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EXPERIMENTAL PROGRAM DATA FILE AND LISTINGS

A. Burwell

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High-energy physicists wishing to propose an experiment to be performed at the National Accelerator Laboratory are required to submit a proposal to the Laboratory stating the physics interest, method for performing the experiment, and necessary requirements in the way of equipment and personnel. This proposal is reviewed by the Program Advisory Committee and the Laboratory Director may then grant approval for the experiment. After approval for the experiment has been obtained, a written agreement is entered into between the Laboratory, represented by James Sanford, and the spokesman for the experiment. The agreement spells out in detail the fiscal, equipment, personnel, and scheduling details of the experiment. Approved experiments must be scheduled into appropriate beam lines, areas of physics interest categorized, equipment purchased and scheduled, the status of the experiment delineated, and by the fall of 1971, it became apparent that some means, other than manual, must be devised in order to keep track of the myriad of details of the proposals and experiments being submitted to the Laboratory. The experimental-program data file was developed to provide an instrument for handling the information itself and a file-management system was to be selected to provide a capability of quick changes in the file and a query capability to determine the impact of change.

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Arthur Roberts was commissioned to make a survey of existing computer software systems available to handle files of such magnitude. His recommendation was that the Laboratory use the IBM System/360 Generalized Information System (GIS). This system was operational on the IBM 360/75 at Argonne National Laboratory and was already in use by NAL for the property record system. The system was chosen, in part, for its ability to react to changes in file content quickly, its use of "plain English" type programming language, the ability to design input and output, and its report-generating capability. Also, its files are accessible by other high-level languages such as Fortran and PL/I. At NAL, we are using Version I, Mod 2 of GIS. The author uses this system to accommodate, manipulate, and display the information about the experimental program. The system is now operational on the IBM 360/195 which replaced the Model 75 in late 1972.

The pattern followed in defining the data was the agreement between the Laboratory and each individual experiment. In broad outline, the elements of the structure are

O. Administrative Information
A. Manpower
B. Beam and Related Equipment
C. Funding
D. Other Considerations Affecting the Experiment
E. Planning or Scheduling Data.

The file contents were designed to conform to this structure. As a general procedure, information about a proposal enters the file at the time it is received at the Laboratory. The record is updated at any time that information concerning changes is received.

It soon became apparent that just the information contained in the proposal or agreement was not sufficient to meet the increased demand for lists and cross-indexing of information so additional items were added to the file as needed. Further refinements and changes will undoubtedly be made as the need develops. Now to the structure of the system.

GIS requires that input and output information be described to the system via a Data Description Table (DDT). We have chosen a hierarchical multi-structured file with two levels. At level zero, the highest level, is the master segment which contains all information which is nonrepetitive, an example of which would be the experiment title. At level 1 are the repetitive segments (or information about multiple occurrences of the same type of information) an example of which would be the list of experimenters. GIS has the capability of allowing the user to set his own conditions under which a file creation or updating will be successful. The conditions may be stringent or lax at the user's discretion and the user can specify what steps for GIS to take in case of error, i.e., abort, continue. Any sensitive item of information can be prevented from entering the file if in error. This feature is the editing capability which, if specified, will check to see if the coded information falls between specified limits, i.e., if 9 falls between 0 and 10. All checking takes place before an update, or a create step is undertaken, and appropriate messages are printed.

Also built into the DDT may be look-up tables which convert coded fields to expanded information upon listing, an example of which would be coding a 'P' in a field which would be presented as 'Physicist' at time of listing information.

The actual input data is punched on 80-byte cards as described by the input DDT. Then a create step is accomplished to structure the varying length spanned record (one per proposal) with maximum length of 32,000 bytes, which is also described by the output DDT. Subsequent updating is done in the same fashion except in the update mode. All file management is done by GIS and the net result is a clean updated file ready for access in the query mode. Since the IBM 360/195 is physically located at ANL, the records are stored permanently at ANL on a 2314 disk pack, a direct access device, which must be mounted on a disk drive at the computer, when inquiry is made to the file. Future plans call for having the GIS system and the data on-line so that the response is not limited by having to mount a disk pack.

The file has provision, for each proposal, for the following information:

1. Master Segment: (1) Experiment number, (2) short title, (3) physics category of experiment, (4) status of proposal, (5) date of the status of proposal, (6) whether agreement is written, (7) date of signing of agreement, (8) the name of NAL liaison physicist, (9) status of the experiment, (10) date of status of experiment, (11) whether preliminary agreement exists, (12) date of preliminary agreement, (13) constraint on start of experiment, (14) name of revisor and date revision took place in various segments of the file, (15) GIS-generated count fields

which contain the number of occurrences of repeating segments in this record.

Repeating Segments

2. Beam Line Segment: (1) Coded information for each beam line, laboratory, predicted sequence in the file, (2) indicates which runs are to be secondary runs of the experiment.

3. Experimenter Segment: (1) Experimenter's supporting institution, (2) NAL group if NAL experimenter, (3) a manpower code, (4) name, (5) ID number, (6) whether he is current spokesman, (7) whether safety procedures have been received, (8) NAL phone, (9) NAL address, (10) remarks concerning intended effort on experiment.

4. Beam Description Segment: (1) A free-form description of the beam line and equipment.

5. Appendix Segment: (1) Title of appendices to agreement, (2) date of appendices to agreement.

6. Agreement Revision Segment: (1) Dates of revision of the agreement.

7. Title Segment: (1) Full title of proposal, (2) Parenthetical remarks.

8. Comment Segment: (1) Free-form comments about status of the experiment.

9. NAL Equipment Segment: For each item of equipment to be supplied by NAL in support of the experiment is listed: (1) class of equipment, (2) whether it is to be procured or is on hand, (3) description of item, (4) date to be available to experiment, (5) acquisition cost, (6) whether bought for this experiment or prior one, (7) remarks as necessary, (8) who is responsible for procurement, (9) date ordered, (10) budget code bought under, (11) date received, (12) purchase-order number, (13) NAL code name.

10. Experimenter Eqpt. Segment: For each item to be supplied by the experimenter is listed: (1) supporting institution providing it, (2) class of equipment, (3) whether it is new equipment to be purchased, (4) its value, (5) whether it is on site or not, (6) expected arrival date, (7) remarks as necessary, (8) item description.

11. Funding Segment: (1) Free-form description of the funding by supporting institutions.

12. Work-Package Segment: (1) List of all budget accounts germain to the experiment, (2) title, (3) current fiscal year budget.

13. Spokesman Segment: (1) All spokesmen for the experiment, with

remarks as to their tenure, (2) indication of current spokesman.

14. Other Considerations Segment: (1) Free-form description of other considerations in the agreement.

15. Milestone Segment: (1) Milestones description, (2) incremental relationship, (3) duration of experiment.

It should be noted that, while provision has been made for many pieces of information, not all information has been kept current at this date.

In conjunction with the main file, indexed sequential files have been established that are known to GIS and available to it during the query mode to the main file. An indexed sequential file basically consists of records established with a unique key appended to each record. This key corresponds in our system to a coded piece of information in a record in the main file. When an inquiry to the main file is undertaken, the indexed sequential file is also made available to GIS so that the information in the indexed file is also available. For example: since a supporting institution name applies no matter where the code is used in the main record, the key for the institution is coded where needed and then GIS will supply the full name associated with the key. It is obvious that indexed sequential files can be used to cut down the amount of information stored in the main file and can be retrieved only when necessary. In our system, we use indexed sequential files to store names of supporting institutions, descriptive titles of beam lines and experimental areas, and NAL group names.

In the system designed at NAL, we have found that the reporting capability of GIS Version I, Mod 2 does not meet most of our report-generating requirements, and we use PL/I to access the files from the inquiries to generate the sophisticated and specialized reports. In the PL/I phase, we use the Checkout Compiler for debugging and the Optomizing Compiler to create the executable programs for repetitive execution of reports.

At this point, the author would like to express her appreciation to John Pollock of the Information Systems Group at NAL and Delta Clark of the Computer Group for their invaluable assistance in this effort. More detailed information about file creation, maintenance, and inquiries to the file is addressed in the Appendices.

APPENDIX I. CREATING THE FILE

GIS Version I Mod 2 assumes that the information contained in the input cards is to be presented in a prescribed manner according to the DDT's. If a particular piece of information is absent or empty, a blank card must be inserted. After the input information is prepared according to the DDT's, a GIS program is compiled to structure the file from the input cards. A sample input DDT is presented in Fig. 1 and the File DDT in Fig. 2. A copy of the CREATE program is presented in Fig. 3. Please note that on the input card DDT each format of input card is described by a Segment (SEGM) statement and that immediately following the first SEGM statement is listed the DATM statement which names the file and determines the environment and attributes of the file. On the file DDT the DATM statement follows the SEGM statement which defines the master segment, composed of six input cards.

```
DDT ; -
FILE EXPCARD1          HDHDHDMCHCMDHDHDHDHCHCMCHCHC   MCHC   HCHAHC;
FLD EXNUM      EBCD    5                                L
FLD GISIDFLD   EBCD    2                                L
FLD TCL0       EBCD    1                                L
FLD PHYSCATA   EBCD    2                                L
FLD PHYSCATB   EBCD    1                                L
FLD EXITIT     EBCD   41                                L
FLD DUM10A     EBCD    4                                L
FLD PHYSCATC   EBCD    2                                L
FLD DUM10B     EBCD    3                                L
FLD EXNUMA     EBCD    4                                L
FLD EXNUMB     EBCD    3                                L
FLD ROMANC     EBCD    5                                L
FLD NEWNOA     EBCD    4                                L
FLD NEWNOB     EBCD    3                                L
SEGM CARD10      0 MULREC ID  GISIDFLD 10  Y EXNUM,A
DATM DSORG=PS, CREATE=NO, ALLOC=PRE, DSNAME=EXPCARD1, LRECL=80, RECFM=FB,
*BLKSIZE=7280, CATLG=NO, VOLUME=SER=DISK94, UNIT=2314
FLD DUM11      EBCD    5                                L
FLD GISIDFLD   EBCD    2                                L
FLD TCL1       EBCD    1                                L
FLD STATUSPW   EBCD    1                                L
FLD DTAPRDY    EBCD    2                                L
FLD DTAPRMO    EBCD    2                                L
FLD DTAPRYR    EBCD    2                                L
FLD AGREE      EBCD    1                                L
FLD DTAGRDY    EBCD    2                                L
FLD DTAGRMO    EBCD    2                                L
FLD DTAGRYR    EBCD    2                                L
FLD EXCOORD    EBCD   20                                L
FLD STATUSEX   EBCD    2                                L
FLD DTCOMPDY   EBCD    2                                L
FLD DTCOMPMO   EBCD    2                                L
FLD DTCOMPYR   EBCD    2                                L
FLD DUMAGR     EBCD    1                                L
FLD DTDUMDY    EBCD    2                                L
FLD DTDUMMO    EBCD    2                                L
FLD DTDUMYR    EBCD    2                                L
FLD DUM11A     EBCD   23                                L
SEGM CARD11      0 OVRFLW ID  GISIDFLD 11
FLD DUM12      EBCD    5                                L
FLD GISIDFLD   EBCD    2                                L
FLD TCL2       EBCD    1                                L
FLD CONSTRNT   EBCD   32                                L
FLD CORDREV    EBCD   14                                L
FLD COREVDY    EBCD    2                                L
FLD COREVMO    EBCD    2                                L
FLD COREVYR    EBCD    2                                L
FLD COLLREV    EBCD   14                                L
FLD COLREVDY   EBCD    2                                L
FLD COLREVMO   EBCD    2                                L
FLD COLREVYR   EBCD    2                                L
SEGM CARD12      0 OVRFLW ID  GISIDFLD 12
FLD DUM13      EBCD    5                                L

FLD GISIDFLD   EBCD    2                                L
FLD TCL3       EBCD    1                                L
FLD 3MDESREV   EBCD   14                                L
FLD 3MDESDY    EBCD    2                                L
FLD 3MDESMO    EBCD    2                                L
```

