULL_NAME                 = "NAIF TEAM"
   PRODUCER_INSTITUTION_NAME          = "JET PROPULSION LABORATORY"
   SOFTWARE_FLAG                      = Y
   DETAILED_CATALOG_FLAG              = N
   PROCESSING_START_TIME              = 1987-05-30
   PROCESSING_STOP_TIME               = 1989-08-29
   DATA_SET_DESC                      = "This data set is a NAIF SPK
    file, which is the realization of the SPICE S and P-ephemeris
    kernels.  The SPICE S kernel is the logical component of the
    SPICE kernel concept which contains spacecraft trajectory data
    (position and velocity in a Cartesian inertial reference frame).
    The SPICE P-ephemeris kernel is the logical component of the
    SPICE kernel concept which contains target (one or more of
    planet, satellite, comet, asteroid)  ephemeris data (position
    and velocity in a Cartesian inertial reference frame).

    NAIF provides a software toolkit, called SPICELIB, containing
    the Fortran 77 source code subroutines which a user needs to
    read SPK files. Those intending to use SPK kernel files should
    order this SPICELIB toolkit from the PDS (if it is not already
    on hand) and integrate appropriate modules into their own
    applications program. Users should NOT attempt to write their
    own software to read SPK kernels files.
```

SPICELIB software is highly documented via internal headers, and some additional documentation is available in separate SPICELIB ASCII text files called Required Reading files. The NAIF Ephemeris System (NESYS) Required Reading File, identified as NESYS.REQ, describes use of the SPK kernel readers.

This particular data set is a merge of seven SPK source files. Six of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The seventh file was made from a post-encounter satellite ephemeris file which contains ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

```
'NAV ID                START TIME                STOP TIME        '\n
'NAIF_ID FOR EACH BODY INCLUDED  (See key below)                    '\n
'-------------------------------------------------------------------'\n
'T790701-B     1979 JUN 08 00:00:00      1979 JUN 25 00:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'T790703       1979 JUN 25 00:00:00      1979 JUN 30 00:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'T790708       1979 JUN 30 00:00:00      1979 JUL 08 00:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'T790713       1979 JUL 08 00:00:00      1979 JUL 10 00:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'T790713-2     1979 JUL 10 00:00:00      1979 JUL 10 12:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'T790714       1979 JUL 10 12:00:00      1979 AUG 29 00:00:00 '\n
'1 thru 10, 301, 399, 501 thru 505, 599, -32                    '\n
'                                                               '\n
'JUP024-VGR    1979 FEB 01 00:00:00      1979 NOV 03 00:00:00 '\n
'505, 514, 515, 516, 599                                        '
```

NAIF body IDs are used within SPICE kernels to label data for a specific body. These IDs must be employed as arguments in the SPICELIB SPK kernel readers.

Users might note that not all those bodies for which data are available in this file are listed in the Data Set Target Template below.

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Satellites which may be found in this particular SPK file are:

```
'501=IO,502=EUROPA,503=GANYMEDE,504=CALLISTO,505=AMALTHEA, '\n
```

```
  '514=THEBE, 515=ADRASTEA, 516=METIS.                          '

  Spacecraft are identified using the numeric IDs assigned by
  JPL's Deep Space Network (DSN), but with a minus sign preceding
  the number.  Thus Voyager 1 is -31 and Voyager 2 is -32."
 CONFIDENCE_LEVEL_NOTE            = "There is essentially no loss in
  accuracy when an SPK file is made from one or several NAV source
  files.

  Statistics on ephemeris accuracy are not available, but errors
  are very small compared to normal uncertainties in reconstructed
  pointing knowledge for the Voyager science instruments."
END_OBJECT                        = DATASETINFO

OBJECT                            = DATASETTARG
 TARGET_NAME                      = EARTH
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = SUN
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = JUPITER
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = IO
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = EUROPA
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = GANYMEDE
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = CALLISTO
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = AMALTHEA
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = THEBE
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = ADRASTEA
END_OBJECT                        = DATASETTARG

OBJECT                            = DATASETTARG
 TARGET_NAME                      = METIS
END_OBJECT                        = DATASETTARG

OBJECT                            = DSPARMINFO
 SAMPLING_PARAMETER_NAME          = 'N/A'
```

```
  SAMPLING_PARAMETER_RESOLUTION  = 'N/A'
  MINIMUM_SAMPLING_PARAMETER     = 'N/A'
  MAXIMUM_SAMPLING_PARAMETER     = 'N/A'
  SAMPLING_PARAMETER_INTERVAL    = 'N/A'
  MINIMUM_AVAILABLE_SAMPLING_INT = 'N/A'
  SAMPLING_PARAMETER_UNIT        = 'N/A'
  DATA_SET_PARAMETER_NAME        = 'N/A'
  NOISE_LEVEL                    = 'N/A'
  DATA_SET_PARAMETER_UNIT        = 'N/A'
 END_OBJECT                      = DSPARMINFO

 OBJECT                          = SCDATASET
  INSTRUMENT_HOST_ID             = 'VG2'
  INSTRUMENT_ID                  = 'N/A'
 END_OBJECT                      = SCDATASET

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 73'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 68'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 69'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 70'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 71'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 72'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

 OBJECT                          = DSPROCESSING
  SOURCE_DATA_SET_ID             = 'NAIF 121'
  SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
  PRODUCT_DATA_SET_ID            = 'VG2-J-6-SPK-V1.0'
 END_OBJECT                      = DSPROCESSING

END_OBJECT                       = DATASET
```

```
 END_OBJECT                          = CATALOG

END_OBJECT                           = FILE

OBJECT                               = FILE
 NAME                                = 'VG1_SAT.ASP'
 RECORD_TYPE                         = VARIABLE_LENGTH
 RECORD_BYTES                        = 72
 FILE_RECORDS                        = 106358
 NOTE                                = "Voyager 2 Saturn data file."

