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FUELPIN: A Data Retrieval System for Nuclear Fuel Pin Information

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MASTER

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MASTER

FUELPIN: A DATA RETRIEVAL SYSTEM
FOR NUCLEAR FUEL PIN INFORMATION

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K. L. Walters, J. O. Barner, and J. L. Green

ABSTRACT

The Fortran IV computer code FUELPIN was developed to assist in the surveillance of large numbers of nuclear fuel pins. Using sixteen levels of sorting and thirty-one key pin characteristics, the computer code sorts through large blocks of pin data to determine those pins having the desired characteristics. Allowance is also made for miscellaneous information on (1) fuel type, (2) clad material, (3) bond data, and (4) general pin information.

Upon execution the blocks of fuel pin information are inspected to insure that the data are credible, i.e., between experimenter specified limits. Octal stops are provided, numbered, and discussed in the codes comment section so as to block all paths of code execution known to indicate operational error. All parameter sort information is also inspected for potential input error with some minor correctional measures accomplished upon detection of an error condition.

Though limited to blocks of two hundred and fifty pins per run, large numbers of pins may be efficiently examined through problem stacking, and proper use of a built in computer time economizing scheme.

I. INTRODUCTION

Surveillance of a large number of nuclear fuel pins requires some type of data retrieval system. For this task the computer code FUELPIN was developed.

FUELPIN was designed to handle in excess of thirty parameters for each of two hundred and fifty pins as well as descriptive information on (1) fuel type, (2) clad material, (3) bond data, and (4) general pin information. Software extension to handle larger numbers of pins was not thought advisable because of the available computer space limitations but an unlimited number of pins could be examined in two hundred and fifty pin blocks.

FUELPIN and the fuel pin data on which it operated, i.e., its data base, were designed to (1) provide

complete information on all pins in house, (2) allow selection of those pins having specific physical characteristics, (3) provide maximum software protection of the data base, and (4) provide code execution output in essentially final report form. When coding effort terminated, items one through three were virtually completed and item four unstarted.

II. CONSTRUCTION OF DATA BASE

In order to provide detailed information on the major aspects of the potentially large number of fuel pins involved, an extended list of the needed fuel pin data was compiled. In addition to indicating the specific data involved, Table I also contains the name used by the code during input, the array name in which

all data of the same type is stored, and the name of the relevant sort parameter. Details of input formats and variable designations can be found in the initial comment section of the computer listing.

Additional information is required for program execution as shown in Table II. Originally these variables, like those in Table I, were to be used in parameter sorting, but termination of coding effort occurred before this could be implemented. The parameters in Table II differ from those in Table I, however, in one major way - most of the input is conditional and depends on exactly how the Table I values were specified.

Another critical point on data base construction is the handling of the fuel, clad, bond, and general pin information comment statements. These conditional comment cards are read only if the respective integer input flags (C, C1, C2, and C3) are in the range of one through five. Blank or negative values are reset to zero and values larger than five cause code execution to stop. Since the maximum possible number of computer words needed to store this data is as indicated below, it would be impractical to use dimensioned arrays.

Words Needed

$$\text{For Comment Cards} = \left(5 \frac{\text{cards}}{\text{comments}}\right) \left(4 \frac{\text{comments}}{\text{pin}}\right) \left(8 \frac{\text{words}}{\text{card}}\right) (250 \text{ pins}) = 40,000 \text{ words (116,100 octal)} \quad (1)$$

Instead, after the initial echo check, the comment card images are written serially onto temporary disk files thus requiring no dimension statements or dedicated computer word space. To use this scheme effectively, however, requires that these files be rewound to the proper starting words before any additional output of this information can be performed. This rewind sequence has not been written and is not included in the attached listing.

Finally, since a major effort was expended to use variable names which were easily associated with the actual parameter designation, extensive use of INTEGER and REAL declaration statements was necessary. It was imperative that all such statements logically match one another so that no subtle changes would occur in data manipulation or storage. Similar care was exercised in matching the sort parameter names with those used for the input variable and array names, in order

to avoid improper sorting. Input data checking, including this type of cross-checking, is extensively performed during execution as discussed in the software protection section.

III. PARAMETER SORTING

Sixteen levels of parameter sorting are possible using any of the twenty-three sort parameters specified in Table I. As explained under the listing comment section entitled "Specification of Sorts Desired," SORTYPE value numbers are used to flag those parameters over which sorts are to be performed. Clear description of the required input formats is given in the comment section of the listing. For the three SORTYPE values where no sort was desired, the octal stop numbers which will be encountered if such a sort is attempted are shown (Table I).

Basically only three types of sort parameter input are required. Alpha-numeric or straight alphabetic input are accomplished through the use of A10 or I5, A5 formats.* The only critical software consideration was the matching of all variable names to avoid

data conversions within the computer and the systematic right or left justification of any data using an A type input format. This justification is crucial since any difference in data location will result in differences in the representation of the data as stored in the computer and thus eliminate the possibility of locating the information when attempting a sort.

Numerical data, representing a potential range of real number values over which sorts are to be performed,[†] invariably require 5X, 2F10.0 input formats. As all of these input sequences are virtually identical, the one for fuel center line temperature will be examined in detail.

* SORTYPE = 1, 4, 12, and 19.

† SORTYPE = 5-7, 10, 11, 13-15, 20-22.

CHECKING FOR DUPLICATE SORT

```
ICLTMAX = ICLTMAX + 1
IF(ICLTMAX .GT. 1) STOP 205
```

CHECKING FOR END OF FILE MARK

```
IF(EOF, 1) 2360, 2380
```

```
2360 STOP 207
```

```
2380 CONTINUE
```

CONSTRUCTING MINIMUM RANGE SORT

```
IF(CLTMAX .NE. CLTMIN) GO TO 2370
CLTMAX = CLTMAX + 0.0001
CLTMIN = CLTMIN - 0.0001
```

CORRECTING FOR INPUT DATA INVERSION

```
2370 IF(CLTMIN .LT. CLTMAX) GO TO 2375
CLTHD = CLTMAX
CLTMAX = CLTMIN
CLTMIN = CLTHD
```

CHECKING FOR SORT PARAMETER CREDIBILITY

```
2375 CONTINUE
```

```
IF(CLTMAX .LT. 0.00 .OR. CLTMAX .GT. 2000.0) STOP 210
IF(CLTMIN .LT. 0.00 .OR. CLTMIN .GT. 2000.0) STOP 211
```

CHECKING INPUT DATA

```
WRITE(2, 360) I, CLTMAX, CLTMIN
```

As can be seen from this example, five types of data input checking are performed on each such data input. First a flag is incremented and checked to ensure that a duplicate sort has not been requested. Since this type of sort request could only occur if potentially mutually exclusive sorts are requested or if an input error is made, code termination occurs if this condition is detected. Similarly, if an EOF (end of file) is detected during data input, an octal stop is encountered. Sort parameter credibility is also checked at the end of each input sequence giving the experimenter an opportunity to set up realistic limiting values for the sort parameters involved. All three of these checks can result in code termination and are designed as part of the software protection to be discussed in the following section.

The remaining two types of data checking, namely data inversion and setting up minimum range sorts, are not part of the software protection sequences and hence no octal stop statements are involved. The data inversion statements merely allow the code operator to input the two respective sort limits in any sequence he chooses and upon execution the necessary ordering is automatically performed. Minimum range sorts are necessary since the actual sorting sequences expect a range of values

over which parameter sorting is to be performed. If one wants all the fuel pins with a center line temperature of exactly 1000° , for instance, both CLTMAX and CLTMIN are given values of 1000 and the "software" automatically sets up a sorting range of 999.9999 to 1000.0001, or a differential of $2.0E-04$. This should be more than adequate resolution and this difference is used in all similar sorts.