Fig. 1. DDT FOR INPUT CARDS.

```
FLD BMDESYR   EBCD   2                                  L
FLD BMEQPREV  EBCD  14                                  L
FLD BMEQPDY   EBCD   2                                  L
FLD BMEQPMO   EBCD   2                                  L
FLD BMEQPYR   EBCD   2                                  L
FLD FUNDREV   EBCD  14                                  L
FLD FUNDDY    EBCD   2                                  L
FLD FUNDMO    EBCD   2                                  L
FLD FUNDYR    EBCD   2                                  L
FLD DUM13A    EBCD  12                                  L
SEGM CARD13     0 OVRFLW ID  GISIDFLD 13
FLD DUM14     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TC14      EBCD   1                                  L
FLD WKPKGREV  EBCD  14                                  L
FLD WKPKGDY   EBCD   2                                  L
FLD WKPKGMO   EBCD   2                                  L
FLD WKPKGYR   EBCD   2                                  L
FLD SPKSMNRV  EBCD  14                                  L
FLD SPKSMNDY  EBCD   2                                  L
FLD SPKSMNMO  EBCD   2                                  L
FLD SPKSMNYR  EBCD   2                                  L
FLD OTHERREV  EBCD  14                                  L
FLD OTHERDY   EBCD   2                                  L
FLD OTHERMO   EBCD   2                                  L
FLD OTHERYR   EBCD   2                                  L
FLD DUM14A    EBCD  12                                  L
SEGM CARD14     0 OVRFLW ID  GISIDFLD 14
FLD DUM15     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TC15      EBCD   1                                  L
FLD MLISTNREV EBCD  14                                  L
FLD MLISTNDY  EBCD   2                                  L
FLD MLISTNMO  EBCD   2                                  L
FLD MLISTNYR  EBCD   2                                  L
FLD DUM15A    EBCD  52                                  L
SEGM CARD15     0 OVRFLW ID  GISIDFLD 15
FLD DUM19     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TC19      EBCD   1                                  L
FLD LABNO     EBCD   2                                  L
FLD LOC       EBCD   2                                  L
FLD BMNO      EBCD   3                                  L
FLD BMSEQ     EBCD   3                                  L
FLD RATE      EBCD   1                                  L
FLD DUM19A    EBCD  61                                  L
SEGM CARD19     1 MULREC ID  GISIDFLD 19  Y LABNO,A
FLD DUM20     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TC20      EBCD   1                                  L
FLD COLLNO    EBCD   4                                  L
FLD INSTIT    EBCD   3                                  L
FLD DUM20A    EBCD   1                                  L
FLD NALGRP    EBCD   2                                  L
FLD DUM20B    EBCD   1                                  L
FLD MPIC      EBCD   2                                  L
FLD DUM20C    EBCD   1                                  L
FLD NAME      EBCD  26                                  L
FLD DUM20D    EBCD   1                                  L
FLD PAYNO     EBCD   6                                  L
FLD PRESENT   EBCD   1                                  L
```

```
FLD SAFETY    EBCD   1                                  L
FLD DUM20E    EBCD  23                                  L
SEGM CARD20     1 MULREC ID  GISIDFLD 20  Y COLLNO,A
FLD DUM21     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI21     EBCD   1                                  L
FLD DUM21A    EBCD   4                                  L
FLD NALEXT    EBCD   9                                  L
FLD DUM21B    EBCD   1                                  L
FLD NAILADDR  EBCD  31                                  L
FLD EFFORT    EBCD  27                                  L
SEGM CARD21     1 OVRFLW ID  GISIDFLD 21
FLD DUM30     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI30     EBCD   1                                  L
FLD LINENO    EBCD   2                                  L
FLD SPLITNO   EBCD   2                                  L
FLD BMDESC    EBCD  68                                  L
SEGM CARD30     1 MULREC ID  GISIDFLD 30  Y LINENO,A
FLD DUM31     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI31     EBCD   1                                  L
FLD APPENDNO  EBCD   2                                  L
FLD APPENDDY  EBCD   2                                  L
FLD APPENDMO  EBCD   2                                  L
FLD APPENDYR  EBCD   2                                  L
FLD APPNDTIT  EBCD  30                                  L
FLD APPNDREV  EBCD  14                                  L
FLD APPNDDY   EBCD   2                                  L
FLD APPNDMO   EBCD   2                                  L
FLD APPNDYR   EBCD   2                                  L
FLD DUM31A    EBCD  14                                  L
SEGM CARD31     1 MULREC ID  GISIDFLD 31  Y APPENDNO,A
FLD DUM32     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI32     EBCD   1                                  L
FLD REVNO     EBCD   2                                  L
FLD REVNODY   EBCD   2                                  L
FLD REVNOMO   EBCD   2                                  L
FLD REVNOYR   EBCD   2                                  L
FLD REVREV    EBCD  20                                  L
FLD DUM32A    EBCD  44                                  L
SEGM CARD32     1 MULREC ID  GISIDFLD 32  Y REVNO,A
FLD DUM33     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI33     EBCD   1                                  L
FLD LINENUMB  EBCD   2                                  L
FLD LONGTIT   EBCD  70                                  L
SEGM CARD33     1 MULREC ID  GISIDFLD 33  Y LINENUMB,A
FLD DUM34     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI34     EBCD   1                                  L
FLD LINENUM   EBCD   2                                  L
FLD APRVLIM   EBCD  70                                  L
SEGM CARD34     1 MULREC ID  GISIDFLD 34  Y LINENUM,A
FLD DUM40     EBCD   5                                  L
FLD GISIDFLD  EBCD   2                                  L
FLD TCI40     EBCD   1                                  L
FLD ITEMNO    EBCD   3                                  L
FLD EQCLASS   EBCD   1                                  L
FLD PROCODE   EBCD   1                                  L
```

```
FLD EQDESC    EBCD  67                                L
SEGM CARD40     1 MULREC ID  GISIDFLD 40  Y ITEMNO,A
FLD DUM41     EBCD   5                                L
FLD GISIDFLD  EBCD   2                                L
FLD TCI41     EBCD   1                                L
FLD DUM41A    EBCD   3                                L
FLD AVDATEDY  EBCD   2                                L
FLD AVDATEMO  EBCD   2                                L
FLD AVDATEYR  EBCD   2                                L
FLD ACQCOST   EBCD   7                                R
FLD COSTFLAG  EBCD   1                                L
FLD EQSTATUS  EBCD  41                                L
FLD NAILEQREV EBCD  14                                L
SEGM CARD41     1 OVRFLW ID  GISIDFLD 41
FLD DUM42     EBCD   5                                L
FLD GISIDFLD  EBCD   2                                L
FLD TCI42     EBCD   1                                L
FLD DUM42A    EBCD   3                                L
FLD NAILGRP   EBCD   2                                L
FLD RESPIND   EBCD  25                                L
FLD DTORDDY   EBCD   2                                L
FLD DTORDMO   EBCD   2                                L
FLD DTORDYR   EBCD   2                                L
FLD DTRCVDY   EBCD   2                                L
FLD DTRCVMO   EBCD   2                                L
FLD DTRCVYR   EBCD   2                                L
FLD PONUM     EBCD   6                                L
FLD WORKPACK  EBCD   3                                L
FLD COSTELEM  EBCD   3                                L
FLD NAILEQDY  EBCD   2                                L
FLD NAILEQMO  EBCD   2                                L
FLD NAILEQYR  EBCD   2                                L
FLD EQLABEL   EBCD  12                                L
SEGM CARD42     1 OVRFLW ID  GISIDFLD 42
FLD DUM50     EBCD   5                                L
FLD GISIDFLD  EBCD   2                                L
FLD TCI50     EBCD   1                                L
FLD COILITEM  EBCD   3                                L
FLD INSTIT    EBCD   3                                L
FLD COILEQCLS EBCD   1                                L
FLD COISTFLG  EBCD   1                                L
FLD NAILGRP   EBCD   2                                L
FLD COILEQDES EBCD  62                                L
SEGM CARD50     1 MULREC ID  GISIDFLD 50  Y COLITEM,A
FLD DUM51     EBCD   5                                L
FLD GISIDFLD  EBCD   2                                L
FLD TCI51     EBCD   1                                L
FLD DUM51A    EBCD   3                                L
FLD VALUE     EBCD   7                                R
FLD UNISITECD EBCD   1                                L
FLD EXIARDTDY EBCD   2                                L
FLD EXIARDTMO EBCD   2                                L
FLD EXIARDTYR EBCD   2                                L
FLD STORELOC  EBCD  35                                L
FLD EXPEQREV  EBCD  14                                L
FLD EXPEQDY   EBCD   2                                L
FLD EXPEQMO   EBCD   2                                L
FLD EXPEQYR   EBCD   2                                L
SEGM CARD51     1 OVRFLW ID  GISIDFLD 51
FLD DUM60     EBCD   5                                L
```

```
FLD GISIDFLD EBCD   2                                   L
FLD TCI60    EBCD   1                                   L
FLD LNNO     EBCD   2                                   L
FLD PNO      EBCD   2                                   L
FLD FUNDDES  EBCD  68                                   L
SEGM CARD60    1 MULREC NID  GISIDFLD 60  Y LNO,A
FLD DUM61    EBCD   5                                   L
FLD GISIDFLD EBCD   2                                   L
FLD TCI61    EBCD   1                                   L
FLD WKPKG    EBCD   3                                   L
FLD FYBUDG   EBCD   7                                   R
FLD WKPKGTIT EBCD  62                                   L
SEGM CARD61    1 MULREC NID  GISIDFLD 61  Y WKPKG,A
FLD DUM70    EBCD   5                                   L
FLD GISIDFLD EBCD   2                                   L
FLD TCI70    EBCD   1                                   L
FLD CORRNO   EBCD   4                                   L
FLD INSTIT   EBCD   3                                   L
FLD CORRNAME EBCD  23                                   L
FLD CORRDUR  EBCD  41                                   L
FLD PRINT    EBCD   1                                   L
SEGM CARD70    1 MULREC NID  GISIDFLD 70  Y CORRNO,A
FLD DUM80    EBCD   5                                   L
FLD GISIDFLD EBCD   2                                   L
FLD TCI80    EBCD   1                                   L
FLD LNNO     EBCD   2                                   L
FLD PARGNO   EBCD   2                                   L
FLD CONSDESC EBCD  68                                   L
SEGM CARD80    1 MULREC NID  GISIDFLD 80  Y LNNO,A
FLD DUM95    EBCD   5                                   L
FLD GISIDFLD EBCD   2                                   L
FLD TCI95    EBCD   1                                   L
FLD MLSTNNO  EBCD   4                                   L
FLD MSTNDTDY EBCD   2                                   L
FLD MSTNDTMO EBCD   2                                   L
FLD MSTNDTYR EBCD   2                                   L
FLD MLSTNTIT EBCD  62                                   L
SEGM CARD95    1 MULREC NID  GISIDFLD 95  Y MLSTNNO,A
FLD DUM96    EBCD   5                                   L
FLD GISIDFLD EBCD   2                                   L
FLD TCI96    EBCD   1                                   L
FLD DUM96A   EBCD   4                                   L
FLD T I      EBCD   1                                   L
FLD JRIGDT   EBCD   3                                   L
FLD PLUS     EBCD   1                                   L
FLD INCRE    EBCD   3                                   L
SEGM CARD96    1 OVRFLW ID  GISIDFLD 96
END
*END TASK SPEC
DDP EXPCARD1;
*END TASK SPEC
```