 OBJECT                               = CATALOG

 OBJECT                               = DATASET
  DATA_SET_ID                         = 'VG2-S-6-SPK-V1.0'

  OBJECT                               = DATASETINFO
   DATA_SET_NAME                       = "VOYAGER 2 SATURN SPICE S- AND
    P-ephem. KERNELS"
   EVENT_START_TIME                    = 1981-07-19T00:00:00Z
   EVENT_STOP_TIME                     = 1981-10-21T00:00:00Z
   NATIVE_START_TIME                   = 'N/A'
   NATIVE_STOP_TIME                    = 'N/A'
   DATA_OBJECT_TYPE                    = "SPK FILE, CONTAINING TRAJECTORY
    AND EPHEMERIS DATA"
   DATA_SET_RELEASE_DATE               = 1989-11-01
   PROCESSING_LEVEL_ID                 = 6
   PRODUCER_FULL_NAME                  = "NAIF TEAM"
   PRODUCER_INSTITUTION_NAME           = "JET PROPULSION LABORATORY"
   SOFTWARE_FLAG                       = Y
   DETAILED_CATALOG_FLAG               = N
   PROCESSING_START_TIME               = 1987-05-30
   PROCESSING_STOP_TIME                = 1989-08-29
   DATA_SET_DESC                       = "This data set is a NAIF SPK
    file, which is the realization of the SPICE S and P-ephemeris
    kernels.  The SPICE S kernel is the logical component of the
    SPICE kernel concept which contains spacecraft trajectory data
    (position and velocity in a Cartesian inertial reference frame).
    The SPICE P-ephemeris kernel is the logical component of the
    SPICE kernel concept which contains target (one or more of
    planet, satellite, comet, asteroid)  ephemeris data (position
    and velocity in a Cartesian inertial reference frame).

    NAIF provides a software toolkit, called SPICELIB, containing
    the Fortran 77 source code subroutines which a user needs to
    read SPK files. Those intending to use SPK kernel files should
    order this SPICELIB toolkit from the PDS (if it is not already
    on hand) and integrate appropriate modules into their own
    applications program. Users should NOT attempt to write their
    own software to read SPK kernels files.

    SPICELIB software is highly documented via internal headers, and
    some additional documentation is available in separate SPICELIB
    ASCII text files called Required Reading files.  The NAIF
    Ephemeris System (NESYS) Required Reading File, identified as
    NESYS.REQ, describes use of the SPK kernel readers.

    This particular data set is a merge of seven SPK source files.
    Three of these were made from standard Voyager NAV Team archival
    products, which were made for SEDR production.  The remaining
```

four were made from post-encounter satellite ephemeris files which contain ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

```
'NAV ID              START TIME                STOP TIME        '\n
'NAIF_ID FOR EACH BODY INCLUDED  (Sey key below)                  '\n
'-----------------------------------------------------------------'\n
'T810808      1981 JUL 18 00:00:00     1981 AUG 10 00:00:00 '\n
'1 thru 10, 301, 399, 601 thru 609, 699, -32                     '\n
'                                                                '\n
'T810818      1981 AUG 10 00:00:00     1981 AUG 25 00:00:00 '\n
'1 thru 10, 301, 399, 601 thru 609, 699, -32                     '\n
'                                                                '\n
'T811001-1    1981 AUG 25 00:00:00     1981 OCT 21 23:59:00 '\n
'1 thru 10, 301, 399, 601 thru 609, 699, -32                     '\n
'                                                                '\n
'SAT022-RCKT  1981 JUN 01 00:00:00     1981 OCT 31 00:00:00 '\n
'613, 615, 616, 617, 699                                         '\n
'                                                                '\n
'SAT023       1980 SEP 01 00:00:00     1981 OCT 31 00:00:00 '\n
'610, 611, 699                                                   '\n
'                                                                '\n
'SAT024       1980 SEP 01 00:00:00     1981 OCT 31 00:00:00 '\n
'612, 699                                                        '\n
'                                                                '\n
'SAT025       1980 SEP 01 00:00:00     1981 OCT 31 00:00:00 '\n
'614, 699                                                        '
```

NAIF body IDs are used within SPICE kernels to label data for a specific body. These IDs must be employed as arguments in the SPICELIB SPK kernel readers.

Users might note that not all those bodies for which data are available in this file are listed in the Data Set Target Template below.

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nkk are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Satellites which may be found in this particular SPK file are:

```
'601=MIMAS,602=ENCELADUS,603=TETHYS, 604=DIONE, 605=RHEA,    '\n
'606=TITAN,607=HYPERION,608=IAPETUS, 609=PHOEBE,610=JANUS,   '\n
'611=EPIMETHEUS,612=HELENE(formerly called DIONE-B),         '\n
'613=TELESTO, 614=CALYPSO, 615=ATLAS, 616=PROMETHEUS,        '\n
'617=PANDORA.                                                '
```

Spacecraft are identified using the numeric IDs assigned by JPL's Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32."

CONFIDENCE_LEVEL_NOTE = "There is essentially no loss in

```
  accuracy when an SPK file is made from one or several NAV source
  files.

  Statistics on ephemeris accuracy are not available, but errors
  are very small compared to normal uncertainties in reconstructed
  pointing knowledge for the Voyager science instruments."
END_OBJECT                          = DATASETINFO

OBJECT                              = DATASETTARG
 TARGET_NAME                        = EARTH
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = SUN
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = SATURN
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = MIMAS
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = ENCELADUS
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = TETHYS
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = DIONE
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = RHEA
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = TITAN
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = HYPERION
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = IAPETUS
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = PHOEBE
END_OBJECT                          = DATASETTARG

OBJECT                              = DATASETTARG
 TARGET_NAME                        = JANUS
END_OBJECT                          = DATASETTARG
```

```
OBJECT                                = DATASETTARG
 TARGET_NAME                          = EPIMETHEUS
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = HELENE
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = TELESTO
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = CALYPSO
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = ATLAS
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = PROMETHEUS
END_OBJECT                            = DATASETTARG

OBJECT                                = DATASETTARG
 TARGET_NAME                          = PANDORA
END_OBJECT                            = DATASETTARG