Coded data* as well as integer input† use primarily 5X, 15 formats. For coded data, the particular coded representations of alpha-numeric input are discussed in the initial comment section of the code. Software checks are performed during execution to ensure that no coded values used either in constructing the data base or in setting up sort parameters are undefined.

Once all SORTYPE values and their corresponding limiting values have been read in and checked, subroutine SORTASK is used to perform the actual eliminations. As with the types of sort parameter inputs required, only three main types of logic checks are necessary. For a A formatted elimination, such as CLADUAL (SORTYPE value = 12), the test is for an exact match. Thus for the Kth pin examined, in order to detect a specific cladding type, both the computer array element, denoted CLADS(k), and the input value CLADUAL must be exactly alike. The specific FORTRAN statement used is as indicated below and analogous tests are performed in all similar cases. Integer tests are also performed in this manner.

```
IF(CLADS(k) .NE. CLADUAL) GO TO 55
```

The section of subroutine SORTASK entitled "SETTING UP MASTER STORAGE LOGIC FOR MULTIPLE ELIMINATIONS" is used to keep track of those fuel pins meeting the sort parameters specified.

*SORTYPE = 4, 16, 17, 23.

†SORTYPE = 2.

Once it is determined that a particular pin meets whatever criterion is being used, the sequential position of that set of data in the data base is saved in the array named ISAVE. At the end of the first and all subsequent sorts, this array is printed out. Only the first sort, however, examines all the pins present in the data base because later sorts are only done on those pins whose sequential position is still contained in ISAVE. Obviously, the most economical way to run the routine is to specify the less likely pin parameters first so that later sorts have fewer pins to consider.

For numeric, real data used to sort for pins having a specified range of values, statements like the one for fuel center line temperature shown below are used.

```
IF(FUELS(kk) .GE. CLTMIN .AND. FUELCLS
(kk) .LE. CLTMAX) GØ TØ 35
```

Note: Exactly the same value could have been specified for CLTMIN and CLTMAX without resorting to setting up minimum range values but since computer representation of numbers can vary slightly from those specified on the input cards, this tack was avoided.

IV. SOFTWARE PROTECTION

As can be seen from Table III, 166 out of the 213 octal stops present in the code, i. e., 85%, arise from the five causes noted. The EOF tests are done simply as good programming practice but all the remaining octal stops are designed to block paths known a priori to be logically in error.

Checking for duplicate sort, as discussed in the previous section, is used to detect an operator error. Only one sort on any given parameter was deemed desirable per problem execution.

Data base and sort parameter out of range error flags arise mainly from input credibility checks. All input data used either in the data base or in setting up the requested sorts are tested to ensure that the numbers are either within the expected experimental limits or are previously defined coded input. These stop

statements are extremely important because through them the experimenter can check range of the data being manipulated.

Sort parameter conflicts arise from only two sources. If the input variable SORTYPE is set equal to eight, nine, eighteen, or greater than twenty-three, execution ceases because no sorting was to be done on the parameters indicated by these SORTYPE values. The remainder of the octal stops involved ensures that a SORTYPE value is not encountered in a part of the code where it logically does not belong.

Normal code termination is done at octal stop number 777. If any other value is listed, the exact nature of the error and its location in the code can be determined from the appropriate comment section at the front of Appendix A. For instance, if octal stop number fourteen is encountered the error is shown to be in the main program under the comment section heading "READING DATA ENTRY" and caused by an improper exit from the comment reading loop involved.

V. OUTPUT

As illustrated in the three sample listings in Appendix B, the first set of output is an echo check of the pins in the data base in the order that they were encountered. This echo-checking is obtained through the input parameter PAR which can be used to (1) provide an echo check of all pins involved, (2) suppress completely the echo check, or (3) pass control of the echo-checking to the individual pins as defined in the DUMP parameter on the first card in each data set.

After the echo-checking, the sequential order, the type of sort requested, and the particular sort parameters involved are listed. The type of sort requested is obtained by storing descriptive names in Hollerith fields in the array named KEY and having the SORTYPE value used trigger the appropriate response. The sort parameters printout is taken directly from the input values.

Finally the ISAVE vector is printed out after each completed sort with a special heading being attached

to the final values. It should be noted that the numbers indicated are the sequential positions of individual data blocks in the data base, exactly the numbers printed out when using the PAR parameter to obtain a complete echo check.

VI. UNCOMPLETED WORK

Two major coding efforts remain uncompleted.

First, none of the parameters listed in Table II have been incorporated in any of the sorting sequences. These variables require nothing really new as far as software logic is concerned, but since the data depend in many cases on previously defined parameters, more than normal care must be used in setting up these sorts. Second, the output is highly limited and contains one known formatting error. To expand the output will require the writing of the necessary output statements in addition to providing the logic necessary to rewind the temporary disk file storage of the comment card images.

TABLE I

	<u>Fuel Pin Data</u>	<u>Input Variable Name</u>	<u>Array Name</u>	<u>Sort Parameter Name</u>
1. Source	Element	SOURCE	SOURCE(250)	ISOURCE
2. Task	I.D.	TASK	TASKS(250)	ITASK
3. Number		NUMBER ID	NUMBERS(250) IDS(250)	INUMBER ID
4. Fuel Type		FUEL	FUELS(250)	IFUEL
5. Uranium Composition		UCOMP	UCOMPS(250)	UCMAX, UCMIN
6. U ²³⁵ Enrichment		RICH235	RICH35S(250)	MAX235, MIN235
7. U ²³³ Enrichment		RICH233	RICH33S(250)	RMAX233, RMIN233
8. Plutonium Composition		PUCOMP	Not Stored	No sort desired
9. Pu ²³⁹ Enrichment		RICH239	Not Stored	No sort desired
10. Fuel Density		RHO	RHOS(250)	RHOMAX, RHOMIN

TABLE I -- Continued

<u>Fuel Pin Data</u>	<u>Input Variable Name</u>	<u>Array Name</u>	<u>Sort Parameter Name</u>
11. Smear Density	SMEAR	SMEARS(250)	SMEARMX,SMEARMI
12. Cladding Type	CLAD	CLADS(250)	CLADUAL
13. Coldwork (%)	COLDWRK	COLDWRS(250)	COLDMAX,COLDMIN
14. Cladding O.D.	CLADOD	CLADODS(250)	CLADMAX,CLADMIN
15. Wall Thickness	WALLTK	WALLTKS(250)	WALLMAX,WALLMIN
16. Bond Type	BOND	BONDS(250)	IBOND
17. Encapsulation	ENCAP	ENCAPS(250)	IENCAPS
18. Shroud	SHROUD	Not stored	No sort desired
19. Subassembly Type	SUBASSM	SUBASSS(250)	SUEVAL
20. Linear Power	LINPOW	LINPOWS(250)	RLINMAX,RLINMIN
21. Clad Temperature	CLADTMP	CLADTMS(250)	CLADTMX,CLADTMI
22. Fuel Center Line Temperature	FUELCLT	FUELCLS(250)	CLTMX,CLTMIN
23. Status	STATUS	STATUSS(250)	STATVAL

TABLE II

<u>Fuel Pin Data</u>	<u>Input Variable Name</u>	<u>Array Name</u>
24. Pin Location	LOCAT	LOCATS(250)
25. Pin Disposition	DISP	DISP(250)
26. Report Status	IREPORT	Not stored
27. Subassembly Number	SANO	SANOS(250)
28. Current Burnup	CURBU	CURBUS(250)
29. Goal Burnup	GOALBU	GOALBUS(250)
30. Report Number	REPORT	REPORTS(250)
31. Treat Test Number	TESTNO	TESTNOS(250)

