

Title: CRC Depletion Calculations for Crystal River Unit 3

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c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
      ELSEIF ((NODES(CT3,2).LT.(100.0)).AND.
c      (NODES(CT3,2).GE.(10.0))) THEN
        WRITE (100,1130) RODS, NODES(CT3,2), IRRAD_STEPS
1130      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F6.3,1X,
c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
      ELSEIF (NODES(CT3,2).LT.(10.0)) THEN
        WRITE (100,1140) RODS, NODES(CT3,2), IRRAD_STEPS
1140      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F5.3,1X,
c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
      ENDIF
      CALL ZEROS(PLEVEL, PLEVELCH)
      CALL ZEROS(CRZONE(CR_DESCRIPTION), CRZONECH)
      IF (MESH.LT.(1.0)) THEN
        WRITE (100,1150) PLEVELCH, CRZONECH, MESH
1150      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c      'numzttotal=',A2,1X,'mxrepeats=0',1X,
c      'mixmod=3 facmesh=',F3.2,1X,'end')
      ELSE
        WRITE (100,1160) PLEVELCH, CRZONECH, MESH
1160      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c      'numzttotal=',A2,1X,'mxrepeats=0',1X,
c      'mixmod=3 facmesh=',F4.2,1X,'end')
      ENDIF
      IF (STEPCONTROL.EQ.'N') THEN
        DO 1169 CT4=1, INT(BLETDOWN(CT1,CT2,2))
          IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
            DO 1164 CT5=1, CRZONE(CR_DESCRIPTION)
              IF (MOD(CT5,6).EQ.0) THEN
                WRITE (100,*)
                ENDIF
                WRITE (100,1162) CRMA(CT5,CR_DESCRIPTION,GTNOW),
c      CRRA(CT5,CR_DESCRIPTION,GTNOW)
1162      FORMAT (I3,1X,F7.5,1X,$)
1164      CONTINUE
                WRITE (100,*)
              ELSEIF (CRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
                DO 1168 CT5=1, CRZONE(CR_DESCRIPTION)
                  IF (MOD(CT5,6).EQ.0) THEN
                    WRITE (100,*)
                    ENDIF
                    WRITE (100,1166) LMC(CT5,CR_DESCRIPTION,GTNOW),
c      LRC(CT5,CR_DESCRIPTION,GTNOW)
1166      FORMAT (I3,1X,F7.5,1X,$)
1168      CONTINUE
                    WRITE (100,*)
                  ENDIF
                CONTINUE
              ENDIF
            CONTINUE
          ELSEIF (STEPCONTROL.EQ.'Y') THEN
            DO 1210 CT4=1, VARSTEPNUM(CT1,CT2)
              IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
                DO 1180 CT5=1, CRZONE(CR_DESCRIPTION)
                  IF (MOD(CT5,6).EQ.0) THEN
                    WRITE (100,*)
                    ENDIF
                    WRITE (100,1170) CRMA(CT5,CR_DESCRIPTION,GTNOW),
c      CRRA(CT5,CR_DESCRIPTION,GTNOW)
1170      FORMAT (I3,1X,F7.5,1X,$)

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1180          CONTINUE
              WRITE (100,*)
              ELSEIF (CRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
                DO 1200 CT5=1,CRZONE(CR_DESCRIPTION)
                  IF (MOD(CT5,6).EQ.0) THEN
                    WRITE (100,*)
                    ENDIF
                    WRITE (100,1190) LMC(CT5,CR_DESCRIPTION,GTNOW),
c                    LRC(CT5,CR_DESCRIPTION,GTNOW)
1190          FORMAT (I3,1X,F7.5,1X,$)
1200          CONTINUE
              WRITE (100,*)
              ENDIF
1210          CONTINUE
          ENDIF
        ENDIF
* Assembly specification if APSR is inserted
      IF ((APSR_INSERTED.EQ..TRUE.) .OR. (FOLLOWIN.EQ..TRUE.)) THEN
        IF (NODES(CT3,2).GE.(100.0)) THEN
          WRITE (100,1220) RODS, NODES(CT3,2), IRRAD_STEPS
1220          FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F7.3,1X,
c          'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ELSEIF ((NODES(CT3,2).LT.(100.0)) .AND.
c          (NODES(CT3,2).GE.(10.0))) THEN
            WRITE (100,1230) RODS, NODES(CT3,2), IRRAD_STEPS
1230          FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F6.3,1X,
c          'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ELSEIF (NODES(CT3,2).LT.(10.0)) THEN
            WRITE (100,1240) RODS, NODES(CT3,2), IRRAD_STEPS
1240          FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F5.3,1X,
c          'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ENDIF
          CALL ZEROS(LEVEL, LEVELCH)
          CALL ZEROS(APSRZONE(APSR_DESCRIPTION), APSRZONECH)
          IF (MESH.LT.(1.0)) THEN
            WRITE (100,1250) LEVELCH, APSRZONECH, MESH
1250          FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c          'numzttotal=',A2,1X,'mxrepeats=0',1X,
c          'mixmod=3 facmesh=',F3.2,1X,'end')
          ELSE
            WRITE (100,1252) LEVELCH, APSRZONECH, MESH
1252          FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c          'numzttotal=',A2,1X,'mxrepeats=0',1X,
c          'mixmod=3 facmesh=',F4.2,1X,'end')
          ENDIF
          IF (STEPCONTROL.EQ.'N') THEN
            DO 1268 CT4=1,INT(BLETDOWN(CT1,CT2,2))
              IF ((APSRINS(CT1,CT2,CT4,CT3).NE.0) .AND.
c              (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).NE.3)) THEN
                DO 1258 CT5=1,APSRZONE(APSR_DESCRIPTION)
                  IF (MOD(CT5,6).EQ.0) THEN
                    WRITE (100,*)
                    ENDIF
                    WRITE (100,1256)
c                    APSRMA(CT5,APSR_DESCRIPTION,GTNOW),
c                    APSRRA(CT5,APSR_DESCRIPTION,GTNOW)
1256          FORMAT (I3,1X,F7.5,1X,$)
1258          CONTINUE

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1295             FORMAT (I3,1X,F7.5,1X,$)
1300             CONTINUE
                WRITE (100,*)
            ENDIF
1310             CONTINUE
            ENDIF
            ENDIF
* Write assembly depletion/decay parameters
            WRITE (100,1320)
1320             FORMAT (''')
            WRITE (100,1330)
1330             FORMAT (''' assembly depletion/decay parameters')
            WRITE (100,1340)
1340             FORMAT (''')
            CALL ZEROS(CYCPOS(CT1),ASSYPOSITION)
            WRITE (100,1350) CYCLEID(CT1), ASSYPOSITION
1350             FORMAT (''',T5,'Cycle-',A2,', one-eighth core',
c             ' assembly number ',A2)
            IF (STEPCONTROL.EQ.'N') THEN
                DO 1380 CT4=3, (INT(BLETDOWN(CT1,CT2,2))+2)
                    IF (CT4.LT.(BLETDOWN(CT1,CT2,2)+2)) THEN
                        DOWNTIME=0.0
                            IF (RTYPE.EQ.'PWR') THEN
                                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c                                BLETDOWN(CT1,CT2,3))
                                WRITE (100,1360) POWER(CT3,RELATIVE_STPT_NUM),
c                                BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1360                                FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c                                G10.5,1X,'bfrac=',G9.4,1X,'end')
                            ELSEIF (RTYPE.EQ.'BWR') THEN
                                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c                                MODREFDEN)
                                WRITE (100,1450) POWER(CT3,RELATIVE_STPT_NUM),
c                                BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1450                                FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c                                G10.5,1X,'h2ofrac=',G9.4,1X,'end')
                            ENDIF
                        ELSEIF ((CT4.EQ.(INT(BLETDOWN(CT1,CT2,2))+2)).AND.
c                        (CT2.LT.STPTS(CT1))) THEN
                            DOWNTIME=STPTDAT(CT1,(CT2+1),3)
                            IF (RTYPE.EQ.'PWR') THEN
                                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c                                BLETDOWN(CT1,CT2,3))
                                WRITE (100,1365) POWER(CT3,RELATIVE_STPT_NUM),
c                                BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1365                                FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c                                G10.5,1X,'bfrac=',G9.4,1X,'end')
                            ELSEIF (RTYPE.EQ.'BWR') THEN
                                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c                                MODREFDEN)
                                WRITE (100,1460) POWER(CT3,RELATIVE_STPT_NUM),
c                                BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1460                                FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c                                G10.5,1X,'h2ofrac=',G9.4,1X,'end')
                            ENDIF
                        ELSEIF ((CT4.EQ.(INT(BLETDOWN(CT1,CT2,2))+2)).AND.
c                        (CT2.EQ.STPTS(CT1))) THEN
                            DOWNTIME=CYCDOWN(CT1)

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      IF (RTYPE.EQ.'PWR') THEN
        BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c         BLETDOWN(CT1,CT2,3))
        WRITE (100,1370) POWER(CT3,RELATIVE_STPT_NUM),
c         BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1370      FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c         G10.5,1X,'bfrac=',G9.4,1X,'end')
        ELSEIF (RTYPE.EQ.'BWR') THEN
          BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c         MODREFDEN)
          WRITE (100,1470) POWER(CT3,RELATIVE_STPT_NUM),
c         BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1470      FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c         G10.5,1X,'bfrac=',G9.4,1X,'end')
        ENDIF
      ENDIF
1380    CONTINUE
    ELSEIF (STEPCONTROL.EQ.'Y') THEN
      DO 1388 CT4=1,VARSTEPNUM(CT1,CT2)
        IF (CT4.LT.VARSTEPNUM(CT1,CT2)) THEN
          DOWNTIME=0.0
          IF (RTYPE.EQ.'PWR') THEN
            BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c             VARBLETDOWN(CT1,CT2,1,2))
            WRITE (100,1382) VARPOWER(CT1,CT2,CT4,CT3),
c             VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1382          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c             G10.5,1X,'bfrac=',G9.4,1X,'end')
            ELSEIF (RTYPE.EQ.'BWR') THEN
              BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c             MODREFDEN)
              WRITE (100,1480) VARPOWER(CT1,CT2,CT4,CT3),
c             VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1480          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c             G10.5,1X,'h2ofrac=',G9.4,1X,'end')
            ENDIF
          ELSEIF ((CT4.EQ.VARSTEPNUM(CT1,CT2)).AND.
c             (CT2.LT.STPTS(CT1))) THEN
            DOWNTIME=STPTDAT(CT1,(CT2+1),3)
            IF (RTYPE.EQ.'PWR') THEN
              BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c             VARBLETDOWN(CT1,CT2,1,2))
              WRITE (100,1384) VARPOWER(CT1,CT2,CT4,CT3),
c             VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1384          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c             G10.5,1X,'bfrac=',G9.4,1X,'end')
              ELSEIF (RTYPE.EQ.'BWR') THEN
                BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c             MODREFDEN)
                WRITE (100,1490) VARPOWER(CT1,CT2,CT4,CT3),
c             VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1490          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c             G10.5,1X,'h2ofrac=',G9.4,1X,'end')
              ENDIF
            ELSEIF ((CT4.EQ.VARSTEPNUM(CT1,CT2)).AND.
c             (CT2.EQ.STPTS(CT1))) THEN
              DOWNTIME=CYCDOWN(CT1)
              IF (RTYPE.EQ.'PWR') THEN

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      BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c      VARBLETDOWN(CT1,CT2,1,2))
      WRITE (100,1386) VARPOWER(CT1,CT2,CT4,CT3),
c      VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1386      FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c      G10.5,1X,'bfrac=',G9.4,1X,'end')
      ELSEIF (RTYPE.EQ.'BWR') THEN
      BORON_FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c      MODREFDEN)
      WRITE (100,1800) VARPOWER(CT1,CT2,CT4,CT3),
c      VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON_FRACTION
1800      FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c      G10.5,1X,'h2ofrac=',G9.4,1X,'end')
      ENDIF
1388      CONTINUE
      ENDIF
* Store final downtime for use in extraction script 'sedexecute.exe'
  FINALDOWNTIME=DOWNTIME
* Write input deck closing statement
  WRITE (100,1390)
1390      FORMAT ('')
  WRITE (100,1400)
1400      FORMAT (''          end of input')
  WRITE (100,1410)
1410      FORMAT ('')
  WRITE (100,1420)
1420      FORMAT ('end')
  CLOSE (UNIT=100)

  RETURN
  END

```

```

*****
* Subroutine to write continuation depletion/decay SAS2H *
* input decks utilizing fuel and burnable poison compositions *
* from the assembly's previous depletion/decay calculation *
* en-route to the final CRC depletion/decay calculation *
*****
  SUBROUTINE CONTINUATION_WRITER (RELATIVE_STPT_NUM, CT1, CT2,
c CT3, AXNUM, CYCPOS, AXBLANK, BPDESID,
c CRINS, CRDES, CRMIXNUM, CRMIXID,
c CRNUMISOS, CRISOID, APSRINS,
c APSRMIXNUM, APSRMIXID, RELATIVE_APSR_MIX_ID,
c APSRNUMISOS, APSRISOID, ISN, IIM, ICM, IUS,
c PLEVEL, BPZONE, BPMA, CRZONE, CRMA,
c LMC, APSRZONE, APSRMA, LMD,
c BPTN, BPBN, STPTS, APSRDES,
c STPTDAT, AXBLANKRICH, GRAMS,
c NODES, RODS, RICH, FTFINAL, MODDENFINAL,
c MODTEMPFINAL, BLETDOWN, BPWTPCT,
c BPDEN, CRDEN, CRISOWTPCT, APSRDEN,
c APSRISOWTPCT, PITCH, FOD, COD, CID, SZF, EPS, PTC,
c MESH, BPRA, CRRA, LRC, APSRRA,
c LRD, POWER, CYCDOWN, PREFIX, NM,
c CYCLEID, REACT, LIB, AXBLANKET, FUELCLAD,
c BPRFLAG, CRSTAT, APSRSTAT, FLAG2, LUZONE, LMB, LRB,