Fig. 2. DDT FOR MASTER FILE.

```
DDT ;
FILE EXPFILE1          HDHDHDMCHCMDHDHDHDHCHCMCHCHC  MCHC  HCHAHC;
FLD EXNUM     EBCD   5                              L EXPERIMENT NUMBER
FLD PHYSCATA  EBCD   2                              L PHYSICS CATEGORY
EDIT RNGE             E          S    2                    0,99
FLD PHYSCATB  EBCD   1                              L
EDIT LKUP             E          S    1   1                ,A,B,C,D,E,F,G,H,I,J,K,L
#M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z;
FLD EXTIT     EBCD  41                              L EXPERIMENT TITLE
FLD PHYSCATC  EBCD   2                              L
FLD EXNUMA    EBCD   4                              L EXPERIMENT NUMBER
FLD EXNUMB    EBCD   3                              L
FLD ROMANC    EBCD   5                              L
FLD NEWNOA    EBCD   4                              L RENUMBERED AS
FLD NEWNOB    EBCD   3                              L
FLD STATUSPW  EBCD   1                              L STATUS OF PROPOSAL
DECD LKUP             E          S S  1   9                1,PROPOSAL ,2,APPROVED ,;
#4,PROPOSED ,5,DEFERRED ,6,WITHDRAWN,7,REJECTED ,8,INACTIVE ;
FLD DTAPRDY   EBCD   2                              L
FLD DTAPRMO   EBCD   2                              L PROPOSAL APPROVED
DECD LKUP             E          S S  2   3                , : , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTAPRYR   EBCD   2                              L
FLD AGREE     EBCD   1                              L STATUS OF AGREEMENT
EDIT RNGE             E          S    1                    0,2
DECD LKUP             E          S S  1   8                0,UNSIGNED,1,SIGNED  ,;
#2,DRAFT   ;
FLD DTAGRDY   EBCD   2                              L
FLD DTAGRMO   EBCD   2                              L AGREEMENT SIGNED
DECD LKUP             E          S S  2   3                , : , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTAGRYR   EBCD   2                              L
FLD EXCOORD   EBCD  20                              L NAL COORDINATOR
FLD STATUSEX  EBCD   2                              L STATUS OF EXPERIMENT
EDIT RNGE             E          S    2                    0,99
DECD LKUP             E          S S  2  21                0,NOT AT NAL
# 1,IN SETUP PERIOD      , 2,RUNNING              , 3,DOWN                  ,;
# 4,PRELIMINARY RUNNING , 5,TEMPORARY SETUP      , 6,DATA TAKING COMPLETED,;
# 7,EQUIPMENT REMOVED   , 8,RESULTS PUBLISHED    , 9,COMPLETED              ;
FLD DTCOMPDY  EBCD   2                              L
FLD DTCOMPMO  EBCD   2                              L
DECD LKUP             E          S S  2   3                , : , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTCOMPYR  EBCD   2                              L
FLD DUMAGR    EBCD   1                              L DUMMY AGREEMENT
EDIT RNGE             E          S    1                    0,1
DECD LKUP             E          S S  1   3                0,NO ,1,YES;
FLD DTDUMDY   EBCD   2                              L
FLD DTDUMMO   EBCD   2                              L
DECD LKUP             E          S S  2   3                , : , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTDUMYR   EBCD   2                              L
FLD CONSTRNT  EBCD  32                              L CONSTRAINT ON START
FLD COORDREV  EBCD  14                              L COORDINATOR REVISED BY
FLD COREVDY   EBCD   2                              L

FLD COREVMO   EBCD   2                              L NAL COORESPONDENT REVISION DATE
DECD LKUP             E          S S  2   3                , : , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD COREVYR   EBCD   2                              L
FLD COLLREV   EBCD  14                              L EXPERIMENTER LIST REVISED BY
```

```
FLD COLREVDY EBCD   2                                  L
FLD COLREVMO EBCD   2                                  L EXPERIMENTER LIST REVISION DATE
DECD LKUP          E          S S   2   3                    . :  . 1,JAN, 2,FEB, 3,:
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD COLREVYR EBCD   2                                  L
FLD BMDESREV EBCD  14                                  L BEAM DESCRIPTION REVISED BY
FLD BMDESDY  EBCD   2                                  L
FLD BMDESMO  EBCD   2                                  L BEAM DESCRIPTION REVISION DATE
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,:
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD BMDESYR  EBCD   2                                  L
FLD BMEQPREV EBCD  14                                  L BEAM EQUIPMENT REVISED BY
FLD BMEQPDY  EBCD   2                                  L
FLD BMEQPMO  EBCD   2                                  L BEAM EQUIPMENT REVISION DATE
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,:
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD BMEQPYR  EBCD   2                                  L
FLD FUNDREV  EBCD  14                                  L FUNDING REVISED BY
FLD FUNDDY   EBCD   2                                  L
FLD FUNDMO   EBCD   2                                  L FUNDS DESCRIPTION REVISION DATE
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD FUNDYR   EBCD   2                                  L
FLD WKPKGREV EBCD  14                                  L WORK PACKAGE LIST REVISEDBY
FLD WKPKGDY  EBCD   2                                  L
FLD WKPKGMO  EBCD   2                                  L WORK PACKAGES REVISION DATE
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD WKPKGYR  EBCD   2                                  L
FLD SPKSMNRV EBCD  14                                  L SPOKESMAN REVISED BY
FLD SPKSMNDY EBCD   2                                  L
FLD SPKSMNMO EBCD   2                                  L SCIENTIFIC SPOKESMAN REVISION D
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD SPKSMNYR EBCD   2                                  L
FLD OTHERREV EBCD  14                                  L OTH CONSIDERATIONS REVISED BY
FLD OTHERDY  EBCD   2                                  L
FLD OTHERMO  EBCD   2                                  L OTHER CONSIDERATIONS REVISION D
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD OTHERYR  EBCD   2                                  L
FLD MLISTNREV EBCD 14                                  L MILESTONE LIST REVISED BY
FLD MLISTNDY EBCD   2                                  L
FLD MLISTNMO EBCD   2                                  L MILESTONE LIST REVISION DATE
DECD LKUP          E          S S   2   3                    .  . 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD MLISTNYR EBCD   2                                  L
FLD COLLCNT  PACD   2                                    NUMBER OF COLLABORATORS
FLD BMDSCCNT PACD   2                                    NUMBER OF LINES OF B.1
FLD APPNDCNT PACD   1                                    NUMBER OF APPENDICES
FLD REVISCNT PACD   1                                    NUMBER OF REVISIONS
FLD EQUIPCNT PACD   2                                    NUMBER OF ITEMS OF NAL EQUIPME
FLD COLEQCNT PACD   2                                    NUMBER OF ITEMS OF COLLAB EQUIP
FLD FUNDCNT  PACD   2                                    NO. OF LINES OF C.1 & C.2
FLD WKPKGCNT PACD   2                                    NO. OF WORK PACKAGES
FLD CORESCNT PACD   1                                    NUMBER OF CORRESPONDENTS
FLD CONSDCNT PACD   2                                    NUMBER OF OTHER CONSIDERATIONS
FLD LGTITCNT PACD   2                                    NO. OF LINES OF LONG TITLE
FLD MLISTNCNT PACD  2                                    NUMBER OF MILESTONES
FLD BMCNT    PACD   2                                    NUMBER OF BEAMLINES
FLD APRVLCNT PACD   2                                    NO. OF LINES OF APPROVAL
```

```
SEGM EXDEFSEG  0 RECORD                          Y EXNUM,A
DATM DSORG=PS, CREATE=YES, ALLOC=CYL, BLKSIZE=32004, CATLG=YES, ;
#DSNAME=C751.AB.GIS.EXPFILE1, ENTRIES=3, INCRE=1, RECFM=VT, RELEASE=YES, ;
#SPACE=1, VOLUME=SER=DISK94, UNIT=2314, LRECL=32000;
FLD LABNO     EBCD   2                           L
FLD LOC       EBCD   2                           L LOCATION OF EXPERIMENT
FLD BMNO      EBCD   3                           L BEAM NUMBER
FLD BMSEQ     EBCD   3                           L SEQUENCE IN BEAM
FLD RATE      EBCD   1                           L CLASS OF EXPERIMENT
SEGM BMSEG     1 TRAILR CNT BMCNT          Y LABNO,A
FLD COLLNO    EBCD   4                           L EXPERIMENTER NUMBER
FLD INSTIT    EBCD   3                           L HOME INSTITUTION
FLD NALGRP    EBCD   2                           L NAL GROUP
FLD MPC       EBCD   2                           L MANPOWER CODE
DECD LKUP           E          S S   2  21              C,CONSULTANT
# ,D,DRAFTSMAN          , L,LECTURER          , M,MACHINIST          ,;
# ,P,PHYSICIST          , T,TECHNICIAN        , X,UNKNOWN            ,;
#C,E,ELECTRONIC ENGINEER  ,DS,DESIGNER         ,EA,ENGINEERING ASSISTANT,;
#E,E,ELECTRICAL ENGINEER  ,EG,ENGINEER         ,ET,ELECTRICAL TECHNICIAN,;
#E,X,ELECTRONIC TECHNICIAN,GS,GRADUATE STUDENT ,LT,LAB TECHNICIAN     ,;
#M,E,MECHANICAL ENGINEER  ,MT,MECHANICAL TECHNICIAN,PF,PHD FELLOW     ,;
#P,G,PROGRAMMER           ,PP,POST PHD FELLOW   ,RS,RESEARCH ASSOCIATE ,;
#R,T,RESEARCH TECHNICIAN  ,SL,SR. LAB TECHNICIAN,SR,SR. LAB TECHNICIAN ,;
#S,T,SENIOR TECHNICIAN    ,TP,THEORY PHYSICIST  ,UG,UNDERGRADUATE STUDENT,;
#X,X,MISCELLANEOUS        ;
FLD NAME      EBCD  26                           L
FLD PAYNO     EBCD   6                           L
FLD PRESENT   EBCD   1                           L
FLD SAFETY    EBCD   1                           L
FLD NALEXT    EBCD   9                           L
FLD NALADDR   EBCD  31                           L
FLD EFFORT    EBCD  27                           L
SEGM COLLSEG   1 TRAILR CNT COLLCNT       Y COLLNO,A
FLD LINENO    EBCD   2                           L
FLD SPLITNO   EBCD   2                           L
FLD BMDESC    EBCD  68                           L DESCRIPTION OF BEAM
SEGM BMDSCSEG  1 TRAILR CNT BMDSCCNT      Y LINENO,A
FLD APPENDNO  EBCD   2                           L