TABLE III

<u>Type of Fatal Error</u>	<u>Number of Suc- Tests Performed</u>	<u>Possible Octal Stops Encountered</u>
Unexpected EOF	32(40)	1-3, 24-26, 34, 44-46, 51, 61-70, 100, 101, 104 111, 112, 115, 117, 121, 123, 137, 203, 207, 213
Attempting Second Sort	21(25)	43, 55-57, 73-76, 102, 103 105, 106, 110, 114, 116, 120 122, 127, 202, 206, 212
Data Base Parameter out of Range	25(31)	4-13, 15-23, 27-33, 35, 36, 47, 50, 124
Sort Parameter Out of Range	27(33)	107, 113, 140-164, 204 205, 210, 211
Sort Parameter Conflict	13(15)	52-54, 60, 125, 126, 130, 133, 134, 136, 165 166, 201

APPENDIX A

COMPUTER LISTING FOR FUELFIN

LP-0248

```

PHUGHAN FUELFIN (AMP FSE1=INP,OUT,FSE2=OUT,FSE3,FSE4,FSE5,FSE1
16)
GREEN
.....
DUMP PARAMETER OVERVIEW:
PAR = FUMAT(19X,11);
PAR = 1 FOR COMPLETE ECHO CHECK OF ALL PINS.
      2 FOR COMPLETE SUPPRESSION OF ECHO CHECK.
      3 FOR USE OF DUMP PARAMETER AS STATED BELOW.
NOTE THIS IS ONLY ONE CARD PLACED IN FRONT OF THE DATA DECK.
.....
DATA ENTRIES: FUM SETTING UP ORIGINAL DATA DECK.
CARD ONE:
SOURCE: TASK NUMBER 10; DUMP. FORMAT(10,2(5X,15),A5,15);
DUMP = LESS THAN ONE TO TERMINATE FUEL FIN DATA READ. BLANK CARD WORKS.
      1 FOR COMPLETE PIN BY PIN DATA PRINTOUT.
      ANY OTHER FIVE DIGIT INTEGER FOR SUPPRESSION OF DATA DUMP.
      IF THE NUMBER VALUE TO BE ENTERED IS ALPHANUMERIC, USE THE A5 FIELD FOR
      THE ALPHANUMERIC PART.
CARD TWO:
FUEL: ULOMP, RICH235, RICH233, PUCOMP, RICH239, RMD, C;
FORMAT(10,1(10F10.0),A12);
FUEL = 1 FOR CANDIDE.
      2 FOR NITRODE.
CARD THREE: CONDITIONAL:
COMMENT(J,J)=1; FUMAT(10A10); FUEL INFORMATION.
READS UP 10 = SUCH CARDS DEPENDENT ON THE VALUE OF C.
BE BRIEF. COMMENT(10) MEAL MONEY.
CARD FOUR:
SHEAR: CLAU: CULOMPA: CLADOD: WALLTK: BOND: ENCAP: SHROUD: C1: C2
FORMAT(10,1(10F10.0),A12);
BOND = 1 FOR YES. ENCAP = 1 FOR YES. SHROUD = 1 FOR YES.
      2 FOR NO.      2 FOR NO.      2 FOR NO.
CARD FIVE: CONDITIONAL:
COMMENT(J,J)=1; FUMAT(10A10); CLADDING INFORMATION.
READS UP 10 = SUCH CARDS DEPENDENT ON THE VALUE OF C1.
BE BRIEF. COMMENT(10) MEAL MONEY.
CARD SIX: CONDITIONAL:
COMMENT(J,J)=1; FUMAT(10A10); BOND INFORMATION.
READS UP 10 = SUCH CARDS DEPENDENT ON THE VALUE OF C2.
BE BRIEF. COMMENT(10) MEAL MONEY.
CARD SEVEN:
SUMADSM: LINPOM: CLADIMP: FUELCLT: STATUS: C3;
FORMAT(10,1(10F10.0),A12);
STATUS = 1 FOR IN PROCESS.
      2 FOR IN STORAGE.
CARD EIGHT: CONDITIONAL:
COMMENT(J,J)=1; FUMAT(10A10); GENERAL INFORMATION.
READS UP 10 = SUCH CARDS DEPENDENT ON THE VALUE OF C3.
BE BRIEF. COMMENT(10) MEAL MONEY.
CARD NINE:
LOCAL: UISM: INEPMO: FUMAT(3(3A,12));
LOCAL = ONE TWO THREE FOUR
      (IN PROGRESS) (ECHO=1) (NOT CELL) (TREAT)
DISP = 1 = ANGRIVE. 1 = PRE-IMRAD. 1 = NOT. 1 = TEST
      2 = DESIGN. 2 = INTERIM. 2 = Destructive. NO.
      3 = FAMILICATION.
      4 = NOT.
INEPMO = 1 = COMPLETE WITH REPORT NO. SPECIFIED BELOW.
      2 = IN PROCESS.
      3 = FOR ANY OTHER VALUE ENTERED = A NO-OP.

```

```

CARD TEN: CONDITIONAL:
SAND: CUMBU: GUALBU: FUMAT(10,2(5A,15,0));
READ IF LOCAL EQUALS 2.
CARD ELEVEN: CONDITIONAL:
REPORT: FUMAT(10);
READ IF INEPMO EQUALS 1.
CARD TWELVE: CONDITIONAL:
TESTNO: FUMAT(10);
READ IF LOCAL EQUALS 3.
.....
SPECIFICATION OF DUMP DESIRED.
CARD ONE:
SORTYPE(1),1=1; FUMAT(1615);
TERMINATED BY BLANK ENTRY OR FULL CARD.
NORMAL CODE EXIT WHEN EOF ENCOUNTERED HERE.
CARD TWO:
TITLE(1),1=1; FUMAT(10A10);
.....
SPECIFICATION OF DUMP PARAMETERS:


| SORTYPE<br>VALUE | ASSOCIATED VARIABLES<br>REQUIRED AS INPUT | FORMAT<br>SPECIFICATION |
|------------------|-------------------------------------------|-------------------------|
| 1                | ISUHLK                                    | A10                     |
| 2                | ITASK                                     | 5X,15                   |
| 3                | IAURNER                                   | 5X,15,45                |
| 4                | IFUEL                                     | 5X,15                   |
| 5                | UCMNA                                     | 5X,2F10.0               |
| 6                | MAA235                                    | 5X,2F10.0               |
| 7                | RMDA233                                   | 5X,2F10.0               |
| 8                | ERNUM RESULTING IN OCTAL STOP 71.         |                         |
| 9                | ERNUM RESULTING IN OCTAL STOP 72.         |                         |
| 10               | RHUMNA                                    | 5X,2F10.0               |
| 11               | SHEARNA                                   | 5X,2F10.0               |
| 12               | CLADUAL                                   | A10                     |
| 13               | COLDOME                                   | 5X,2F10.0               |
| 14               | CLADUMNA                                  | 5X,2F10.0               |
| 15               | WALLMNA                                   | 5X,2F10.0               |
| 16               | ISUNU                                     | 5X,15                   |
| 17               | ISUNLPS                                   | 5X,15                   |
| 18               | ERNUM RESULTING IN OCTAL STOP 77.         |                         |
| 19               | SUVAL                                     | A10                     |
| 20               | RLINMNA                                   | 5X,2F10.0               |
| 21               | CLAUTMA                                   | 5X,2F10.0               |
| 22               | CLINAA                                    | 5X,2F10.0               |
| 23               | STAIVAL                                   | 9X,11                   |


.....
DEFINITION OF FSE1 USES:
1 INPUT.
2 OUTPUT.
3 FUEL INFORMATION.
4 CLADDING INFORMATION.
5 BOND INFORMATION.
6 GENERAL INFORMATION.
.....
STRUCTURE OF CODE:
PROGRAM FUELFIN: CONTAINS ALL READS FROM INPUT DECK. CHECKS ALL DATA
AND ECHO-CHECKS IF REQUESTED.