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c MASSTOTAL, FUELISONAME, FUELISOWTPCT, BPRAISONAME,
 c BPRAISOVALUE, LEFTLIST, CARRYCOUNTER, BPXSECT, BPRODS,
 c PREVIOUSNAME, FINALDOWNTIME, LEFTVAL, BPRA_INSERTED, CLADTOT,
 c CLADDESNUM, CLADDESNAME, BPRCLAD, CRCLAD, APSRCLAD,
 c CLTEMP, BPMIXNUM, BPMIX, BPMIXID,
 c BPNUMISOS, BPISOID, BPISOWTPCT, UCSPACERFRAC,
 c SPACERMAT, STEPCONTROL, VARBLETDOWN, VARSTEPNUM,
 c VARPOWER, BPRFM, BPFMNUMISOS, BPFISOID,
 c ABOVEBPNUM, APSRFM, BPRFR, BPFISOWTPCT,
 c APSRFR, ABOVEBP, APSRFOLLOWMIX, CT1START, CT2GOVALUE,
 c APSRINSOLD, RTYPE, MODREFDEN, CRMIXDEN, GTNOW,
 c LIMFLAG)

*
 INTEGER*4 RELATIVE STPT_NUM, CT1, CT2, CT3, AXNUM,
 c NUMSTPT1, NUMSTPT2, NUMSTPT3, CYCPOS(10), AXBLANK(50),
 c BPDESID(10), BPRA_DESCRIPTION_ID, CT4, CT5, CRINS(10,20,23,50),
 c CR_MIXTURE_ID, CR_DESCRIPTION, CRDES(10,20,23,50), CRMIXNUM,
 c CRMIXID(25), RELATIVE_CR_MIX_ID, CRNUMISOS(25),
 c CRISOID(25,10), APSRINS(10,20,23,50), APSR_MIXTURE_ID,
 c APSR_DESCRIPTION, APSRMIXNUM, APSRMIXID(25),
 c RELATIVE_APSR_MIX_ID, APSRNUMISOS(25), APSRISOID(25,10),
 c ISN, IIM, ICM, IUS, PLEVEL, BPZONE(10), BPMA(15,10,10),
 c CRZONE(10), CRMA(15,10,10), LMC(15,10,10), APSRZONE(10),
 c APSRMA(15,10,10), LMD(15,10,10), BPTN(10), BPN(10), STPTS(10),
 c APSRDES(10,20,23,50), LUZONE, LMB(15,10), CARRYCOUNTER,
 c FUELISOTOPENUMBER, BPRODS(10), PNMCT1, PNMCT2, PNUMSTPT1,
 c PNUMSTPT2, PNUMSTPT3, NUMSTPT4, NUMSTPT5, NUMSTPT6,
 c PNUMSTPT4, PNUMSTPT5, PNUMSTPT6, CLADTOT, CLADDESNUM(10),
 c BPRCLAD(10), CRCLAD(10), APSRCLAD(10), BPRCLNUM, CRCLNUM,
 c APSRCLNUM, BPMIXNUM, BPMIX(10), BPMIXID(10), BPNUMISOS(10),
 c BPISOID(10,20), VARSTEPNUM(10,20), BPRFM(15,10,10),
 c BPFMNUMISOS(25), BPFISOID(25,10), ABOVEBPNUM(10),
 c APSRFM(15,10,10), APSRFOLLOWMIX(10,20,23,50),
 c FOLNODKEEP, FOLSTEPKEEP, APSRFOLNUM, APSRINSOLD(10,20,23,50),
 c APSRFOLLOWDATA(10,20,23,50), CT1START, CT2GOVALUE,
 c GTNOW

*
 REAL STPTDAT(10,20,3), ENR, AXBLANKRICH, OXYGMS, GRAMS(50),
 c FVOL, PI, NODES(50,2), RODS, FDEN,
 c RICH, FTFINAL(50,20),
 c MODDENFINAL(50,20), MODTEMPFINAL(50,20), BLETDOWN(10,20,25),
 c BPWTPCT(10), BPDEN(10), ALFRAC, OFRAC, CRDEN(10),
 c CRISOWTPCT(25,10), APSRDEN(10), APSRISOWTPCT(25,10),
 c PITCH, FOD, COD, CID, SZF, EPS, PTC, MESH, BPRA(15,10,10),
 c CRRA(15,10,10), LRC(15,10,10), APSRRA(15,10,10), LRD(15,10,10),
 c DOWNTIME, BORON FRACTION, POWER(50,20), CYCDOWN(10), LRB(15,10),
 c MASSTOTAL, FUELISOWTPCT(1000), BPRAISOVALUE(2), BPXSECT(10),
 c BPVOL, FINALDOWNTIME, LEFTVAL(1000), CLTEMP,
 c BPISOWTPCT(10,20), UCSPACERFRAC, BORATEDMODVF,
 c BORONVF, UCMODREGIONDEN, B4CMASS, ALMASS, OMASS, CMASS,
 c NEWBPMASSTOTAL, NEWBPDEN, ALWTPCT, OWTPCT, CWTPTCT, B1OWTPCT,
 c B11WTPCT, VARBLETDOWN(10,20,25,25), VARPOWER(10,20,25,50),
 c BPRFR(15,10,10), BPFISOWTPCT(25,10), APSRFR(15,10,10), MODREFDEN,
 c CRMIXDEN(25)

*
 CHARACTER CHNODE*2, CHID*2, PREFIX*3, CHSTPT1*1, CHSTPT2*1,
 c CHSTPT3*1, NM*31, CYCLEID(10)*2, REACT*21, LIB*15,
 c AXBLANKET*1, FUELCLAD*10, BPRFLAG*1, CRSTAT*6, APSRSTAT*6,

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c FLAG2*7, IRRAD_STEPS*2, PLEVELCH*2, BPZONECH*2, CRZONECH*2,
c APSRZONECH*2, LUZONECH*2, FUELISONAME(1000)*5, BPRAISONAME(2)*6,
c LEFTLIST(1000)*6, PREVIOUSNAME*25, PCHSTPT1*1, PCHSTPT2*1,
c PCHSTPT3*1, ASSYPOSITION*2, CHSTPT4*1, CHSTPT5*1, CHSTPT6*1,
c PCHSTPT4*1, PCHSTPT5*1, PCHSTPT6*1, PCHID*2, CLADDESNAME(10)*7,
c SPACERMAT*7, STEPCONTROL*1, ABOVEBP(10)*5, RTYPE*3, LIMFLAG*1

```

```

* LOGICAL BPRA_INSERTED, CR_INSERTED, CRCOMPFLAG, APSR_INSERTED,
c APSRCOMPFLAG, BPRA_FOLLOW, APSRBOTFLAG, FOLLOWIN

```

```

* PI=3.14159265359

```

```

* Determination of the input deck filename

```

```

CALL ZEROS(CT3,CHNODE)
CALL ZEROS(CYCPOS(CT1),CHID)
IF ((CT2-1).EQ.0) THEN
  PNMCT1=CT1-1
  PNMCT2=STPTS(PNMCT1)
ELSE
  PNMCT1=CT1
  PNMCT2=CT2-1
ENDIF

```

```

CALL ZEROS(CYCPOS(PNMCT1),PCHID)

```

```

* Determine new filename

```

```

NUMSTPT1=INT(STPTDAT(CT1,CT2,1)/100.0)
CHSTPT1=CHAR(NUMSTPT1+48)
NUMSTPT2=INT((STPTDAT(CT1,CT2,1)-(NUMSTPT1*100))/10.0)
CHSTPT2=CHAR(NUMSTPT2+48)
NUMSTPT3=INT((STPTDAT(CT1,CT2,1)-(NUMSTPT1*100)-
c (NUMSTPT2*10)))
CHSTPT3=CHAR(NUMSTPT3+48)
IF (CT2.LT.STPTS(CT1)) THEN
  NUMSTPT4=INT(STPTDAT(CT1,(CT2+1),1)/100.0)
  CHSTPT4=CHAR(NUMSTPT4+48)
  NUMSTPT5=INT((STPTDAT(CT1,(CT2+1),1)-(NUMSTPT4*100))/10.0)
  CHSTPT5=CHAR(NUMSTPT5+48)
  NUMSTPT6=INT((STPTDAT(CT1,(CT2+1),1)-(NUMSTPT4*100)-
c (NUMSTPT5*10)))
  CHSTPT6=CHAR(NUMSTPT6+48)
ELSEIF (CT2.EQ.STPTS(CT1)) THEN
  NUMSTPT4=INT(STPTDAT((CT1+1),1,1)/100.0)
  CHSTPT4=CHAR(NUMSTPT4+48)
  NUMSTPT5=INT((STPTDAT((CT1+1),1,1)-(NUMSTPT4*100))/10.0)
  CHSTPT5=CHAR(NUMSTPT5+48)
  NUMSTPT6=INT((STPTDAT((CT1+1),1,1)-(NUMSTPT4*100)-
c (NUMSTPT5*10)))
  CHSTPT6=CHAR(NUMSTPT6+48)
ENDIF

```

```

NM(1:3)=PREFIX
NM(4:4)='A'
NM(5:6)=CHID
NM(7:7)='N'
NM(8:9)=CHNODE
NM(10:11)='DC'
NM(12:13)=CYCLEID(CT1)
NM(14:14)='T'
NM(15:15)=CHSTPT1
NM(16:16)=CHSTPT2
NM(17:17)=CHSTPT3

```


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```

NM(18:19)='AC'
IF (CT2.EQ.STPTS(CT1)) THEN
  NM(20:21)=CYCLEID(CT1+1)
ELSE
  NM(20:21)=CYCLEID(CT1)
ENDIF
NM(22:22)='T'
NM(23:23)=CHSTPT4
NM(24:24)=CHSTPT5
NM(25:25)=CHSTPT6
NM(26:31)='.input'
* Determine previous filename
PNUMSTPT1=INT(STPTDAT(PNMCT1,PNMCT2,1)/100.0)
PCHSTPT1=CHAR(PNUMSTPT1+48)
PNUMSTPT2=INT((STPTDAT(PNMCT1,PNMCT2,1)-
c (PNUMSTPT1*100))/10.0)
PCHSTPT2=CHAR(PNUMSTPT2+48)
PNUMSTPT3=INT((STPTDAT(PNMCT1,PNMCT2,1)-(PNUMSTPT1*100)-
c (PNUMSTPT2*10)))
PCHSTPT3=CHAR(PNUMSTPT3+48)
IF (PNMCT2.LT.STPTS(PNMCT1)) THEN
  PNUMSTPT4=INT(STPTDAT(PNMCT1,(PNMCT2+1),1)/100.0)
  PCHSTPT4=CHAR(PNUMSTPT4+48)
  PNUMSTPT5=INT((STPTDAT(PNMCT1,(PNMCT2+1),1)-
c (PNUMSTPT4*100))/10.0)
  PCHSTPT5=CHAR(PNUMSTPT5+48)
  PNUMSTPT6=INT((STPTDAT(PNMCT1,(PNMCT2+1),1)-
c (PNUMSTPT4*100)-(PNUMSTPT5*10)))
  PCHSTPT6=CHAR(PNUMSTPT6+48)
ELSEIF (PNMCT2.EQ.STPTS(PNMCT1)) THEN
  PNUMSTPT4=INT(STPTDAT((PNMCT1+1),1,1)/100.0)
  PCHSTPT4=CHAR(PNUMSTPT4+48)
  PNUMSTPT5=INT((STPTDAT((PNMCT1+1),1,1)-
c (PNUMSTPT4*100))/10.0)
  PCHSTPT5=CHAR(PNUMSTPT5+48)
  PNUMSTPT6=INT((STPTDAT((PNMCT1+1),1,1)-(PNUMSTPT4*100)-
c (PNUMSTPT5*10)))
  PCHSTPT6=CHAR(PNUMSTPT6+48)
ENDIF
PREVIOUSNAME(1:3)=PREFIX
PREVIOUSNAME(4:4)='A'
PREVIOUSNAME(5:6)=PCHID
PREVIOUSNAME(7:7)='N'
PREVIOUSNAME(8:9)=CHNODE
PREVIOUSNAME(10:11)='DC'
IF (CT2.EQ.1) THEN
  PREVIOUSNAME(12:13)=CYCLEID(CT1-1)
ELSE
  PREVIOUSNAME(12:13)=CYCLEID(CT1)
ENDIF
PREVIOUSNAME(14:14)='T'
PREVIOUSNAME(15:15)=PCHSTPT1
PREVIOUSNAME(16:16)=PCHSTPT2
PREVIOUSNAME(17:17)=PCHSTPT3
PREVIOUSNAME(18:19)='AC'
PREVIOUSNAME(20:21)=CYCLEID(CT1)
PREVIOUSNAME(22:22)='T'
PREVIOUSNAME(23:23)=PCHSTPT4

```

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```

PREVIOUSNAME(24:24)=PCHSTPT5
PREVIOUSNAME(25:25)=PCHSTPT6
* Open and rewind the input deck file
OPEN(UNIT=100, FILE=NM, STATUS='UNKNOWN')
REWIND(UNIT=100)
* Write first section of input deck
WRITE (100,10)
10  FORMAT ('=sas2h',T11,'parm=skipshipdata')
    IF (CT2.LT.STPTS(CT1)) THEN
      WRITE (100,20) REACT, CHID, CHNODE,
c      NM(12:13), STPTDAT(CT1,CT2,1), NM(20:21),
c      STPTDAT(CT1,(CT2+1),1)
20  FORMAT (A21,1X,'Assy-',A2,
c      ', Node-',A2,1X,
c      '{Cyc-',A2,', 'F5.1,' to Cyc-',
c      A2,', 'F5.1,' EFPD}')
    ELSEIF (CT2.EQ.STPTS(CT1)) THEN
      WRITE (100,25) REACT, CHID, CHNODE,
c      NM(12:13), STPTDAT(CT1,CT2,1), NM(20:21),
c      STPTDAT((CT1+1),1,1)
25  FORMAT (A21,1X,'Assy-',A2,
c      ', Node-',A2,1X,
c      '{Cyc-',A2,', 'F5.1,' to Cyc-',
c      A2,', 'F5.1,' EFPD}')
    ENDIF
    WRITE (100,30) LIB
30  FORMAT (A15,1X,'latticecell')
    WRITE (100,40)
40  FORMAT (''')
    WRITE (100,50)
50  FORMAT (''' fuel density based on mass of uranium per',
c      ' assembly',T56,'% total pellet stack')
    WRITE (100,60)
60  FORMAT (''' volume to account for fuel volume loss to',
c      ' pellet c',T55,'hamfers')
    WRITE (100,70)
70  FORMAT (''')
* Write second section of input deck (material specifications)
WRITE (100,80)
80  FORMAT (''',5X,'material specification input')
    WRITE (100,90)
90  FORMAT (''')
* Calculate initial fuel parameters depending upon whether or not the
* node represents axial blanket fuel
  IF ((AXBLANKET.EQ.'Y').AND.(AXBLANK(CT3).EQ.1)) THEN
    ENR=AXBLANKRICH
  ELSE
    ENR=RICH
  ENDIF
  OXYGMS=(GRAMS(CT3)*2*15.994915)/(((ENR/100)*235.043915)+
c  ((0.007731*(ENR)**1.0837))/100)*234.040904)+
c  ((0.0046*ENR)/100)*236.045637)+(((100-(0.007731*
c  (ENR)**1.0837))-ENR)-(0.0046*ENR))/100)*238.05077))
* Determine if the burnable poison charge isotopics should be retrieved
  BPRA_INSERTED=.FALSE.
  IF ((BPRFLAG.EQ.'Y').AND.(BPDESID(CT1).NE.0).AND.
c  (CT3.GE.BPTN(CT1)).AND.(CT3.LE.BPBN(CT1))) THEN
    BPRA_INSERTED=.TRUE.