OBJECT                                = DSPARMINFO
 SAMPLING_PARAMETER_NAME              = 'N/A'
 SAMPLING_PARAMETER_RESOLUTION        = 'N/A'
 MINIMUM_SAMPLING_PARAMETER           = 'N/A'
 MAXIMUM_SAMPLING_PARAMETER           = 'N/A'
 SAMPLING_PARAMETER_INTERVAL          = 'N/A'
 MINIMUM_AVAILABLE_SAMPLING_INT       = 'N/A'
 SAMPLING_PARAMETER_UNIT              = 'N/A'
 DATA_SET_PARAMETER_NAME              = 'N/A'
 NOISE_LEVEL                          = 'N/A'
 DATA_SET_PARAMETER_UNIT              = 'N/A'
END_OBJECT                            = DSPARMINFO

OBJECT                                = SCDATASET
 INSTRUMENT_HOST_ID                   = 'VG2'
 INSTRUMENT_ID                        = 'N/A'
END_OBJECT                            = SCDATASET

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = 'NAIF 94'
 SOFTWARE_NAME                        = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                  = 'VG2-S-6-SPK-V1.0'
END_OBJECT                            = DSPROCESSING

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = 'NAIF 96'
 SOFTWARE_NAME                        = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
 PRODUCT_DATA_SET_ID                  = 'VG2-S-6-SPK-V1.0'
END_OBJECT                            = DSPROCESSING

OBJECT                                = DSPROCESSING
 SOURCE_DATA_SET_ID                   = 'NAIF 97'
```

```
    SOFTWARE_NAME                    = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID              = 'VG2-S-6-SPK-V1.0'
   END_OBJECT                        = DSPROCESSING

   OBJECT                            = DSPROCESSING
    SOURCE_DATA_SET_ID               = 'NAIF 117'
    SOFTWARE_NAME                    = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID              = 'VG2-S-6-SPK-V1.0'
   END_OBJECT                        = DSPROCESSING

   OBJECT                            = DSPROCESSING
    SOURCE_DATA_SET_ID               = 'NAIF 118'
    SOFTWARE_NAME                    = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID              = 'VG2-S-6-SPK-V1.0'
   END_OBJECT                        = DSPROCESSING

   OBJECT                            = DSPROCESSING
    SOURCE_DATA_SET_ID               = 'NAIF 119'
    SOFTWARE_NAME                    = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID              = 'VG2-S-6-SPK-V1.0'
   END_OBJECT                        = DSPROCESSING

   OBJECT                            = DSPROCESSING
    SOURCE_DATA_SET_ID               = 'NAIF 120'
    SOFTWARE_NAME                    = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID              = 'VG2-S-6-SPK-V1.0'
   END_OBJECT                        = DSPROCESSING

  END_OBJECT                         = DATASET

  END_OBJECT                         = CATALOG

END_OBJECT                           = FILE

OBJECT                               = FILE
 NAME                                = 'VG2_URA.ASP'
 RECORD_TYPE                         = VARIABLE_LENGTH
 RECORD_BYTES                        = 72
 FILE_RECORDS                        = 11842
 NOTE                                = "Voyager 2 Uranus data file."

 OBJECT                              = CATALOG

 OBJECT                              = DATASET
  DATA_SET_ID                        = 'VG2-U-6-SPK-V1.0'

  OBJECT                             = DATASETINFO
   DATA_SET_NAME                     = "VOYAGER 2 URANUS SPICE S- AND
    P-ephem. KERNELS"
   EVENT_START_TIME                  = 1985-11-05T00:00:00Z
   EVENT_STOP_TIME                   = 1986-02-25T00:00:00Z
   NATIVE_START_TIME                 = 'N/A'
   NATIVE_STOP_TIME                  = 'N/A'
   DATA_OBJECT_TYPE                  = "SPK FILE, CONTAINING TRAJECTORY
    AND EPHEMERIS DATA"
   DATA_SET_RELEASE_DATE             = 1989-11-01
   PROCESSING_LEVEL_ID               = 6
   PRODUCER_FULL_NAME                = "NAIF TEAM"
   PRODUCER_INSTITUTION_NAME         = "JET PROPULSION LABORATORY"
   SOFTWARE_FLAG                     = Y
```

```
DETAILED_CATALOG_FLAG           = N
PROCESSING_START_TIME           = 1987-05-30
PROCESSING_STOP_TIME            = 1989-08-29
DATA_SET_DESC                   = "This data set is a NAIF SPK
 file, which is the realization of the SPICE S and P-ephemeris
 kernels.  The SPICE S kernel is the logical component of the
 SPICE kernel concept which contains spacecraft trajectory data
 (position and velocity in a Cartesian inertial reference frame).
 The SPICE P-ephemeris kernel is the logical component of the
 SPICE kernel concept which contains target (one or more of
 planet, satellite, comet, asteroid)  ephemeris data (position
 and velocity in a Cartesian inertial reference frame).
```

NAIF provides a software toolkit, called SPICELIB, containing the Fortran 77 source code subroutines which a user needs to read SPK files. Those intending to use SPK kernel files should order this SPICELIB toolkit from the PDS (if it is not already on hand) and integrate appropriate modules into their own applications program. Users should NOT attempt to write their own software to read SPK kernels files.

SPICELIB software is highly documented via internal headers, and some additional documentation is available in separate SPICELIB ASCII text files called Required Reading files. The NAIF Ephemeris System (NESYS) Required Reading File, identified as NESYS.REQ, describes use of the SPK kernel readers.

This particular data set is a merge of four SPK source files, all made from standard Voyager NAV Team archival products, which were made for SEDR production. These source files are summarized below.

```
'NAV ID              START TIME                STOP TIME       '\n
'NAIF_ID FOR EACH BODY INCLUDED  (Sey key below)                  '\n
'-------------------------------------------------------------- '\n
'T851208      1985 NOV 04 12:00:00     1985 DEC 03 10:42:00 '\n
'1 thru 10, 301, 399, 701 thru 705, 799, -32                    '\n
'                                                               '\n
'T860103      1985 DEC 03 10:42:00     1986 JAN 10 08:42:00 '\n
'1 thru 10, 301, 399, 701 thru 705, 799, -32                    '\n
'                                                               '\n
'T860111      1986 JAN 10 08:42:00     1986 JAN 22 02:42:00 '\n
'1 thru 10, 301, 399, 701 thru 705, 799, -32                    '\n
'                                                               '\n
'T860204      1986 JAN 22 02:42:00     1986 FEB 25 13:42:00 '\n
'1 thru 10, 301, 399, 701 thru 705, 799, -32                    '
```

NAIF body IDs are used within SPICE kernels to label data for a specific body. These IDs must be employed as arguments in the SPICELIB SPK kernel readers.

Users might note that not all those bodies for which data are available in this file are listed in the Data Set Target Template below.

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nkk are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Satellites which may be found in this particular SPK file are:

'701=ARIEL, 702=UMBRIEL, 703=TITANIA, 704=OBERON, 705=MIRANDA'

Spacecraft are identified using the numeric IDs assigned by JPL's Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32."