```

SUBROUTINE SUMTAD: PERFORMS REQUESTED ELIMINATIONS ON MASTER DATA SET. SETS UP VECTOR ISAVE WHOSE ELEMENTS ARE THOSE LEFT AFTER ELIMINATIONS.

SUBROUTINE STACK: USES LIBRARY SUBROUTINES TO STRUCTURE ELEMENTS OF ISAVE AS SPECIFIED BY APPROPRIATE INPUT.

SUBROUTINE TAP1: PRINTS OUT IN REPORT FORM THE STRUCTURED DATA SPECIFIED IN ISAVE.

INTERNAL STOPS:

STOP 1 * PROGRAM FULLPIL: DETERMINING ORDER AND TYPES OF SOPS
MESSAGE: UNEXPECTED EOP IN TITLE READ.

4	IFUEL			51.15
5	UNHSA	LCMIN		51.2710:0
6	MAZ33	MIN33		51.2710:0
7	MAZ33	MIN33		51.2710:0
8				
9				
10				
11	SHHSA	SHHSA		51.2710:0
12	CLAUH	CLAUH		51.2710:0
13	CLAUH	CLAUH		51.2710:0
14	CLAUH	CLAUH		51.2710:0
15	CLAUH	CLAUH		51.2710:0
16	CLAUH	CLAUH		51.2710:0
17	CLAUH	CLAUH		51.2710:0
18				
19				
20	CLAUH	CLAUH		51.2710:0
21	CLAUH	CLAUH		51.2710:0
22	CLAUH	CLAUH		51.2710:0
23	CLAUH	CLAUH		51.2710:0

DEFINITION OF SOPS:

- 1 INPUT.
- 2 OUTPUT.
- 3 FULL INFORMATION.
- 4 ELIMINATING INFORMATION.
- 5 SOPS INFORMATION.
- 6 MESSAGE INFORMATION.

STRUCTURE OF COPS:

PROGRAM FULLPIL: CONTAINS ALL READS FROM INPUT DECK. CHECKS ALL DATA AND REMOVES IT TO COPS.

SUBROUTINE SUMTAD: PERFORMS REQUESTED ELIMINATIONS ON MASTER DATA SET. SETS UP VECTOR ISAVE WHOSE ELEMENTS ARE THOSE LEFT AFTER ELIMINATIONS.

SUBROUTINE STACK: USES LIBRARY SUBROUTINES TO STRUCTURE ELEMENTS OF ISAVE AS SPECIFIED BY APPROPRIATE INPUT.

SUBROUTINE TAP1: PRINTS OUT IN REPORT FORM THE STRUCTURED DATA SPECIFIED IN ISAVE.

INTERNAL STOPS:

STOP 1 * PROGRAM FULLPIL: DETERMINING ORDER AND TYPES OF SOPS
MESSAGE: UNEXPECTED EOP IN TITLE READ.

STOP 2 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN SOURCE READ.

STOP 3 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 4 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 5 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 6 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 7 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 8 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 9 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 10 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 11 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 12 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 13 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 14 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 15 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 16 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 17 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 18 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 19 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 20 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 21 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 22 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 23 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 24 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 25 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 26 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 27 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 28 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 29 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 30 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 31 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 32 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 33 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 34 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 35 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 36 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 37 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 38 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 39 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 40 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 41 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 42 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 43 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 44 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 45 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

STOP 46 * PROGRAM FULLPIL: READING DATA ENTRY.
UNEXPECTED EOP IN FULL READ.