FLD APPENDDY  EBCD   2                           L
FLD APPENDMO  EBCD   2                           L DATE OF APPENDIX
DECD LKUP           E          S S   2   3              , ,  1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD APPENDYR  EBCD   2                           L
FLD APPNDTIT  EBCD  30                           L APPENDIX TITLE
FLD APPNDREV  EBCD  14                           L APPENDIX REVISED BY
FLD APPNDDY   EBCD   2                           L
FLD APPNDMO   EBCD   2                           L APPENDIX REVISION DATE
DECD LKUP           E          S S   2   3              , ,  1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD APPNDYR   EBCD   2                           L
SEGM APPNDSEG  1 TRAILR CNT APPNDCNT      Y APPENDNO,A
FLD REVNO     EBCD   2                           L
FLD REVNODY   EBCD   2                           L
FLD REVNOMO   EBCD   2                           L DATE REVISED
DECD LKUP           E          S S   2   3              ,  , 1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD REVNOYR   EBCD   2                           L
FLD REVREV    EBCD  20                           L REVISED BY
SEGM REVISSEG  1 TRAILR CNT REVISCNT      Y REVNO,A
FLD LINENUMB  EBCD   2                           L
FLD LONGTIT   EBCD  70                           L
```

```
SEGM LGTITSEG  1 TRAILR CNT LGTITCNT     Y LINENUMB,A
FLD LINENUM   EBCD   2                          L
FLD APRVLIM   EBCD  70                          L
SEGM APRVSEG   1 TRAILR CNT APRVLCNT     Y LINENUM,A
FLD ITEMNO    EBCD   3                          L ITEM NUMBER
FLD EQCLASS   EBCD   1                          L EQUIP CLASS
EDIT LKUP             E          S     1                    A,C,D,E,F,H,I,K,L,M,N,O,
#P,,R,S,,T,V,X
DECD LKUP             E          S S   1  40                 A,ANALYSIS MAGNETS
#                     ,C,COMPUTERS
#D,,DETIECTORS-COMPONENTS-ELECIRIONICS-CABLING,;
#E,,EXPENDABLE ITEMS                          ,;
#F,,RECIRCULATORS                             ,;
#H,,SHIELDING                                 ,;
#I,,PLANT ITEMS                               ,;
#K,,PORITAKAMPS                               ,;
#L,,COLILIMATORS                              ,;
#M,,BEAM MAGNETS                              ,;
#O,,OFFL-LINE COMPUTING                       ,;
#P,,PREP                                      ,;
#R,,REFRIGERATORS                             ,;
#S,,POWIER SUPPLIES                           ,;
#T,,TARIGETS                                  ,;
#V,,TANIKS-DEWARS                             ,;
#X,,MISCELLANEOUS                             ;
FLD PROCODE   EBCD   1                          L PROCUREMENT STATUS
EDIT RNGE             E          S     1                    1,2
DECD LKUP             E          S S   1  14                1,ON HAND      ,2,TO BE
#ROCJRED;
FLD EQDESC    EBCD  67                          L EQUIPMENT DESCRIPTION
FLD AVDATEDY  EBCD   2                          L
FLD AVDATEMO  EBCD   2                          L DATE AVAILABLE
DECD LKUP             E          S S   2   3                 ,  , 1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD AVDATEYR  EBCD   2                          L
FLD ACQCOST   PACD   4                            ACQUISITION COST
MASK Z,ZZZ,ZCZ-
FLD COSTFLAG  EBCD   1                          L
EDIT RNGE             E          S     1                    1,2
FLD EQSTATUS  EBCD  41                          L EQUIPMENT STATUS
FLD NALEQREV  EBCD  14                          L NAL EQUIP REVISED BY
FLD NALGRP    EBCD   2                          L RESPONSIBLE NAL GROUP
FLD RESPIND   EBCD  25                          L RESP INDIVIDUAL
FLD DTORDDY   EBCD   2                          L
FLD DTORDMO   EBCD   2                          L DATE ITEM ORDERED
DECD LKUP             E          S S   2   3                 ,  , 1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTORDYR   EBCD   2                          L
FLD DTRCVDY   EBCD   2                          L
FLD DTRCVMO   EBCD   2                          L DATE RECEIVED
DECD LKUP             E          S S   2   3                 ,  , 1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD DTRCVYR   EBCD   2                          L
FLD PONUM     EBCD   6                          L
FLD WORKPACK  EBCD   3                          L WORK PKG
FLD COSTELEM  EBCD   3                          L COST ELEMENT
FLD NALEQDY   EBCD   2                          L
FLD NALEQMO   EBCD   2                          L REVISION DATE
DECD LKUP             E          S S   2   3                 ,  , 1,JAN, 2,FEB, 3,
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD NALEQYR   EBCD   2                          L
```

```
FLD EQLABEL   EBCD  12                              L
SEGM NALEQSEG  1 TRAILR CNT EQUIPCNT      Y ITEMNO,A
FLD COLITEM   EBCD   3                          L ITEM NUMBER
FLD INSTIT    EBCD   3                          L INSTITUTION
FLD COLEQCLS  EBCD   1                          L EQUIP CLASS
EDIT LKUP           E          S     1                  A,C,D,E,F,H,I,K,L,M,N,O,;
#R,,S,T,,V,X
DECD LKUP           E          S S   1  40               A,ANALYSIS MAGNETS      ;
#  ,                ,C,COMPUTERS                            ,;
#D,,DETIECTORS-COMPONENTS-ELECTRIONICS-CABLING,;
#E,,EXPENDABLE ITEMS                          ,;
#F,,RECIRCULATORS                             ,;
#H,,SHIELDING                                 ,;
#I,,PLANT ITEMS                               ,;
#K,,PORTAKAMPS                                ,;
#L,,COLLIMATORS                               ,;
#M,,BEAM MAGNETS                              ,;
#O,,OFF-LINE COMPUTING                        ,;
#R,,REFRIGERATORS                             ,;
#S,,POWER SUPPLIES                            ,;
#T,,TARGETS                                   ,;
#V,,TANKS-DEWARS                              ,;
#X,,MISCELLANEOUS                             ;
FLD COISTFLG  EBCD   1                            L
FLD NALGRP    EBCD   2                          L NAL GROUP
FLD COLEQDES  EBCD  62                          L EQUIPMENT DESCRIPTION
FLD VALUE     PACD   4                            VALUE
MASK Z,ZZZ,Z(Z-
FLD ONSITECD  EBCD   1                          L ON SITE
EDIT LKUP           E          S     1                  N,Y
DECD LKUP           E          S S   1   3              N,NO ,Y,YES;
FLD EXARDTDY  EBCD   2                          L
FLD EXARDTMO  EBCD   2                          L EXPECTED ARRIVAL DATE
DECD LKUP           E          S S   2   3                ,  ,  , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD EXARDTYR  EBCD   2                          L
FLD STORELOC  EBCD  35                          L STORAGE LOCATION
FLD EXPEQREV  EBCD  14                          L EXPERIMENTER EQUIP REVISED BY
FLD EXPEQDY   EBCD   2                          L
FLD EXPEQMO   EBCD   2                          L REVISION DATE
DECD LKUP           E          S S   2   3                ,  ,  , 1,JAN, 2,FEB, 3,;
#MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD EXPEQYR   EBCD   2                          L
SEGM COLEQSEG  1 TRAILR CNT COLEQCNT      Y COLITEM,A
FLD LNIO      EBCD   2                          L LINE NUMBER
FLD PNO       EBCD   2                          L PARAGRAPH NO.
FLD FUNDDES   EBCD  68                          L FUNDING DESCRIPTION
SEGM FUNDSEG   1 TRAILR CNT FUNDCNT       Y LNO,A
FLD WKPKG     EBCD   3                          L WORK PKG
FLD FYIBUDG   PACD   4                            CURRENT FY BUDGET
MASK Z,ZZZ,Z(Z-
FLD WKPKGTIT  EBCD  62                          L WORK PACKAGE TITLE
SEGM WKPKGSEG  1 TRAILR CNT WKPKGCNT      Y WKPKG,A
FLD CORRNO    EBCD   4                          L
FLD INSTIT    EBCD   3                          L INSTITUTION
FLD CORRNAME  EBCD  23                          L CORRESPONDENT
FLD CORRDUR   EBCD  41                          L PERIOD AS CORRESPONDENT
FLD PRINT     EBCD   1                          L
SEGM CORESSEG  1 TRAILR CNT CORESCNT      Y CORRNO,A
FLD LNINO     EBCD   2                          L
FLD PARGNO    EBCD   2                          L ITEM NUMBER
```

```
FLD CONSDESC EBCD  68                                  L OTHER CONSIDERATIONS
SEGM CONSDSEG  1 TRAILR CNT CONSDCNT     Y LNNO,A
FLD MLISTNNO  EBCD   4                                 L MILESTONE NO
FLD MSITNDTDY EBCD   2                                 L
FLD MSITNDTMO EBCD   2                                 L MILESTONE DATE
DECD LKUP          E          S S   2   3                    ,   , 1,JAN, 2,FEB, 3,
*MAR, 4,APR, 5,MAY, 6,JUN, 7,JUL, 8,AUG, 9,SEP,10,OCT,11,NOV,12,DEC;
FLD MSITNDTYR EBCD   2                                 L
FLD MLISTNTIT EBCD  62                                 L TITLE
FLD T I       EBCD   1                                 L
FLD ORIIGDT   EBCD   3                                 L
FLD PLUS      EBCD   1                                 L
FLD INCRE     EBCD   3                                 L
SEGM MLSTNSEG  1 TRAILR CNT MLSTNCNT     Y MLSTNNO,A
END
*END TASK SPEC
DOP EXPFILE1;
*END TASK SPEC
```

```
CREATE EXPFILE1 FROM EXPCARD1
STRUCTURE EXDEFSEG FROM CARD10
EQUATE
 EXNUM TO CARD10:EXNUM
END EQUATE
 STORE EXDEFSEG
STRUCTURE BMSEG FROM CARD19
EQUATE
 EXNUM TO CARD19:DUM19
END EQUATE
STORE BMSEG
STRUCTURE COLLSEG FROM CARD20
EQUATE
 EXNUM TO CARD20:DUM20
END EQUATE
 STORE COLLSEG
STRUCTURE BMDSCSEG FROM CARD30
EQUATE
EXNUM TO CARD30:DUM30
END EQUATE
STORE BMDSCSEG
STRUCTURE APPNDSEG FROM CARD31
EQUATE
EXNUM TO CARD31:DUM31
END EQUATE
STORE APPNDSEG
STRUCTURE REVISSEG FROM CARD32
EQUATE
EXNUM TO CARD32:DUM32
END EQUATE
STORE REVISSEG
STRUCTURE LGTITSEG FROM CARD33
EQUATE
EXNUM TO CARD33:DUM33
END EQUATE
STORE LGTITSEG
STRUCTURE APRVSEG FROM CARD34
EQUATE
EXNUM TO CARD34:DUM34
END EQUATE
STORE APRVSEG
STRUCTURE NALEQSEG FROM CARD40
EQUATE
EXNUM TO CARD40:DUM40
END EQUATE
 STORE NALEQSEG
STRUCTURE COLEQSEG FROM CARD50
EQUATE
 EXNUM TO CARD50:DUM50
END EQUATE
STORE COLEQSEG
STRUCTURE FUNDSEG FROM CARD60
EQUATE
 EXNUM TO CARD60:DUM60
END EQUATE
STORE FUNDSEG
STRUCTURE WKPKGSEG FROM CARD61
EQUATE
 EXNUM TO CARD61:DUM61
END EQUATE
STORE WKPKGSEG
STRUCTURE CORESSEG FROM CARD70
```