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      ENDIF
* Call subroutine to retrieve charge for fuel and bp isotopics
  CALL RETRIEVER (OXYGMS, MASSTOTAL,
    c FUELISONAME, FUELISOWTPCT, BPRAISONAME,
    c BPRAISVALUE, LEFTLIST, CARRYCOUNTER,
    c PREVIOUSNAME, LEFTVAL, NM, BPRA_INSERTED,
    c LIMFLAG)
* Calculate the nodal fuel volume, fuel density, and oxygen wt%
  FVOL=(PI/4)*(FOD**2)*(NODES(CT3,2))*(RODS)
  FDEN=MASSTOTAL/FVOL
  OXYWTPCT=(OXYGMS/MASSTOTAL)*100.0
  FUELISOTOPENUMBER=CARRYCOUNTER+1
* Write fuel composition input description
  IF (FDEN.LT.(10.0)) THEN
    WRITE (100,100) FDEN, FUELISOTOPENUMBER, OXYWTPCT
100   FORMAT ('arbm-fuel',1X,G10.3,1X,I3,1X,'0 0 0',1X,
    c   '8016',1X,G10.3)
    ELSE
110   WRITE (100,110) FDEN, FUELISOTOPENUMBER, OXYWTPCT
    c   FORMAT ('arbm-fuel',1X,G10.3,1X,I3,1X,'0 0 0',1X,
    c   '8016',1X,G10.3)
  ENDIF
  DO 130 CT4=1,CARRYCOUNTER
    IF (MOD(CT4,3).EQ.0) THEN
      WRITE (100,*)
    ENDIF
120   WRITE (100,120) FUELISONAME(CT4), FUELISOWTPCT(CT4)
    c   FORMAT (5X,A5,1X,G10.3,1X,$)
130   CONTINUE
    WRITE (100,*)
    WRITE (100,140) FTFINAL(CT3,RELATIVE_STPT_NUM)
140   FORMAT (5X,'1',3X,'1.0',3X,F6.1,' end')
* Write cladding material specifications
* Additional cladding material specifications may be added to the
* following IF statement as required
  IF ((FUELCLAD.EQ.'ZIRC-4 ') .OR.
    c (FUELCLAD.EQ.'ZIRCALLOY4')) THEN
532   WRITE (100,532)
    c   FORMAT ('arbm-zirc4 6.56 5 0 0 0 8016 0.12 24000',
    c   ' 0.10 26000 0.20 50000 1.40')
    WRITE (100,535) CLTEMP
535   FORMAT (T12,'40000 98.18 2 1.0 ',F5.1,' end')
    ELSEIF (FUELCLAD.EQ.'SS304 ') THEN
    WRITE (100,537)
537   FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055',
    c   ' 2.0 26304 69.5 28304 9.5')
    WRITE (100,540) CLTEMP
540   FORMAT (T12,'2 1.0 ',F5.1,' end')
    ELSEIF (FUELCLAD.EQ.'SS304S ') THEN
    WRITE (100,542)
542   FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055',
    c   ' 2.0 26000 69.5 28000 9.5')
    WRITE (100,545) CLTEMP
545   FORMAT (T13,'2 1.0 ',F5.1,' end')
    ELSEIF (FUELCLAD.EQ.'SS316 ') THEN
    WRITE (100,547)
547   FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000',
    c   ' 1.0 24304 17.0 25055 2.0')

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      WRITE (100,550)
550     FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
      WRITE (100,552) CLTEMP
552     FORMAT (T12,'2 1.0 ',F5.1,' end')
      ELSEIF (FUELCLAD.EQ.'SS316S  ') THEN
      WRITE (100,555)
555     FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000',
c      ' 1.0 24000 17.0 25055 2.0')
      WRITE (100,557)
557     FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
      WRITE (100,559) CLTEMP
559     FORMAT (T13,'2 1.0 ',F5.1,' end')
      ENDIF
* Write moderator material specifications
      BORATEDMODVF=1.0-UCSPACERFRAC
      IF (RTYPE.EQ.'PWR') THEN
      IF (STEPCONTROL.EQ.'N') THEN
      BORONVF=BLETDOWN(CT1,CT2,3)*(1E-6)*BORATEDMODVF
      ELSEIF (STEPCONTROL.EQ.'Y') THEN
      BORONVF=VARBLETDOWN(CT1,CT2,1,2)*(1E-6)*BORATEDMODVF
      ENDIF
      ENDIF
      WRITE (100,560)
560     FORMAT ('')
      IF ((SPACERMAT.EQ.'ZIRC-4 ').AND.
c      (UCSPACERFRAC.GT.(0.0))) THEN
      WRITE (100,561)
561     FORMAT ('' material composition of moderator',
c      ' within unit cell')
      WRITE (100,562)
562     FORMAT ('' with smeared zirc-4 spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
      UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c      BORATEDMODVF)+(6.56*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
      UCMODREGIONDEN=(MODREFDEN*
c      BORATEDMODVF)+(6.56*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
      WRITE (100,563) UCMODREGIONDEN, BORATEDMODVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
563     FORMAT ('h2o 3 den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
      WRITE (100,564) UCMODREGIONDEN, BORATEDMODVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
564     FORMAT ('h2o 3 den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
      WRITE (100,565) UCMODREGIONDEN, BORONVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
565     FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c      1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
      WRITE (100,566) UCMODREGIONDEN
566     FORMAT ('arbm-spacer',3X,F6.4,1X,'5 0 0 0 8016 0.12',
c      ' 24000 0.10 26000 0.25')
      WRITE (100,567) UCSPACERFRAC,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)

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567     FORMAT (T17'50000 1.40 40000 98.18 3',1X,F6.5,1X,
c       F7.1,1X,'end')
      ELSEIF ((SPACERMAT.EQ.'INCONEL').AND.
c       (UCSPACERFRAC.GT.(0.0))) THEN
        WRITE (100,568)
568     FORMAT (''' material composition of moderator',
c       ' within unit cell')
        WRITE (100,569)
569     FORMAT (''' with smeared inconel spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
        UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c       BORATEDMODVF)+(8.3*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
        UCMODREGIONDEN=(MODREFDEN*
c       BORATEDMODVF)+(8.3*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
        WRITE (100,570) UCMODREGIONDEN, BORATEDMODVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
570     FORMAT ('h2o 3 den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
        WRITE (100,571) UCMODREGIONDEN, BORATEDMODVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
571     FORMAT ('h2o 3 den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
        WRITE (100,572) UCMODREGIONDEN, BORONVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
572     FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c       1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
        WRITE (100,573) UCMODREGIONDEN
573     FORMAT ('arbm-spacer',3X,F6.4,1X,'5 0 0 0 14000 2.5',
c       ' 22000 2.5 24000 15.0')
        WRITE (100,574) UCSPACERFRAC,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
574     FORMAT (T17'26000 7.0 28000 73.0 3',1X,F6.5,1X,
c       F7.1,1X,'end')
      ELSEIF ((SPACERMAT.EQ.'SS316 ').AND.
c       (UCSPACERFRAC.GT.(0.0))) THEN
        WRITE (100,575)
575     FORMAT (''' material composition of moderator',
c       ' within unit cell')
        WRITE (100,576)
576     FORMAT (''' with smeared ss316 spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
        UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c       BORATEDMODVF)+(7.75*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
        UCMODREGIONDEN=(MODREFDEN*
c       BORATEDMODVF)+(7.75*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
        WRITE (100,577) UCMODREGIONDEN, BORATEDMODVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
577     FORMAT ('h2o 3 den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
        WRITE (100,578) UCMODREGIONDEN, BORATEDMODVF,

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c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
578      FORMAT ('h2o  3  den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
      WRITE (100,579) UCMODREGIONDEN, BORONVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
579      FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c      1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
      WRITE (100,580) UCMODREGIONDEN
580      FORMAT ('arbm-spacer',3X,F6.4,1X,'7 0 0 0 6012 0.08',
c      ' 14000 1.0 24304 17.0 25055 2.0')
      WRITE (100,581) UCSPACERFRAC,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
581      FORMAT (T5'26304 65.42 28304 12.0 42000 2.5 3',1X,F6.5,1X,
c      F7.1,1X,'end')
      ELSEIF ((SPACERMAT.EQ.'SS316S ').AND.
c      (UCSPACERFRAC.GT.(0.0))) THEN
      WRITE (100,582)
582      FORMAT (''' material composition of moderator',
c      ' within unit cell')
      WRITE (100,583)
583      FORMAT (''' with smeared ss316s spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
      UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c      BORATEDMODVF)+(7.75*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
      UCMODREGIONDEN=(MODREFDEN*
c      BORATEDMODVF)+(7.75*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
      WRITE (100,584) UCMODREGIONDEN, BORATEDMODVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
584      FORMAT ('h2o  3  den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
      WRITE (100,585) UCMODREGIONDEN, BORATEDMODVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
585      FORMAT ('h2o  3  den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
      WRITE (100,586) UCMODREGIONDEN, BORONVF,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
586      FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c      1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
      WRITE (100,587) UCMODREGIONDEN
587      FORMAT ('arbm-spacer',3X,F6.4,1X,'7 0 0 0 6012 0.08',
c      ' 14000 1.0 24000 17.0 25055 2.0')
      WRITE (100,588) UCSPACERFRAC,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
588      FORMAT (T5'26000 65.42 28000 12.0 42000 2.5 3',1X,F6.5,1X,
c      F7.1,1X,'end')
      ELSEIF ((SPACERMAT.EQ.'SS304 ').AND.
c      (UCSPACERFRAC.GT.(0.0))) THEN
      WRITE (100,589)
589      FORMAT (''' material composition of moderator',
c      ' within unit cell')
      WRITE (100,590)