[illegible]


```

100 CONTINUE
STOP 24
150 CONTINUE
1610 CONTINUE
IF (C1.EQ. 0) GO TO 1010
ISTART = -7 * ISTOP + 0
DO 170 I = 1,C2
ISTART = ISTART + N * ISTOP = ISTOP + N
IF (ISTOP - ISTART) .GT. 1000000
READ(1,1000) (CONM2(I),J=ISTART,ISTOP)
IF (IUF(1,1000,170
180 CONTINUE
STOP 25
170 CONTINUE
1415 CONTINUE
READ(1,1000) SUBADDN, LINPON, CLADTMP, FUELCLT, STATUS, C3
IF (IUF(1,1000,200
190 CONTINUE
STOP 26
280 CONTINUE
IF (LINPON .LT. 0) GO TO 4, LINPON .GT. 1000) STOP 27
IF (CLADTMP .LT. -20) GO TO CLADTMP .GT. 1000) STOP 28
IF (FUELCLT .LT. -10) GO TO FUELCLT .GT. 1000) STOP 31
IF (STATUS .LT. 1) GO TO STATUS .GT. 2) STOP 32
IF (DUMP .GT. 1) GO TO 105
WRITE(1,1100) SUBADDN,LINPON,CLADTMP,FUELCLT
IF (STATUS .EQ. 1) WRITE(1,1055)
IF (STATUS .EQ. 2) WRITE(1,1060)
165 CONTINUE
IF (C1 .LT. 0) C3 = 0
IF (C1 .GT. 5) STOP 124
IF (C1 .EQ. 0) GO TO 1420
ISTART = -7 * ISTOP + 0
DO 230 I = 1,C3
ISTART = ISTART + N * ISTOP = ISTOP + N
IF (ISTOP - ISTART) .GT. 1000000
READ(1,1000) (CONM3(I),J=ISTART,ISTOP)
IF (IUF(1) 230,200
205 CONTINUE
STOP 31
285 CONTINUE
305 CONTINUE
1620 CONTINUE
C
READING LOCATION ENTRIES:
C
READ(1,1000) LOCAT, DISP, IMPORT
IF (IUF(1,1210,220
210 CONTINUE
STOP 34
220 CONTINUE
IF (LOCAT .LT. 1) GO TO LOCAT .GT. 5) STOP 35
IF (LOCAT .LT. 1) STOP 36
IF (LOCAT .EQ. 3) GO TO 105
IF (LOCAT .EQ. 2) GO TO 105
IF (LOCAT .EQ. 3) GO TO 105
IF (LOCAT .EQ. 4) GO TO 105
IF (LOCAT .EQ. 5) GO TO 105
IF (LOCAT .EQ. 6) GO TO 105
IF (LOCAT .EQ. 7) GO TO 105
IF (LOCAT .EQ. 8) GO TO 105
IF (LOCAT .EQ. 9) GO TO 105
IF (LOCAT .EQ. 10) GO TO 105
IF (LOCAT .EQ. 11) GO TO 105
IF (LOCAT .EQ. 12) GO TO 105
IF (LOCAT .EQ. 13) GO TO 105
IF (LOCAT .EQ. 14) GO TO 105
IF (LOCAT .EQ. 15) GO TO 105
IF (LOCAT .EQ. 16) GO TO 105
IF (LOCAT .EQ. 17) GO TO 105
IF (LOCAT .EQ. 18) GO TO 105
IF (LOCAT .EQ. 19) GO TO 105
IF (LOCAT .EQ. 20) GO TO 105
IF (LOCAT .EQ. 21) GO TO 105
IF (LOCAT .EQ. 22) GO TO 105
IF (LOCAT .EQ. 23) GO TO 105
IF (LOCAT .EQ. 24) GO TO 105
IF (LOCAT .EQ. 25) GO TO 105
IF (LOCAT .EQ. 26) GO TO 105
IF (LOCAT .EQ. 27) GO TO 105
IF (LOCAT .EQ. 28) GO TO 105
IF (LOCAT .EQ. 29) GO TO 105
IF (LOCAT .EQ. 30) GO TO 105
IF (LOCAT .EQ. 31) GO TO 105
IF (LOCAT .EQ. 32) GO TO 105
IF (LOCAT .EQ. 33) GO TO 105
IF (LOCAT .EQ. 34) GO TO 105
IF (LOCAT .EQ. 35) GO TO 105
IF (LOCAT .EQ. 36) GO TO 105
IF (LOCAT .EQ. 37) GO TO 105
IF (LOCAT .EQ. 38) GO TO 105
IF (LOCAT .EQ. 39) GO TO 105
IF (LOCAT .EQ. 40) GO TO 105
IF (LOCAT .EQ. 41) GO TO 105
IF (LOCAT .EQ. 42) GO TO 105
IF (LOCAT .EQ. 43) GO TO 105
IF (LOCAT .EQ. 44) GO TO 105
IF (LOCAT .EQ. 45) GO TO 105
IF (LOCAT .EQ. 46) GO TO 105
IF (LOCAT .EQ. 47) GO TO 105
IF (LOCAT .EQ. 48) GO TO 105
IF (LOCAT .EQ. 49) GO TO 105
IF (LOCAT .EQ. 50) GO TO 105
IF (LOCAT .EQ. 51) GO TO 105
IF (LOCAT .EQ. 52) GO TO 105
IF (LOCAT .EQ. 53) GO TO 105
IF (LOCAT .EQ. 54) GO TO 105
IF (LOCAT .EQ. 55) GO TO 105
IF (LOCAT .EQ. 56) GO TO 105
IF (LOCAT .EQ. 57) GO TO 105
IF (LOCAT .EQ. 58) GO TO 105
IF (LOCAT .EQ. 59) GO TO 105
IF (LOCAT .EQ. 60) GO TO 105
IF (LOCAT .EQ. 61) GO TO 105
IF (LOCAT .EQ. 62) GO TO 105
IF (LOCAT .EQ. 63) GO TO 105
IF (LOCAT .EQ. 64) GO TO 105
IF (LOCAT .EQ. 65) GO TO 105
IF (LOCAT .EQ. 66) GO TO 105
IF (LOCAT .EQ. 67) GO TO 105
IF (LOCAT .EQ. 68) GO TO 105
IF (LOCAT .EQ. 69) GO TO 105
IF (LOCAT .EQ. 70) GO TO 105
IF (LOCAT .EQ. 71) GO TO 105
IF (LOCAT .EQ. 72) GO TO 105
IF (LOCAT .EQ. 73) GO TO 105
IF (LOCAT .EQ. 74) GO TO 105
IF (LOCAT .EQ. 75) GO TO 105
IF (LOCAT .EQ. 76) GO TO 105
IF (LOCAT .EQ. 77) GO TO 105
IF (LOCAT .EQ. 78) GO TO 105
IF (LOCAT .EQ. 79) GO TO 105
IF (LOCAT .EQ. 80) GO TO 105
IF (LOCAT .EQ. 81) GO TO 105
IF (LOCAT .EQ. 82) GO TO 105
IF (LOCAT .EQ. 83) GO TO 105
IF (LOCAT .EQ. 84) GO TO 105
IF (LOCAT .EQ. 85) GO TO 105
IF (LOCAT .EQ. 86) GO TO 105
IF (LOCAT .EQ. 87) GO TO 105
IF (LOCAT .EQ. 88) GO TO 105
IF (LOCAT .EQ. 89) GO TO 105
IF (LOCAT .EQ. 90) GO TO 105
IF (LOCAT .EQ. 91) GO TO 105
IF (LOCAT .EQ. 92) GO TO 105
IF (LOCAT .EQ. 93) GO TO 105
IF (LOCAT .EQ. 94) GO TO 105
IF (LOCAT .EQ. 95) GO TO 105
IF (LOCAT .EQ. 96) GO TO 105
IF (LOCAT .EQ. 97) GO TO 105
IF (LOCAT .EQ. 98) GO TO 105
IF (LOCAT .EQ. 99) GO TO 105
IF (LOCAT .EQ. 100) GO TO 105
IF (LOCAT .EQ. 101) GO TO 105
IF (LOCAT .EQ. 102) GO TO 105
IF (LOCAT .EQ. 103) GO TO 105
IF (LOCAT .EQ. 104) GO TO 105
IF (LOCAT .EQ. 105) GO TO 105
IF (LOCAT .EQ. 106) GO TO 105
IF (LOCAT .EQ. 107) GO TO 105
IF (LOCAT .EQ. 108) GO TO 105
IF (LOCAT .EQ. 109) GO TO 105
IF (LOCAT .EQ. 110) GO TO 105
IF (LOCAT .EQ. 111) GO TO 105
IF (LOCAT .EQ. 112) GO TO 105
IF (LOCAT .EQ. 113) GO TO 105
IF (LOCAT .EQ. 114) GO TO 105
IF (LOCAT .EQ. 115) GO TO 105
IF (LOCAT .EQ. 116) GO TO 105
IF (LOCAT .EQ. 117) GO TO 105
IF (LOCAT .EQ. 118) GO TO 105
IF (LOCAT .EQ. 119) GO TO 105
IF (LOCAT .EQ. 120) GO TO 105
IF (LOCAT .EQ. 121) GO TO 105
IF (LOCAT .EQ. 122) GO TO 105
IF (LOCAT .EQ. 123) GO TO 105
IF (LOCAT .EQ. 124) GO TO 105
IF (LOCAT .EQ. 125) GO TO 105
IF (LOCAT .EQ. 126) GO TO 105
IF (LOCAT .EQ. 127) GO TO 105
IF (LOCAT .EQ. 128) GO TO 105
IF (LOCAT .EQ. 129) GO TO 105
IF (LOCAT .EQ. 130) GO TO 105
IF (LOCAT .EQ. 131) GO TO 105
IF (LOCAT .EQ. 132) GO TO 105
IF (LOCAT .EQ. 133) GO TO 105
IF (LOCAT .EQ. 134) GO TO 105
IF (LOCAT .EQ. 135) GO TO 105
IF (LOCAT .EQ. 136) GO TO 105
IF (LOCAT .EQ. 137) GO TO 105
IF (LOCAT .EQ. 138) GO TO 105
IF (LOCAT .EQ. 139) GO TO 105
IF (LOCAT .EQ. 140) GO TO 105
IF (LOCAT .EQ. 141) GO TO 105
IF (LOCAT .EQ. 142) GO TO 105
IF (LOCAT .EQ. 143) GO TO 105
IF (LOCAT .EQ. 144) GO TO 105
IF (LOCAT .EQ. 145) GO TO 105
IF (LOCAT .EQ. 146) GO TO 105
IF (LOCAT .EQ. 147) GO TO 105
IF (LOCAT .EQ. 148) GO TO 105
IF (LOCAT .EQ. 149) GO TO 105
IF (LOCAT .EQ. 150) GO TO 105
IF (LOCAT .EQ. 151) GO TO 105
IF (LOCAT .EQ. 152) GO TO 105
IF (LOCAT .EQ. 153) GO TO 105
IF (LOCAT .EQ. 154) GO TO 105
IF (LOCAT .EQ. 155) GO TO 105
IF (LOCAT .EQ. 156) GO TO 105
IF (LOCAT .EQ. 157) GO TO 105
IF (LOCAT .EQ. 158) GO TO 105
IF (LOCAT .EQ. 159) GO TO 105
IF (LOCAT .EQ. 160) GO TO 105
IF (LOCAT .EQ. 161) GO TO 105
IF (LOCAT .EQ. 162) GO TO 105
IF (LOCAT .EQ. 163) GO TO 105
IF (LOCAT .EQ. 164) GO TO 105
IF (LOCAT .EQ. 165) GO TO 105
IF (LOCAT .EQ. 166) GO TO 105
IF (LOCAT .EQ. 167) GO TO 105
IF (LOCAT .EQ. 168) GO TO 105
IF (LOCAT .EQ. 169) GO TO 105
IF (LOCAT .EQ. 170) GO TO 105
IF (LOCAT .EQ. 171) GO TO 105
IF (LOCAT .EQ. 172) GO TO 105
IF (LOCAT .EQ. 173) GO TO 105
IF (LOCAT .EQ. 174) GO TO 105
IF (LOCAT .EQ. 175) GO TO 105
IF (LOCAT .EQ. 176) GO TO 105
IF (LOCAT .EQ. 177) GO TO 105
IF (LOCAT .EQ. 178) GO TO 105
IF (LOCAT .EQ. 179) GO TO 105
IF (LOCAT .EQ. 180) GO TO 105
IF (LOCAT .EQ. 181) GO TO 105
IF (LOCAT .EQ. 182) GO TO 105
IF (LOCAT .EQ. 183) GO TO 105
IF (LOCAT .EQ. 184)
```