Fig. 3. GIS CREATE PROGRAM.

```
EQUATE
 EXNUM TO CARD70:DUM70
END EQUATE
STORE CORESSEG
STRUCTURE CONSDSEG FROM CARD80
EQUATE
 EXNJM TO CARD80:DUM80
END EQUATE
STORE CONSDSEG
STRUCTURE MLSTNSEG FROM CARD95
EQUATE
 EXNJM TO CARD95:DUM95
END EQUATE
STORE MLSTNSEG
END PROCEDURE
*END TASK SPEC
```

APPENDIX II. UPDATING THE FILE

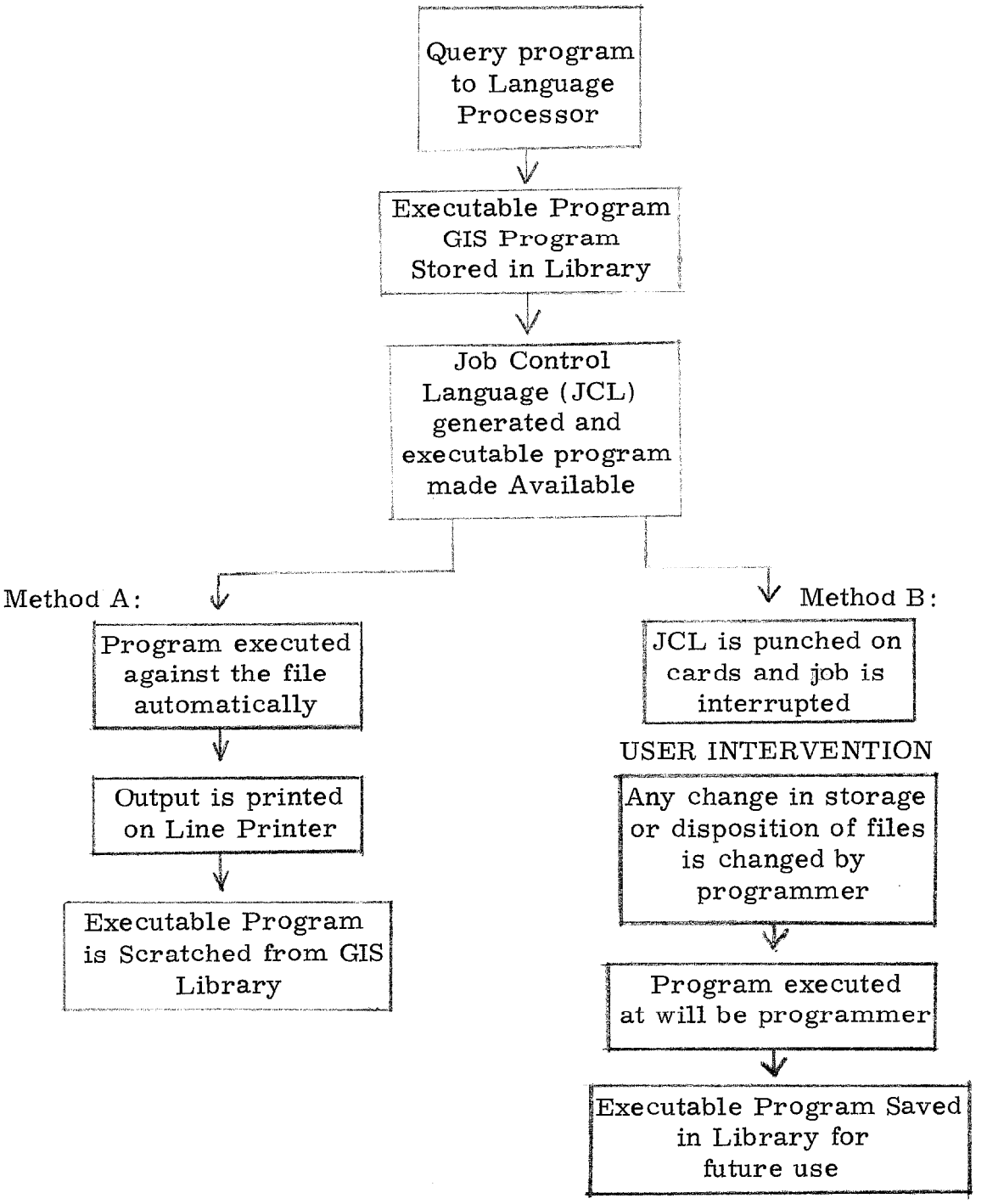
It was determined that the easiest way to get the master file (EXPFILE 1) updated since it is a hierarchical multilevel file was to update the input cards (EXPCARD 1) themselves and recreate the master file. Therefore a PL/I program was written which creates a unique sorting key for each existing card in the file and the updating cards and the input card file for the master file is updated via GIS. Card records may be added, deleted or replaced by the use of 'A', 'D', or 'R' respectively. A copy of the update program is presented in Fig. 4.

```
DATE  73155          TIME  114615

UPDATE UPDTFILE FROM UPDTCARD;

STRUCTURE REKDSEG FROM CARD1;

EQUATE:

 CARNO TO CARD1:CARDNO;

END EQUATE;
LP3680 A      2 EQUATES APPLY TO THIS STRUCTURE PARTITION

  IF TC EQ 'A';

  INSERT REKDSEG;

  RETURN;

  IF TC EQ 'R';

  REPLACE REKDSEG;

  RETURN;

  IF TC EQ 'D';

  DELETE REKDSEG;

  RETURN;

IN ANY CASE;

  LIST 'ILLEGAL TRANSACTION CODE.  ID FLD =', CARD1:CARDNO;

END PROCEDURE;



TOTAL NUMBER OF MESSAGES          1
HIGHEST SEVERITY ENCOUNTERED      A
AN EXECUTE MODULE HAS BEEN PRODUCED
TOTAL NUMBER OF STATEMENTS       17
```

Fig. 4. GIS UPDATE PROGRAM.

APPENDIX III. INQUIRY INTO FILE

Queries for information from the file are handled in one of two ways which can best be shown by a diagram.



Method A is particularly well suited for "one-time" queries such as "List all experimenters on Experiment #60 alphabetically." The query for this type would be:

```
(a) QUERY EXPFILE1
    LOCATE RECORD
    WHEN EXNUM EQ ' 60'
    LOCATE COLLSEG
    HOLD HOLD1 NAME
    EXHAUST COLLSEG
    EXHAUST RECORD

(b) SORT HOLD1 ASC NAME SIZE 500

(c) QUERY HOLD1
    LOCATE RECORD
    LIST RECORD
    EXHAUST RECORD
    END PROCEDURE
```

Section (a) of this query would cause a file search to find the record for Experiment #60. All the experimenters' names would be written on a scratch file entitled HOLD1. Then statement (b) would effect a sort of the names alphabetically. The HOLD1 file would be reopened by section (c), the contents listed, and the HOLD1 file and load module scratched at the end of the job. All actions in this procedure are automatically generated and at the end the executable program (land module) is scratched from the GIS Library. It is obvious that the program keeps track of data attributes and this whole procedure in itself is always independent of changes in the data and does not need to be rewritten unless data attributes change. The advantage of Method A is that it is independent, but the disadvantage is that it must be recompiled each time the query is executed, the generated file (HOLD1) cannot be retained for future use, and the user has little control over the format of the listing.