```
 CONFIDENCE_LEVEL_NOTE          = "There is essentially no loss in
  accuracy when an SPK file is made from one or several NAV source
  files.

  Statistics on ephemeris accuracy are not available, but errors
  are very small compared to normal uncertainties in reconstructed
  pointing knowledge for the Voyager science instruments."
END_OBJECT                      = DATASETINFO

OBJECT                          = DATASETTARG
 TARGET_NAME                    = EARTH
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = SUN
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = URANUS
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = ARIEL
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = UMBRIEL
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = TITANIA
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = OBERON
END_OBJECT                      = DATASETTARG

OBJECT                          = DATASETTARG
 TARGET_NAME                    = MIRANDA
END_OBJECT                      = DATASETTARG

OBJECT                          = DSPARMINFO
 SAMPLING_PARAMETER_NAME        = 'N/A'
 SAMPLING_PARAMETER_RESOLUTION  = 'N/A'
 MINIMUM_SAMPLING_PARAMETER     = 'N/A'
 MAXIMUM_SAMPLING_PARAMETER     = 'N/A'
 SAMPLING_PARAMETER_INTERVAL    = 'N/A'
```

```
    MINIMUM_AVAILABLE_SAMPLING_INT = 'N/A'
    SAMPLING_PARAMETER_UNIT        = 'N/A'
    DATA_SET_PARAMETER_NAME        = 'N/A'
    NOISE_LEVEL                    = 'N/A'
    DATA_SET_PARAMETER_UNIT        = 'N/A'
   END_OBJECT                      = DSPARMINFO

   OBJECT                          = SCDATASET
    INSTRUMENT_HOST_ID             = 'VG2'
    INSTRUMENT_ID                  = 'N/A'
   END_OBJECT                      = SCDATASET

   OBJECT                          = DSPROCESSING
    SOURCE_DATA_SET_ID             = 'NAIF 110'
    SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID            = 'VG2-U-6-SPK-V1.0'
   END_OBJECT                      = DSPROCESSING

   OBJECT                          = DSPROCESSING
    SOURCE_DATA_SET_ID             = 'NAIF 111'
    SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID            = 'VG2-U-6-SPK-V1.0'
   END_OBJECT                      = DSPROCESSING

   OBJECT                          = DSPROCESSING
    SOURCE_DATA_SET_ID             = 'NAIF 112'
    SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID            = 'VG2-U-6-SPK-V1.0'
   END_OBJECT                      = DSPROCESSING

   OBJECT                          = DSPROCESSING
    SOURCE_DATA_SET_ID             = 'NAIF 113'
    SOFTWARE_NAME                  = "NAIF EPHEMERIS LIBRARIAN  (NEL)"
    PRODUCT_DATA_SET_ID            = 'VG2-U-6-SPK-V1.0'
   END_OBJECT                      = DSPROCESSING

  END_OBJECT                       = DATASET

 END_OBJECT                        = CATALOG

 END_OBJECT                        = FILE

END_OBJECT                         = DIRECTORY

END_OBJECT                         = VOLUME

END
```

DSC #689
Voyager

VG1-J-SPK.DIF;4

```
Entry_ID: VG1-J-SPK
Entry_Title: VG1 > VOYAGER 1, JUPITER, SPK > SPICE S- AND P-EPHEMERIS KERNELS
Start_date: 1979-02-07T00:00:00Z
Stop_date: 1979-04-08T00:00:00Z
Source_Name: VG1 > VOYAGER 1
Sensor_Name: N/A > N/A
Discipline: Planetary Science
Group: Investigator
    First_name: N/A
    Middle_name:
    Last_name:
    Phone:
    Email: N/A
    Group: Address
    End_Group
End_Group
Group: Technical_contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Author
    First_name: Patrick
    Middle_name: D.
    Last_name: Hogan
    Phone: (818)354-2873
    Email: SPAN>JPLPDS::PHOGAN
    Group: Address
       Mail Stop 301-440
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Data_Center
  Data_Center_Name: PDS > Planetary Data System
  Dataset_ID: VG1-J-6-SPK-V1.0
  Group: Data_Center_Contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
  End_Group
End_Group
Originating_center: PDS > Planetary Data System
Location: IO
Location: SUN
Location: EARTH
Location: METIS
Location: THEBE
Location: EUROPA
Location: JUPITER
Location: ADRASTEA
Location: AMALTHEA
Location: CALLISTO
Location: GANYMEDE
Group: Summary

This data set is a NAIF Generalized Ephemeris File (GEF),
which is the realization of the SPICE S and P kernels. The
SPICE S kernel is the logical component of the SPICE kernel
concept which contains spacecraft trajectory data (position
and velocity in a Cartesian inertial reference frame). The
SPICE P-ephemeris kernel is the logical component of the
SPICE kernel concept which contains target (one or more of
planet, satellite, comet, asteroid) ephemeris data
(position and velocity in a Cartesian inertial reference
frame).