[illegible]

14

[illegible][illegible]

15


```

C      ISAVE VECTOR AND EXIT LOGIC:
C
C 10 CONTINUE
   IF(I .EQ. ISORT) GO TO 185
   IF(I .EQ. 1) WRITE(6,140)
563   WRITE(2,45) (ISAVE(I),I=1,ICOUNT)
576   185 CONTINUE
601   200 CONTINUE
C
C      ELEMENTS OF ISAVE AFTER ELIMINATIONS:
C
601   WRITE(2,225)
605   WRITE(2,40)
614   IF(ICOUNT .LT. 1) GO TO 210
622   GO TO 215
623   210 CONTINUE
623   WRITE(2,240)
627   RETURN
630   215 CONTINUE
630   WRITE(2,45) (ISAVE(I),I=1,ICOUNT)
C
   40 FORMAT(5X'ISAVE(I) VALUES AFTER ELIMINATIONS COMPLETED: ')
   45 FORMAT(6X,20I5)
   50 FORMAT(10I1,////)
   180 FORMAT(/////5X'ISAVE(I) VALUES AFTER PARTIAL ELIMINATIONS: ')
   220 FORMAT(5X'RETURNING TO MAIN PROGRAM WITH ICOUNT,LT. 1')
   225 FORMAT(///)
643   RETURN
644   END
C.....

```

```

SUBROUTINE SIACK(ICOUNT,KOUNT,ISORT,SORTYPE)
C GREEN
C INTEGER SORTYPE(16)
C UPDATE COMMON NAME TO WHICH THAT USED EARLIER:
C RETURN
C END
C.....

SUBROUTINE IEXPI
C PURPLE
C RETURN
C END
C.....

```

APPENDIX B

SAMPLE OUTPUT

ECHO CHECKING ALL INPUT DATA.

1 IDENTIFIER	2	3	4 28	CARBIDE FUEL
UANIUM COMPOSITION	= 70.0000	U235 ENRICHMENT	= 91.0000	U233 ENRICHMENT = 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY = 90.0500
SMFAR DENSITY	= 90.0000			
ENCAPSULATED		CLAD TYPE	= 31755	COLDWORK = 1.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	MELTIN ROND
SMROUD				
SURASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE = 675.0000
FUEL CENTERLINE TNP	= 1050.0000			STATUS = IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.				
FUEL INFORMATION.				
FUEL INFORMATION ON FIRST TEST PROBLEM INSENTED HERE.				
CLADDING INFORMATION.				
CLAD INFORMATION ON FIRST TEST PROBLEM INSENTED HERE.				
BOND INFORMATION.				
BOND INFORMATION ON FIRST TEST PROBLEM INSENTED HERE.				
GENERAL INFORMATION.				
GENERAL INFORMATION ON TEST PROBLEM NUMBER ONE.				

ECHO CHECKING ALL INPUT DATA.

```

2 IDENTIFIER          -          K          # 422          CARBIDE FUEL

UNANIUM COMPOSITION   = 80.8000  U235 ENRICHMENT           = 92.0000  U233 ENRICHMENT           = 90.0200
PU COMPOSITION        = 90.8300  PU239 ENRICHMENT           = 90.0400  FUEL DENSITY             = 90.0500
SMEAR DENSITY         = 90.0000

NOT ENCAPSULATED      =          CLAD TYPE                   =          316SS  COLDWORK              = 2.0000
CLADDING O.D.         = .4500    WALL THICKNESS          = .0100  HELIUM RONO

SURASSEMBLY TYPE      =          A-19 LINEAR POWER          =          30.0000  CLAD TEMPERATURE          = 675.0000
FUEL CENTERLINE TMP   = 1050.0000
IN PROCESS. NON-DESTRUCTIVE TEST.

FUEL INFORMATION.

CLADDING INFORMATION.

RONO INFORMATION.

GENERAL INFORMATION.
GENERAL INFO FOR TEST PR. 2.
IDENTICAL TO PR. 1 EXCEPT FOR TASK AND NUMBER.
NO FUEL, CLAD, OR RONO COMMENTS.

```

ECHO CHECKING ALL INPUT DATA.

3 IDENTIFIER L 1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SFAR DENSITY	= 90.0000				
NOT ENCAPSULATED		CLAD TYPE	= 31655	COLDWORK	= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
 GENERAL INFO. FOR TEST PR. 3.
 IDENTICAL TO PR. 1 EXCEPT FOR SOURCE.
 NO FUEL, CLAD, OR BOND COMMENTS.

ECHO CHECKING ALL INPUT DATA.

4 IDENTIFIER L 2 422

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SFAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 31655	COLDWORK	= 4.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0200	HELIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
 GENERAL INFO. FOR TEST PR. 4.
 VIRTUALLY IDENTICAL TO PR. 2 EXCEPT FOR SOURCE.

ECHO CHECKING ALL INPUT DATA.

9 IDENTIFIER

K 2 428

NITWIDE FULL

URANIUM COMPOSITION	= 50.0000
PU COMPOSITION	= 90.0300
SWEAR DENSITY	= 90.0000

U215 ENRICHMENT
PU239 ENRICHMENT

```

# 93.0000    U233 ENRICHMENT
# 90.0440    FUEL DENSITY

```

= \$10.0200
 = 90.0500

ENCAPSULATED
CLADDING O.D. = .3001
SHROUD

CLAY TYPE
WALL THICKNESS

- 316SS COLNWORK
- .0100 SODIUM BOND

5,000

SURASSEMBLY TYPE = A-19 LINEAR POWER
FUEL CENTERLINE TMP = 1050.0000
FUR-II. INTRIN EXAMINATION.
SURASSEMBLY NUMBER = KLV123 CURRENT BUYNUP
REPORT NUMBER = LA-72212

■ 30.4000 CLAD TEMPERATURE STATUS

- 675.0000
- IN STORAGE

• .05 GOAL HURNUP

2 05

FUEL INFORMATION.

FUEL INFORMATION IDENTICAL TO PROBLEM ONE.

CLADDING INFORMATION.

CLADDING O.D. 0.0001 LARGER THAN PHOLEX ONE.

HUND INFORMATION.

ADDITIONAL INFORMATION IDENTICAL TO PROBLEM ONE.

GENERAL INFORMATION.

STATUS: CLADING O.D., LOCAT, DISP, AND IREPORT
ALL DIFFER FROM PROBLEM ONE VALUES.

ECHO CHECKING ALL INPUT DATA.