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590     FORMAT ('''      with smeared ss304 spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
          UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c         BORATEDMODVF)+(7.92*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
          UCMODREGIONDEN=(MODREFDEN*
c         BORATEDMODVF)+(7.92*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
          WRITE (100,591) UCMODREGIONDEN, BORATEDMODVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
591     FORMAT ('h2o   3   den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
          WRITE (100,592) UCMODREGIONDEN, BORATEDMODVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
592     FORMAT ('h2o   3   den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
          WRITE (100,593) UCMODREGIONDEN, BORONVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
593     FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c         1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
      WRITE (100,594) UCMODREGIONDEN
594     FORMAT ('arbm-spacer',3X,F6.4,1X,'4 0 0 0 24304 19.0',
c         ' 25055 2.0 26304 69.5 28304 9.5')
      WRITE (100,595) UCSPACERFRAC,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
595     FORMAT (T15'3',1X,F6.5,1X,F7.1,1X,'end')
      ELSEIF ((SPACERMAT.EQ.'SS304S ').AND.
c         (UCSPACERFRAC.GT.(0.0))) THEN
          WRITE (100,596)
596     FORMAT ('''      material composition of moderator',
c         ' within unit cell')
          WRITE (100,597)
597     FORMAT ('''      with smeared ss304s spacer grids')
      IF (RTYPE.EQ.'PWR') THEN
          UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c         BORATEDMODVF)+(7.92*UCSPACERFRAC)
      ELSEIF (RTYPE.EQ.'BWR') THEN
          UCMODREGIONDEN=(MODREFDEN*
c         BORATEDMODVF)+(7.92*UCSPACERFRAC)
      ENDIF
      IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
          WRITE (100,598) UCMODREGIONDEN, BORATEDMODVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
598     FORMAT ('h2o   3   den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
      ELSE
          WRITE (100,599) UCMODREGIONDEN, BORATEDMODVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
599     FORMAT ('h2o   3   den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
      ENDIF
      IF (RTYPE.EQ.'PWR') THEN
          WRITE (100,600) UCMODREGIONDEN, BORONVF,
c         MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
600     FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c         1X,F6.5,1X,F7.1,1X,'end')
      ENDIF
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        WRITE (100,601) UCMODREGIONDEN
601     FORMAT ('arbm-spacer',3X,F6.4,1X,'4 0 0 0 24000 19.0',
c       ' 25055 2.0 26000 69.5 28000 9.5')
        WRITE (100,602) UCSPACERFRAC,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
602     FORMAT (T15'3',1X,F6.5,1X,F7.1,1X,'end')
        ELSEIF (UCSPACERFRAC.EQ.(0.0)) THEN
        WRITE (100,603)
603     FORMAT ('' material composition of moderator',
c       ' within unit cell')
        WRITE (100,604)
604     FORMAT ('' with no smeared spacer grids')
        IF (RTYPE.EQ.'PWR') THEN
        UCMODREGIONDEN=(MODDENFINAL(CT3,RELATIVE_STPT_NUM)*
c       BORATEDMODVF)
        ELSEIF (RTYPE.EQ.'BWR') THEN
        UCMODREGIONDEN=(MODREFDEN*
c       BORATEDMODVF)
        ENDIF
        IF (MODDENFINAL(CT3,RELATIVE_STPT_NUM).LT.(1.0)) THEN
        WRITE (100,605) UCMODREGIONDEN, BORATEDMODVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
605     FORMAT ('h2o 3 den=',F5.4,3X,F6.5,3X,F7.1,3X,'end')
        ELSE
        WRITE (100,606) UCMODREGIONDEN, BORATEDMODVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
606     FORMAT ('h2o 3 den=',F6.4,3X,F6.5,3X,F7.1,3X,'end')
        ENDIF
        IF (RTYPE.EQ.'PWR') THEN
        WRITE (100,607) UCMODREGIONDEN, BORONVF,
c       MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
607     FORMAT ('arbm-bormod',3X,F6.4,1X,'1 0 0 0 5000 100 3',
c       1X,F6.5,1X,F7.1,1X,'end')
        ENDIF
        ENDIF
        WRITE (100,608)
608     FORMAT ('')
* Write BPRA material specifications
* BPR follow specifications
        BPRA_FOLLOW=.FALSE.
        IF ((BPRFLAG.EQ.'Y').AND.(BPDESID(CT1).NE.0).AND.
c       (CT3.LT.BPTN(CT1))) THEN
        BPRA_FOLLOW=.TRUE.
        BPRA_DESCRIPTION_ID=BPDESID(CT1)
        WRITE(100,610)
610     FORMAT('')
        WRITE(100,612)
612     FORMAT('',5X,'BPR above the BP absorber region')
        WRITE(100,614)
614     FORMAT('')
        IF ((BPRCLAD(BPDESID(CT1)).NE.0).AND.
c       (BPRCLAD(BPDESID(CT1)).NE.2)) THEN
        DO 616 CT5=1,10
            IF (BPRCLAD(BPDESID(CT1)).EQ.CLADDESNUM(CT5)) THEN
                BPRCLNUM=CT5
                EXIT
            ENDIF
        616     CONTINUE

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        IF (CLADDESNAME(BPRCLNUM).EQ.'SS304 ') THEN
          WRITE (100,618)
618      FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055',
          c      ' 2.0 26304 69.5 28304 9.5')
          WRITE (100,620) CLADDESNUM(BPRCLNUM), CLTEMP
620      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
        ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS304S ') THEN
          WRITE (100,622)
622      FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055',
          c      ' 2.0 26000 69.5 28000 9.5')
          WRITE (100,624) CLADDESNUM(BPRCLNUM), CLTEMP
624      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
        ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS316 ') THEN
          WRITE (100,626)
626      FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000',
          c      ' 1.0 24304 17.0 25055 2.0')
          WRITE (100,628)
628      FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
          WRITE (100,630) CLADDESNUM(BPRCLNUM), CLTEMP
630      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
        ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS316S ') THEN
          WRITE (100,632)
632      FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000',
          c      ' 1.0 24000 17.0 25055 2.0')
          WRITE (100,633)
633      FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
          WRITE (100,634) CLADDESNUM(BPRCLNUM), CLTEMP
634      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
        ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'INCONEL') THEN
          WRITE (100,635)
635      FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
          c      ' 22000 2.5 24000 15.0')
          WRITE (100,636)
636      FORMAT (T13,'26000 7.0 28000 73.0')
          WRITE (100,637) CLADDESNUM(BPRCLNUM), CLTEMP
637      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
        ENDIF
      ENDIF
    IF (ABOVEBP(BPDESID(CT1)).EQ.'AL2O3') THEN
      ALFRAC=((BPDEN(BPDESID(CT1)))*2.0*26.981539)/
          c      (101.9631)/BPDEN(BPDESID(CT1))
      OFRAC=1.0-ALFRAC
      IF (BPDEN(BPDESID(CT1)).LT.(1.0)) THEN
          c      WRITE (100,638) ABOVEBPNUM(BPDESID(CT1)),
          c      BPDEN(BPDESID(CT1)), ALFRAC,
          c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
638      FORMAT ('al',3X,I3,3X,'den=',F4.3,1X,F7.5,
          c      1X,F7.1,1X,'end')
          WRITE (100,640) ABOVEBPNUM(BPDESID(CT1)),
          c      BPDEN(BPDESID(CT1)), OFRAC,
          c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
640      FORMAT ('o',3X,I3,3X,'den=',F4.3,1X,F7.5,
          c      1X,F7.1,1X,'end')
      ELSE
          c      WRITE (100,642) ABOVEBPNUM(BPDESID(CT1)),
          c      BPDEN(BPDESID(CT1)), ALFRAC,
          c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
642      FORMAT ('al',3X,I3,3X,'den=',F5.3,1X,F7.5,

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c          1X,F7.1,1X,'end')
          WRITE (100,644) ABOVEBPNUM(BPDESID(CT1)),
c          BPDEN(BPDESID(CT1)), OFRAC,
c          MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
644      FORMAT ('o',3X,I3,3X,'den=',F5.3,1X,F7.5,
c          1X,F7.1,1X,'end')
          ENDIF
        ELSE
          WRITE (100,*) 'arbm-bp ',
c          BPDEN(BPRA_DESCRIPTION_ID),
c          ' ', BPFMNUMISOS(BPRA_DESCRIPTION_ID),
c          ' 0 0 0'
          DO 650 CT4=1,BPFMNUMISOS(BPRA_DESCRIPTION_ID)
c          WRITE (100,648)
c          BPFISOID(BPRA_DESCRIPTION_ID,CT4),
c          BPFISOWTPCT(BPRA_DESCRIPTION_ID,CT4)
648      FORMAT (10X,I6,3X,F10.5)
650      CONTINUE
          WRITE (100,*) ' ',
c          ABOVEBPNUM(BPRA_DESCRIPTION_ID),
c          ' 1.0 ',MODTEMPFINAL(CT3,RELATIVE_STPT_NUM),
c          ' end'
          ENDIF
        ENDIF
* Actual BPR specifications
  BPR_INSERTED=.FALSE.
  IF ((BPRFLAG.EQ.'Y').AND.(BPDESID(CT1).NE.0).AND.
c  (CT3.GE.BPTN(CT1)).AND.(CT3.LE.BPBN(CT1))) THEN
    BPR_INSERTED=.TRUE.
    BPR_DESCRIPTION_ID=BPDESID(CT1)
685    WRITE (100,685)
    FORMAT ('')
c    IF ((BPMIX(BPRA_DESCRIPTION_ID).EQ.0).OR.
    (BPMIX(BPRA_DESCRIPTION_ID).EQ.4)) THEN
      WRITE (100,690) BPWTPCT(BPDESID(CT1))
690    FORMAT ('',5X,'Al2O3-B4C burnable absorber pellet',1X,
c    'specification ',F4.2,1X,'wt% b4c')
    ELSE
      WRITE (100,695)
695    FORMAT ('',5X,'burnable absorber pellet ',
c    'specification')
    ENDIF
    WRITE (100,700)
700    FORMAT ('')
* Write B4C material specification
  IF ((BPRCLAD(BPDESID(CT1)).NE.0).AND.
c  (BPRCLAD(BPDESID(CT1)).NE.2)) THEN
    DO 701 CT5=1,10
      IF (BPRCLAD(BPDESID(CT1)).EQ.CLADDESNUM(CT5)) THEN
        BPRCLNUM=CT5
        EXIT
      ENDIF
701    CONTINUE
      IF (CLADDESNAME(BPRCLNUM).EQ.'SS304 ') THEN
        WRITE (100,702)
702    FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055',
c    ' 2.0 26304 69.5 28304 9.5')
        WRITE (100,703) CLADDESNUM(BPRCLNUM), CLTEMP

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703      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS304S ') THEN
      WRITE (100,704)
704      FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055',
c        ' 2.0 26000 69.5 28000 9.5')
      WRITE (100,705) CLADDESNUM(BPRCLNUM), CLTEMP
705      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS316 ') THEN
      WRITE (100,706)
706      FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000',
c        ' 1.0 24304 17.0 25055 2.0')
      WRITE (100,707)
707      FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
      WRITE (100,708) CLADDESNUM(BPRCLNUM), CLTEMP
708      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'SS316S ') THEN
      WRITE (100,709)
709      FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000',
c        ' 1.0 24000 17.0 25055 2.0')
      WRITE (100,710)
710      FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
      WRITE (100,711) CLADDESNUM(BPRCLNUM), CLTEMP
711      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(BPRCLNUM).EQ.'INCONEL') THEN
      WRITE (100,712)
712      FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
c        ' 22000 2.5 24000 15.0')
      WRITE (100,713)
713      FORMAT (T13,'26000 7.0 28000 73.0')
      WRITE (100,714) CLADDESNUM(BPRCLNUM), CLTEMP
714      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ENDIF
      ENDIF
* Material specification if it is a BOC to statepoint 1 calculation
IF (CT2.EQ.1) THEN
* Material specification for AL2O3-B4C
c    IF ((BPMIX(BPRA DESCRIPTION_ID).EQ.0).OR.
      (BPMIX(BPRA DESCRIPTION_ID).EQ.4)) THEN
      IF (BPWTPCT(BPDESID(CT1)).NE.(0.0)) THEN
      IF (BPDEN(BPDESID(CT1)).LT.(1.0)) THEN
c        WRITE (100,715) BPDEN(BPDESID(CT1)),
c          (BPWTPCT(BPDESID(CT1))/100.0),
c          MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
715      FORMAT ('b4c 4 den=',F4.3,IX,F7.5,1X,F7.1,1X,
c        'end')
      ELSE
c        WRITE (100,716) BPDEN(BPDESID(CT1)),
c          (BPWTPCT(BPDESID(CT1))/100.0),
c          MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
716      FORMAT ('b4c 4 den=',F5.3,IX,F7.5,1X,F7.1,1X,
c        'end')
      ENDIF
      ENDIF
* Calculate aluminum and oxygen material specifications
c    ALFRAC=(((100.0-BPWTPCT(BPDESID(CT1)))/100)*
c    BPDEN(BPDESID(CT1)))*26.981539)/(101.9631)/
c    BPDEN(BPDESID(CT1))
      OFRAC=1-(BPWTPCT(BPDESID(CT1))/100.0)-ALFRAC

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WRITE (100,718) BPDEN(BPDESID(CT1)), ALFRAC,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
718    FORMAT ('al  4  den=',F5.3,1X,F7.5,1X,F7.1,1X,'end')
WRITE (100,720) BPDEN(BPDESID(CT1)), OFRAC,
c      MODTEMPFINAL(CT3,RELATIVE_STPT_NUM)
720    FORMAT ('o  4  den=',F5.3,1X,F7.5,1X,F7.1,1X,'end')
ELSE
* Material specification for BP other than Al2O3-B4C
DO 722 CT4=1,BPMIXNUM
  IF (BPMIXID(CT4).EQ.BPMIX(BPRA_DESCRIPTION_ID)) THEN
    RELATIVE_BP_MIX_ID=CT4
  ENDIF
722    CONTINUE
WRITE (100,*) 'arbm-bp  ', BPDEN(BPRA_DESCRIPTION_ID),
c      ' ', BPNUMISOS(RELATIVE_BP_MIX_ID),
c      ' 0 0 0'
DO 726 CT4=1,BPNUMISOS(RELATIVE_BP_MIX_ID)
  WRITE (100,724) BPISOID(RELATIVE_BP_MIX_ID,CT4),
c      BPISOWTPCT(RELATIVE_BP_MIX_ID,CT4)
724    FORMAT (10X,I6,3X,F10.5)
726    CONTINUE
WRITE (100,*) ' ', BPMIX(BPRA_DESCRIPTION_ID),
c      ' 1.0 ',MODTEMPFINAL(CT3,RELATIVE_STPT_NUM), ' end'
ENDIF
* Material specification if it is not a BOC to statepoint 1 calculation
ELSEIF(CT2.NE.1) THEN
  BPVOL=BPXSECT(BPRA_DESCRIPTION_ID)*
c  BPRODS(BPRA_DESCRIPTION_ID)*NODES(CT3,2)
* Material specification for Al2O3-B4C
IF ((BPMIX(BPRA_DESCRIPTION_ID).EQ.0).OR.
c  (BPMIX(BPRA_DESCRIPTION_ID).EQ.4)) THEN
  B4CMASS=(BPWTPCT(BPDESID(CT1))/100.0)*
c  BPDEN(BPDESID(CT1))*BPVOL
  ALMASS=(((100-BPWTPCT(BPDESID(CT1)))/100.0)*
c  BPDEN(BPDESID(CT1)))*BPVOL)*((2*26.981539)/101.961278)
  OMASS=(((100-BPWTPCT(BPDESID(CT1)))/100.0)*
c  BPDEN(BPDESID(CT1)))*BPVOL)-ALMASS
  CMASS=B4CMASS*0.217374
  NEWBPMASSTOTAL=ALMASS+OMASS+CMASS+BPRAISOVALUE(1)+
c  BPRAISOVALUE(2)
  NEWBPDEN=NEWBPMASSTOTAL/BPVOL
  ALWTPCT=(ALMASS/NEWBPMASSTOTAL)*100.0
  OWTPCT=(OMASS/NEWBPMASSTOTAL)*100.0
  CWTPCT=(CMASS/NEWBPMASSTOTAL)*100.0
  B10WTPCT=(BPRAISOVALUE(1)/NEWBPMASSTOTAL)*100.0
  B11WTPCT=(BPRAISOVALUE(2)/NEWBPMASSTOTAL)*100.0
  IF (BPWTPCT(BPDESID(CT1)).NE.(0.0)) THEN
    WRITE (100,728) NEWBPDEN
728    FORMAT ('arbm-bp',1X,F7.3,1X,'5 0 0 0')
    IF (BPRAISOVALUE(1).NE.0) THEN
      WRITE (100,730) BPRAISONAME(1),
c      B10WTPCT
730    FORMAT (5X,A6,1X,G10.3)
    ENDIF
    IF (BPRAISOVALUE(2).NE.0) THEN
      WRITE (100,732) BPRAISONAME(2),
c      B11WTPCT
732    FORMAT (5X,A6,1X,G10.3)