NAIF provides, within the SPICELIB software toolkit, the
Fortran 77 source code subroutines which a user needs to
```

read GEF files. Users of GEF files should order this code from the NAIF node of the PDS.

This data set is a merge of five GEF source files. Four of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The fifth file was made from a satellite ephemeris file which contains ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

```
NAV ID              START TIME              STOP TIME
NAIF_ID FOR EACH BODY INCLUDED (See key below)
-----------------------------------------------------------
T790210      1979 FEB 06 00:00:00     1979 FEB 13 00:00:00
1 thru 10, 301, 399, 501 thru 505, 599, -31

T790213      1979 FEB 13 00:00:00     1979 FEB 19 00:00:00
1 thru 10, 301, 399, 501 thru 505, 599, -31

T790303      1979 FEB 19 00:00:00     1979 MAR 03 00:00:00
1 thru 10, 301, 399, 501 thru 505, 599, -31

T790318      1979 MAR 03 00:00:00     1979 APR 09 00:00:00
1 thru 10, 301, 399, 501 thru 505, 599, -31

JUP024-VGR   1979 FEB 01 00:00:00     1979 NOV 03 00:00:00
505, 514, 515, 516, 599
```

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Found in this particular GEF file are:
501=IO, 502=EUROPA, 503=GANYMEDE, 504=CALLISTO,
505=AMALTHEA, 514=THEBE, 515=ADRASTEA, 516=METIS.

Spacecraft are identified using the numeric IDs assigned by the Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32.
End_Group
Group: Reference
End_Group

VG1-S-SPK.DIF;4

```
Entry_ID: VG1-S-SPK
Entry_Title: VG1 > VOYAGER 1, SATURN, SPK > SPICE S- AND P-EPHEMERIS KERNELS
Start_date: 1980-09-02T00:00:00Z
Stop_date: 1980-12-29T00:00:00Z
Source_Name: VG1 > VOYAGER 1
Sensor_Name: N/A > N/A
Discipline: Planetary Science
Group: Investigator
    First_name: N/A
    Middle_name:
    Last_name:
    Phone:
    Email: N/A
    Group: Address
    End_Group
End_Group
Group: Technical_contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Author
    First_name: Patrick
    Middle_name: D.
    Last_name: Hogan
    Phone: (818)354-2873
    Email: SPAN>JPLPDS::PHOGAN
    Group: Address
       Mail Stop 301-440
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Data_Center
  Data_Center_Name: PDS > Planetary Data System
  Dataset_ID: VG1-S-6-SPK-V1.0
  Group: Data_Center_Contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
  End_Group
End_Group
Originating_center: PDS > Planetary Data System
Location: SUN
Location: RHEA
Location: ATLAS
Location: DIONE
Location: EARTH
Location: JANUS
Location: MIMAS
Location: TITAN
Location: HELENE
Location: SATURN
Location: CALYPSO
Location: IAPETUS
Location: PANDORA
Location: TELESTO
Location: TETHYS
Location: HYPERION
Location: ENCELADUS
Location: EPIMETHEUS
Location: PROMETHEUS
Group: Summary
```

This data set is a NAIF Generalized Ephemeris File (GEF), which is the realization of the SPICE S and P kernels. The SPICE S kernel is the logical component of the SPICE kernel concept which contains spacecraft trajectory data (position and velocity in a Cartesian inertial reference frame). The

SPICE P-ephemeris kernel is the logical component of the SPICE kernel concept which contains target (one or more of planet, satellite, comet, asteroid) ephemeris data (position and velocity in a Cartesian inertial reference frame).

NAIF provides, within the SPICELIB software toolkit, the Fortran 77 source code subroutines which a user needs to read GEF files. Users of GEF files should order this code from the NAIF node of the PDS.

This data set is a merge of ten GEF source files. Six of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The remaining four were made from satellite ephemeris files which contain ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

NAV ID	START TIME	STOP TIME
NAIF_ID FOR EACH BODY INCLUDED (Sey key below)		
T801012	1980 AUG 23 00:00:00	1980 OCT 24 00:00:00
1 thru 10, 301, 399, 601 thru 608, 699, -31		
T801107	1980 OCT 24 00:00:00	1980 NOV 03 00:00:00
1 thru 10, 301, 399, 601 thru 608, 699, -31		
T801119	1980 NOV 03 00:00:00	1980 NOV 12 00:00:00
1 thru 10, 301, 399, 601 thru 608, 699, -31		
T801202-1	1980 NOV 12 00:00:00	1980 DEC 29 23:59:00
1 thru 10, 301, 399, 601 thru 608, 699, -31		
T801202-2	1980 DEC 29 23:59:00	1981 JAN 01 00:00:00
1 thru 10, 301, 399, -31		
T810307	1981 JAN 01 00:00:00	1981 FEB 01 00:00:00
1 thru 10, 301, 399, -31		
SAT021-RCKT	1980 SEP 01 00:00:00	1981 JAN 01 00:00:00
613, 615, 616, 617, 699		
SAT023	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
, 611, 699		
SAT024	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
612, 699		
SAT025	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
614, 699		

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Found in this particular GEF file are:
601=MIMAS, 602=ENCELADUS, 603=TETHYS, 604=DIONE, 605=RHEA, 606=TITAN, 607=HYPERION, 608=IAPETUS, 610=JANUS, 611=EPIMETHEUS, 612=HELENE (formerly called DIONE-B), 613=TELESTO, 614=CALYPSO, 615=ATLAS, 616=PROMETHEUS, 617=PANDORA.

Spacecraft are identified using the numeric IDs assigned by the Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32.
End_Group
Group: Reference
End_Group

VG2-J-SPK.DIF;2

```
Entry_ID: VG2-J-SPK
Entry_Title: VG2 > VOYAGER 2, JUPITER, SPK > SPICE S- AND P-EPHEMERIS KERNELS
Start_date: 1979-06-09T00:00:00Z
Stop_date: 1979-08-28T00:00:00Z
Source_Name: VG2 > VOYAGER 2
Sensor_Name: N/A > N/A
Discipline: Planetary Science
Group: Investigator
    First_name: N/A
    Middle_name:
    Last_name:
    Phone:
    Email: N/A
    Group: Address
    End_Group
End_Group
Group: Technical_contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Author
    First_name: Patrick
    Middle_name: D.
    Last_name: Hogan
    Phone: (818)354-2873
    Email: SPAN>JPLPDS::PHOGAN
    Group: Address
       Mail Stop 301-440
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Data_Center
  Data_Center_Name: PDS > Planetary Data System
  Dataset_ID: VG2-J-6-SPK-V1.0
  Group: Data_Center_Contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
  End_Group
End_Group
Originating_center: PDS > Planetary Data System
Location: IO
Location: SUN
Location: EARTH
Location: METIS
Location: THEBE
Location: EUROPA
Location: JUPITER
Location: ADRASTEA
Location: AMALTHEA
Location: CALLISTO
Location: GANYMEDE
Group: Summary
```

This data set is a NAIF Generalized Ephemeris File (GEF), which is the realization of the SPICE S and P kernels. The SPICE S kernel is the logical component of the SPICE kernel concept which contains spacecraft trajectory data (position and velocity in a Cartesian inertial reference frame). The SPICE P-ephemeris kernel is the logical component of the SPICE kernel concept which contains target (one or more of planet, satellite, comet, asteroid) ephemeris data (position and velocity in a Cartesian inertial reference frame).

NAIF provides, within the SPICELIB software toolkit, the Fortran 77 source code subroutines which a user needs to

read GEF files. Users of GEF files should order this code from the NAIF node of the PDS.

This data set is a merge of seven GEF source files. Six of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The seventh file was made from a satellite ephemeris file which contains ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