Method B is a different situation. This type of procedure is used when a query is a very standard type to be used repetitively. From the diagram, it can be noted that a punched deck of cards is received which can then be modified to generate the query at will and repetitively. The load module is always available for execution and is saved until scratched deliberately. An example of a query of this type would be "List the spokesmen for all approved and not completed experiments with their supporting institutions in a formal report. "

```
(a) QUERY EXPFILE1, INSTNAME
    LOCATE RECORD
(b) WHEN STATUSPW EQ '2'
    AND NOT STATUSEX EQ ' 9'
    LOCATE CORESSEG
(c) WHEN PRINT EQ 'Y'
(d) LOCATE INSTNAME:RECORD
    WHEN INSTNAME:INSTIT EQ EXPFILE1:CORESSEG:INSTIT
(e) HOLD HOLD1 EXNUM, CORRNAME, INSTNAME:INSTITNM
    EXHAUST INSTNAME:RECORD
    EXHAUST CORESSEG
    EXHAUST RECORD
(f) SORT HOLD1 ASC EXNUM SIZE 250
(g) QUERY HOLD1, REPDATE
    DEFINE
    LITERALI = '
    END DEFINE
```

```
(h) LOCATE REPDATE:RECORD
    CHANGE LITERALI TO REPDATE:REPDATE
    EXHAUST REPDATE:RECORD
(i) LOCATE HOLD1:RECORD
(j) REPORT WIDTH 132, BODYLINES 46
(k) HEADER
    1 'LIST OF SPOKESMEN FOR APPROVED EXPERIMENTS'
    HEADER
(l) 1 LITERALI
    HEADER
    SPACE2
(m) DETAIL
    1 EXNUM
    10 NAME

    50 INSTITNM
    END REPORT
    EXHAUST HOLD1:RECORD
    END PROCEDURE
```

Section (a) opens the files EXPFILE1 and INSTNAME (an indexed sequential file) for processing. Section (b) limits the search to approved experiments that have not been completed. Statement (c) limits the spokesman to the current one. Section (d) searches the indexed sequential file (INSTNAME) for the corresponding full name of the supporting institution according to the code

entered in the master file. Statement (e) writes the experiment number, the spokesman's name, and his institution on a file (HOLD1). Statement (f) sorts the file (HOLD1) by experiment number and closes it. Section (g) reopens file (HOLD1) for processing and the current date file (REPDATE). Section (h) puts the current date in a work area available to the report. Statement (i) starts processing the file (HOLD1). Statement (j) starts a series of statements that specify the format of the formal report using the GIS report-generating capability. Statements of the type in statement (k) are HEADER statements. HEADER statements specify what is to be printed at the top of each page of the report. The arabic character at the beginning of the line indicates the column number. Statement (l) prints the current date in the heading. Statements of the type of Statement (m) are DETAIL statements and DETAIL statements specify the format of the lines in the body of the report. It can be seen in the above example that the programming for formal reports is extremely simple and conversely is limited in its capability. This is not to imply that this sample program represents all the report-generating capability of GIS but is shown only as an example of the ease in writing formal reports.

The advantages of Method B are that data sets may be created at will on cards, disk files, tape files, and saved indefinitely. In the above application, for instance, the file HOLD1 could subsequently be sorted alphabetically by experimenters or by the institution names thus saving another file search which is time consuming and relatively costly. The load module is kept, saving the cost and time of recompilation, and needs to be recompiled only when the characteristics of the data change.

APPENDIX IV. REPORTS

In this Appendix are displayed reports that are generated from the data file on an occasional basis at the present time. A brief description is included and a sample first page is included. Other reports and listings are generated as needed and are not included in this representative sampling.

List 1. Title -All research proposals submitted to NAL and their current status

Contents -The proposals are listed in order according to their assigned numbers. Included are both a short and a full title, the corrent spokesman's name, institutions of the participants and approval information.

PL/I PROGRAM

1A NEUTRINO #1A — CLINE, DAVID — HARVARD UNIVERSITY; PENNSYLVANIA, UNIVERSITY OF; WISCONSIN, UNIVERSITY OF

NAL NEUTRINO PROPOSAL. (BROAD BAND BEAM INCIDENT ON TARGET CALORIMETER WITH MUON SPECTROMETER)
APPROVED OCT 1970

2B 30-INCH HYBRID #2B — SMITH, GERALD A. — ARGONNE NATIONAL LABORATORY; DUKE UNIVERSITY; IOWA STATE UNIVERSITY; MARYLAND, UNIVERSITY OF; MICHIGAN STATE UNIVERSITY; NATIONAL ACCELERATOR LABORATORY; NOTRE DAME, UNIVERSITY OF; PURDUE UNIVERSITY; TORONTO, UNIVERSITY OF (CANADA); WISCONSIN, UNIVERSITY OF

STUDY OF MULTIPARTICLE P-P INTERACTIONS FROM 100 GEV/C TO 400 GEV/C WITH A 30-INCH BUBBLE CHAMBER-OPTICAL SPARK CHAMBER HYBRID SYSTEM. (500K PLUS 500K LATER OF P-P @ 100-400 GEV WITH ANALYZING MAGNET)
APPROVED MAY 1971

100K PIX OF P - P @ 200 GEV	ANL/NAL, MSU, ISU, MD
100K PIX OF P - P @ 300 OR 400 GEV)	
120K PIX OF PI MINUS - P @ 200 GEV	DUKE, TORONTO, NOTRE DAME
50K PIX OF PI MINUS - P @ 100 GEV)	
80K PIX OF PI PLUS - P @ 100 GEV	PURDUE, WISCONSIN

3 MONOPOLE #3 — ROSS, RONALD — LAWRENCE BERKELEY LABORATORY; STANFORD LINEAR ACCELERATOR CENTER

PROPOSAL FOR A SEARCH FOR MAGNETIC MONOPOLES AT NAL. (FERROMAGNETIC TARGET LOCATED IN A BEAM DUMP)
APPROVED AUG 1970

4I NEUTRON CROSS SECTION #4I — LONGO, MICHAEL — ARGONNE NATIONAL LABORATORY; MICHIGAN, UNIVERSITY OF

NEUTRON-PROTON DIFFRACTION SCATTERING AND NEUTRON TOTAL CROSS SECTIONS UP TO 200 GEV. (TOTAL CROSS SECTIONS ON H2, D2, HEAVY NUCLEI TO < 2%; CAPABLE OF ENERGIES UP TO 300 GEV)
APPROVED AUG 1970

4II NEUTRON ELASTIC SCATTERING #4II — LONGO, MICHAEL — ARGONNE NATIONAL LABORATORY; MICHIGAN, UNIVERSITY OF

NEUTRON-PROTON DIFFRACTION SCATTERING AND NEUTRON TOTAL CROSS SECTIONS UP TO 200 GEV. (DIFFERENTIAL CROSS SECTIONS WITH T FROM 0.1 TO 3.5; CAPABLE OF ENERGIES UP TO 300 GEV)
APPROVED AUG 1970

5 MUON #5 — PERL, MARTIN L. — STANFORD LINEAR ACCELERATOR CENTER

MUON-PROTON INELASTIC SCATTERING.
WITHDRAWN OCT 1970

6 PROTON-PROTON ELASTIC #6 — KRISCH, ALAN D. — ARGONNE NATIONAL LABORATORY; MICHIGAN, UNIVERSITY OF

200-GEV PROTON-PROTON ELASTIC SCATTERING AT HIGH TRANSVERSE MOMENTUM.

List 12. Title -Approved, proposed, deferred, and completed proposals at NAL by category of physics coverage

Contents -The areas of physics interest for NAL experiments have been divided into categories. The appropriate proposals are listed under each category with their short title, current spokesman's name, beam line, and approval status.

