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**CHIT: A COST ACCOUNTING PROGRAM FOR
POSTIRRADIATION EXAMINATIONS OF
FAST BREEDER REACTOR MATERIALS**

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ABSTRACT

CHIT is the Los Alamos Scientific Laboratory's cost accounting computer program for nondestructive and destructive examinations of irradiated fuel pins. The program allows immediate retrieval of fuel pin examination information and provides itemized listings for completed and projected fuel pin examinations, detailed cost accounting summaries for each investigator, fuel pin examinations during a specified time interval, and various subsets of the information. CHIT has been in successful operation for the past two years, providing precise information on cost accounting more efficiently than possible with a manual technique.

I. INTRODUCTION

The Chemistry-Materials Science Division and the Nondestructive Testing Group of the Dynamic Testing Division of the Los Alamos Scientific Laboratory (LASL), perform postirradiation examinations of experimental fast reactor fuel pins for the Division of Reactor Research and Development (RRD) of the Energy Research and Development Administration (ERDA). RRD divides fiscal year funding for this work among several principal experimenters, depending on their projected examination requirements for that fiscal year. The amount allocated to each experimenter is called his "chit" (a term suggested by an RRD employee), from which derives the name of the cost accounting computer program.

The need for an accounting program became apparent with the increase in number of experimenters, examinations performed, and LASL groups performing the examinations. To standardize the levels of effort involved in postirradiation examinations of pins by various contractors, RRD suggested five separate classes. These classes,

defined by types of examinations routinely performed at LASL, are detailed in Appendix A. Examinations that do not fall within any particular class are considered special examinations; examinations that were not included in the experimenter's original examination plan are called additional examinations. Relative costs have been assigned to each examination class as shown in Appendix B. These costs are useful for budget planning and for CHIT determination of cost overruns for any particular pin examination. Note that all costs in this report have been used for illustrative purposes only and are not actual costs.

II. PROGRAM DESCRIPTION

The CHIT cost accounting computer program calculates projected and accrued costs of all experimental fuel pin examinations at LASL. The accrued costs are obtained from four groups: Analytical Chemistry Group, Plutonium Chemistry and Metallurgy Group, Irradiated Materials Examination and Handling Group, and Nonde-

structive Testing Group. The types of examination costs collectively performed by these groups are listed in Appendix C. Each examination has been assigned a work unit value that can be related to actual dollars by using a unique internal conversion factor for each group.

The summation of these examination costs is corrected automatically for the variable support activities, resulting in actual costs per examination and total cost for the complete examination of each pin. The support activities are variable (fluctuating slightly from month to month) because of scheduled preventive maintenance and unscheduled repairs. Therefore, at the end of the fiscal year, each cost center (experimenter) will have been charged the correct fraction of the nonexamination costs.

Specific information about individual fuel pins is stored on an UPDATE data file to permit easy modification of the data. UPDATE is a computer program for manipulating data files and is available on most computing systems. The program runs on a Control Data Corporation 7600 computer, requires less than 1-minute central processing unit time, and costs less than \$10 for a program in which all options are requested.

CHIT offers six main options.

- **Full Listing.** A complete listing of each fuel pin including types of examination, dates of request for examination, completion dates, actual costs, previous fiscal year's costs accrued, and present fiscal year totals.
- **Special Examinations.** An itemized listing of the special examinations performed during the specified time interval that do not fall into the five classes described in Appendix A.
- **Additional Examinations.** A listing of the examinations performed during the stated period that were not a part of the experimenter's original test plan.
- **List Data.** The data on the UPDATE file is copied to the output, providing a detailed image of all the information stored on the data file.
- **Summary.** Summaries of the accrued costs of all the experimenters for the fiscal year to date, or any specified time interval, including separation of special and additional examinations and a detailed summary listing for all the fuel pins and cost overruns in excess of those costs

projected on the basis of the experimenter's initial requirements.

- **Examination Group.** Itemized listing of the examinations performed by the four organizational groups during the specified dates.

These options may be executed on an annual (year-to-date) or quarterly basis to obtain summaries of the experimenter's activities and individual fuel pin data for reporting progress to the experimenters and to ERD. The data file is modified at least monthly; if an experimenter has specific questions about the progress of a particular fuel pin, the information is readily available. This information can be used by experimenters for adjusting their examination requests to correspond to their remaining chit.

CHIT assumes that all monies or total chits will be costed on a projected annual basis without project overruns. The total chit is divided by the number of days in the year (366 days for a leap year); consequently, total monies to be costed during any reporting period will be the fraction of the total chit that the particular reporting period represents. A first pass is made through the data to determine a multiplying factor, called the support factor, which is then used to adjust all costs to bring the total for the reporting period equal to the proper fraction of the total chit. This support factor represents costs for the supporting groups and activities, such as quality assurance, equipment maintenance and repair, and other indirect labor costs. The support factor reflects the performance and efficiency of the entire operation, e.g., backlog of pins, prompt delivery of required forms and information by experimenters, downtime required for routine maintenance and emergency repairs to examination and support equipment, and proper scheduling of pins through examination sequence.

A complete listing of the control cards, a listing of the program's main variables, and a FORTRAN IV listing of the computer code are presented in Appendixes D, E, and F, respectively. Comment cards have been liberally inserted in the source deck to explain the options and variables of the cost accounting program.

Typical examples of program output are presented in

Appendixes G-L. Appendix G gives a summary of accrued costs of all the experimenters for the fiscal year to any specified reporting date. Costs given in the Appendixes are hypothetical; the total of the experimenters' chits was arbitrarily set at \$1 million. An experimenter's chit is fixed for the fiscal year based on his approved projected examination requirements. The committed costs are determined by a more detailed examination plan submitted during the fiscal year. Committed and costed values are percentages of committed costs and actual costs in relation to the experimenter's chit. The summary also separates projected and actual costs for additional examinations.

A similar summary of experimenter cost accrual is presented in Appendix H which breaks down experimenter's costs on a quarterly period basis. Committed costs have been omitted in this summary because fiscal year commitments do not conform well to a quarterly period. Both summaries are valuable in reflecting the status of each experimenter's chit during the specified reporting period.

Total costs and status of each pin are summarized by the output presented in Appendix I. Costs of examinations performed during the present fiscal year as well as total costs for all previous years are presented. In addition, a class cost overrun is presented which represents the difference between the actual examination costs and the estimated costs for a particular examination class when the actual costs are greater than the class costs shown in Appendix B. The overruns are usually the results of an experimenter requesting additional examinations that are not defined in a particular class. Note that some fuel pins have not been assigned to a class, usually the result of an incomplete examination plan. Often an experimenter wishes to evaluate preliminary results before committing himself to a complete plan.

Appendix J presents a summary of only those pins for which all planned examinations have been completed during a quarterly period. This type of summary can be produced to include all pins that are completed during the fiscal year.

An example of a summary for special examinations completed during a quarterly period is presented in

Appendix K. The same type of summary can also be printed for additional examinations; both the special and additional examination summaries can be listed for year-to-date and fiscal year periods.

The option for a full listing gives a complete data listing for each pin including type of examination, date of request for examination, examination completion date, unit costs, total costs, previous fiscal year costs, and present fiscal year totals. This listing, shown in Appendix L, is valuable for determining in detail the status of any particular fuel pin.

III. CONCLUSIONS

CHIT, the cost accounting computer program for examining experimental fuel pins, has been in operation at LASL for 2 yr. CHIT provides project administrators and experimenters with summaries and detailed listings of projected and accrued costs of specific examinations. Before CHIT was available, cost projections for specific or general examinations were based primarily on experience and intuition. Now individual costs have been accurately quantified, permitting LASL to administer the project more efficiently and allowing experimenters to make realistic projections based on more accurate estimates. Operation of the entire cost accounting program requires about 2 man-days per month, whereas a comparable manual technique for a project of this size would require many times the manpower effort. This general type of cost accounting can be readily adapted for use at other fuel pin examination facilities.

ACKNOWLEDGEMENTS

The CHIT cost accounting computer program has benefited from the suggestions of R. D. Baker, Chemistry-Materials Science Division leader, and the following principal investigators of the project: J. W. Schulte, G. R. Waterbury, and K. A. Johnson. W. T. Wood assisted in collecting necessary information and offered many helpful suggestions. CHIT was developed at the request of the Division of Reactor Research and Development of the Energy Research and Development Administration.