6 IDENTIFIER

K 2 428

NITROCE FUEL

URANIUM COMPOSITION	= 90.0000
PU COMPOSITION	= 90.0300
SHEAR DENSITY	= 90.0000

U235 ENRICHMENT
PU239 ENRICHMENT

U233 ENRICHMENT
FUEL DENSITY

= 90.0200
 = 90.0600

ENCAPSULATED
CLADDING O.D. = .3001
SHROUD

CLAD TYPE
WALL THICKNESS

- 316SS COL.DWORK
- .010U HELIUM RONG

*** 0.0007**

SUBASSEMBLY TYPE = A-19 LINEAR POWER
FUEL CENTERLINE TWP = 1050-0000
REPORT NUMBER = 1A2R3C4D

• 30.0000 CLAD TEMPERATURE
STATUS

■ 675.0000
BATHING RANGE

FUEL INFORMATION.

CLADDING INFORMATION.

NOTE INFORMATION.

GENERAL INFORMATION.
DIFFERS FROM PRECEDING PROBLEMS ONLY IN COMMENT CARDS AND
LOCAT PARAMETER.

ECHO CHECKING ALL INPUT DATA.

7 IDENTIFIER

K 2 428

CARRIAGE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0500
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0000
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLONWORK		= 0.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	HELIUM ROUN	
SHROUD					
SUBASSEMBLY TYPE	= A-19 LINEAR POWER		= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TYP	= 1050.0000			STATUS	IN PROCESS
REPORT NUMBER	= 1A283C40				

FUEL INFORMATION.

CLADDING INFORMATION.

ROUND INFORMATION.

GENERAL INFORMATION.

DIFFERS FROM PRECEDING PROBLEM ONLY IN VALUE ASSIGNED TO HMO PARAMETER.

ECHO CHECKING ALL INPUT DATA.

8 IDENTIFIER

L 1 42C

CARRIAGE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0300	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMEAR DENSITY	= 91.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLONWORK		= 0.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM ROUN	
SHROUD					
SUBASSEMBLY TYPE	= A-19 LINEAR POWER		= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TYP	= 1050.0000			STATUS	IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

ROUND INFORMATION.

GENERAL INFORMATION.

GENERAL INFO. FOR TEST PR. 3.
IDENTICAL TO PR. 1 EXCEPT FOR SOURCE.
NO FUEL, CLAD, OR ROUND COMMENTS.

ECHO CHECKING ALL INPUT DATA.

9 IDENTIFIER

K 2 42B

NITRIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 94.0000	U233 ENRICHMENT	= 90.0000
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 10.0000
SMFAR DENSITY	= 90.0000				

NOT ENCAPSULATED		CLAD TYPE	= 316SS COLONORX	= 0.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	HELIUM BOND
SHROUD				

SURASSEMBLY TYPE	= A-19 LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000		STATUS	IN STORAGE
REPORT NUMBER	= 1A2R3C4D			

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
 DIFFERS FROM PRECEEDING PROBLEMS ONLY IN COMMENT CARDS AND
 LOCAT PARAMETER.

ECHO CHECKING ALL INPUT DATA.

10 IDENTIFIER

L 1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0000
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 10.0000
SMFAR DENSITY	= 90.0000				

ENCAPSULATED		CLAD TYPE	= 316SS COLONORX	= 0.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND
SHROUD				

SURASSEMBLY TYPE	= A-19 LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000		STATUS	IN STORAGE
IN PROCESS. NON-DESTRUCTIVE TEST.				

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

11 IDENTIFIER

=

L

1 42C

CARBIDE FUEL

U235 COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMFAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 31655	COLORWORK	= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM GCMU	
SHROUD					
SURASSEMBLY TYPE	= A-19 LINEAR POWER		25.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

MOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

12 IDENTIFIER

=

L

1 42C

CARBIDE FUEL

U235 COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMFAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 31655	COLORWORK	= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM GCMU	
SHROUD					
SURASSEMBLY TYPE	= A-19 LINEAR POWER		30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 950.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

MOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

13 IDENTIFIER

*

L

1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 99.0000	U235 ENRICHMENT	= 99.0100	U233 ENRICHMENT	= 99.0200
PU COMPOSITION	= 99.0300	PU239 ENRICHMENT	= 99.0400	FUEL DENSITY	= 99.0500
SMEAR DENSITY	= 99.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLONWORK		= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SMRUD					
SUBASSEMBLY TYPE	= A-19 LINEAR POWER		= 30.0000	CLAD TEMPERATURE STATUS	= 500.0000
FUEL CENTERLINE TMP	= 1050.0000				= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

14 IDENTIFIER

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L

1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 99.0000	U235 ENRICHMENT	= 99.0100	U233 ENRICHMENT	= 99.0200
PU COMPOSITION	= 99.0300	PU239 ENRICHMENT	= 99.0400	FUEL DENSITY	= 99.0500
SMEAR DENSITY	= 99.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLONWORK		= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SMRUD					
SUBASSEMBLY TYPE	= A-18 LINEAR POWER		= 30.0000	CLAD TEMPERATURE STATUS	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000				= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

15 IDENTIFIER * K 1 42R

CARRIDE FUEL

URANIUM COMPOSITION	= 70.0000	U235 ENRICHMENT	= 91.0000	U233 ENRICHMENT	= 90.0000
PU COMPOSITION	= 90.9300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 31755	COLDWORK	= 1.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SURASSEMBLY TYPE	= A-19 LINEAR POWER		30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					
FUEL INFORMATION.					
FUEL INFORMATION ON FIRST TEST PROBLEM INSERTED HERE.					
CLADDING INFORMATION.					
CLAD INFORMATION ON FIRST TEST PROBLEM INSERTED HERE.					
BOND INFORMATION.					
BOND INFORMATION ON FIRST TEST PROBLEM INSERTED HERE.					
GENERAL INFORMATION.					
GENERAL INFORMATION ON TEST PROBLEM NUMBER ONE.					

ECHO CHECKING ALL INPUT DATA.

16 IDENTIFIER * K 2 42Z

CARRIDE FUEL

URANIUM COMPOSITION	= 80.0000	U235 ENRICHMENT	= 92.0000	U233 ENRICHMENT	= 90.0000
PU COMPOSITION	= 90.9300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMEAR DENSITY	= 90.0000				
NOT ENCAPSULATED		CLAD TYPE	= 31655	COLDWORK	= 2.0000
CLADDING O.D.	= .4500	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SURASSEMBLY TYPE	= A-19 LINEAR POWER		30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					
FUEL INFORMATION.					
CLADDING INFORMATION.					
BOND INFORMATION.					
GENERAL INFORMATION.					
GENERAL INFO FOR TEST PR. 2.					
IDENTICAL TO PR. 1 EXCEPT FOR TASK AND NUMBER.					
NO FUEL, CLAD, OR BOND COMMENTS.					

ECHO CHECKING ALL INPUT DATA.

17 IDENTIFIER

L 1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMFAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS	COLDWORK	= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SURASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
 GENERAL INFO. FOR TEST PR. 3.
 IDENTICAL TO PR. 1 EXCEPT FOR SOURCE.
 NO FUEL, CLAD, OR BOND COMMENTS.

ECHO CHECKING ALL INPUT DATA.

18 IDENTIFIER

L 2 422

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMFAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS	COLDWORK	= 4.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0200	HELIUM BOND	
SHROUD					
SURASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
 GENERAL INFO. FOR TEST PR. 4.
 VIRTUALLY IDENTICAL TO PR. 2 EXCEPT FOR SOURCE.

ECHO CHECKING ALL INPUT DATA.

19 IDENTIFIER

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K 2 42B

NITRIDE FUEL

URANIUM COMPOSITION	= 50.0000	U235 ENRICHMENT	= 93.0000	U233 ENRICHMENT	= 99.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 99.0500
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLDWORK		= 5.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	SODIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19 LINEAR POWER				
FUEL CENTERLINE TMP	= 1050.0000			CLAD TEMPERATURE STATUS	= 675.0000
EHR-TI. INTERIM EXAMINATION.					= IN STORAGE
SUBASSEMBLY NUMBER	= KLW123 COMMENT BURNUP			GOAL BURNUP	= .05
REPORT NUMBER	= LA-24212				

FUEL INFORMATION.