```
 NAV ID              START TIME                STOP TIME
 NAIF_ID FOR EACH BODY INCLUDED  (See key below)
 ------------------------------------------------------------
 T790701-B    1979 JUN 08 00:00:00     1979 JUN 25 00:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 T790703      1979 JUN 25 00:00:00     1979 JUN 30 00:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 T790708      1979 JUN 30 00:00:00     1979 JUL 08 00:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 T790713      1979 JUL 08 00:00:00     1979 JUL 10 00:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 T790713-2    1979 JUL 10 00:00:00     1979 JUL 10 12:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 T790714      1979 JUL 10 12:00:00     1979 AUG 29 00:00:00
 1 thru 10, 301, 399, 501 thru 505, 599, -32

 JUP024-VGR   1979 FEB 01 00:00:00     1979 NOV 03 00:00:00
 505, 514, 515, 516, 599
```

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Found in this particular GEF file are:
501=IO, 502=EUROPA, 503=GANYMEDE, 504=CALLISTO, 505=AMALTHEA, 514=THEBE, 515=ADRASTEA, 516=METIS.

Spacecraft are identified using the numeric IDs assigned by the Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32.
End_Group
Group: Reference
End_Group

VG2-S-SPK.DIF;3

```
Entry_ID: VG2-S-SPK
Entry_Title: VG2 > VOYAGER 2, SATURN, SPK > SPICE S- AND P-EPHEMERIS KERNELS
Start_date: 1981-07-19T00:00:00Z
Stop_date: 1981-10-21T00:00:00Z
Source_Name: VG2 > VOYAGER 2
Sensor_Name: N/A > N/A
Discipline: Planetary Science
Group: Investigator
    First_name: N/A
    Middle_name:
    Last_name:
    Phone:
    Email: N/A
    Group: Address
    End_Group
End_Group
Group: Technical_contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Author
    First_name: Patrick
    Middle_name: D.
    Last_name: Hogan
    Phone: (818)354-2873
    Email: SPAN>JPLPDS::PHOGAN
    Group: Address
       Mail Stop 301-440
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Data_Center
  Data_Center_Name: PDS > Planetary Data System
  Dataset_ID: VG2-S-6-SPK-V1.0
  Group: Data_Center_Contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
  End_Group
End_Group
Originating_center: PDS > Planetary Data System
Location: SUN
Location: RHEA
Location: ATLAS
Location: DIONE
Location: EARTH
Location: JANUS
Location: MIMAS
Location: TITAN
Location: HELENE
Location: PHOEBE
Location: SATURN
Location: CALYPSO
Location: IAPETUS
Location: PANDORA
Location: TELESTO
Location: TETHYS
Location: HYPERION
Location: ENCELADUS
Location: EPIMETHEUS
Location: PROMETHEUS
Group: Summary

This data set is a NAIF Generalized Ephemeris File (GEF),
which is the realization of the SPICE S and P kernels. The
SPICE S kernel is the logical component of the SPICE kernel
concept which contains spacecraft trajectory data (position
```

and velocity in a Cartesian inertial reference frame). The SPICE P-ephemeris kernel is the logical component of the SPICE kernel concept which contains target (one or more of planet, satellite, comet, asteroid) ephemeris data (position and velocity in a Cartesian inertial reference frame).

NAIF provides, within the SPICELIB software toolkit, the Fortran 77 source code subroutines which a user needs to read GEF files. Users of GEF files should order this code from the NAIF node of the PDS.

This data set is a merge of seven GEF source files. Three of these were made from standard Voyager NAV Team archival products, which were made for SEDR production. The remaining four were made from satellite ephemeris files which contain ephemeris data for satellites which were not included in the standard Voyager NAV Team archival products. These source files are summarized below.

NAV ID	START TIME	STOP TIME
NAIF_ID FOR EACH BODY INCLUDED (Sey key below)		
T810808	1981 JUL 18 00:00:00	1981 AUG 10 00:00:00
1 thru 10, 301, 399, 601 thru 609, 699, -32		
T810818	1981 AUG 10 00:00:00	1981 AUG 25 00:00:00
1 thru 10, 301, 399, 601 thru 609, 699, -32		
T811001-1	1981 AUG 25 00:00:00	1981 OCT 21 23:59:00
1 thru 10, 301, 399, 601 thru 609, 699, -32		
SAT022-RCKT	1981 JUN 01 00:00:00	1981 OCT 31 00:00:00
613, 615, 616, 617, 699		
SAT023	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
610, 611, 699		
SAT024	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
612, 699		
SAT025	1980 SEP 01 00:00:00	1981 OCT 31 00:00:00
614, 699		

to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Found in this particular GEF file are:
601=MIMAS, 602=ENCELADUS, 603=TETHYS, 604=DIONE, 605=RHEA, 606=TITAN, 607=HYPERION, 608=IAPETUS, 609=PHOEBE, 610=JANUS, 611=EPIMETHEUS, 612=HELENE (formerly called DIONE-B), 613=TELESTO, 614=CALYPSO, 615=ATLAS, 616=PROMETHEUS, 617=PANDORA.
Spacecraft are identified using the numeric IDs assigned by the Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32.
End_Group
Group: Reference
End_Group

VG2-U-SPK.DIF;2