APPENDIX A

POSTIRRADIATION EXAMINATIONS AND SUPPORT OPERATIONS PERFORMED AT THE LAST HOT CELL FACILITIES

CLASS I	CLASS II (Cont)
<ol style="list-style-type: none"> 1. <u>Cask unloading</u> 2. <u>Visual inspection.</u> QC inspection: identification, radiation, contamination, temperature. 3. <u>Betatron radiography.</u> Capsule or pin at 0° and 90°; furnish negatives and prints. 4. <u>Gross gamma scan.</u> Capsule or pin. All energies >150 keV, one axial and three diametral scans. 5. <u>Photography (capsule)</u> Full-length 0° and at maximum bow. Incremental, three orientations at 2X, if required. Unusual areas. 6. <u>Profilometry (optical)</u> Capsule. Up to five orientations, if requested. Pin. Up to five orientations, if requested. 7. <u>Gas sampling</u> and mass spectrometric analysis of capsule cover gas; quantity of gas and void volume calculations. 8. <u>Capsule disassembly.</u> Remove sodium bond, wire wrap, capsule clad. Dispose of hardware. (Breached pins would be disassembled in an alpha containment box where the manpower requirements are doubled.) 9. <u>Profilometry on breached pin (mechanical).</u> Orientations as requested. 10. <u>Photography (pin)</u> Full-length, 0° and maximum bow. Incremental, three orientations at 2X, if requested. Unusual areas. 	<ol style="list-style-type: none"> b. Autoradiographs (alpha and beta-gamma). c. Ten selected microscopy photographs, one print each of items 1 and 2. d. Mosaic. e. One high-magnification strip. 6. <u>Burnup (1 per pin)</u>
CLASS II	CLASS III
<ol style="list-style-type: none"> 1. <u>All of Class I</u> 2. <u>Fission gas (pin).</u> Sampling, analysis, volume, and quantity calculations. 3. <u>Sectioning</u> 4. <u>Sodium distillation</u> 5. <u>Microstructural analysis.</u> Two fuel-clad samples, each with <ol style="list-style-type: none"> a. Macro-photographs. 	<ol style="list-style-type: none"> 1. <u>All of Class I</u> 2. <u>All of Class II except item 5</u> 3. <u>Microstructural analysis</u> Three fuel-clad specimens. Same examination as Class II, item 5. a-e. 4. <u>Multispectral gamma scan</u> (four isotopes, 5-mm steps). One axial scan. 5. <u>EMX (one sample).</u> Characterize fuel-clad interface at two points; radial U/Pu ratio, two scans. 6. <u>Density (two samples)</u>
CLASS II	CLASS IV
	<ol style="list-style-type: none"> 1. <u>All of Classes I, II, and III (except item 3)</u> 2. <u>Microstructural analysis</u> Four fuel-clad specimens. Same as Class II, item 5. a-e. 3. <u>Multispectral gamma scan</u> (ten isotopes, 0.5-mm steps) 4. <u>EMX (one sample).</u> Characterize fuel-clad interface at three points; radial U/Pu ratio; radial distribution of four fission products, two scans.

CLASS V

1. Includes all of Class IV and usually several parts of items 2 or 3 below.
2. Special examinations (examples)
 - a. Capsule or pin weight
 - b. Balance point
 - c. Clad or fuel SEM (one sample)
 - d. Length measurement
 - e. Location of pin failure point
 - f. Oxygen in clad
 - g. Oxygen in fuel
 - h. Clad microhardness (one sample)
 - i. Fuel-clad replication (one sample)

CLASS V (Cont)

3. Additional examination requests (examples)
 - a. Burnup sample
 - b. Retained fission gas
 - c. TWODIM gamma scan (four isotopes, one location)
 - d. Profilometry (one pin, multiscan, data reduction)
 - e. Microstructural analysis, (one sample)
 - f. Burnup profile from gamma scan
 - g. Clad leach, cesium analysis
 - h. EMX (extensive examination of one or more samples)

APPENDIX B**COST OF POSTIRRADIATION EXAMINATIONS**

<u>Class Examination</u>	<u>Cost in Thousands of Dollars^a</u>	
	<u>Unbreached Pin</u>	<u>Breached Pin</u>
I	3.1	4.6
II	8.5	10.1
III	11.6	13.6
IV	16.1	18.5
V	32.0	32.0

^a Absolute dollar values listed are hypothetical, but relative costs are consistent, based on LASL cost accounting for the past 2 yr.

APPENDIX C
FUEL-PIN EXAMINATIONS

Nondestructive Capsule	Destructive Pin	Nondestructive Pin	Special Examinations
Cask unloading	Wire-wrap removal	Visual inspection	Retained fission gas
Visual inspection	Wire-wrap disposition	Contamination measure	Uranium, plutonium deter- mination
Contamination measure	Fission gas sampling	Radiation measure	Flux tube storage
Radiation measure	Fission gas analysis	Temperature measure	Weld leak check
Temperature measure	Sectioning	Profilometry, optical	Leach gas plenum
Profilometry, optical	Microstructural analysis	Diameter measure	Burst test samples
Diameter, micrometer	Microprobe preparation	Radiography, betatron	Oxygen analysis of fuel
Photography, full-length	Microprobe analysis	Gross gamma scan	Length measurement
Photography, incremental	Burnup analysis	Spectral gamma scan	Eddy current
Radiography, betatron	Clad density preparation	Photography, full-length with wire	Nitrogen in fuel
Gross gamma scan	Clad density	Photography, full-length without wire	Carbon in fuel
Spectral gamma scan	Disposition of fuel	Photography, incremental with wire	Kollmorgen photographs
Cover gas sampling	Disposition of pin clad	Photography, incremental without wire	Sodium distillation
Cover gas analysis		Eddy current scan	Split pin clad
Bonding removal		Profilometry, mechanical	Pressure leak test
Clad removal			Leak rate test
Clad disposition			Sequential surface prepara- tion
			Clad failure location
			TWODIM gamma scan
			Burnup profile
			Oxygen in clad
			Capsule weight
			Balance point
			SEM sectioning

APPENDIX D CONTROL CARDS

<u>Control Card</u>	<u>Explanation</u>	<u>Control Card</u>	<u>Explanation</u>
START DATE	Specifies the starting date of the reporting period.	ADDITIONAL EXAMINATIONS	Produces a listing of additional examinations performed during the reporting period.
LAST DATE	Specifies the ending date of the reporting period.	LIST DATA	Produces a listing of all the input data to date. Used for updating or changing data. This card overrides all other listing or summary card commands.
QSTART	Specifies the starting date for a quarterly reporting period.	QUARTER	Produces summaries and listings performed or completed during the quarterly period.
QEND	Specifies the ending date for a quarterly reporting period.	ANNUAL	Produces a summary of pins completed during the current fiscal year and a listing of all examinations completed by individual groups during the fiscal year.
FISCAL 197X	Specifies the fiscal year.	EXPERIMENTER'S IDENTIFICATION	Includes the experimenter's name, chit, and two-letter alpha-numeric code for program identification.
CHITS	Specifies the number of chits or experimenters and the total chit for the fiscal year.		
SUMMARY	Produces a brief summary of each fuel pin.		
FULL LISTING	Produces a full listing for each fuel pin.		
SPECIAL EXAMINATIONS	Produces a listing of special examinations performed during the reporting period.		

APPENDIX E VARIABLES

<u>Variable Name</u>	<u>Pin Data</u>	<u>Variable Name</u>	<u>Pin Data</u>
ADATA	Control card data	TOT	Total costs for experimenter
XADDP	Projected costs for additional examinations	PRCNT	Actual percentage of projected costs for experimenter
XADDC	Actual costs for additional examinations	PREST	Estimated percentage of projected costs for experimenter
XSPECP	Projected costs for special examinations	PRTOT	Actual percentage of total dollars
XSPECC	Actual costs for special examinations	CODE	Experimenter's identification code letters
QAADDC	Costs for additional examinations during quarterly period	QPRCNT	Percentage of actual costs for experimenter during quarter
QXSPECC	Costs for special examinations during quarter period	QACT	Actual costs for experimenter during quarter
EST	Total estimated costs for experimenter	ICOPY	Number of printed output copies required
ACT	Actual costs for experimenter	FYEAR	Fiscal year
NUM	Number of pins for experimenter	CMB1-14	Group performing examination
CHIT	Experimenter's total chit		

APPENDIX F

CHIT SOURCE CODE (FORTRAN IV)

```

PROGRAM D401CH (INP,OUT,FSET1=INP,FSET2=OUT,FSET3,FSET4,FSET5,FSET6,
16,FSET7,FSET8,FSET9,FSET10,FSET11,FSET12,FSET13,FSET14,FSET15,FSET
216,FSET17,FSET18,FSET19,FSET20,FSET21,FSET22,FSET23,FSET24,FSET25,
3FSET26,FSET27,FSET28,FSET29)
  DIMENSION ADATA(6)
  DIMENSION XADDP(8), XADDC(8), XSPECC(8), XSPECC(8)
  DIMENSION QXADDC(8), QXSPECC(8), QPRCNT(8), QACT(8)
  DIMENSION EST(8), ACT(8), NUM(8), PRCNT(8), CHIT(8), PREST(8), TOT
1(8), PRTOT(8), SUP(8)
  DIMENSION FACT(10)
  DIMENSION DATA(15), A(10), B(10), C(10), D(10), E(10), F(10), G(10)
1), CODE(10)
  DIMENSION P(10),R(10)
  DIMENSION TITLE(8), PRIN(6)
  INTEGER FYEAR
  INTEGER ADATA,CMB1,CMB11,CMB14
  INTEGER QSTART,QEND
  INTEGER A,B,C,D,E,F,G,DATES,DATEL,FISCAL
  INTEGER QS12,QS34,QS56,QE12,QE34,QE56
  INTEGER P,R
  INTEGER SUMMARY
  INTEGER START,CHITS,FULL,SPEC,ADD
  INTEGER CODE,EXP1
  INTEGER QUARTER
  INTEGER ANNUAL
  INTEGER ANNCOMP
  INTEGER ANNOMB
  INTEGER BLANK1
  INTEGER CLASS,U1,U2,U3,U4,U5,B1,B2,B3,B4,B5
  REAL NDT
  DATA BLANK1/1H-/
  DATA B1,B2,B3,B4,B5/2H1B,2H2B,2H3B,2H4B,2H5B/
  DATA U1,U2,U3,U4,U5/2H1U,2H2U,2H3U,2H4U,2H5U/
  DATA '1ST DAT/10H1ST DATA /
  DATA ASTER3/4H*** /
  DATA DEST/4HDEST/
  DATA NDT,CAP,PIN/4HNDT,10H- CAPSULE,10H- PIN /
  DATA ASTER2,ASTER4/4H** ,4H****/
  DATA START,LAST/10HSTART DATE,10HLAST DATE /
  DATA FISCAL/10HFISCAL 197/
  DATA SUMMARY,FULL,ADD,SPEC/10HSUMMARY ,10HFULL,1HST1,10HADD,10H
1AL,10HSPECIAL EX/
  DATA QUARTER/2HQUARTER/
  DATA ANNUAL/6HANNUAL/
  DATA QSTART,QEND/6HQSTART,4HQEND/
  DATA CMB1/10HCMB-1 /
  DATA CMB11/10HCMB-11 /
  DATA CMB14/10HCMB-14 /
  DATA CHITS/10HCHITS /
  REWIND 2