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                ENDIF
                WRITE (100,734) CWPCT
734             FORMAT (5X, ' 6012', 1X, G10.3)
                ELSE
                WRITE (100,736) NEWBPDEN
736             FORMAT ('arbm-bp', 1X, F7.3, 1X, '2 0 0 0')
                ENDIF
* Calculate aluminum and oxygen material specifications
                WRITE (100,738) ALWTPCT, OWPCT
738             FORMAT (5X, '13027', 1X, F7.3, 1X, ' 8016', 1X, F7.3)
                WRITE (100,740) MODTEMPFINAL(CT3, RELATIVE_STPT_NUM)
740             FORMAT (5X, '4', 1X, '1.0', 1X, F6.1, 1X, 'end')
                ELSE
* Material specification for BP other than Al2O3-B4C
                DO 742 CT4=1, BPMIXNUM
                IF (BPMIXID(CT4).EQ.BPMIX(BPRA_DESCRIPTION_ID)) THEN
                RELATIVE_BP_MIX_ID=CT4
                ENDIF
742             CONTINUE
                NEWBPMASSTOTAL=0.0
                DO 743 CT4=1, BPNUMISOS(RELATIVE_BP_MIX_ID)
                IF (BPISOID(RELATIVE_BP_MIX_ID,CT4).EQ.5010) THEN
                NEWBPMASSTOTAL=NEWBPMASSTOTAL+BPRAISOVALUE(1)
                ELSEIF (BPISOID(RELATIVE_BP_MIX_ID,CT4).EQ.5011)
c              THEN
c              NEWBPMASSTOTAL=NEWBPMASSTOTAL+BPRAISOVALUE(2)
                ELSE
c              NEWBPMASSTOTAL=NEWBPMASSTOTAL+
c              ((BPISOWTPCT(RELATIVE_BP_MIX_ID,CT4)/100.0)*
c              BPDEN(BPRA_DESCRIPTION_ID)*BPVOL)
                ENDIF
743             CONTINUE
                NEWBPDEN=NEWBPMASSTOTAL/BPVOL
                WRITE (100,*) 'arbm-bp ', NEWBPDEN,
c              ' ', BPNUMISOS(RELATIVE_BP_MIX_ID),
c              ' 0 0 0'
                DO 750 CT4=1, BPNUMISOS(RELATIVE_BP_MIX_ID)
                IF (BPISOID(RELATIVE_BP_MIX_ID,CT4).EQ.5010) THEN
                IF (BPRAISOVALUE(1).NE.0) THEN
c              WRITE (100,744) BPRAISONAME(1),
c              ((BPRAISOVALUE(1)/NEWBPMASSTOTAL)*100.0)
744             FORMAT(5X, A6, 1X, G10.3)
                ENDIF
                ELSEIF (BPISOID(RELATIVE_BP_MIX_ID,CT4).EQ.5011)
c              THEN
c              IF (BPRAISOVALUE(2).NE.0) THEN
c              WRITE (100,746) BPRAISONAME(2),
c              ((BPRAISOVALUE(2)/NEWBPMASSTOTAL)*100.0)
746             FORMAT(5X, A6, 1X, G10.3)
                ENDIF
                ELSE
c              WRITE (100,748) BPISOID(RELATIVE_BP_MIX_ID,CT4),
c              (((BPISOWTPCT(RELATIVE_BP_MIX_ID,CT4)/100.0)*
c              BPDEN(BPRA_DESCRIPTION_ID)*BPVOL)/
c              NEWBPMASSTOTAL)*100.0
748             FORMAT (10X, I6, 3X, F10.5)
                ENDIF
750             CONTINUE

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        WRITE (100,*) '          ', BPMIX(BPRA_DESCRIPTION_ID),
c         ' 1.0 ', MODTEMPFINAL(CT3, RELATIVE_STPT_NUM), ' end'
      ENDIF
    ENDIF
  ENDIF
* Write control rod material specification
  CR_INSERTED=.FALSE.
  IF (CRSTAT.EQ.'RODDED') THEN
  IF (RTYPE.EQ.'PWR') THEN
    CRCOMPFLAG=.FALSE.
    DO 760 CT4=1,23
      IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
        CRCOMPFLAG=.TRUE.
        CR_INSERTED=.TRUE.
        CR_MIXTURE_ID=CRINS(CT1,CT2,CT4,CT3)
        CR_DESCRIPTION=CRDES(CT1,CT2,CT4,CT3)
        EXIT
      ENDIF
760    CONTINUE
      IF (CRCOMPFLAG.EQ..TRUE.) THEN
        DO 770 CT4=1,CRMIXNUM
          IF (CRMIXID(CT4).EQ.CR_MIXTURE_ID) THEN
            RELATIVE_CR_MIX_ID=CT4
          ENDIF
770    CONTINUE
780    WRITE (100,780)
790    FORMAT ('')
790    WRITE (100,790)
790    FORMAT ('',T5,' control rod material specification')
800    WRITE (100,800)
800    FORMAT ('')
      IF (CRCLAD(CR_DESCRIPTION).NE.0) THEN
        DO 801 CT5=1,10
          IF (CRCLAD(CR_DESCRIPTION).EQ.CLADDESNUM(CT5)) THEN
            CRCLNUM=CT5
            EXIT
          ENDIF
801    CONTINUE
          IF (CLADDESNAME(CRCLNUM).EQ.'SS304 ') THEN
            WRITE (100,802)
802    FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055 ',
c           '2.0 26304 69.5 28304 9.5')
            WRITE (100,803) CLADDESNUM(CRCLNUM), CLTEMP
803    FORMAT (T12,I2,' 1.0 ',F5.1,' end')
          ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS304S ') THEN
            WRITE (100,804)
804    FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055 ',
c           '2.0 26000 69.5 28000 9.5')
            WRITE (100,805) CLADDESNUM(CRCLNUM), CLTEMP
805    FORMAT (T13,I2,' 1.0 ',F5.1,' end')
          ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS316 ') THEN
            WRITE (100,806)
806    FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000 ',
c           '1.0 24304 17.0 25055 2.0')
            WRITE (100,807)
807    FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
            WRITE (100,808) CLADDESNUM(CRCLNUM), CLTEMP
808    FORMAT (T12,I2,' 1.0 ',F5.1,' end')

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ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS316S ') THEN
  WRITE (100,809) /
809   FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000 ',
  c     '1.0 24000 17.0 25055 2.0')
  WRITE (100,810)
810   FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
  WRITE (100,811) CLADDESNUM(CRCLNUM), CLTEMP
811   FORMAT (T13,I2,' 1.0 ',F5.1,' end')
ELSEIF (CLADDESNAME(CRCLNUM).EQ.'INCONEL') THEN
  WRITE (100,812)
812   FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
  c     ' 22000 2.5 24000 15.0')
  WRITE (100,813)
813   FORMAT (T13,'26000 7.0 28000 73.0')
  WRITE (100,814) CLADDESNUM(CRCLNUM), CLTEMP
814   FORMAT (T13,I2,' 1.0 ',F5.1,' end')
ENDIF
ENDIF
  WRITE (100,*) 'arbm-cr ', CRDEN(CR_DESCRIPTION),
  c     ' ', CRNUMISOS(RELATIVE_CR_MIX_ID), ' 0 0 0'
  DO 820 CT4=1,CRNUMISOS(RELATIVE_CR_MIX_ID)
  c     WRITE (100,815) CRISOID(RELATIVE_CR_MIX_ID,CT4),
  c     CRISOWTPCT(RELATIVE_CR_MIX_ID, CT4)
815     FORMAT (10X,I5,3X,F10.5)
820     CONTINUE
  WRITE (100,*) ' ', CR_MIXTURE_ID, ' 1.0 ',
  c     MODTEMPFINAL(CT3,RELATIVE_STPT_NUM), ' end'
ENDIF
ELSEIF (RTYPE.EQ.'BWR') THEN
  CRCOMPFLAG=.FALSE.
  DO 1500 CT4=1,23
    IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
      CRCOMPFLAG=.TRUE.
      CR_INSERTED=.TRUE.
      CR_DESCRIPTION=CRDES(CT1,CT2,CT4,CT3)
      EXIT
    ENDIF
1500  CONTINUE
    IF (CRCOMPFLAG.EQ..TRUE.) THEN
      WRITE (100,1510)
1510     FORMAT ('')
      WRITE (100,1520)
1520     FORMAT ('',T5,' control blade material specifications')
      WRITE (100,1530)
1530     FORMAT ('')
    IF (CRCLAD(CR_DESCRIPTION).NE.0) THEN
      DO 1540 CT5=1,10
        IF (CRCLAD(CR_DESCRIPTION).EQ.CLADDESNUM(CT5)) THEN
          CRCLNUM=CT5
          EXIT
        ENDIF
      CONTINUE
1540     IF (CLADDESNAME(CRCLNUM).EQ.'SS304 ') THEN
        WRITE (100,1550)
1550     FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055 ',
  c     '2.0 26304 69.5 28304 9.5')
        WRITE (100,1560) CLADDESNUM(CRCLNUM), CLTEMP
1560     FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ENDIF
    ENDIF
  ENDIF

```

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```

ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS304S ') THEN
WRITE (100,1570)
1570   FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055 ',
c       '2.0 26000 69.5 28000 9.5')
WRITE (100,1580) CLADDESNUM(CRCLNUM), CLTEMP
1580   FORMAT (T13,I2,' 1.0 ',F5.1,' end')
ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS316 ') THEN
WRITE (100,1590)
1590   FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000 ',
c       '1.0 24304 17.0 25055 2.0')
WRITE (100,1600)
1600   FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
WRITE (100,1610) CLADDESNUM(CRCLNUM), CLTEMP
1610   FORMAT (T12,I2,' 1.0 ',F5.1,' end')
ELSEIF (CLADDESNAME(CRCLNUM).EQ.'SS316S ') THEN
WRITE (100,1620)
1620   FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000 ',
c       '1.0 24000 17.0 25055 2.0')
WRITE (100,1630)
1630   FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
WRITE (100,1640) CLADDESNUM(CRCLNUM), CLTEMP
1640   FORMAT (T13,I2,' 1.0 ',F5.1,' end')
ELSEIF (CLADDESNAME(CRCLNUM).EQ.'INCONEL') THEN
WRITE (100,1650)
1650   FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
c       ' 22000 2.5 24000 15.0')
WRITE (100,1660)
1660   FORMAT (T13,'26000 7.0 28000 73.0')
WRITE (100,1670) CLADDESNUM(CRCLNUM), CLTEMP
1670   FORMAT (T13,I2,' 1.0 ',F5.1,' end')
ENDIF
ENDIF
DO 1720 RELATIVE_CR_MIX_ID=1,CRMIXNUM
IF (RELATIVE_CR_MIX_ID.LT.10) THEN
WRITE (100,1672) RELATIVE_CR_MIX_ID,
c       CRMIXDEN(RELATIVE_CR_MIX_ID),
c       CRNUMISOS(RELATIVE_CR_MIX_ID)
1672   FORMAT (T1,'arbm-cr',I1,3X,
c       G14.8,3X,I2,' 0 0 0')
ELSEIF (RELATIVE_CR_MIX_ID.EQ.10) THEN
WRITE (100,1674) RELATIVE_CR_MIX_ID,
c       CRMIXDEN(RELATIVE_CR_MIX_ID),
c       CRNUMISOS(RELATIVE_CR_MIX_ID)
1674   FORMAT (T1,'arbm-cr',I2,3X,
c       G14.8,3X,I2,' 0 0 0')
ENDIF
DO 1690 CT4=1,CRNUMISOS(RELATIVE_CR_MIX_ID)
WRITE (100,1680) CRISOID(RELATIVE_CR_MIX_ID,CT4),
c       CRISOWTPCT(RELATIVE_CR_MIX_ID, CT4)
1680   FORMAT (10X,I5,3X,F10.5)
1690   CONTINUE
WRITE (100,*) ' ', CRMIXID(RELATIVE_CR_MIX_ID),
c       ' 1.0 ', MODTEMPFINAL(CT3,RELATIVE_STPT_NUM), ' end'
1720   CONTINUE
ENDIF
ENDIF
* Write APSR material specification

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```

      IF ((CT1.EQ.CT1START).AND.(CT2.EQ.CT2GOVALUE).AND.
c      (CT3.EQ.1)) THEN
      DO 824 CT4=1,10
        DO 823 CT5=1,20
          DO 822 CT6=1,23
            DO 821 CT7=1,50
              APSRINSOLD(CT4,CT5,CT6,CT7)=
c              APSRINS(CT4,CT5,CT6,CT7)
821          CONTINUE
822          CONTINUE
823          CONTINUE
824          CONTINUE
        ENDIF
      APSR INSERTED=.FALSE.
      IF (APSRSTAT.EQ.'RODDED') THEN
        DO 830 CT4=1,23
          APSRBOTFLAG=.FALSE.
          DO 825 CT5=50,1,-1
            IF ((APSRINSOLD(CT1,CT2,CT4,CT5).NE.0).AND.
c            (APSRBOTFLAG.EQ..FALSE.)) THEN
              APSR_DESCRIPTION=APSRDES(CT1,CT2,CT4,CT5)
              APSRBOTFLAG=.TRUE.
              FOLNODKEEP=CT5
              FOLSTEPKEEP=CT4
              ENDIF
            IF ((APSRINSOLD(CT1,CT2,CT4,CT5).EQ.0).AND.
c            (APSRBOTFLAG.EQ..TRUE.)) THEN
              APSRINS(CT1,CT2,CT4,CT5)=
c              APSRFOLLOWMIX(CT1,CT2,FOLSTEPKEEP,FOLNODKEEP)
              APSRFOLLOWDATA(CT1,CT2,CT4,CT5)=3
            ENDIF
825          CONTINUE
830          CONTINUE
          FOLLOWIN=.FALSE.
          DO 831 CT4=1,23
            IF (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).EQ.3) THEN
              FOLLOWIN=.TRUE.
              EXIT
            ENDIF
831          CONTINUE
          IF (FOLLOWIN.EQ..TRUE.) THEN
832            WRITE (100,832)
            FORMAT ('''')
834            WRITE (100,834)
            FORMAT ('''',T5,' APSR follow rod material',
c            ' specification')
            WRITE (100,836)
836            FORMAT ('''')
          IF ((APSRFOLLOWMIX(CT1,CT2,FOLSTEPKEEP,FOLNODKEEP).NE.0)
c          .AND.
c          (APSRFOLLOWMIX(CT1,CT2,FOLSTEPKEEP,FOLNODKEEP).NE.2)) THEN
            DO 838 CT5=1,10
              IF (APSRFOLLOWMIX(CT1,CT2,FOLSTEPKEEP,FOLNODKEEP)
c              .EQ.CLADDESNUM(CT5)) THEN
                APSRFOLNUM=CT5
                EXIT
              ENDIF
838            CONTINUE

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```
      IF (CLADDESNAME(APSRFOLNUM).EQ.'SS304 ') THEN
      WRITE (100,840)
840      FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055 ',
      c      '2.0 26304 69.5 28304 9.5')
      WRITE (100,842) CLADDESNUM(APSRFOLNUM), CLTEMP
842      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRFOLNUM).EQ.'SS304S ') THEN
      WRITE (100,844)
844      FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055 ',
      c      '2.0 26000 69.5 28000 9.5')
      WRITE (100,846) CLADDESNUM(APSRFOLNUM), CLTEMP
846      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRFOLNUM).EQ.'SS316 ') THEN
      WRITE (100,848)
848      FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000 ',
      c      '1.0 24304 17.0 25055 2.0')
      WRITE (100,850)
850      FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
      WRITE (100,852) CLADDESNUM(APSRFOLNUM), CLTEMP
852      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRFOLNUM).EQ.'SS316S ') THEN
      WRITE (100,854)
854      FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000 ',
      c      '1.0 24000 17.0 25055 2.0')
      WRITE (100,856)
856      FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
      WRITE (100,858) CLADDESNUM(APSRFOLNUM), CLTEMP
858      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRFOLNUM).EQ.'INCONEL') THEN
      WRITE (100,860)
860      FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
      c      ' 22000 2.5 24000 15.0')
      WRITE (100,862)
862      FORMAT (T13,'26000 7.0 28000 73.0')
      WRITE (100,864) CLADDESNUM(APSRFOLNUM), CLTEMP
864      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ENDIF
      ENDIF
      ENDIF
      APSRCOMPFLAG=.FALSE.
      DO 865 CT4=1,23
      IF ((APSRINS(CT1,CT2,CT4,CT3).NE.0).AND.
      c      (APSRINS(CT1,CT2,CT4,CT3).NE.
      c      APSRFOLLOWMIX(CT1,CT2,FOLSTEPKEEP,FOLNODKEEP))) THEN
      APSRCOMPFLAG=.TRUE.
      APSR_INSERTED=.TRUE.
      APSR_MIXTURE_ID=APSRINS(CT1,CT2,CT4,CT3)
      APSR_DESCRIPTION=APSRDES(CT1,CT2,CT4,CT3)
      EXIT
      ENDIF
865      CONTINUE
      IF (APSRCOMPFLAG.EQ..TRUE.) THEN
      DO 866 CT4=1,APSRMIXNUM
      IF (APSRMIXID(CT4).EQ.APSR_MIXTURE_ID) THEN
      RELATIVE_APSR_MIX_ID=CT4
      ENDIF
866      CONTINUE
      WRITE (100,868)
```