```
Entry_ID: VG2-U-SPK
Entry_Title: VG2 > VOYAGER 2, URANUS, SPK > SPICE S- AND P-EPHEMERIS KERNELS
Start_date: 1985-11-05T00:00:00Z
Stop_date: 1986-02-25T00:00:00Z
Source_Name: VG2 > VOYAGER 2
Sensor_Name: N/A > N/A
Discipline: Planetary Science
Group: Investigator
    First_name: N/A
    Middle_name:
    Last_name:
    Phone:
    Email: N/A
    Group: Address
    End_Group
End_Group
Group: Technical_contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
End_Group
Group: Author
    First_name: Patrick
    Middle_name: D.
    Last_name: Hogan
    Phone: (818)354-2873
    Email: SPAN>JPLPDS::PHOGAN
    Group: Address
       Mail Stop 301-440
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
    Group
Group: Data_Center
  Data_Center_Name: PDS > Planetary Data System
  Dataset_ID: VG2-U-6-SPK-V1.0
  Group: Data_Center_Contact
    First_name: Charles
    Middle_name: H.
    Last_name: Acton
    Phone: (818)354-3869
    Email: SPAN>NAIF::CHA
    Group: Address
       Mail Stop 301-125
       4800 Oak Grove Drive
       Pasadena, CA  91109
       USA
    End_Group
  End_Group
End_Group
Originating_center: PDS > Planetary Data System
Location: SUN
Location: ARIEL
Location: EARTH
Location: OBERON
Location: URANUS
Location: MIRANDA
Location: TITANIA
Location: UMBRIEL
Group: Summary
```

This data set is a NAIF Generalized Ephemeris File (GEF), which is the realization of the SPICE S and P kernels. The SPICE S kernel is the logical component of the SPICE kernel concept which contains spacecraft trajectory data (position and velocity in a Cartesian inertial reference frame). The SPICE P-ephemeris kernel is the logical component of the SPICE kernel concept which contains target (one or more of planet, satellite, comet, asteroid) ephemeris data (position and velocity in a Cartesian inertial reference frame).

NAIF provides, within the SPICELIB software toolkit, the Fortran 77 source code subroutines which a user needs to read GEF files. Users of GEF files should order this code from the NAIF node of the PDS.

This data set is a merge of four GEF source files, all made from standard Voyager NAV Team archival products, which were made for SEDR production. These source files are summarized below.

```
NAV ID              START TIME                STOP TIME
_ID FOR EACH BODY INCLUDED  (Sey key below)
-------------------------------------------------------
T851208      1985 NOV 04 12:00:00     1985 DEC 03 10:42:00
1 thru 10, 301, 399, 701 thru 705, 799, -32

T860103      1985 DEC 03 10:42:00     1986 JAN 10 08:42:00
1 thru 10, 301, 399, 701 thru 705, 799, -32

T860111      1986 JAN 10 08:42:00     1986 JAN 22 02:42:00
1 thru 10, 301, 399, 701 thru 705, 799, -32

T860204      1986 JAN 22 02:42:00     1986 FEB 25 13:42:00
1 thru 10, 301, 399, 701 thru 705, 799, -32
```

Key to NAIF_IDs:

1 thru 9 are planet-satellite system barycenters for Mercury thru Pluto respectively.

199 thru 999 are planet mass centers for Mercury thru Pluto.

10 is the SUN.

nxx are satellites, where n is the parent planet number. Thus, n=3 for Earth, n=4 for Mars, n=5 for Jupiter, etc. Found in this particular GEF file are:
701=ARIEL, 702=UMBRIEL, 703=TITANIA, 704=OBERON, 705=MIRANDA

Spacecraft are identified using the numeric IDs assigned by the Deep Space Network (DSN), but with a minus sign preceding the number. Thus Voyager 1 is -31 and Voyager 2 is -32.
End_Group
Group: Reference
End_Group

DSC #689 D-79964
C-28036
(on tape)
This is a sample of the documentation. Each tape has it's own files of documentation.

```
CCSD1Z000001000058483NJPL1V00PDS100058463 = SFDU_LABEL

OBJECT                              = VOLUME
 NAME                               = VGRSPK
 MEDIA_TYPE                         = TAPE
 TAPE_DENSITY                       = 1600
 TAPES                              = 1
 PROCESS_NAME                       = COPY
 FORMAT                             = ANSI
 HARDWARE_NAME                      = 'VAX 11/780'
 OPERATING_SYSTEM_NAME              = 'VMS 4.7'
 FILES                              = 6
 DATE_TIME                          = 1989-08-31
 DATA_SET_ID                        = {'VG1-S-6-SPK-V1.0',
                                       'VG1-J-6-SPK-V1.0',
                                       'VG2-J-6-SPK-V1.0',
                                       'VG2-S-6-SPK-V1.0',
                                       'VG2-U-6-SPK-V1.0'}
 NOTE                               = "This volume consists of this Volume
  Description Label and five actual datasets.

  The five datasets referenced by this volume label are the archival
  ephemeris and trajectory files for the Voyager 1 and Voyager 2
  flybys of Jupiter, Saturn, and Uranus.  The datasets are in the form
  of Navigation Ancillary Information Facility SPICE kernels; in
  particular, these five datasets are ASCII-format SPK files (SPK
  stands for 'S and P Kernels'). People intending to use these files
  must also order the NAIF Ephemeris System (NESYS) portion of the
  SPICELIB software 'toolkit' (if available separately at the time the
  order is placed), or, better yet, order the entire SPICELIB toolkit.
  All SPICELIB software is available as portable, ANSI standard
  Fortran 77 modules.

  NESYS includes the utility program named SEFU needed to convert any of
  these ASCII-format SPK files (e.g. VG1_JUP.ASP) back to binary format
  appropriate for the user's   host computer.  NESYS also contains the
  subroutines needed to read   binary SPK kernel files, complete with
  appropriate user documentation."