```

PROGRAM IS SET UP TO MANIPULATE 8 SEPARATE EXPERIMENTERS

INPUT DATA REQUIRED AND OPTIONAL

START DATE 040174	REQUIRED
LAST DATE 063074	REQUIRED
QSTART 070174	REQUIRED FOR QUARTERLY
	REPORT
QEND 103174	REQUIRED FOR QUARTERLY
	REPORT
FISCAL 1974	REQUIRED
CHITS 4 1000000.	REQUIRED
SUMMARY	OPTIONAL
FULL LISTING	OPTIONAL
SPECIAL EXAMINATIONS	OPTIONAL
ADDITIONAL EXAMINATIONS	OPTIONAL
QUARTER	OPTIONAL
ANNUAL	OPTIONAL
NOTE QUARTER AND ANNUAL CONTROL CARDS CANNOT BE USED TOGETHER	
SFM.	REQUIRED
EXPERIMENTER A EA	230000. REQUIRED
EXPERIMENTER B EB	102000. REQUIRED
EXPERIMENTER C EC	300000. REQUIRED
EXPERIMENTER D ED	360000. REQUIRED
ACCOUNTING RUN FOR D401 06/30/74	REQUIRED
FSET 3 SUMMARY OF NO. 1 EXPERIMENTS	
FSET 4 SUMMARY OF NO. 2 EXPERIMENTS	
FSET 5 SUMMARY OF NO. 3 EXPERIMENTS	
FSET 6 SUMMARY OF NO. 4 EXPERIMENTS	
FSET 7 SUMMARY OF NO. 5 EXPERIMENTS	
FSET 8 SUMMARY OF NO. 6 EXPERIMENTS	
FSET 9 SUMMARY OF NO. 7 EXPERIMENTS	
FSET 10 SUMMARY OF NO. 8 EXPERIMENTS	
FSET 11 LISTING OF NO. 1 EXPERIMENTS	
FSET 12 LISTING OF NO. 2 EXPERIMENTS	
FSET 13 LISTING OF NO. 3 EXPERIMENTS	
FSET 14 LISTING OF NO. 4 EXPERIMENTS	
FSET 15 LISTING OF NO. 5 EXPERIMENTS	

C FSET 16 LISTING OF NO. 6 EXPERIMENTS
 C FSET 17 LISTING OF NO. 7 EXPERIMENTS
 C FSET 18 LISTING OF NO. 8 EXPERIMENTS
 C ICOPY THE NUMBER OF PRINTED OUTPUT COPIES REQUIRED
 C ADDCOST ACTUAL COST OF ADDITIONAL EXAMINATIONS
 C ADDEST PROJECTED COST OF ADDITIONAL EXAMINATIONS
 C SPECOST ACTUAL COST OF SPECIAL EXAMINATIONS
 C SPEEST PROJECTED COST OF SPECIAL EXAMINATIONS
 C ISETADD = 0 DOES NOT PRODUCE SUMMARY SHEET FOR ADDITIONAL EXAM
 C ISETADD = 1 DOES PRODUCE SUMMARY SHEET FOR ADDITIONAL EXAM
 C ISETSPE = 1 DOES PRODUCE SUMMARY SHEET FOR SPECIAL EXAMS
 C ISETSPE = 0 DOES NOT PRODUCE SUMMARY SHEET FOR SPECIAL EXAMS
 C ICOPY NUMBER OF LISTINGS

C *****
 C *****
 C

C AVERAGE COST OF EACH EXAMINATION CLASS FOR PRESENT FY

C *****
 C CLASS1B=4600.00
 C CLASS1U=3100.00
 C CLASS2B=10100.00
 C CLASS2U=8500.00
 C CLASS3B=13600.00
 C CLASS3U=11600.00
 C CLASS4B=18500.00
 C CLASS4U=16100.00
 C CLASS5B=32000.00
 C CLASS5U=32000.00

C *****
 C XADDC(I) ACTUAL ADDITIONAL COSTS FOR ITH EXPERIMENTER
 C XADDP(I) PROJECTED ADDITIONAL COSTS FOR ITH EXPERIMENTER
 C XSPECP(I) PROJECTED SPECIAL COSTS FOR ITH EXPERIMENTER
 C XSPECC(I) PROJECTED ADDITIONAL COSTS FOR ITH EXPERIMENTER
 C EST(I) TOTAL ESTIMATED COSTS OF ITH EXPERIMENTER
 C ACT(I) ACTUAL ESTIMATED COSTS OF ITH EXPERIMENTER
 C NUM(I) NUMBER OF EXPERIMENTS FOR ITH EXPERIMENTER
 C CHIT(I) DOLLAR VALUES OF ITH EXPERIMENTERS CHIT
 C PREST(I) ESTIMATED PERCENTAGE OF PROJECTED COSTS FOR ITH EXP
 C PRCNT(I) ACTUAL PERCENTAGE OF PROJECTED COSTS FOR ITH EXP
 C PRTOT(I) ACTUAL PERCENTAGE OF TOTAL DOLLARS

C *****
 C

ADDEST=0.0
 ADDCOST=0.0
 SPEEST=0.0
 ISEARCH=0.
 SPECOST=0.0
 ISETADD=0
 ISETSPE=0
 DO 10 I=1,8
 QXADDC(I)=0.0
 QXSPECC(I)=0.0
 QPRCNT(I)=0.0
 QACT(I)=0.0
 A(I)=0
 B(I)=0
 C(I)=0
 D(I)=0
 E(I)=BLANK1
 F(I)=BLANK1
 G(I)=BLANK1
 R(I)=0
 P(I)=0
 XADDP(I)=0.0
 XADDC(I)=0.0
 XSPECC(I)=0.0
 XSPECP(I)=0.0
 EST(I)=0.0
 ACT(I)=0.0
 NUM(I)=0.0
 TOT(I)=0.0
 CHIT(I)=0C0
 PREST(I)=0.0
 PRCNT(I)=0.0

```

    PRIOR: 1) - 0.0
10 CONTINUE
    COST1=0.0
    COST11=0.0
    COST14=0.0
    INDEX=0

```

```

*****

```

```

    INDEX = 0          FIRST PASS THRU DATA TO OBTAIN SUPPORT
                        FRACTION
    INDEX = 1          USE SUPPORT FACTOR (SUFFACT) TO CORRECT
                        DATA FOR SUPPORT
    ISPEC = 1          SUMMARY OF SPECIAL EXAMINATIONS
    IADD = 1           SUMMARY OF ADDITIONAL EXAMINATIONS
    ISUM = 1           SUMMARY OF EXAMINATIONS
    LIST = 1           COMPLETE LISTING OF EACH FUEL PIE
    IQUART = 1         PRODUCES SUMMARY OF SPECIAL AND ADDITIONAL
                        EXAMINATIONS, AND PINS COMPLETED DURING
                        QUARTLY PERIOD
    IANN = 1           PRODUCES SUMMARY OF PINS COMPLETED DURING
                        THE FISCAL YEAR

```

```

*****

```

```

ISPEC=0
IADD=0
ISUM=0
LIST=0
IQUART=0
IANN=0
LCMB1=0
LCMB11 0
LCMB14 0

```

```

*****

```

```

    READS IN CONTROL CARDS

```

```

*****

```

```

20 READ (1,1450) ADATA
   IF (EOF.1) 40.30
30 CONTINUE
   IF (ADATA(1).EQ.CMB1) LCMB1=1
   IF (ADATA(1).EQ.CMB11) LCMB11=1
   IF (ADATA(1).EQ.CMB14) LCMB14=1
   IF (ADATA(1).EQ.LISTDAT) GO TO B10
   IF (ADATA(1).EQ.FULL) LIST=1
   IF (ADATA(1).EQ.SUMMARY) ISUM=1
   IF (ADATA(1).EQ.ADD) IADD=1
   IF (ADATA(1).EQ.SPEC) ISPEC=1
   IF (ADATA(1).EQ.QUARTER) IQUART=1
   IF (ADATA(1).EQ.ANNUAL) IANN=1