PL/I PROGRAM

	SPOKESMAN	STATUS	EXP AREA & BEAM LINE
1. HADRON INTERACTIONS IN ELECTRONIC DETECTORS			
1.1 SEARCH AND SURVEY			
QUARK #72	LEIPUNER, LAWRENCE B.	COMPLETED	MA-M4 BEAM
PHOTON SEARCH #120	CLINE, DAVID	COMPLETED	ITA-C-0
MONOPOLE #3	ROSS, RONALD	APPROVED	PA-(WEST)/NA-TARGET
MONOPOLE #22	COLLINS, GEORGE B.	APPROVED	MA-M2 BEAM
MUON SEARCH #48	ADAIR, ROBERT K.	APPROVED	PA-(WEST)
PARTICLE PRODUCTION #63A	WALKER, JAMES K.	APPROVED	PA-(WEST)/ITA-C-0
LEPTON #70	LEDERMAN, LEON	APPROVED	PA-(CENTER)
MONOPOLE #74	FLEISCHER, R L	APPROVED	PA-(WEST)
QUARK # 75	YAMANOUCHI, TAIJI	APPROVED	MA-M2 BEAM
MONOPOLE #76	CARRIGAN, RICHARD	APPROVED	NA-TARGET
PHOTON SEARCH #95A	COX, BRADLEY	APPROVED	PA-(WEST)
PARTICLE SEARCH #100	PIROUE, PIERRE	APPROVED	PA-(EAST)
LONG-LIVED PARTICLES #115	STEVENSON, M. LYNN	APPROVED	PA-(WEST)
PARTICLE SEARCH #184	MANN, ALFRED K.	APPROVED	ITA-C-0
PARTICLE SEARCH #187	LEDERMAN, LEON M.	APPROVED	PA-(CENTER)
MASSIVE PARTICLE SEARCH #199	FRANKEL, SHERMAN	APPROVED	NA-TARGET
MULTIGAMMA #230	LONGO, MICHAEL J.	APPROVED	MA-M3 BEAM
MONOPOLE #19A	TOMPKINS, DONALD JR.	DEFERRED	MA-M2 BEAM
TACHYON MONOPOLE #202	BARTLETT, DAVID F.	PROPOSED	NA-15-FT B.C. MAGNET
LONG-LIVED PARTICLES #239	FRATI, WILLIAM	PROPOSED	NA-TARGET
1.2 TOTAL CROSS SECTION EXPERIMENTS			
NEUTRON CROSS SECTION # 41	LONGO, MICHAEL	APPROVED	MA-M3 BEAM
TOTAL CROSS SECTION #104	KYCIA, THADDEUS E.	APPROVED	MA-M1 BEAM
1.3 ELASTIC SCATTERING EXPERIMENTS			
PROTON-PROTON ELASTIC #36A	COOL, RODNEY L.	COMPLETED	ITA-C-0
NEUTRON ELASTIC SCATTERING #41I	LONGO, MICHAEL	APPROVED	MA-M3 BEAM
ELASTIC SCATTERING #7	MEYER, DONALD I	APPROVED	MA-M1 BEAM
NEUTRON BACKWARD SCATTERING #12	READY, NEVILLE W.	APPROVED	MA-M3 BEAM
POLARIZED SCATTERING #61	CHAMBERLAIN, OWEN	APPROVED	MA-M1 BEAM
ELASTIC SCATTERING #69A	SANDWEISS, JACK	APPROVED	MA-M6 BEAM
ELASTIC SCATTERING #96	RITSON, DAVID	APPROVED	MA-M6 BEAM
PROTON-PROTON ELASTIC #177A	OREAR, JAY	APPROVED	PA-(WEST)
PROTON-DEUTERON SCATTERING #186	MELISSINOS, ADRIAN	APPROVED	ITA-C-0
ELASTIC SCATTERING #165	RITSON, DAVID	DEFERRED	MA-M6 BEAM
PROTON-NUCLEON SCATTERING #198	OLSEN, STEPHEN L.	DEFERRED	ITA-C-0
BACKWARD SCATTERING #212	DAVID, M.	DEFERRED	MA-M1 BEAM
PROTON-NUCLEON SCATTERING #231	YAMADA, RYUJI	DEFERRED	ITA-C-0
NEUTRON ELASTIC SCATTERING #235	JONES, LAWRENCE W.	PROPOSED	MA-M3 BEAM
1.4 INELASTIC SCATTERING EXPERIMENTS			
PROTON-PROTON INELASTIC #144	FRANZINI, PAOLO	COMPLETED	NA-TARGET
PROTON-PROTON MISSING MASS #67A	SANNES, FELIX	COMPLETED	ITA-C-0
PROTON-NUCLEON INCLUSIVE #188	SANNES, FELIX	COMPLETED	ITA-C-0
INCLUSIVE SCATTERING #23A	ROTHBERG, JOSEPH E.	APPROVED	MA-M1 BEAM
PION CHARGE EXCHANGE #111	TOLLESTRUP, ALVIN V	APPROVED	MA-M2 BEAM
PROTON-PROTON INELASTIC #221	FRANZINI, PAOLO	APPROVED	ITA-C-0
ASSOCIATED PRODUCTION #99	DIEBOLD, ROBERT E.	DEFERRED	MA-M6 BEAM
INCLUSIVE SCATTERING #118A	FRIEDMAN, JEROME I.	DEFERRED	MA-M6 BEAM

List 23. Title -Approved, completed, proposed, and deferred proposals listed by beam line. Approved and completed experiments are listed first in approximate sequence. Active and deferred proposals follow in numerical order.

Contents -With each experimental area are given the beam lines in that area. The appropriate proposals are placed in the above mentioned sequence by beam line with their short title, current spokesman's name, and approval status.

PL/I PROGRAM

EXPERIMENTAL AREA AND BEAM LINE	SPOKESMAN	STATUS
MESON AREA M1 BEAM (CHARGED PARTICLES)		
TOTAL CROSS SECTION #104	KYCIA, THADDEUS F.	APPROVED
ELASTIC SCATTERING #7	MEYER, DONALD I	APPROVED
INCLUSIVE SCATTERING #23A	ROTHBERG, JOSEPH E.	APPROVED
POLARIZED SCATTERING #61	CHAMBERLAIN, OWEN	APPROVED
DIFFRACTIVE DISSOCIATION #86A	LUBATTI, HENRY J.	APPROVED
FORM FACTOR #216	DRICKEY, DARRELL J.	APPROVED
DIFFRACTIVE SCATTERING #176	PICCIONI, ORESTE	DEFERRED
BACKWARD SCATTERING #212	DAVID, M.	DEFERRED
HADRON JETS #222	PILCHER, JAMES E.	DEFERRED
HADRON JETS #236	MOCKETT, PAUL	PROPOSED
MESON AREA M2 BEAM (DIFFRACTED PROTONS)		
QUARK # 75	YAMANOUCHI, TAIJI	APPROVED
PION CHARGE EXCHANGE #111	TOLLESTRUP, ALVIN V	APPROVED
MISSING MASS #51	VON GOELER, EBERHARD	APPROVED
NUCLEAR CHEMISTRY #84A	WEISFIELD, MICHAEL W	APPROVED
BEAM DUMP #108	AWSCHALOM, MIGUEL	APPROVED
NEUTRAL HYPERON #8	PONDROM, LEE	APPROVED
MONOPOLE #22	COLLINS, GEORGE B.	APPROVED
CHARGED HYPERON #97	LACH, JOSEPH	APPROVED
MONOPOLE #19A	TOMPKINS, DONALD JR.	DEFERRED
CHARGED HYPERON #149A	WINSTON, ROLAND	DEFERRED
K ZERO DECAY #160	NAUENBERG, URIEL	DEFERRED
K ZERO DECAY #162	PONDROM, LEE	DEFERRED
SIGMA ZERO LIFETIME #168	DEVLIN, THOMAS J.	DEFERRED
MESON AREA M3 BEAM (NEUTRONS)		
NEUTRON CROSS SECTION #141	LONGO, MICHAEL	APPROVED
MULTIGAMMA #230	LONGO, MICHAEL J.	APPROVED
NEUTRON DISSOCIATION #27A	ROSEN, JEROME	APPROVED
NEUTRON BACKWARD SCATTERING #12	REAY, NEVILLE W.	APPROVED
NEUTRON ELASTIC SCATTERING #41I	LONGO, MICHAEL	APPROVED
NEUTRON ELASTIC SCATTERING #235	JONES, LAWRENCE W.	PROPOSED
MESON AREA M4 BEAM (NEUTRAL KAONS)		
QUARK #72	LEIPUNER, LAWRENCE B.	COMPLETED
K ZERO REGENERATION #82	TELEGDI, VALENTINE	APPROVED
K-SHORT REGENERATION #226	ROSENBERG, ELI I	PROPOSED
MESON AREA M6 BEAM (CHARGED PARTICLES)		
MULTIPLICITIES #178	BUSZA, WIT	APPROVED
ELASTIC SCATTERING #96	RITSON, DAVID	APPROVED
ELASTIC SCATTERING #69A	SANDWEISS, JACK	APPROVED
MULTIPARTICLE #110A	PINE, JEROME	APPROVED
ASSOCIATED PRODUCTION #99	DIEBOLD, ROBERT E.	DEFERRED
FORM FACTOR #101	GITTELMAN, BERNARD	DEFERRED
INCLUSIVE SCATTERING #118A	FRIEDMAN, JEROME I.	DEFERRED
COULOMB EXCITATION #148	RUDDICK, KEITH	DEFERRED
ELASTIC SCATTERING #165	RITSON, DAVID	DEFERRED

List 31. Title -Alphabetic list of researchers' names
Completed, approved, deferred, and unconsidered proposals

Contents -All experimenters are listed that are associated with research at NAL. Also listed is the experiment number, the institution represented, the NAL identification number, the telephone number, and location of the experiment. The names of researchers associated with rejected, withdrawn, or inactive proposals have been removed.

GIS PROGRAM

LIST 31. ALPHABETIC LIST OF RESEARCHERS' NAMES
COMPLETED, APPROVED, DEFERRED, AND UNCONSIDERED PROPOSALS

# INDICATES RECEIPT OF SAFETY PROCEDURES

NAME	EXP NO	INSTITUTION	ID NO	EXT.	LOCATION
ABE, K.	83A	TOHOKU UNIVERSITY (JAPAN)			
#ABE, KAZUO	67A	RUTGERS UNIVERSITY	V00357	3128	ITA-C-O
#ABE, KAZUO	188	RUTGERS UNIVERSITY	V00357		
#ABE, KAZUO	198	RUTGERS UNIVERSITY	V00357		
ABOLINS, MARIS A.	12	MICHIGAN STATE UNIVERSITY		4061	ANL-OSU TRAILER
ABRAMS, GERALD S.	137	LAWRENCE BERKELEY LABORATORY			
ABRAMS, GERALD S.	215	LAWRENCE BERKELEY LABORATORY			
ABRAMS, ROBERT J.	110A	ILLINOIS, UNIVERSITY OF, CHICAGO CIRCLE		3554	MA-M6 BEAM
ADAIR, ROBERT K.	48	YALE UNIVERSITY	V00260	3620	PA-WEST
ADAIR, ROBERT K.	72	YALE UNIVERSITY	V00260		
ADAMOVIC, O.	233	BELGRADE, UNIVERSITY OF, BELGRADE (YUGOSLAVIA)			
ADAMOVICH, M.	177A	LEBEDEV PHYSICAL INSTITUTE, MOSCOW (USSR)			
AKERLOF, CARL W.	7	MICHIGAN, UNIVERSITY OF	V00420	3059	MA-M1 BEAM
ALBRIGHT, JOHN R.	65	FLORIDA STATE UNIVERSITY		3686	NA-15' HADRON
ALLEN, JOHN	138I	MICHIGAN, UNIVERSITY OF	V00324	3330	NA-30" BUBBLE CHMBR
ALLEN, JOHN	138II	MICHIGAN, UNIVERSITY OF	V00324	3362	NA-30" BUBBLE CHMBR
ALLEN, JOHN	180	MICHIGAN, UNIVERSITY OF	V00324	3355	NA-15' BUBBLE CHMBR
ALLEY, PAUL W.	229	BROOKHAVEN NATIONAL LABORATORY			
#ALSPECTOR, JOSHUA L.	67A	RUTGERS UNIVERSITY	V00504	3128	ITA-C-O
#ALSPECTOR, JOSHUA L.	188	RUTGERS UNIVERSITY	V00504		
#ALSPECTOR, JOSHUA L.	198	RUTGERS UNIVERSITY	V00504		
#ALSTON-GARNJOST, MARGARET	9B	LAWRENCE BERKELEY LABORATORY	V00510		
#ALSTON-GARNJOST, MARGARET	121A	LAWRENCE BERKELEY LABORATORY	V00510	3355	NA-15' BUBBLE CHMBR
#ALSTON-GARNJOST, MARGARET	217	LAWRENCE BERKELEY LABORATORY	V00510		
ALVAREZ, LUIS W.	3	LAWRENCE BERKELEY LABORATORY			
#ALYEA, ETHAN D.	132	INDIANA UNIVERSITY	V00443		
#ALYEA, ETHAN D.	154	INDIANA UNIVERSITY	V00443	3330	NA-30" BUBBLE CHMBR
AMMANN, ARTHUR C.	85	PURDUE UNIVERSITY			
ANDERSON, E. WALTER	2B	IOWA STATE UNIVERSITY	V00285	3705	NA-30" HADRON
#ANDERSON, HERBERT L.	98	CHICAGO, UNIVERSITY OF	V00184	3613	NA-MUON/HADRON
ANDERSON, ROBERT L.	96	STANFORD UNIVERSITY	V00221	3188	MA-M6 BEAM
ANDERSON, ROBERT L.	165	STANFORD LINEAR ACCELERATOR CENTER	V00221		
ANELLI,	96	BARI, UNIVERSITY OF (ITALY)		3188	MA-M6 BEAM
ANH, TRAN HA	185	CENTRE DE RECHERCHES NUCLEAIRES DE SACLAY (FRANCE)			
ANSORGE, R. E.	213	CAVENDISH LABORATORY, CAMBRIDGE (GREAT BRITAIN)			
ANSORGE, R. E.	214	CAVENDISH LABORATORY, CAMBRIDGE (GREAT BRITAIN)			
ANTREASYAN, DIKRAN	21A	CALIFORNIA INSTITUTE OF TECHNOLOGY	V00453	3266	NA-NEUTRINO
APPEL, JEFFREY A.	70	COLUMBIA UNIVERSITY	V00276	3187	PA-CENTER
APPEL, JEFFREY A.	187	COLUMBIA UNIVERSITY	V00276	3690	PA-CENTER
ARETI, H	116	UNIVERSITE D'OTTAWA (CANADA)			
ARETI, H.	233	UNIVERSITE D'OTTAWA (CANADA)			
ARMSTRONG, RICHARD	98	CHICAGO, UNIVERSITY OF	V00185	3613	NA-MUON/HADRON
ARMSTRONG, WILLIAM	51	NORTHEASTERN UNIVERSITY		3369	NA-MUON/HADRON
ARONSON, SAMUEL H.	82	CHICAGO, UNIVERSITY OF	V00301	3052	MA-M4 BEAM
ARONSON, SAMUEL H.	226	WISCONSIN, UNIVERSITY OF	V00301		
ASCOLI, GIULIO	132	ILLINOIS, UNIVERSITY OF			