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868      FORMAT ('')
      WRITE (100,870)
870      FORMAT ('',T5,' axial power shaping rod material',
c        ' specification')
      WRITE (100,880)
880      FORMAT ('')
      IF (APSRCLAD(APSR_DESCRIPTION).NE.0) THEN
      DO 881 CT5=1,10
      IF (APSRCLAD(APSR_DESCRIPTION).EQ.CLADDESNUM(CT5)) THEN
      APSRCLNUM=CT5
      EXIT
      ENDIF
881      CONTINUE
      IF (CLADDESNAME(APSRCLNUM).EQ.'SS304 ') THEN
      WRITE (100,882)
882      FORMAT ('arbm-ss304 7.92 4 0 0 0 24304 19.0 25055 ',
c        '2.0 26304 69.5 28304 9.5')
      WRITE (100,883) CLADDESNUM(APSRCLNUM), CLTEMP
883      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRCLNUM).EQ.'SS304S ') THEN
      WRITE (100,884)
884      FORMAT ('arbm-ss304s 7.92 4 0 0 0 24000 19.0 25055 ',
c        '2.0 26000 69.5 28000 9.5')
      WRITE (100,885) CLADDESNUM(APSRCLNUM), CLTEMP
885      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRCLNUM).EQ.'SS316 ') THEN
      WRITE (100,886)
886      FORMAT ('arbm-ss316 7.75 7 0 0 0 6012 0.08 14000 ',
c        '1.0 24304 17.0 25055 2.0')
      WRITE (100,887)
887      FORMAT (T12,'26304 65.42 28304 12.0 42000 2.5')
      WRITE (100,888) CLADDESNUM(APSRCLNUM), CLTEMP
888      FORMAT (T12,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRCLNUM).EQ.'SS316S ') THEN
      WRITE (100,889)
889      FORMAT ('arbm-ss316s 7.75 7 0 0 0 6012 0.08 14000 ',
c        '1.0 24000 17.0 25055 2.0')
      WRITE (100,890)
890      FORMAT (T13,'26000 65.42 28000 12.0 42000 2.5')
      WRITE (100,891) CLADDESNUM(APSRCLNUM), CLTEMP
891      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ELSEIF (CLADDESNAME(APSRCLNUM).EQ.'INCONEL') THEN
      WRITE (100,892)
892      FORMAT ('arbm-inconel 8.3 5 0 0 0 14000 2.5',
c        ' 22000 2.5 24000 15.0')
      WRITE (100,893)
893      FORMAT (T13,'26000 7.0 28000 73.0')
      WRITE (100,894) CLADDESNUM(APSRCLNUM), CLTEMP
894      FORMAT (T13,I2,' 1.0 ',F5.1,' end')
      ENDIF
      ENDIF
      WRITE (100,*) 'arbm-apsr ', APSRDEN(APSR_DESCRIPTION),
c        ' ', APSRNUMISOS(RELATIVE_APSR_MIX_ID), ' 0 0 0'
      DO 900 CT4=1,APSRNUMISOS(RELATIVE_APSR_MIX_ID)
      WRITE (100,895) APSRISOID(RELATIVE_APSR_MIX_ID,CT4),
c        APSRISOWTPCT(RELATIVE_APSR_MIX_ID, CT4)
895      FORMAT (10X,I5,3X,F10.5)
900      CONTINUE

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        WRITE (100,*) '          ', APSR_MIXTURE_ID, ' 1.0 ',
c        MODTEMPFINAL(CT3,RELATIVE_STPT_NUM), ' end'
      ENDIF
    ENDIF
* Write fuel rod fill gas material specification
  WRITE (100,910)
910  FORMAT ('')
  WRITE (100,920)
920  FORMAT ('he 5 end')
  WRITE (100,930)
930  FORMAT ('end comp')
* Write base reactor lattice specifications
  WRITE (100,940)
940  FORMAT ('')
  WRITE (100,950)
950  FORMAT ('' base reactor lattice specification')
  WRITE (100,960)
960  FORMAT ('')
  WRITE (100,970) PITCH, FOD, COD, CID
970  FORMAT ('squarepitch',3X,F7.5,3X,F6.4,3X,'1 3',3X,F6.4,
c    3X,'2',3X,F6.4,3X,'0 end')
* The following writing routine for 'SPECIAL' input data
* has not been formatted to compensate for FORTRAN's ingenious
* incapability to print leading zeros in numeric fields.
* Errors will occur in the FIDO input if null space exists
* between an equal sign and the appropriate value. Therefore,
* the IIM and ICM factors must always be at least 10.
      IF (FLAG2.EQ.'SPECIAL') THEN
        IF (SZF.LT.1) THEN
          WRITE (100,980) SZF, ISN, IIM, ICM, EPS, PTC, IUS
980  FORMAT ('more data',1X,'szf=0',F3.2,1X,'isn=',I1,1X,
c    'iim=',I2,1X,'icm=',I2,1X,'eps=0',G7.2,1X,'ptc=0',G7.2,
c    1X,'ius=',I1,3X,'end')
        ELSE
          WRITE (100,990) SZF, ISN, IIM, ICM, EPS, PTC, IUS
990  FORMAT ('more data',1X,'szf=',F4.2,1X,'isn=',I1,1X,
c    'iim=',I2,1X,'icm=',I2,1X,'eps=0',G7.2,1X,'ptc=0',G7.2,
c    1X,'ius=',I1,3X,'end')
        ENDIF
      ELSEIF (FLAG2.NE.'SPECIAL') THEN
        IF (MESH.LT.1) THEN
          WRITE (100,1000) MESH
1000  FORMAT ('more data',1X,'szf=0',F3.2,1X,'end')
        ELSE
          WRITE (100,1010) MESH
1010  FORMAT ('more data',1X,'szf=',F4.2,1X,'end')
        ENDIF
      ENDIF
* Write assembly specifications
  WRITE (100,1020)
1020  FORMAT ('')
  WRITE (100,1030)
1030  FORMAT ('' assembly specification')
  WRITE (100,1040)
1040  FORMAT ('')
      IF (STEPCONTROL.EQ.'Y') THEN
        CALL ZEROS(VARSTEPNUM(CT1,CT2),IRRAD_STEPS)
      ELSEIF (STEPCONTROL.EQ.'N') THEN

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        CALL ZEROS (INT (BLETDOWN (CT1, CT2, 2)), IRRAD_STEPS)
    ENDIF
* Assembly specification if no BPRA, no CR, and no APSR is inserted
  IF ((BPRA_INSERTED.EQ..FALSE.) .AND. (CR_INSERTED.EQ..FALSE.)
    c .AND. (APSR_INSERTED.EQ..FALSE.)
    c .AND. (BPRA_FOLLOW.EQ..FALSE.)
    c .AND. (FOLLOWIN.EQ..FALSE.)) THEN
      IF (NODES (CT3, 2) .GE. (100.0)) THEN
        WRITE (100, 1041) RODS, NODES (CT3, 2), IRRAD_STEPS
1041   FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F7.3, 1X,
    c     'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')
        ELSEIF ((NODES (CT3, 2) .LT. (100.0)) .AND.
    c     (NODES (CT3, 2) .GE. (10.0))) THEN
        WRITE (100, 1042) RODS, NODES (CT3, 2), IRRAD_STEPS
1042   FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F6.3, 1X,
    c     'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')
        ELSEIF (NODES (CT3, 2) .LT. (10.0)) THEN
1043   WRITE (100, 1043) RODS, NODES (CT3, 2), IRRAD_STEPS
    c     FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F5.3, 1X,
        'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')
      ENDIF
      CALL ZEROS (PLEVEL, PLEVELCH)
      CALL ZEROS (LUZONE, LUZONECH)
      IF (MESH.LT.(1.0)) THEN
1044   WRITE (100, 1044) PLEVELCH, LUZONECH, MESH
    c     FORMAT ('printlevel=', A2, 1X, 'inplevel=2', 1X,
    c     'numztotal=', A2, 1X, 'mxrepeats=1', 1X,
        'mixmod=3 facmesh=', F3.2, 1X, 'end')
      ELSE
1045   WRITE (100, 1045) PLEVELCH, LUZONECH, MESH
    c     FORMAT ('printlevel=', A2, 1X, 'inplevel=2', 1X,
    c     'numztotal=', A2, 1X, 'mxrepeats=1', 1X,
        'mixmod=3 facmesh=', F4.2, 1X, 'end')
      ENDIF
      DO 1047 CT4=1, LUZONE
        IF (MOD (CT4, 6) .EQ. 0) THEN
          WRITE (100, *)
        ENDIF
        WRITE (100, 1046) LMB (CT4, GTNOW), LRB (CT4, GTNOW)
1046   FORMAT (I3, 1X, F7.5, 1X, $)
1047   CONTINUE
        WRITE (100, *)
      ENDIF
* Assembly specification if BPRA is inserted
  IF (BPRA_FOLLOW.EQ..TRUE.) THEN
    IF (NODES (CT3, 2) .GE. (100.0)) THEN
1050   WRITE (100, 1050) RODS, NODES (CT3, 2), IRRAD_STEPS
    c     FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F7.3, 1X,
        'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')
    ELSEIF ((NODES (CT3, 2) .LT. (100.0)) .AND.
    c     (NODES (CT3, 2) .GE. (10.0))) THEN
        WRITE (100, 1052) RODS, NODES (CT3, 2), IRRAD_STEPS
1052   FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F6.3, 1X,
    c     'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')
    ELSEIF (NODES (CT3, 2) .LT. (10.0)) THEN
1054   WRITE (100, 1054) RODS, NODES (CT3, 2), IRRAD_STEPS
    c     FORMAT ('npin/assembly=', I3, 1X, 'fuelngth=', F5.3, 1X,
        'ncycles=', A2, 1X, 'nlib/cyc=1 lightel=0')