```

```

*****

```

```

    ISUM = 1  GENERATES ONLY THE SUMMARY DATA, NOT A FULL LISTING
    LIST = 1  COMPLETE LISTING WITH SUMMARY DATA
    ISPEC = 1  LISTS ONLY THE SPECIAL EXAMINATIONS
    IADD = 1  LISTS ONLY THE ADDITIONAL EXAMINATIONS
    IF ISPEC = 1 AND IADD = 1 PRODUCES COMBINATION LISTING OF
    SPECIAL AND ADDITIONAL EXAMINATIONS

```

```

*****

```

```

   IF (ADATA(1).EQ.START) DECODE (10,1460,ADATA(2))A
   IF (ADATA(1).EQ.LAST) DECODE (10,1460,ADATA(2))B
   IF (ADATA(1).EQ.FISCAL) DECODE (10,1460,ADATA(2))C
   IF (ADATA(1).EQ.CHITS) DECODE (10,1460,ADATA(2))D
   IF (ADATA(1).EQ.CHITS) DECODE (10,1470,ADATA(3))TOTCHIT
   IF (ADATA(1).EQ.QSTART) DECODE (10,1460,ADATA(2))P
   IF (ADATA(1).EQ.QEND) DECODE (10,1460,ADATA(2))R
   GO TO 20

```

```

40 CONTINUE
   IF (IANN.EQ.1) GO TO 50
   IF (IADD.EQ.1) WRITE (21,1500)
   IF (ISPEC.EQ.1) WRITE (22,1490)

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```

50 CONTINUE
   FYEAR=1970+C(1)
   IF (IADD.EQ.1.AND.IANN.EQ.1) WRITE (21,2060)FYEAR
   IF (ISPEC.EQ.1.AND.IANN.EQ.1) WRITE (22,2070)FYEAR
   IF (IADD.EQ.1.AND.IQUART.EQ.1) WRITE (23,1900)
   IF (ISPEC.EQ.1.AND.IQUART.EQ.1) WRITE (29,1910)
   DATES=A(2)*100000+A(3)*10000+A(4)*1000+A(5)*100+A(6)*10+A(7)
   DATEL=B(1)*100000+B(2)*10000+B(3)*1000+B(4)*100+B(5)*10+B(6)
   NCHITS=D(1)
   DAYST=0.0
   AMTTOT=0.0

```

```

C      ****
C      TOTCHIT  TOTAL FUNDS AVAILABLE FOR EXAMINATIONS
C      FCMB1    DOLLAR CHARGES PER WORK UNIT IN CMB-1
C      FCMB11   DOLLAR CHARGES PER WORK UNIT IN CMB-11
C      FCMB14   DOLLAR CHARGES PER WORK UNIT IN CMB-14
C      ****
C      FCMB1=20.8
C      FCMB11=0.7
C      FCMB14=0.0
C      WRITE (20,1510)
C      WRITE (20,1520)
C      WRITE (20,1530)
C      IF (1QUART.EQ.1) WRITE (27,1920)
C      IF (1QUART.EQ.1) WRITE (27,1520)
C      IF (1QUART.EQ.1) WRITE (27,1530)
C      IF (1ANN.EQ.1) WRITE (27,2020) FYEAR
C      IF (1ANN.EQ.1) WRITE (27,1520)
C      IF (1ANN.EQ.1) WRITE (27,1530)
C      SUPFACT=1.0
C      ****
C      READS IN EXPERIMENTER IDENTIFICATION, CODE WORD, DOLLARS IN CHIT
C      ****
C      DO 70 I=1,NCHITS
C      READ (1,1540) E(I),F(I),C(I),CODE(I),CHIT(I)
C      IF (EOF,1) GO,60
C60  CONTINUE
C70  CONTINUE
C80  CONTINUE
C      ****
C      LFY      LAST FISCAL YEAR
C      MFY      MONEY FISCAL YEAR - PRESENT YEAR
C      ****
C      READ (1,1180) ICOPY
C      IF (EOF,1) GO,100
C90  ICOPY=1
C100 CONTINUE
C      READ (1,1550) (TITLE(L),L=1,7)
C      IF (EOF,1) GO,120
C110 WRITE (2,1160)
C120 CONTINUE
C      AMTTO1=0.0
C      CALL DATE (MMDDYY)
C      DECODE (10,1190,MMDDYY) IMTH,1DAY,1YR
C      LFY=FYEAR-1
C      MFY=FYEAR
C      M12=B(1)*10+B(2)
C      M34=B(3)*10+B(4)
C      M56=B(5)*10+B(6)
C      N12=A(2)*10+A(3)
C      N34=A(4)*10+A(5)
C      N56=A(6)*10+A(7)
C      QS12=P(1)*10+P(2)
C      QS34=P(3)*10+P(4)
C      QS56=P(5)*10+P(6)
C      QE12=R(1)*10+R(2)
C      QE34=R(3)*10+R(4)
C      QE56=R(5)*10+R(6)
C      ****
C      M12      PRESENT MONTH
C      M34      PRESENT DAY
C      M56      PRESENT YEAR
C      THIS SECTION CALCULATES THE NUMBER OF DAYS FOR THIS FISCAL YEAR
C      FOR COMPUTING SUPPORT FRACTIONS
C      N12      MONTH OF STARTING DATE
C      N34      DAY OF STARTING DATE
C      N56      YEAR OF STARTING DATE
C      ****
C      ISTART=N56*10000.+N12*100.+N34
C      IEND=N56*10000.+N12*100.+N34
C      DAYS=0
C      QDAYS=0
C      IF (N12.GT.7) DAYS=DAYS+31
C      IF (N12.GT.8) DAYS=DAYS+31
C      IF (N12.GT.9) DAYS=DAYS+30
C      IF (N12.GT.10) DAYS=DAYS+31
C      IF (N12.GT.11) DAYS=DAYS+30

```

[illegible]


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C *****
C
WRITE (ITPEL,1770) NUMX, EXP1, EXP2, EXP3, CLASS, FYTOT
WRITE (ITPEL,1780)
DO 330 I=1,NCHITS
IF (EXP1.EQ.CODE(1)) NUM(I)=NUM(I)+1
330 CONTINUE
340 CONTINUE
TOTAL=0.0
ESTIMAT=0.0
QCPIE=0.0
OTOTAL=0.0
ANNCOMP=0
C *****
C
C CHECK FOUR DIGIT CODE FOR PROGRAM CONTROL.
C TYPE1 AND TYPE2 DESCRIPTION PARAMETERS
C IDATECP DATE PIE COMPLETED
C IDATERQ DATE PIE REQUESTED
C IDATERP DATE PIE REPORTED
C WRKUNT WORK UNIT VALUES ASSIGNED TO EACH EXAMINATION
C IGRP GROUP PERFORMING EXAMINATION
C *****
C
350 READ (23,1790) CHECK, TYPE1, TYPE2, IDATERQ, IDATECP, IDATERP, WRKUNT, 'GR
IF
IF (ENDFILE 23) 450,360
360 CONTINUE
IF (CHECK.EQ.ASTER4) ISETADD=0
IF (CHECK.EQ.ASTER4) ISETSPE=0
IF (CHECK.EQ.ASTER4) GO TO 140
IF (CHECK.EQ.ASTER3) ISETADD=1
IF (CHECK.EQ.ASTER3) ISETSPE=0
IF (CHECK.EQ.ASTER2) ISETSPE=1
IF (CHECK.EQ.ASTER2) ISETADD=0
IF (INDEX.LT.1) GO TO 370
IF (CHECK.EQ.ASTER3) WRITE (ITPEL,1610)
IF (CHECK.EQ.ASTER3) GO TO 350
IF (CHECK.EQ.ASTER2) WRITE (ITPEL,1600)
IF (CHECK.EQ.ASTER2) GO TO 350
IF (CHECK.EQ.NDT.AND.TYPE1.EQ.CAP) WRITE (ITPEL,1800)
IF (CHECK.EQ.NDT.AND.TYPE1.EQ.CAP) GO TO 350
IF (CHECK.EQ.NDT.AND.TYPE1.EQ.PIN) WRITE (ITPEL,1810)
IF (CHECK.EQ.NDT.AND.TYPE1.EQ.PIN) GO TO 350
IF (CHECK.EQ.DEST) WRITE (ITPEL,1820)
IF (CHECK.EQ.DEST) GO TO 350
370 CONTINUE
C *****
C
C PCPIE PROJECTED COST OF POSTIRRADIATION EXAMINATION
C CPIE COST OF POSTIRRADIATION EXAMINATION
C QCPIE COST OF POSTIRRADIATION EXAMINATION DURING QUARTERLY
C PERIOD
C *****
C
PCPIE=0.0
CPIE=0.0
QCPIE=0.0
IF (INDEX.LT.1.AND.CHECK.EQ.DEST) GO TO 350
IF (INDEX.LT.1.AND.CHECK.EQ.NDT) GO TO 350
IF (INDEX.LT.1.AND.CHECK.EQ.ASTER2) GO TO 350
IF (INDEX.LT.1.AND.CHECK.EQ.ASTER3) GO TO 350
IF (IDATECP.LT.1) IDATECP=IDATERP
IF (IDATERQ.LT.1.AND.IDATECP.LT.1) GO TO 350
C *****
C
C SELECTS WHICH GROUP FACTOR WILL BE USED TO COMPUTE CHARGES
C *****
C
IF (ISETADD.NE.1.AND.IDATERQ.GT.0.AND.IDATECP.LT.1) ICOMP=1
IF (IGRP.EQ.1) FACTOR=FCMB1
IF (IGRP.EQ.11) FACTOR=FCMB11
IF (IGRP.EQ.14) FACTOR=FCMB14
IF (IGRP.EQ.0) FACTOR=0.0
IF (IGRP.EQ.99) GO TO 440
IF (IDATECP.LT.1) GO TO 380
I12=IDATECP/10000.
I34=IDATECP/100.-I12*100.
I56=IDATECP-I12*10000.-I34*100.
ISTEND=I56*10000+I12*100+I34
ITRUE12=0
ITRUE56=0
IF (I12.GE.QS12.AND.I12.LE.QE12.AND.I12.GT.J12.AND.ISETADD.NE.1.AN
ID.IQUART.EQ.1) ITRUE12=1
IF (I56.GE.QS56.AND.I56.LE.QE56.AND.I56.GT.J56.AND.ISETADD.NE.1.AN
ID.IQUART.EQ.1) ITRUE56=1