 OBJECT                             = DIRECTORY
  NAME                              = ROOT
  NJPL1I00PDS100036920              = SFDU_LABEL

  OBJECT                             = FILE
   NAME                              = 'VOLDESC.SFD'
   RECORD_TYPE                       = STREAM
  END_OBJECT                         = FILE

  OBJECT                             = FILE
   NAME                              = 'VG1_JUP.ASP'
   RECORD_TYPE                       = VARIABLE_LENGTH
   RECORD_BYTES                      = 72
   FILE_RECORDS                      = 45775
   NOTE                              = "Voyager 1 Jupiter data file."

   OBJECT                             = CATALOG

   OBJECT                             = DATASET
    DATA_SET_ID                       = 'VG1-J-6-SPK-V1.0'
```

D-79964
Label = VGRSPK
77-076A - 00E,G,H
77-084A - 00E,F

```
'NATF/NTP'
          2
          6
'VG1-J-6-SPK-V1.0                                                    '
1
'NATF SOURCE EPHEMERIS NATF/121.          '
 -660052749.8160000        -636292749.8160000
        599            5            4            2
        100
 -659880000.0000000        172800.0000000000        56.6423384458705 8
  21.61200008112719        26.91612654157903       -2.003979318256525
 -13.34509106394833       -3.509889980567577        14.16323500737161
  1.718290076749148       -5.356049735778631       -0.4288559022410570
 0.9013149823786943       6.132945402872419 3E-02   19.92751176464453
 -13.63633461764885        14.84512533732603        12.34316805849710
  2.791744887839400       -14.28529161232794       -2.540981331263159
  8.734809419995484       0.8622016321067029       -2.295520200735400
-0.1420607480761136       0.3315608181097599        10.26473818444791
 -6.234428157829704        7.185866849475969        5.824941125777561
  1.185440129634142       -6.859428628909443       -0.9831566452193881
  4.190946147207464       0.3221641420075557       -1.101151459577758
-5.270568311197652 8E-02  0.1590417565926217       -659534400.0000000
  172800.0000000000       -17.65082319945044       -149.9904647619071
 -4.476186019973235        20.67714191787789       -5.830861855621915
  13.05612759894002        2.148692211959308       -9.593864763980148
-0.5701943113278943        2.560982861015784        8.926194866358950 7E-02
-0.3708026660098457        94.10551010065511        11.80495723027129
 -58.80374953366208        4.742247964194631       -2.594426696080444
 -3.480220823694666        12.20716582263369        1.104599549299669
 -4.840273078745614       -0.2488493458323455       0.8193143370762484
 3.487296917078227 3E-02   44.30569219368864        3.579628331718292
 -27.98824749917484        2.613592860537977       -1.293952612659286
 -1.450996936858541        5.846995319352926        0.3675612851770314
 -2.315921838977716       -7.597744417505674 7E-02  0.3919539002106840
 1.044360554575391 7E-02  -659188800.0000000        172800.0000000000
 -79.33428934626648        127.4692953695536        41.57839525764591
 -26.49108991566329       0.2172817519843301        3.277475177927476
 -12.99130193074966       -0.4656757831287262       5.347388366578562
 7.820680107208511 9E-02  -0.9104981807823508      -1.024469153679564 1E-02
 -53.98566824620486       -78.07567125013318        59.75052674760792
  17.64786072178629       -8.530385302974649        10.35594848628504
  1.158316075532109       -8.542030336531844       -0.2069595163898868
  2.313891768402817
        100
 2.942258819800506 9E-02  -0.3358955393267643       -26.69827893363062
 -35.44431157947518        28.92621854158828        8.141704567009584
 -4.031478149230885        4.963695690781928        0.3329328704293249
 -4.076752504494529       -9.389932057982850 6E-03   1.103998649976015
-1.152947698496649 5E-03  -0.1602545387840733       -658843200.0000000
  172800.0000000000        22.07523841417562       -21.09110131400871
  3.112126867440110       -7.123926784557971        0.2042475055226127
 -11.08018865599127        0.4491799804543915        9.376317730488695
-0.2188977911429746       -2.557705424287786        3.823208712028025 1E-02
 0.3717886352924326       -41.36740910613783        3.078433071128054
 -7.364931487508905        0.3292791292235810        1.295838061070238
-0.1424020094271028       -11.50077912046261        0.2730145879595928
  4.807907265341837       -7.992284354986274 9E-02 -0.8211090310392956
 1.175844967817137 5E-02  -19.27170543531085        1.346492286378465
 -3.329726578357621        6.986487118797201 5E-02  0.5854171891695522
-0.2713834746734113       -5.469750197801888        0.2881760567785944
```

2.287544857713125	-8.079526845685834 5E-02	-0.3906923184731982
1.180131131092457E-02	-658497600.0000000	172800.0000000000
95.69160685472930	64.71419485525813	-65.12618143367140
-19.30135588485299	2.808662002089617	3.649021095900105
12.67260086655233	-1.219550762872672	-5.302919008961579
0.2924492696832132	0.9047198518831246	-4.158069099827904E-02
-0.4001576867069351	115.4980100215927	41.15741974239555
-25.70887273500033	-6.856170486793302	-9.517895147002632
1.820993701512961	8.448019524429744	-0.5359907813153735
-2.300345911099478	8.669678209127720 1E-02	0.3341985519882810
1.192754270672543	55.52133410627954	18.71549961419708
-12.46043777278681	-3.282817659674405	-4.485513022786450
1.086788024917159	4.006627861160525	-0.3442881017478818
-1.091493420754578	5.641093455617725 4E-02	0.1585860323435713
-658152000.0000000	172800.0000000000	-46.48782045767155
-129.0101213893644	29.95804153101349	20.40442088727378
5.000661444491369	12.18887042694623	-3.247872052112057
-9.408310867625777		
100		
1.020228128063511	2.527451275438675	-0.1656202864466886
-0.3663590400678010	91.06803102940192	-79.67459113604821
-51.28510723939785	1.094046092458848	-1.466546983607609
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425952000.000	106.496	6.367	228.611
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425952192.000	106.470	6.367	230.543
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425952288.000	106.458	6.367	231.509
425952336.000	106.452	6.367	231.992
425952384.000	106.445	6.367	232.474
426802672.000	286.047	5.292	252.096
426802720.000	286.053	5.292	252.579
426802768.000	286.059	5.292	253.063
426802816.000	286.064	5.292	253.547
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