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        ENDIF
        CALL ZEROS(PLEVEL, PLEVELCH)
        CALL ZEROS(BPZONE(BPRA_DESCRIPTION_ID), BPZONECH)
        IF (MESH.LT.(1.0)) THEN
1056      WRITE (100,1056) PLEVELCH, BPZONECH, MESH
          c      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
          c      'numztotal=',A2,1X,'mxrepeats=1',1X,
          c      'mixmod=3 facmesh=',F3.2,1X,'end')
        ELSE
1058      WRITE (100,1058) PLEVELCH, BPZONECH, MESH
          c      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
          c      'numztotal=',A2,1X,'mxrepeats=1',1X,
          c      'mixmod=3 facmesh=',F4.2,1X,'end')
        ENDIF
        DO 1062 CT4=1, BPZONE(BPRA_DESCRIPTION_ID)
          IF (MOD(CT4,6).EQ.0) THEN
            WRITE (100,*)
            ENDIF
            WRITE (100,1060) BPRFM(CT4,BPRA_DESCRIPTION_ID,GTNOW),
          c      BPRFR(CT4,BPRA_DESCRIPTION_ID,GTNOW)
1060      FORMAT (I3,1X,F7.5,1X,$)
1062      CONTINUE
            WRITE (100,*)
          ENDIF
        IF (BPRA_INSERTED.EQ..TRUE.) THEN
          IF (NODES(CT3,2).GE.(100.0)) THEN
1098      WRITE (100,1098) RODS, NODES(CT3,2), IRRAD_STEPS
          c      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F7.3,1X,
          c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ELSEIF ((NODES(CT3,2).LT.(100.0)).AND.
          c      (NODES(CT3,2).GE.(10.0))) THEN
1100      WRITE (100,1100) RODS, NODES(CT3,2), IRRAD_STEPS
          c      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F6.3,1X,
          c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ELSEIF (NODES(CT3,2).LT.(10.0)) THEN
1102      WRITE (100,1102) RODS, NODES(CT3,2), IRRAD_STEPS
          c      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F5.3,1X,
          c      'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
          ENDIF
          CALL ZEROS(PLEVEL, PLEVELCH)
          CALL ZEROS(BPZONE(BPRA_DESCRIPTION_ID), BPZONECH)
          IF (MESH.LT.(1.0)) THEN
1104      WRITE (100,1104) PLEVELCH, BPZONECH, MESH
          c      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
          c      'numztotal=',A2,1X,'mxrepeats=1',1X,
          c      'mixmod=3 facmesh=',F3.2,1X,'end')
          ELSE
1106      WRITE (100,1106) PLEVELCH, BPZONECH, MESH
          c      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
          c      'numztotal=',A2,1X,'mxrepeats=1',1X,
          c      'mixmod=3 facmesh=',F4.2,1X,'end')
          ENDIF
          DO 1110 CT4=1, BPZONE(BPRA_DESCRIPTION_ID)
            IF (MOD(CT4,6).EQ.0) THEN
              WRITE (100,*)
            ENDIF
            WRITE (100,1108) BPMA(CT4,BPRA_DESCRIPTION_ID,GTNOW),
          c      BPRA(CT4,BPRA_DESCRIPTION_ID,GTNOW)

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1108         FORMAT (I3,1X,F7.5,1X,$)
1110         CONTINUE
           WRITE (100,*)
           ENDIF
* Assembly specification if CR is inserted
  IF (CR_INSERTED.EQ..TRUE.) THEN
    IF (NODES(CT3,2).GE.(100.0)) THEN
      WRITE (100,1120) RODS, NODES(CT3,2), IRRAD_STEPS
1120         FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F7.3,1X,
c           'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
      ELSEIF ((NODES(CT3,2).LT.(100.0)).AND.
c           (NODES(CT3,2).GE.(10.0))) THEN
      WRITE (100,1130) RODS, NODES(CT3,2), IRRAD_STEPS
1130         FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F6.3,1X,
c           'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
      ELSEIF (NODES(CT3,2).LT.(10.0)) THEN
      WRITE (100,1140) RODS, NODES(CT3,2), IRRAD_STEPS
1140         FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F5.3,1X,
c           'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
    ENDIF
    CALL ZEROS(PLEVEL,PLEVELCH)
    CALL ZEROS(CRZONE(CR_DESCRIPTION),CRZONECH)
    IF (MESH.LT.(1.0)) THEN
      WRITE (100,1150) PLEVELCH, CRZONECH, MESH
1150         FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c           'numzttotal=',A2,1X,'mxrepeats=0',1X,
c           'mixmod=3 facmesh=',F3.2,1X,'end')
    ELSE
      WRITE (100,1160) PLEVELCH, CRZONECH, MESH
1160         FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
c           'numzttotal=',A2,1X,'mxrepeats=0',1X,
c           'mixmod=3 facmesh=',F4.2,1X,'end')
    ENDIF
    IF (STEPCONTROL.EQ.'N') THEN
      DO 1168 CT4=1,INT(BLETDOWN(CT1,CT2,2))
        IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
          DO 1162 CT5=1,CRZONE(CR_DESCRIPTION)
            IF (MOD(CT5,6).EQ.0) THEN
              WRITE (100,*)
            ENDIF
            WRITE (100,1161) CRMA(CT5,CR_DESCRIPTION,GTNOW),
c           CRRA(CT5,CR_DESCRIPTION,GTNOW)
1161             FORMAT (I3,1X,F7.5,1X,$)
1162             CONTINUE
              WRITE (100,*)
            ELSEIF (CRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
              DO 1166 CT5=1,CRZONE(CR_DESCRIPTION)
                IF (MOD(CT5,6).EQ.0) THEN
                  WRITE (100,*)
                ENDIF
                WRITE (100,1164) LMC(CT5,CR_DESCRIPTION,GTNOW),
c           LRC(CT5,CR_DESCRIPTION,GTNOW)
1164                 FORMAT (I3,1X,F7.5,1X,$)
1166                 CONTINUE
                  WRITE (100,*)
                ENDIF
              CONTINUE
            ELSEIF (STEPCONTROL.EQ.'Y') THEN

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```

DO 1210 CT4=1,VARSTEPNUM(CT1,CT2)
  IF (CRINS(CT1,CT2,CT4,CT3).NE.0) THEN
    DO 1180 CT5=1,CRZONE(CR_DESCRIPTION)
      IF (MOD(CT5,6).EQ.0) THEN
        WRITE (100,*)
      ENDIF
      WRITE (100,1170) CRMA(CT5,CR_DESCRIPTION,GTNOW),
        CRRA(CT5,CR_DESCRIPTION,GTNOW)
      FORMAT (I3,1X,F7.5,1X,$)
    CONTINUE
    WRITE (100,*)
  ELSEIF (CRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
    DO 1200 CT5=1,CRZONE(CR_DESCRIPTION)
      IF (MOD(CT5,6).EQ.0) THEN
        WRITE (100,*)
      ENDIF
      WRITE (100,1190) LMC(CT5,CR_DESCRIPTION,GTNOW),
        LRC(CT5,CR_DESCRIPTION,GTNOW)
      FORMAT (I3,1X,F7.5,1X,$)
    CONTINUE
    WRITE (100,*)
  ENDIF
CONTINUE
ENDIF
ENDIF
* Assembly specification if APSR is inserted
  IF ((APSR_INSERTED.EQ..TRUE.).OR.(FOLLOWIN.EQ..TRUE.)) THEN
    IF (NODES(CT3,2).GE.(100.0)) THEN
      WRITE (100,1220) RODS, NODES(CT3,2), IRRAD_STEPS
      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F7.3,1X,
        'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
    ELSEIF ((NODES(CT3,2).LT.(100.0)).AND.
      (NODES(CT3,2).GE.(10.0))) THEN
      WRITE (100,1230) RODS, NODES(CT3,2), IRRAD_STEPS
      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F6.3,1X,
        'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
    ELSEIF (NODES(CT3,2).LT.(10.0)) THEN
      WRITE (100,1240) RODS, NODES(CT3,2), IRRAD_STEPS
      FORMAT ('npin/assembly=',I3,1X,'fuelngth=',F5.3,1X,
        'ncycles=',A2,1X,'nlib/cyc=1 lightel=0')
    ENDIF
    CALL ZEROS(LEVEL,LEVELCH)
    CALL ZEROS(APSRZONE(APSR_DESCRIPTION),APSRZONECH)
    IF (MESH.LT.(1.0)) THEN
      WRITE (100,1250) LEVELCH, APSRZONECH, MESH
      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
        'numzttotal=',A2,1X,'mxrepeats=0',1X,
        'mixmod=3 facmesh=',F3.2,1X,'end')
    ELSE
      WRITE (100,1252) LEVELCH, APSRZONECH, MESH
      FORMAT ('printlevel=',A2,1X,'inplevel=2',1X,
        'numzttotal=',A2,1X,'mxrepeats=0',1X,
        'mixmod=3 facmesh=',F4.2,1X,'end')
    ENDIF
    IF (STEPCONTROL.EQ.'N') THEN
      DO 1268 CT4=1,INT(BLETDOWN(CT1,CT2,2))
        IF ((APSRINS(CT1,CT2,CT4,CT3).NE.0).AND.
          (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).NE.3)) THEN