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REWIND 20
END FILE 24
END FILE 24
END FILE 25
END FILE 25
END FILE 26
END FILE 26
END FILE 27
REWIND 27
END FILE 28
REWIND 28
END FILE 29
REWIND 29
L=1
510 CONTINUE
L=L+1
WRITE (2,1270) (TITLE(I), I=1,7), 1MTH, 1DAY, 1YR
WRITE (2,1620) NCHITS
WRITE (2,1640)
COST1=TEMP1
COST11=TEMP11
COST14=TEMP14
TOTGRP=COST1+COST11+COST14
PRCNT1=(COST1/TOTGRP)*100.0
PRCNT11=(COST11/TOTGRP)*100.0
PRCNT14=(COST14/TOTGRP)*100.0
WRITE (2,1650) SUPPORT, AMT, DAYS
IF (1QUART.EQ.1) WRITE (2,2010) QDAYS
TOT1=0.0
TOT11=0.0
TOT14=0.0
TOT1=COST1*SUPFACT
TOT11=COST11*SUPFACT
TOT14=COST14*SUPFACT
WRITE (2,1660)
WRITE (2,1700) COST1, TOT1, PRCNT1
WRITE (2,1710) COST11, TOT11, PRCNT11
WRITE (2,1720) COST14, TOT14, PRCNT14
WRITE (2,1410)
WRITE (2,1230)
WRITE (2,1240)
IF (N34.GT.9) WRITE (2,1250) FYEAR, N12, N34, N36, N12, M34, M36
IF (N34.LT.10) WRITE (2,1260) FYEAR, N12, N34, N36, N12, M34, M36
WRITE (2,1870) FYEAR
DO 520 I=1, NCHITS
WRITE (2,1630) E(I), F(I), CHIT(I), EST(I), PREST(I), ACT(I), PRCNT(I), NU
1M(I)
520 CONTINUE
WRITE (2,1670)
WRITE (2,1680)
DO 530 I=1, NCHITS
WRITE (2,1690) E(I), F(I), XADDP(I), XADDC(I), XSPECP(I), XSPECC(I)
530 CONTINUE
IF (1QUART.EQ.1) WRITE (2,1230)
IF (1QUART.EQ.1) WRITE (2,1240)
IF (QS34.GT.9.AND.1QUART.EQ.1) WRITE (2,1930) QS12, QS34, QS56, QE12, Q
1E34, QE56
IF (QS34.LT.10.AND.1QUART.EQ.1) WRITE (2,1940) QS12, QS34, QS56, Q12,
1QE34, QE56
IF (1QUART.EQ.1) WRITE (2,1950) FYEAR
DO 540 I=1, NCHITS
IF (1QUART.EQ.1) WRITE (2,1960) E(I), F(I), CHIT(I), QACT(I), QPRCNT(I)
540 CONTINUE
IF (1QUART.EQ.1) WRITE (2,1970)
IF (1QUART.EQ.1) WRITE (2,1980)
DO 550 I=1, NCHITS
IF (1QUART.EQ.1) WRITE (2,1990) E(I), F(I), QXADDC(I), QXSPECC(I)
550 CONTINUE
WRITE (2,1410)
WRITE (2,1350)
WRITE (2,1360) CLASS10, CLASS1B
WRITE (2,1370) CLASS20, CLASS2B
WRITE (2,1380) CLASS30, CLASS3B
WRITE (2,1390) CLASS40, CLASS4B
WRITE (2,1400) CLASS50, CLASS5B
DO 560 I=1, 27
K=2+I
REWIND K
560 CONTINUE
570 READ (20,1860) (DATA(I), I=1,13)
IF (EOF,20) 590,580
580 WRITE (2,1860) (DATA(I), I=1,13)
GO TO 570
590 CONTINUE
600 READ (27,1860) (DATA(I), I=1,13)
IF (EOF,27) 620,610
610 WRITE (2,1860) (DATA(I), I=1,13)
GO TO 600
620 CONTINUE
WRITE (2,1760)
IF (1ADD.NE.1.AND.LIST.NE.1) GO TO 650

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630 READ (21,1860)(DATA(I),I=1,13)
    IF (EOF,21) 650,640
640 WRITE (2,1860)(DATA(I),I=1,13)
    GO TO 630
650 CONTINUE
    WRITE (2,1760)
    IF (ISPEC.NE.1.AND.LIST.NE.1) GO TO 680
660 READ (22,1860)(DATA(I),I=1,13)
    IF (EOF,22) 680,670
670 WRITE (2,1860)(DATA(I),I=1,13)
    GO TO 660
680 CONTINUE
    WRITE (2,1760)
    IF (IQUART.EQ.1) GO TO 710
    IF (IANN.EQ.1) GO TO 750
690 READ (28,1860)(DATA(I),I=1,13)
    IF (EOF,28) 710,700
700 WRITE (2,1860)(DATA(I),I=1,13)
    GO TO 690
710 CONTINUE
    IF (IQUART.EQ.1) WRITE (2,1760)
    IF (ISPEC.NE.1.AND.IQUART.NE.1) GO TO 740
720 READ (29,1860)(DATA(I),I=1,13)
    IF (EOF,29) 740,730
730 WRITE (2,1860)(DATA(I),I=1,13)
    GO TO 720
740 CONTINUE
    IF (IQUART.EQ.1) WRITE (2,1760)
750 CONTINUE
    ITAPE=3
760 CONTINUE
    IF (ISUM.EQ.1.AND.LIST.NE.1.AND.ITAPE.GT.10) GO TO 800
    IF (ISUM.NE.1.AND.LIST.NE.1) GO TO 800
    REWIND ITAPE
770 READ (ITAPE,1860)(DATA(I),I=1,13)
    IF (EOF,ITAPE) 790,780
780 WRITE (2,1860)(DATA(I),I=1,13)
    GO TO 770
790 ITAPE=ITAPE+1
    IF (ITAPE.GT.18) GO TO 800
    GO TO 760
800 CONTINUE
    IF (L.GT.1COPY) GO TO 850
    GO TO 810
810 CONTINUE
    WRITE (2,1440)
    REWIND 23
820 READ (23,1420)(A(I),I=1,9)
    IF (ENDFILE 23) 840,830
830 WRITE (2,1430)(A(I),I=1,9)
    GO TO 820
840 CONTINUE
850 IF (LCMB1.NE.1.AND.LCMB11.NE.1.AND.LCMB14.NE.1) STOP
    IF (IQUART.EQ.0.AND.IANN.EQ.0) STOP
    DO 860 I=1,NCHITS
        K=2+I
        REWIND K
860 CONTINUE
    IF (LCMB1.NE.1) GO TO 950
    IF (IQUART.EQ.1) WRITE (2,1280)
    IF (IANN.EQ.1) WRITE (2,2030)FYEAR
    WRITE (2,1300)
    REWIND 24
870 READ (24,1750)NUMX,EXP1,EXP2,EXP3
    IF (EOF,24) 910,880
880 READ (24,1830)CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    IF (EOF,24) 910,890
890 WRITE (2,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    IF
        DO 900 I=1,NCHITS
            K=2+I
            IF (EXP1.EQ.CODE(I)) WRITE (K,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1
            IF (TYPE2.IDATERQ.IDATECP)
900 CONTINUE
            GO TO 870
910 CONTINUE
            DO 940 I=1,NCHITS
                K=2+I
                END FILE K
                END FILE K
                REWIND K
                KPASS=0
920 READ (K,1320)FACT
                IF (EOF,K) 940,930
930 KPASS=KPASS+1
                IF (KPASS.EQ.1) WRITE (2,1290)E(I),F(I),G(I)
                WRITE (2,1320)FACT
                GO TO 920
940 CONTINUE