List 34. Title -Experimenters' names listed by proposals in the approved, deferred, or completed categories

Contents -Each proposal (or experiment) is listed on a separate page with the short title and approval status. Individuals associated with the proposal are listed alphabetically with their institution affiliation for that experiment. For approved experiments an asterisk indicates the current spokesman.

PL/I PROGRAM

LIST 34. EXPERIMENTERS' NAMES LISTED BY PROPOSALS IN THE COMPLETED, APPROVED, DEFERRED, AND UNCONSIDERED CATEGORIES

. NEUTRINO #1A STATUS: APPROVED

NAMES	ID NO	INSTITUTIONS
#BAUMANN, CARL	V00180	WISCONSIN, UNIVERSITY OF
#BENNETT, ROBERT		WISCONSIN, UNIVERSITY OF
BENVENUTI, ALBERTO C.	V00088	WISCONSIN, UNIVERSITY OF
#CAMERINI, UGO	V00355	WISCONSIN, UNIVERSITY OF
CHENG, DAVID C.	V00231	HARVARD UNIVERSITY
* CLINE, DAVID	V00001	WISCONSIN, UNIVERSITY OF
FORD, WILLIAM	V00148	PENNSYLVANIA, UNIVERSITY OF
FRY, W. F.		WISCONSIN, UNIVERSITY OF
GERKEET, FRED	V00132	WISCONSIN, UNIVERSITY OF
#HAUGHT, WILLIAM	V00418	PENNSYLVANIA, UNIVERSITY OF
#HICKS, JOHN	V00061	WISCONSIN, UNIVERSITY OF
IMLAY, RICHARD	V00002	WISCONSIN, UNIVERSITY OF
#KOZANECKI, WITOLD	V00330	HARVARD UNIVERSITY
MAAS, K.		WISCONSIN, UNIVERSITY OF
MANN, ALFRED K.	V00137	PENNSYLVANIA, UNIVERSITY OF
#MAPP, JAMES	V00354	WISCONSIN, UNIVERSITY OF
MARCH, ROBERT	V00013	WISCONSIN, UNIVERSITY OF
MAYER, EDWARD	V00050	PENNSYLVANIA, UNIVERSITY OF
MCFARLAND, ROBERT	V00142	HARVARD UNIVERSITY
MESSING, FRED	V00042	PENNSYLVANIA, UNIVERSITY OF
#MICHAEL, JOHN L.	V00364	WISCONSIN, UNIVERSITY OF
#PICCIONI, ROBERT	V00371	HARVARD UNIVERSITY
#PILCHER, JAMES E.	V00082	CHICAGO, UNIVERSITY OF
REEDER, DON D.	V00123	WISCONSIN, UNIVERSITY OF
RUBBIA, CARLO	V00143	HARVARD UNIVERSITY
#SMITH, WESLEY	V00515	HARVARD UNIVERSITY
#STRAIT, JIM	V00457	WISCONSIN, UNIVERSITY OF
SULAK, LAWRENCE	V00081	HARVARD UNIVERSITY
#THOMAS, LINWOOD	V00020	WISCONSIN, UNIVERSITY OF
#WANDERER, PETER	V00509	WISCONSIN, UNIVERSITY OF
WHITTAKER, JOHN D.	V00160	HARVARD UNIVERSITY
#WILLE, EDWIN		WISCONSIN, UNIVERSITY OF
#ZYLBERSTEJN, ARMAND	V00209	CHICAGO, UNIVERSITY OF

* INDICATES CURRENT SPOKESMAN
# INDICATES RECEIPT OF SAFETY PROCEDURES

List 43. Title -Institutions represented by all experiments, except inactive, withdrawn, and rejected

Contents -This is an alphabetical list of institutions with the assigned number of the proposals for which there are participants from each institution.

LIST 43. INSTITUTIONS REPRESENTED BY ALL PROPOSALS, EXCEPT INACTIVE, WITHDRAWN, AND REJECTED

INSTITUTION	EXPERIMENTS
AF CAMBRIDGE RESEARCH LABORATORY (CRFC)	195
ARGONNE NATIONAL LABORATORY	2B, 4I, 4II, 7, 31A, 61, 81A, 96, 99, 101, 141A, 149A
ARIZONA, UNIVERSITY OF	34
BARI, UNIVERSITY OF (ITALY)	96, 118A
BELGRADE, UNIVERSITY OF, BELGRADE (YUGOSLAVIA)	233
BROOKHAVEN NATIONAL LABORATORY	22, 48, 53A, 58, 65, 72, 81A, 104, 143A, 229
BROWN UNIVERSITY	96, 118A, 132, 154
CALIFORNIA INSTITUTE OF TECHNOLOGY	21A, 37A, 110A, 111, 209
CALIFORNIA, UNIVERSITY OF, BERKELEY	89, 137, 172, 215
CALIFORNIA, UNIVERSITY OF, DAVIS	121A, 217, 218, 226
CALIFORNIA, UNIVERSITY OF, LOS ANGELES	37A, 110A, 216, 223
CALIFORNIA, UNIVERSITY OF, SAN DIEGO	26, 82, 176
CALIFORNIA, UNIVERSITY OF, SANTA BARBARA	25A
CALIFORNIA, UNIVERSITY OF, SANTA CRUZ	152B
CALIFORNIA, UNIVERSITY OF, BERKELEY-SPACE SCIENCE LAB	34
CARLETON UNIVERSITY (CANADA)	12, 144A, 174A
CARNEGIE-MELLON UNIVERSITY	31A, 81A, 196
CAVENDISH LABORATORY, CAMBRIDGE (GREAT BRITAIN)	213, 214
CENTRE DE RECHERCHES NUCLEAIRES DE SACLAY (FRANCE)	185
CENTRE DE RECHERCHES NUCLEAIRES, STRASBOURG (FRANCE)	116, 147, 185, 233
CERN	28A, 96, 125, 211
CHICAGO, UNIVERSITY OF	81A, 82, 98, 100, 120, 149A, 184, 222, 226
CINCINNATI, UNIVERSITY OF	154
COLORADO, UNIVERSITY OF	160, 202
COLUMBIA UNIVERSITY	14A, 53A, 70, 87A, 187, 221
CORNELL UNIVERSITY	26, 87A, 96, 99, 101, 177A, 225
DEPT. PHYS. DES PART. ELEM., CEN-SACLAY, (FRANCE)	212
DUKE UNIVERSITY	2B, 163A
EMMANUEL COLLEGE	195
FLORIDA STATE UNIVERSITY	65
GENERAL ELECTRIC COMPANY RESEARCH & DEVELOPMENT CENTER	74
GODDARD SPACE FLIGHT CENTER, NASA	34
HARVARD UNIVERSITY	1A, 61, 98, 120, 184, 200
HARVEY MUDD COLLEGE	181
HAWAII, UNIVERSITY OF	9B, 87A, 155, 206
HIROSHIMA UNIVERSITY (JAPAN)	117A
HOUSTON, UNIVERSITY OF	192, 193
IHEP, ACADEMY OF SCIENCES OF THE KAZAKH, ALMA-ATA (USSR	208
ILLINOIS INSTITUTE OF TECHNOLOGY	132, 151A, 154
ILLINOIS, UNIVERSITY OF	87A, 98, 132, 154
ILLINOIS, UNIVERSITY OF, CHICAGO CIRCLE	67A, 81A, 110A
IMPERIAL COLLEGE, LONDON (GREAT BRITAIN)	67A, 188
INDIANA UNIVERSITY	7, 132, 154
INS, TOKYO UNIVERSITY (JAPAN)	117A, 156, 205A
INST. OF THEORETICAL&EXPERIMENTAL PHYSICS, MOSCOW(USSR)	180, 186
INSTITUTE OF ATOMIC PHYSICS, BUCHAREST (ROUMANIA)	233
INSTITUTE OF HIGH ENERGY PHYSICS, SERPUKHOV (USSR)	180
INSTITUTE OF NUCLEAR RESEARCH, CRACOW (POLAND)	90