FUEL INFORMATION IDENTICAL TO PROBLEM ONE.

CLADDING INFORMATION.

CLADDING O.D. 0.0001 LARGER THAN PROBLEM ONE.

BOND INFORMATION.

BOND INFORMATION IDENTICAL TO PROBLEM ONE.

GENERAL INFORMATION.

STATUS: CLADDING O.D., LOCAT, DISP, AND IREPORT
ALL DIFFER FROM PROBLEM ONE VALUES.

ECHO CHECKING ALL INPUT DATA.

20 IDENTIFIER

*

K 2 42B

NITRIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 99.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 99.0600
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLDWORK		= 0.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19 LINEAR POWER				
FUEL CENTERLINE TMP	= 1050.0000			CLAD TEMPERATURE STATUS	= 675.0000
REPORT NUMBER	= 1A2B3C4D				NATURAL STORAGE

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

DIFFERS FROM PRECEDING PROBLEMS ONLY IN COMMENT CARDS AND
LOCAT PARAMETER.

ECHO CHECKING ALL INPUT DATA.

21 IDENTIFIER

K 2 42B

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0500
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0600
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLDWORK		= 0.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					

SUBASSEMBLY TYPE	= A-19 LINEAR POWER		= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	IN PROCESS
REPORT NUMBER	= 1A2B3C4D				

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

DIFFERS FROM PRECEEDING PROBLEM ONLY IN VALUE ASSIGNED TO HHO PARAMETER.

ECHO CHECKING ALL INPUT DATA.

22 IDENTIFIER

L 1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0300	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMEAR DENSITY	= 91.0000				
ENCAPSULATED		CLAD TYPE	= 316SS COLDWORK		= 0.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					

SUBASSEMBLY TYPE	= A-19 LINEAR POWER		= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	IN PROCESS
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

GENERAL INFO. FOR TEST PR. 3.

IDENTICAL TO PR. 1 EXCEPT FOR SOURCE.

NO FUEL, CLAD, OR BOND COMMENTS.

ECHO CHECKING ALL INPUT DATA.

23 IDENTIFIER = K 2 42B

NITRIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 94.0000	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0600
SMEAR DENSITY	= 90.0000				
NOT ENCAPSULATED		CLAD TYPE	= 316SS	COLDWORK	= 0.0000
CLADDING O.D.	= .3001	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN STORAGE
REPORT NUMBER	= 1A2R3C4D				

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.
DIFFERS FROM PRECEEDING PROBLEMS ONLY IN COMMENT CARDS AND
LOCAT PARAMETER.

ECHO CHECKING ALL INPUT DATA.

24 IDENTIFIER = L 1 42C

CARRIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0300	PU239 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMEAR DENSITY	= 90.0000				
ENCAPSULATED		CLAD TYPE	= 316SS	COLDWORK	= 3.0000
CLADDING O.D.	= .3000	WALL THICKNESS	= .0100	HELIUM BOND	
SHROUD					
SUBASSEMBLY TYPE	= A-19	LINEAR POWER	= 30.0000	CLAD TEMPERATURE	= 675.0000
FUEL CENTERLINE TMP	= 1050.0000			STATUS	= IN STORAGE
IN PROCESS. NON-DESTRUCTIVE TEST.					

FUEL INFORMATION.

CLADDING INFORMATION.

BOND INFORMATION.

GENERAL INFORMATION.

ECHO CHECKING ALL INPUT DATA.

25 IDENTIFIER

L 1 42C

CARBIDE FUEL

URANIUM COMPOSITION	= 90.0000	U235 ENRICHMENT	= 90.0100	U233 ENRICHMENT	= 90.0200
PU COMPOSITION	= 90.0100	PUC39 ENRICHMENT	= 90.0400	FUEL DENSITY	= 90.0500
SMFAR DENSITY	= 90.0000				

ENCAPSULATED		CLAD TYPE		316SS COLWORK	= 3.0000
CLADDING O.D.	= 3.000	WALL THICKNESS	= .0100	HELIUM ROND	
GROUP					

SUBASSEMBLY TYPE	= A-19 LINEAR POWER	CLAD TEMPERATURE	= 25.0000	STATUS	= 675.0000
FUEL CENTRLINE IMP	= 1050.0000				
IN PROCESS.	NON-DESTRUCTIVE TEST.				

FUEL INFORMATION.

CLADDING INFORMATION.

ROUND INFORMATION.

GENERAL INFORMATION.

EXTENDED MULTIPLE SORT(INTEGER TYPE).

ORDER AND TYPES OF SORTS REQUESTED.

NUMBER OF SORT	TYPE OF SORT REQUESTED
-------------------	---------------------------

1	SOURCE
2	TASK
3	NUMBER
4	FUEL
5	BOND

SORT PARAMETERS.

1	K
2	?
3	42R
4	?
5	1

ISAVE(I) VALUES AFTER PARTIAL ELIMINATIONS.

1	2	5	6	7	9	15	16	19	20	21	23
2	5	6	7	9	16	19	20	21	23		
5	6	7	9	15	20	21	23				
5	6	9	19	20	23						

ISAVF(I) VALUES AFTER ELIMINATIONS COMPLETED.

6	9	20	23
---	---	----	----

EXTENDED FINATING POINT MIXED SORT.

ORDER AND TYPES OF SORTS REQUESTED.

NUMBER OF SORT	TYPE OF SORT REQUESTED
-------------------	---------------------------

1	UCOMP
2	RICH235
3	RICH233
4	ENCAP

SORT PARAMETERS.

1	91.0000000000	89.0030000000
2	90.0300000000	90.0000000000
3	90.0300000000	90.0100000000
4	?	

ISAVF(I) VALUES AFTER PARTIAL ELIMINATIONS.

3	4	6	7	8	9	10	11	12	13	14	17	18	20	21	22	23	24	25
3	4	6	7	8	10	11	12	13	14	17	18	20	21	22	24	25		
3	4	6	8	10	11	12	13	14	17	18	20	22	24	25				

ISAVF(I) VALUES AFTER ELIMINATIONS COMPLETED.

3

SECOND EXTENDED FLOATING POINT AND A FIELD SORT.

ORDER AND TYPES OF SORTS REQUESTED.

NUMBER OF SORT	TYPE OF SORT REQUESTED
-------------------	---------------------------

1	RHO
2	SHEAR
3	COLDWRK
4	CLADDD
5	WALLTK
6	CLAD
7	LINPOW
8	CLADTMP
9	FUELCLT
10	STATUS
11	SUBASSM

SORT PARAMETERS.

1	90.0500000000	90.0400000000
2	90.0000000000	89.0000000000
3	4.0000000000	1.0000000000
4	.3500000000	.2500000000
5	.0150000000	.0050000000
6	31655	
7	30.0000000000	29.0000000000
8	675.0001000000	674.9999000000
9	1050.0001000000	1049.9999000000
10	1	
11	A-10	

ISAVF(II) VALUES AFTER PARTIAL ELIMINATIONS.

1	2	3	4	5	8	10	11	12	13	14	15	16	17	18	19	22	24	25
1	2	3	4	5	10	11	12	13	14	15	16	17	18	19	24	25		
1	2	3	4	10	11	12	13	14	15	16	17	18	24	25				
1	3	4	10	11	12	13	14	15	17	18	24	25						
3	10	11	12	13	14	17	24	25										
3	10	12	13	14	17	24												
3	10	12	14	17	24													
3	10	14	17	24														
3	14	17																

ISAVE(II) VALUES AFTER ELIMINATIONS COMPLETED.

14