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950 IF (LCMB11.NE.1) GO TO 1050
    IF (QUART.EQ.1) WRITE (2,1330)
    IF (JANN.EQ.1) WRITE (2,2040)FYEAR
    WRITE (2,1300)
    DO 960 I=1,NCHITS
    K=2+I
960 REWIND K
    REWIND 25
970 READ (25,1750)NUMX,EXP1,EXP2,EXP3
    IF (EOF,25) 1010,980
980 READ (25,1830)CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    IF (EOF,25) 1010,990
990 WRITE (2,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    1P
    DO 1000 I=1,NCHITS
    K=2+I
    IF (EXP1.EQ.CODE(1)) WRITE (K,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
1000 CONTINUE
    GO TO 970
1010 CONTINUE
    DO 1040 I=1,NCHITS
    K=2+I
    END FILE K
    END FILE K
    REWIND K
    KPASS=0
1020 READ (K,1320)FACT
    IF (EOF,K) 1040,1030
1030 KPASS=KPASS+1
    IF (KPASS.EQ.1) WRITE (2,1880)E(1),F(1),G(1)
    WRITE (2,1320)FACT
    GO TO 1020
1040 CONTINUE
1050 CONTINUE
    IF (LCMB14.NE.1) GO TO 1150
    IF (QUART.EQ.1) WRITE (2,1340)
    IF (JANN.EQ.1) WRITE (2,2050)FYEAR
    WRITE (2,1300)
    DO 1060 I=1,NCHITS
    K=2+I
1060 REWIND K
    REWIND 26
1070 READ (26,1750)NUMX,EXP1,EXP2,EXP3
    IF (EOF,26) 1110,1080
1080 READ (26,1830)CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    IF (EOF,26) 1110,1090
1090 WRITE (2,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
    1P
    DO 1100 I=1,NCHITS
    K=2+I
    IF (EXP1.EQ.CODE(1)) WRITE (K,1310)NUMX,EXP1,EXP2,EXP3,CHECK,TYPE1,TYPE2,IDATERQ,IDATECP
1100 CONTINUE
    GO TO 1070
1110 CONTINUE
    DO 1140 I=1,NCHITS
    K=2+I
    END FILE K
    END FILE K
    REWIND K
    KPASS=0
1120 READ (K,1320)FACT
    IF (EOF,K) 1140,1130
1130 KPASS=KPASS+1
    IF (KPASS.EQ.1) WRITE (2,1890)E(1),F(1),G(1)
    WRITE (2,1320)FACT
    GO TO 1120
1140 CONTINUE
1150 STOP

```

C
C
C
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C
C

FORMATS

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1160 FORMAT (10X,'ERROR ON INPUT - NO TITLE CARD')
1170 FORMAT (3X,13,8X,A2,2A10,6X,A2,8X,9HCOMPLETED,5X,F10.2,6X,F10.2)
1180 FORMAT (11)
1190 FORMAT (312)
1200 FORMAT (3X,73,8X,A2,2A10,6X,A2,8X,9HCOMPLETED,5X,F10.2,6X,F10.2,16
1X,F9.2)
1210 FORMAT (3X,13,8X,A2,2A10,6X,A2,22X,F10.2,6X,F10.2,16X,F9.2)
1220 FORMAT (3X,13,8X,A2,2A10,6X,A2,8X,9HCOMPLETED5X,F10.2,6X,F10.2)
1230 FORMAT (1H1,///37X,76H***** COSTING AND COST ALLOCATIONS FOR FUEL
EXAMINATION - PROGRAM D401 *****//)
1240 FORMAT (50X,32HLOS ALAMOS SCIENTIFIC LABORATORY,///)
1250 FORMAT (//.32X,34H*** SUMMARY SHEET FOR FISCAL YEAR ,14,6H FROM ,1
12,1H-12,1H-12,4H TO 12,1H-12,1H-12,4H ***//)
1260 FORMAT (//.32X,34H*** SUMMARY SHEET FOR FISCAL YEAR ,14,6H FROM ,1
12,1H-11,1H-12,4H TO 12,1H-12,1H-12,4H ***//)

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1270 FORMAT (1H1,/,/,3X,7A10,27X,5HDATE,12,1B-12,1B-12)
1280 FORMAT (1H1,28X,74H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-1
DURING QUARTERLY PERIOD ***,/)
1290 FORMAT (1H1,5X,23HCMB-1 EXAMINATIONS FOR,3A10,/,/,9H LASL NO.,5X,
127HEXPERIMENTER IDENTIFICATION,5X,23HEXAMINATION DESCRIPTION,4X,9H
2REQUESTED,4X,9HCOMPLETED,/)
1300 FORMAT (/,/,9H LASL NO.,5X,27HEXPERIMENTER IDENTIFICATION,5X,23HEX
AMINATION DESCRIPTION,4X,9HREQUESTED,4X,9HCOMPLETED,/)
1310 FORMAT (6H LASL 13,7X,A2,2A10,8X,A4,2A10,5X,16,7%,16)
1320 FORMAT (10A10)
1330 FORMAT (1H1,27X,75H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-11
1 DURING QUARTERLY PERIOD ***,/)
1340 FORMAT (1H1,27X,75H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-14
1 DURING QUARTERLY PERIOD ***,/)
1350 FORMAT (1H1,/,/,41X,48H*** ASSIGNED COST FOR EACH EXAMINATION CL
ASS ***,/)
1360 FORMAT (11X,24HCLASS 1 UNBREACHED - 1U ,F12.2,20X,22HCLASS 1 BREAC
IHED - 1B ,F12.2,/)
1370 FORMAT (11X,24HCLASS 2 UNBREACHED - 2U ,F12.2,20X,22HCLASS 2 BREAC
IHED - 2B ,F12.2,/)
1380 FORMAT (11X,24HCLASS 3 UNBREACHED - 3U ,F12.2,20X,22HCLASS 3 BREAC
IHED - 3B ,F12.2,/)
1390 FORMAT (11X,24HCLASS 4 UNBREACHED - 4U ,F12.2,20X,22HCLASS 4 BREAC
IHED - 4B ,F12.2,/)
1400 FORMAT (11X,24HCLASS 5 UNBREACHED - 5U ,F12.2,20X,22HCLASS 5 BREAC
IHED - 5B ,F12.2,/)
1410 FORMAT (/,/,/,/)
1420 FORMAT (9A10)
1430 FORMAT (1X,9A10)
1440 FORMAT (1H1,/,/,10X,32HLISTING OF DATA ON FUEL PIN LIST,/,/)
1450 FORMAT (8A10)
1460 FORMAT (10I1)
1470 FORMAT (F10.3)
1480 FORMAT (3X,13,15X,A2,2A10,5X,A4,2A10,8X,F12.2,12X,F12.2)
1490 FORMAT (1H1,/,/,33X,64H*** SUMMARY SHEET FOR SPECIAL EXAMINATIONS
1COMPLETED TO DATE ***,/,/,1X,8ELASL NO.,8X,19HPIN IDENTIFICATION ,
215X,11HEXAMINATION,19X,14HPROJECTED COST,12X,11HACTUAL COST,/)
1500 FORMAT (1H1,/,/,31X,67H*** SUMMARY SHEET FOR ADDITIONAL EXAMINATIO
1NS COMPLETED TO DATE ***,/,/,1X,8HLASL NO.,8X,19H PIN IDENTIFICATI
2ON,15X,11HEXAMINATION,19X,14HPROJECTED COST,12X,11HACTUAL COST,/)
1510 FORMAT (1H1,/,/,32X,66H*** SUMMARY SHEET FOR INDIVIDUAL PIN EXAMINA
1TION COSTS TO DATE ***,/)
1520 FORMAT (/70X,7HPRESENT,10X,5HTOTAL)
1530 FORMAT (1X,8HLASL NO.,6X,18HPIN IDENTIFICATION,8X,7H CLASS ,8X,6HS
1STATUS,8X,6H FY TOTAL,8X,6HALL FYS ,10X,18HCLASS COST OVERRUN,/)
1540 FORMAT (3A10,A2,8X,F10.2)
1550 FORMAT (8A10)
1560 FORMAT (/,/,3X,6H LASL ,5X,13HEXPERIMENTER ,10X,11HEXAMINATION,10X
1,9HESTIMATED,5X,7HO/O OF ,5X,7H TOTAL ,5X,6HO/O OF)
1570 FORMAT (3X,6HNUMBER,7X,6HNUMBER,10X,5HCLASS,15X,4HCOST,9X,4HCIT,8
1X,4HCOST,8X,4HCIT,/)
1580 FORMAT (/66X,12H TOTAL(S) = ,4X,F12.2,3X,F12.2)
1590 FORMAT (/76X,14H DIFFERENCE = ,F12.2)
1600 FORMAT (/36H SPECIAL REQUEST(S) FOR EXAMINATION ,/)
1610 FORMAT (/39H ADDITIONAL REQUEST(S) FOR EXAMINATION ,/)
1620 FORMAT (/,/,5X,18HNUMBER OF CHITS = ,12,/)
1630 FORMAT (/1X,2A10,5X,F10.2,8X,F10.2,10X,F7.2,10X,F12.2,9X,F7.2,9X,
116)
1640 FORMAT (/,/,55X,31H*** GROUP SUMMARY ***,/)
1650 FORMAT (5X,10HSUPPORT = ,F12.2,10X,10H AMOUNT = ,F12.2,10X,37H NUM
1BER OF DAYS IN REPORTED PERIOD = ,F6.2,/)
1660 FORMAT (/,/,5X,10H CMB GROUP,9X,13HAMOUNT COSTED,9X,12HTOTAL COSTED
1,9X,16HPERCENT OF TOTAL,/)
1670 FORMAT (/,/,/,/,2B0.,39X,25H ADDITIONAL EXAMINATIONS ,22X,20HSPECI
1AL EXAMINATIONS)
1680 FORMAT (5X,13HORCANIZATION ,22X,9HPROJECTED,13X,6HCOSTED,18X,9HPRO
1JECTED,10X,6HCOSTED,/)
1690 FORMAT (1X,2A10,16X,F12.2,8X,F12.2,14X,F12.2,5X,F12.2,/)
1700 FORMAT (11X,1H1,14X,F10.2,10X,F10.2,10X,F10.2,/)
1710 FORMAT (10X,2H11,14X,F10.2,10X,F10.2,10X,F10.2,/)
1720 FORMAT (10X,2H14,14X,F10.2,10X,F10.2,10X,F10.2,/)
1730 FORMAT (1H1,/,/,20X,8A10,/,/)
1740 FORMAT (3X,13,8X,A2,2A10,6X,A2,22X,F10.2,6X,F10.2)
1750 FORMAT (13,3X,A2,2A10,8X,A2,F10.3)
1760 FORMAT (/,/,10X,97HTHE DOLLAR VALUES MAY VARY BETWEEN ACCOUNTING PE
1RIODS DUE TO CHANGES IN THE SUPPORTING ACTIVITIES,/,/)
1770 FORMAT (1H1,/,/,9H LASL NO.,13,5X,A2,2A10,5X,19H EXAMINATION CLASS ,
1A2,10X,19H PREVIOUS FY TOTAL ,F12.2,/,/)
1780 FORMAT (6X,13H EXAMINATION ,11X,15H DATE REQUESTED,4X,14HDATE COMP
1LETED,6X,10HWORK UNITS,6X,12H EST COST ,4X,10HTOTAL COST,/)
1790 FORMAT (A4,2A10,6X,16,6X,16,6X,16,6X,F6.2,6X,12)
1800 FORMAT (/25H***** NDT - CAPSULE *****,/)
1810 FORMAT (/21H***** NDT - PIN *****,/)
1820 FORMAT (/29H***** DESTRUCTIVE - PIN *****,/)
1830 FORMAT (1X,A4,2A10,9X,16,12X,16,12X,F8.2,4X,F12.2,3X,F12.2)
1840 FORMAT (1B ,115X,12H ERROR IGRP)
1850 FORMAT (3X,13,7X,A2,2A10,8X,A2,11X,F10.2,6X,F6.2,2X,F10.2,6X,F6.2)
1860 FORMAT (13A10)

1870 FORMAT (///,5X,12HORGANIZATION,10X,3HFY,14,5H CHIT,5X,9HCOMMITTED
1,9X,13H0/0 COMMITTED,10X,6HCOSTED,16X,10H0/0 COSTED,6X,12HFUEL ELE
2MENT,//)

1880 FORMAT (1H1,5X,24HCMB-11 EXAMINATIONS FOR ,3A10,///,9H LASHL NO.,5X
1,27HEXPERIMENTER IDENTIFICATION,5X,23HEXAMINATION DESCRIPTION,4X,9
2HREQUESTED,4X,9HCOMPLETED,//)

1890 FORMAT (1H1,5X,24HCMB-14 EXAMINATIONS FOR ,3A10,///,9H LASHL NO.,5X
1,27HEXPERIMENTER IDENTIFICATION,5X,23HEXAMINATION DESCRIPTION,4X,9
2HREQUESTED,4X,9HCOMPLETED,//)

1900 FORMAT (1H1,///,24X,83H*** SUMMARY SHEET FOR ADDITIONAL EXAMINATIO
NS COMPLETED DURING QUARTERLY PERIOD ***,///,13X,8HLASL NO.,8X,19H
2 PIN IDENTIFICATION,15X,11HEXAMINATION,19X,11HACTUAL COST,//)

1910 FORMAT (1H1,///,25X,80H*** SUMMARY SHEET FOR SPECIAL EXAMINATIONS
1COMPLETED DURING QUARTERLY PERIOD ***,///,13X,8HLASL NO.,8X,19H P
2N IDENTIFICATION,15X,11HEXAMINATION,19X,11HACTUAL COST,//)

1920 FORMAT (1H1,///,27X,75H*** SUMMARY SHEET FOR INDIVIDUAL PINS COMPLE
TED DURING QUARTERLY PERIOD ***,//)

1930 FORMAT (///,29X,39H*** SUMMARY SHEET FOR QUARTERLY PERIOD ,6H FROM
1,12,1H-12,1H-12,4H TO 12,1H-12,1H-12,4H ***)

1940 FORMAT (///,29X,39H*** SUMMARY SHEET FOR QUARTERLY PERIOD ,6H FROM
1,12,1H-11,1H-12,4H TO 12,1H-12,1H-12,4H ***)

1950 FORMAT (///,20X,12HORGANIZATION,14X,3HFY,14,5H CHIT,12X,6HCOSTED
112X,10H0/0 COSTED,//)

1960 FORMAT (/,15X,2A10,11X,F10.2,11X,F10.2,12X,F7.2)

1970 FORMAT (////////,2H0.,48X,23HADDITIONAL EXAMINATIONS,16X,20HSPECIAL
1 EXAMINATIONS)

1980 FORMAT (20X,12HORGANIZATION,26X,6HCOSTED,31X,6HCOSTED,//)

1990 FORMAT (15X,2A10,19X,F10.2,29X,F10.2//)

2000 FORMAT (16X,13,15X,A2,2A10,5X,A4,2A10,8X,F12.2)

2010 FORMAT (69X,36H NUMBER OF DAYS IN QUARTER PERIOD = ,F6.2,///)

2020 FORMAT (1H1,///,32X,67H*** SUMMARY SHEET FOR INDIVIDUAL PINS COMPLE
TED DURING FISCAL YEAR ,14,4H ***,//)

2030 FORMAT (1H1,28X,66H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-1
1DURING FISCAL YEAR ,14,4H ***,//)

2040 FORMAT (1H1,27X,67H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-11
1 DURING FISCAL YEAR ,14,4H ***,//)

2050 FORMAT (1H1,27X,67H*** LISTING OF EXAMINATIONS COMPLETED BY CMB-14
1 DURING FISCAL YEAR ,14,4H ***,//)

2060 FORMAT (1H1,///,28X,75H*** SUMMARY SHEET FOR ADDITIONAL EXAMINATIO
NS COMPLETED DURING FISCAL YEAR ,14,4H ***,///,1X,8HLASL NO.,8X,19
2H PIN IDENTIFICATION,15X,11HEXAMINATION,19X,14HPROJECTED COST,12X,
311HACTUAL COST,//)

2070 FORMAT (1H1,///,29X,72H*** SUMMARY SHEET FOR SPECIAL EXAMINATIONS
1COMPLETED DURING FISCAL YEAR ,14,4H ***,///,1X,8HLASL NO.,8X,19H P
2IN IDENTIFICATION,15X,11HEXAMINATION,19X,14HPROJECTED COST,12X,11H
3ACTUAL COST,//)

APPENDIX G

**** COSTING AND COST ALLOCATIONS FOR FUEL EXAMINATION^a - PROGRAM D401****

LOS ALAMOS SCIENTIFIC LABORATORY

*** SUMMARY SHEET FOR FISCAL YEAR 1975 FROM 7-1-74 TO 6-30-75***

ORGANIZATION	FY 1975 CHIT	COMMITTED	O/O COMMITTED	COSTED	O/O COSTED	NO. PINS
EXPERIMENTER A	238000.00	275173.66	115.62	230582.81	96.88	115
EXPERIMENTER B	102000.00	108554.41	106.43	77756.68	76.23	8
EXPERIMENTER C	300000.00	579584.93	193.19	374600.60	124.87	107
EXPERIMENTER D	360000.00	976309.64	197.71	317059.91	88.07	90

ORGANIZATION	ADDITIONAL EXAMINATIONS		SPECIAL EXAMINATIONS	
	PROJECTED	COSTED	PROJECTED	COSTED
EXPERIMENTER A	41536.18	41536.18	40667.47	37871.80
EXPERIMENTER B	24122.70	24122.70	5296.48	2500.81
EXPERIMENTER C	50032.72	50032.72	22105.67	17404.30
EXPERIMENTER D	40039.50	40039.50	25180.39	23099.95

^aCost figures are hypothetical with the total of the experimenter's chit arbitrarily set to \$1 million.

APPENDIX H

**** COSTING AND COST ALLOCATIONS FOR FUEL EXAMINATION^a - PROGRAM D401****

LOS ALAMOS SCIENTIFIC LABORATORY

*** SUMMARY SHEET FOR QUARTERLY PERIOD FROM 4-1-75 TO 6-30-75 ***

ORGANIZATION	FY 1975 CHIT	COSTED	O/O COSTED
EXPERIMENTER A	238000.00	54689.68	22.98
EXPERIMENTER B	102000.00	35530.64	34.83
EXPERIMENTER C	300000.00	90077.35	30.03
EXPERIMENTER D	360000.00	123266.90	34.24

ORGANIZATION	ADDITIONAL EXAMINATIONS		SPECIAL EXAMINATIONS	
	COSTED		COSTED	
EXPERIMENTER A	22221.80		13036.34	
EXPERIMENTER B	24122.70		0.00	
EXPERIMENTER C	6725.10		159.35	
EXPERIMENTER D	24530.79		11177.22	

^aCost figures are hypothetical with the total of the experimenter's chit arbitrarily set to \$1 million.

APPENDIX I

SUMMARY SHEET FOR INDIVIDUAL PIN EXAMINATION COSTS^a TO DATE

LASL NO.	PIN IDENTIFICATION	CLASS	STATUS	PRESENT FY TOTAL	TOTAL ALL FYS	CLASS COST OVERRUN
102	ED-781		COMPLETED	773.42	773.42	
107	ED-591	1U	COMPLETED	0.00	3598.49	498.49
110	ED-002		COMPLETED	0.00	4356.80	
111	ED-602		COMPLETED	773.42	773.42	
115	ED-2N-34	1B	COMPLETED	31.56	3273.03	
117	EC-Q21		COMPLETED	110.71	110.71	
118	EC-P21		COMPLETED	110.71	110.71	
132	ED-73-B		COMPLETED	0.00	0.00	
135	ED-1N-34	1B	COMPLETED	0.00	1331.81	
140	ED-54	1B	COMPLETED	0.00	8063.46	3463.46
141	ED-46	1B	COMPLETED	31.56	13431.49	8831.49
142	ED-94	1B	COMPLETED	0.00	6560.85	1960.85
143	ED-50		COMPLETED	0.00	0.00	
144	ED-51	4B		8067.82	8067.82	
145	ED-2-3	1B	COMPLETED	31.56	8888.83	4288.83
146	ED-2-2	5B	COMPLETED	11598.59	14025.25	
148	ED-5-3	5B	COMPLETED	31.56	4715.69	
149	ED-B63	5B	COMPLETED	0.00	13638.23	
150	ED-88	5U		0.00	1601.31	
151	ED-39		COMPLETED	773.42	773.42	
152	ED-49	5U	COMPLETED	811.38	7001.25	
153	ED-79	3U	COMPLETED	3545.93	10037.99	
154	ED-89	5B		8396.15	10652.13	
156	ED-601	5B		7394.10	9650.08	
157	ED-011	3U		0.00	3287.52	
158	ED-311	3U		0.00	3287.52	
159	ED-411	3B		0.00	2255.98	
160	ED-581	1U		0.00	1601.31	
161	ED-681	1U		0.00	1601.31	
162	ED-202	1U		0.00	1601.31	
163	ED-203	1U	COMPLETED	0.00	1601.31	
164	ED-204	1U		0.00	1601.31	
165	ED-205	1U		0.00	1601.31	
166	EC-I8F	3U	COMPLETED	0.00	9005.74	
167	EC-I9J	3U	COMPLETED	0.00	8916.99	
168	EC-I10	3U	COMPLETED	0.00	8049.20	

^aCost figures are hypothetical; they were chosen only as examples of the type of output from the computer program.

APPENDIX J

*** SUMMARY SHEET FOR INDIVIDUAL PINS COMPLETED DURING QUARTERLY PERIOD ***

LASL NO.	PIN IDENTIFICATION	CLASS	STATUS	PRESENT ^a FY TOTAL	TOTAL ^a ALL FYS	CLASS COST ^a OVERRUN
144	ED-51	4B	COMPLETED	11796.15	11796.15	
150	ED-88	5U	COMPLETED	0.00	1601.31	
160	ED-581	1U	COMPLETED	0.00	1601.31	
161	ED-681	1U	COMPLETED	0.00	1601.31	
162	ED-202	1U	COMPLETED	0.00	1601.31	
164	ED-204	1U	COMPLETED	0.00	1601.31	
165	ED-205	1U	COMPLETED	0.00	1601.31	
183	EB-100	5B	COMPLETED	46256.51	53455.66	21455.66
261	ED-562	5B	COMPLETED	29438.27	31134.51	
262	ED-622	5U	COMPLETED	13066.86	13066.86	
287	EB-41	5U	COMPLETED	21044.64	25645.90	
289	EB-61	5U	COMPLETED	23792.05	28393.31	
311	EB-60	5U	COMPLETED	24641.10	26337.34	
324	ED-3-2	4U	COMPLETED	9194.35	12028.71	
329	ED-FW6	4B	COMPLETED	9854.29	11188.58	
335	ED-842	5B	COMPLETED	33200.00	35247.01	3247.01
433	ED-331	1U	COMPLETED	4988.00	4988.00	1888.00
434	ED-431	1U	COMPLETED	4988.00	4988.00	1888.00

THE DOLLAR VALUES MAY VARY BETWEEN ACCOUNTING PERIODS DUE TO CHANGES IN THE SUPPORTING ACTIVITIES

^aCost figures are hypothetical; they were chosen only as examples of the type of output from the computer program.

APPENDIX K

SUMMARY SHEET FOR SPECIAL EXAMINATIONS COMPLETED DURING QUARTERLY PERIOD

LASL NO.	PIN IDENTIFICATION	EXAMINATION	ACTUAL COST ^a
183	EB-100	SEQ. SURFACE PREP.	1387.74
272	EC-24	NA D ¹ STILLATION	132.79
327	ED-102	NA DISTILLATION	132.79
329	ED-666	NA DISTILLATION	132.79
334	ED-902	NA DISTILLATION	132.79
335	ED-842	SEQ. SURFACE PREP.	1387.74
408	EA-A81	TWO DIM GAMMA SCAN	931.89
409	EA-A-42	TWO DIM GAMMA SCAN	931.89
410	EA-A-63	TWO DIM GAMMA SCAN	931.89
450	EC-43	SCRIBE REF. MARKS	13.28
451	EC-44	SCRIBE REF. MARKS	13.28

THE DOLLAR VALUES MAY VARY BETWEEN ACCOUNTING PERIODS DUE TO CHANGES IN THE SUPPORT-
ING ACTIVITIES

^aCost figures are hypothetical; they were chosen only as examples of the type of output from the computer program.

APPENDIX L

LASL NO. 419 EC-789-C

EXAMINATION CLASS U

EXAMINATION	DATE REQUESTED	DATE COMPLETED	WORK UNITS ^a	EST ^b COST	TOTAL ^b COST
**** NDT - CAPSULE ****					
CASK UNLOADING	121774	11075	150.	132.28	132.28
VISUAL INSPECTION	121774	11375	75.	66.40	66.40
CONTAMINATION MEAS.	121774	11375	25.	22.13	22.13
RADIATION MEAS.	121774	11375	25.	22.13	22.13
TEMPERATURE MEAS.	121774	11075	25.	22.13	22.13
PROFILOMETRY, OPT.	121774	51475	325.	287.72	287.72
PHOTOG., FULL LENGTH	121774	11775	15.	13.28	13.28
COVER GAS SAMPLING	121774	52775	170.	150.50	150.50
COVER GAS ANALYSIS	121774	72775	3.	69.89	69.89
BONDING REMOVAL	121774	53075	170.	150.50	150.50
CLAD REMOVAL	121774	53075	170.	150.50	150.50
CLAD DISPOSITION	121774	53075	35.	30.98	30.98
CLAD DENSITY PREP.	121774	-0	2.	46.59	0.00
CLAD DENSITY	121774	-0	200.	177.06	0.00
**** NDT - PIN ****					
VISUAL INSPECTION	121774	60275	75.	66.40	66.40
CONTAMINATION MEAS.	121774	60274	25.	22.13	22.13
PROFILOMETRY, OPT.	121774	62475	325.	287.72	287.72
RADIOGRAPHY - BETATRON	121774	-0	610.	540.03	0.00
GROSS GAMMA SCAN	121774	61975	16.	372.76	372.76
SPECT. GAMMA SCAN	121774	61975	30.	698.92	698.92
EDDY CURRENT SCAN	121774	62075	50.	44.26	44.26
**** DESTRUCTIVE - PIN ****					
WIRE WRAP REMOVAL	121774	60975	30.	26.56	26.56
FISSION GAS SAMPLING	121774	-0	170.	26.56	0.00
FISSION GAS ANALYSIS	121774	-0	3.	69.89	0.00
SECTIONING	121774	-0	400.	354.12	0.00
			TOTAL (\$)	=	5358.82
			DIFFERENCE =		2566.13

^a Work units are related to actual dollars by a conversion factor unique to each examining group.

^b Cost figures are hypothetical; they were chosen only as examples of the type of output from the computer program.