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```
DO 1258 CT5=1,APSRZONE(APSR DESCRIPTION)
  IF (MOD(CT5,6).EQ.0) THEN
    WRITE (100,*)
  ENDIF
  WRITE (100,1256)
  APSRMA(CT5,APSR DESCRIPTION,GTNOW),
  APSRRA(CT5,APSR DESCRIPTION,GTNOW)
  FORMAT (I3,1X,F7.5,1X,$)
1256
1258 CONTINUE
  WRITE (100,*)
  ELSEIF ((APSRINS(CT1,CT2,CT4,CT3).NE.0).AND.
  (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).EQ.3)) THEN
  DO 1262 CT5=1,APSRZONE(APSR DESCRIPTION)
    IF (MOD(CT5,6).EQ.0) THEN
      WRITE (100,*)
    ENDIF
    WRITE (100,1260)
    APSRFM(CT5,APSR DESCRIPTION,GTNOW),
    APSRFR(CT5,APSR DESCRIPTION,GTNOW)
    FORMAT (I3,1X,F7.5,1X,$)
  1260
  1262 CONTINUE
    WRITE (100,*)
    ELSEIF (APSRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
    DO 1266 CT5=1,APSRZONE(APSR DESCRIPTION)
      IF (MOD(CT5,6).EQ.0) THEN
        WRITE (100,*)
      ENDIF
      WRITE (100,1264) LMD(CT5,APSR DESCRIPTION,GTNOW),
      LRD(CT5,APSR DESCRIPTION,GTNOW)
      FORMAT (I3,1X,F7.5,1X,$)
  1264
  1266 CONTINUE
        WRITE (100,*)
      ENDIF
    CONTINUE
    ELSEIF (STEPCONTROL.EQ.'Y') THEN
    DO 1310 CT4=1,VARSTEPNUM(CT1,CT2)
      IF ((APSRINS(CT1,CT2,CT4,CT3).NE.0).AND.
  1310 (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).NE.3)) THEN
      DO 1280 CT5=1,APSRZONE(APSR DESCRIPTION)
        IF (MOD(CT5,6).EQ.0) THEN
          WRITE (100,*)
        ENDIF
        WRITE (100,1270)
        APSRMA(CT5,APSR DESCRIPTION,GTNOW),
        APSRRA(CT5,APSR DESCRIPTION,GTNOW)
        FORMAT (I3,1X,F7.5,1X,$)
  1270
  1280 CONTINUE
          WRITE (100,*)
        ELSEIF ((APSRINS(CT1,CT2,CT4,CT3).NE.0).AND.
  1280 (APSRFOLLOWDATA(CT1,CT2,CT4,CT3).EQ.3)) THEN
        DO 1290 CT5=1,APSRZONE(APSR DESCRIPTION)
          IF (MOD(CT5,6).EQ.0) THEN
            WRITE (100,*)
          ENDIF
          WRITE (100,1285)
          APSRFM(CT5,APSR DESCRIPTION,GTNOW),
          APSRFR(CT5,APSR DESCRIPTION,GTNOW)
          FORMAT (I3,1X,F7.5,1X,$)
  1285
```

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```

1290          CONTINUE
              WRITE (100,*)
              ELSEIF (APSRINS(CT1,CT2,CT4,CT3).EQ.0) THEN
                DO 1300 CT5=1,APSRZONE(APSR_DESCRIPTION)
                  IF (MOD(CT5,6).EQ.0) THEN
                    WRITE (100,*)
                  ENDIF
                  WRITE (100,1295) LMD(CT5,APSR_DESCRIPTION,GTNOW),
c                LRD(CT5,APSR_DESCRIPTION,GTNOW)
1295          FORMAT (I3,1X,F7.5,1X,$)
1300          CONTINUE
              WRITE (100,*)
            ENDIF
1310          CONTINUE
        ENDIF
    ENDIF
* Write assembly depletion/decay parameters
    WRITE (100,1320)
1320          FORMAT ('''')
    WRITE (100,1330)
1330          FORMAT (''' assembly depletion/decay parameters')
    WRITE (100,1340)
1340          FORMAT ('''')
    CALL ZEROS(CYCPOS(CT1),ASSYPOSITION)
    WRITE (100,1350) CYCLEID(CT1), ASSYPOSITION
1350          FORMAT ('''',T5,'Cycle-',A2,', one-eighth core',
c          ' assembly number ',A2)
    IF (STEPCONTROL.EQ.'N') THEN
      DO 1380 CT4=3,(INT(BLETDOWN(CT1,CT2,2))+2)
        IF (CT4.LT.(BLETDOWN(CT1,CT2,2)+2)) THEN
          DOWNTIME=0.0
          IF (RTYPE.EQ.'PWR') THEN
            BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c          BLETDOWN(CT1,CT2,3))
            ELSEIF (RTYPE.EQ.'BWR') THEN
            BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c          MODREFDEN)
            ENDIF
            WRITE (100,1360) POWER(CT3,RELATIVE_STPT_NUM),
c          BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1360          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c          G10.5,1X,'bfrac=',G9.4,1X,'end')
            ELSEIF ((CT4.EQ.(INT(BLETDOWN(CT1,CT2,2))+2)).AND.
c          (CT2.LT.STPTS(CT1))) THEN
              DOWNTIME=STPTDAT(CT1,(CT2+1),3)
              IF (RTYPE.EQ.'PWR') THEN
                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c          BLETDOWN(CT1,CT2,3))
                ELSEIF (RTYPE.EQ.'BWR') THEN
                BORON_FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c          MODREFDEN)
                ENDIF
                WRITE (100,1365) POWER(CT3,RELATIVE_STPT_NUM),
c          BLETDOWN(CT1,CT2,1), DOWNTIME, BORON_FRACTION
1365          FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c          G10.5,1X,'bfrac=',G9.4,1X,'end')
            ELSEIF ((CT4.EQ.(INT(BLETDOWN(CT1,CT2,2))+2)).AND.
c          (CT2.EQ.STPTS(CT1))) THEN

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```

      DOWNTIME=CYCDOWN(CT1)
      IF (RTYPE.EQ.'PWR') THEN
        BORON FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c         BLETDOWN(CT1,CT2,3))
      ELSEIF (RTYPE.EQ.'BWR') THEN
        BORON FRACTION=(BLETDOWN(CT1,CT2,CT4)/
c         MODREFDEN)
      ENDIF
      WRITE (100,1370) POWER(CT3,RELATIVE_STPT_NUM),
c         BLETDOWN(CT1,CT2,1), DOWNTIME, BORON FRACTION
1370     FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c         G10.5,1X,'bfrac=',G9.4,1X,'end')
      ENDIF
1380     CONTINUE
      ELSEIF (STEPCONTROL.EQ.'Y') THEN
        DO 1388 CT4=1,VARSTEPNUM(CT1,CT2)
          IF (CT4.LT.VARSTEPNUM(CT1,CT2)) THEN
            DOWNTIME=0.0
            IF (RTYPE.EQ.'PWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              VARBLETDOWN(CT1,CT2,1,2))
            ELSEIF (RTYPE.EQ.'BWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              MODREFDEN)
            ENDIF
            WRITE (100,1382) VARPOWER(CT1,CT2,CT4,CT3),
c              VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON FRACTION
1382     FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c              G10.5,1X,'bfrac=',G9.4,1X,'end')
          ELSEIF ((CT4.EQ.VARSTEPNUM(CT1,CT2)).AND.
c          (CT2.LT.STPTS(CT1))) THEN
            DOWNTIME=STPTDAT(CT1,(CT2+1),3)
            IF (RTYPE.EQ.'PWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              VARBLETDOWN(CT1,CT2,1,2))
            ELSEIF (RTYPE.EQ.'BWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              MODREFDEN)
            ENDIF
            WRITE (100,1384) VARPOWER(CT1,CT2,CT4,CT3),
c              VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON FRACTION
1384     FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c              G10.5,1X,'bfrac=',G9.4,1X,'end')
          ELSEIF ((CT4.EQ.VARSTEPNUM(CT1,CT2)).AND.
c          (CT2.EQ.STPTS(CT1))) THEN
            DOWNTIME=CYCDOWN(CT1)
            IF (RTYPE.EQ.'PWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              VARBLETDOWN(CT1,CT2,1,2))
            ELSEIF (RTYPE.EQ.'BWR') THEN
              BORON FRACTION=(VARBLETDOWN(CT1,CT2,CT4,2)/
c              MODREFDEN)
            ENDIF
            WRITE (100,1386) VARPOWER(CT1,CT2,CT4,CT3),
c              VARBLETDOWN(CT1,CT2,CT4,1), DOWNTIME, BORON FRACTION
1386     FORMAT ('power=',G10.5,1X,'burn=',G9.4,1X,'down=',
c              G10.5,1X,'bfrac=',G9.4,1X,'end')
          ENDIF
        ENDIF
      ENDIF

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```

1388     CONTINUE
        ENDIF
*   Store final downtime for use in extraction script 'sedexecute.exe'
        FINALDOWNTIME=DOWNTIME
*   Write input deck closing statement
        WRITE (100,1390)
1390     FORMAT ('''')
        WRITE (100,1400)
1400     FORMAT (''' end of input')
        WRITE (100,1410)
1410     FORMAT ('''')
        WRITE (100,1420)
1420     FORMAT ('end')
        CLOSE(UNIT=100)

        RETURN
        END

*****
*   This subroutine cuts the final ORIGEN output in *
*   the SAS2H output file down to the essential *
*   data needed for the CRC calculations. *
*****
        SUBROUTINE CUTTER (NM)
*
        INTEGER*4 LINECOUNTER, CUTLINE, NUM1, NUM2,
        c NUM3, NUM4, NUM5, NUM6, NUM7, SEDEXERESULT,
        c VERIFCOUNTER, VERIFCUTLINE, VERIFENDCUTLINE,
        c OUTPUTREMOVALRESULT
*
        CHARACTER NM*31, OUTPUTFILE*32, BPLABEL*14,
        c LINVAL*7, SEDEXECOMMAND*60, FORMATLABEL*29,
        c VERIFLABEL*14, VERIFLINVAL*7, VERIFENDLINVAL*7,
        c OUTPUTREMOVAL*35
*
        LOGICAL BPFIND, NUMZEROFLAG, VERIFFIND
*
        OUTPUTFILE(1:25)=NM(1:25)
        OUTPUTFILE(26:32)='.output'
        OPEN (UNIT=700, FILE=OUTPUTFILE, STATUS='OLD')
        REWIND(700)
        LINECOUNTER=0
        BPFIND=.FALSE.
        DO 14 WHILE (BPFIND.EQ..FALSE.)
            LINECOUNTER=LINECOUNTER+1
            READ(700,12) BPLABEL
12         FORMAT (T98,A14)
            IF (BPLABEL.EQ.'light elements') THEN
                READ(700,*)
                READ(700,13) FORMATLABEL
13         FORMAT (T46,A29)
                IF (FORMATLABEL.EQ.'nuclide concentrations, grams') THEN
                    BPFIND=.TRUE.
                ELSE
                    BACKSPACE(700)
                    BACKSPACE(700)
                ENDIF
            ENDIF
        ENDIF
        ENDIF

```

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```
14 CONTINUE
  NUMZEROFLAG=.FALSE.
  CUTLINE=LINECOUNTER-2
    NUM1=INT(CUTLINE/1000000.0)
    IF ((NUM1.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(1:1)=' '
    ELSE
      LINVAL(1:1)=CHAR(NUM1+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM2=INT((CUTLINE-(NUM1*1000000))/100000.0)
    IF ((NUM2.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(2:2)=' '
    ELSE
      LINVAL(2:2)=CHAR(NUM2+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM3=INT((CUTLINE-(NUM2*100000)-(
c (NUM1*1000000))/10000.0)
    IF ((NUM3.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(3:3)=' '
    ELSE
      LINVAL(3:3)=CHAR(NUM3+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM4=INT((CUTLINE-(NUM3*10000)-(
c (NUM2*100000)-(NUM1*1000000))/1000.0)
    IF ((NUM4.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(4:4)=' '
    ELSE
      LINVAL(4:4)=CHAR(NUM4+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM5=INT((CUTLINE-(NUM4*1000)-(NUM3*10000)-
c (NUM2*100000)-(NUM1*1000000))/100.0)
    IF ((NUM5.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(5:5)=' '
    ELSE
      LINVAL(5:5)=CHAR(NUM5+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM6=INT((CUTLINE-(NUM5*100)-(NUM4*1000)-
c (NUM3*10000)-(NUM2*100000)-
c (NUM1*1000000))/10.0)
    IF ((NUM6.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
      LINVAL(6:6)=' '
    ELSE
      LINVAL(6:6)=CHAR(NUM6+48)
      NUMZEROFLAG=.TRUE.
    ENDIF
    NUM7=INT(CUTLINE-(NUM6*10)-(NUM5*100)-
c (NUM4*1000)-(NUM3*10000)-(NUM2*100000)-
c (NUM1*1000000))
    LINVAL(7:7)=CHAR(NUM7+48)
  REWIND(700)
  VERIFCOUNTER=0
  VERIFFIND=.FALSE.
  DO 30 WHILE (VERIFFIND.EQ..FALSE.)
```

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```
VERIFCOUNTER=VERIFCOUNTER+1
READ(700,20) VERIFLABEL
20  FORMAT (T45,A14)
   IF (VERIFLABEL.EQ.'program: sas2') THEN
       VERIFFIND=.TRUE.
   ENDIF
30  CONTINUE
   NUMZEROFLAG=.FALSE.
   VERIFCUTLINE=VERIFCOUNTER-12
   VERIFENDCUTLINE=VERIFCOUNTER+18
       NUM1=INT(VERIFCUTLINE/1000000.0)
       IF ((NUM1.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(1:1)=' '
       ELSE
           VERIFLINVAL(1:1)=CHAR(NUM1+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM2=INT((VERIFCUTLINE-(NUM1*1000000))/100000.0)
       IF ((NUM2.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(2:2)=' '
       ELSE
           VERIFLINVAL(2:2)=CHAR(NUM2+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM3=INT((VERIFCUTLINE-(NUM2*100000)-
c      (NUM1*1000000))/10000.0)
       IF ((NUM3.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(3:3)=' '
       ELSE
           VERIFLINVAL(3:3)=CHAR(NUM3+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM4=INT((VERIFCUTLINE-(NUM3*10000)-
c      (NUM2*100000)-(NUM1*1000000))/1000.0)
       IF ((NUM4.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(4:4)=' '
       ELSE
           VERIFLINVAL(4:4)=CHAR(NUM4+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM5=INT((VERIFCUTLINE-(NUM4*1000)-(NUM3*10000)-
c      (NUM2*100000)-(NUM1*1000000))/100.0)
       IF ((NUM5.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(5:5)=' '
       ELSE
           VERIFLINVAL(5:5)=CHAR(NUM5+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM6=INT((VERIFCUTLINE-(NUM5*100)-(NUM4*1000)-
c      (NUM3*10000)-(NUM2*100000)-
c      (NUM1*1000000))/10.0)
       IF ((NUM6.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
           VERIFLINVAL(6:6)=' '
       ELSE
           VERIFLINVAL(6:6)=CHAR(NUM6+48)
           NUMZEROFLAG=.TRUE.
       ENDIF
       NUM7=INT(VERIFCUTLINE-(NUM6*10)-(NUM5*100)-
```

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```

c      (NUM4*1000) - (NUM3*10000) - (NUM2*100000) -
c      (NUM1*1000000)
      VERIFLINVAL(7:7)=CHAR(NUM7+48)
      NUM1=INT(VERIFENDCUTLINE/1000000.0)
      IF ((NUM1.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(1:1)=' '
      ELSE
        VERIFENDLINVAL(1:1)=CHAR(NUM1+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM2=INT((VERIFENDCUTLINE-(NUM1*1000000))/100000.0)
      IF ((NUM2.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(2:2)=' '
      ELSE
        VERIFENDLINVAL(2:2)=CHAR(NUM2+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM3=INT((VERIFENDCUTLINE-(NUM2*100000)-
c      (NUM1*1000000))/10000.0)
      IF ((NUM3.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(3:3)=' '
      ELSE
        VERIFENDLINVAL(3:3)=CHAR(NUM3+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM4=INT((VERIFENDCUTLINE-(NUM3*10000)-
c      (NUM2*100000)-(NUM1*1000000))/1000.0)
      IF ((NUM4.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(4:4)=' '
      ELSE
        VERIFENDLINVAL(4:4)=CHAR(NUM4+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM5=INT((VERIFENDCUTLINE-(NUM4*1000)-(NUM3*10000)-
c      (NUM2*100000)-(NUM1*1000000))/100.0)
      IF ((NUM5.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(5:5)=' '
      ELSE
        VERIFENDLINVAL(5:5)=CHAR(NUM5+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM6=INT((VERIFENDCUTLINE-(NUM5*100)-(NUM4*1000)-
c      (NUM3*10000)-(NUM2*100000)-
c      (NUM1*1000000))/10.0)
      IF ((NUM6.EQ.0).AND.(NUMZEROFLAG.EQ..FALSE.)) THEN
        VERIFENDLINVAL(6:6)=' '
      ELSE
        VERIFENDLINVAL(6:6)=CHAR(NUM6+48)
        NUMZEROFLAG=.TRUE.
      ENDIF
      NUM7=INT(VERIFENDCUTLINE-(NUM6*10)-(NUM5*100)-
c      (NUM4*1000)-(NUM3*10000)-(NUM2*100000)-
c      (NUM1*1000000)
      VERIFENDLINVAL(7:7)=CHAR(NUM7+48)
      SEDEXECOMMAND(1:11)='sedexecute '
      SEDEXECOMMAND(12:36)=NM(1:25)
      SEDEXECOMMAND(37:37)=' '
      SEDEXECOMMAND(38:44)=LINVAL

```

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```

SEDEXECOMMAND(45:45)=' '
SEDEXECOMMAND(46:52)=VERIFLINVAL
SEDEXECOMMAND(53:53)=' '
SEDEXECOMMAND(54:60)=VERIFENDLINVAL
SEDEXERESULT=SYSTEM(SEDEXECOMMAND)
IF (SEDEXERESULT.LT.0) THEN
  WRITE (*,*) 'AN ERROR OCCURRED DURING OUTPUT',
c 'EXTRACTION FROM ', NM(1:25), '.output'
ENDIF
OUTPUTREMOVAL(1:3)='rm '
OUTPUTREMOVAL(4:28)=NM(1:25)
OUTPUTREMOVAL(29:35)='.output'
OUTPUTREMOVALRESULT=SYSTEM(OUTPUTREMOVAL)
IF (OUTPUTREMOVALRESULT.LT.0) THEN
  WRITE (*,*) 'AN ERROR OCCURRED DURING ',
c 'DELETION OF ', NM(1:25), '.output'
ENDIF

RETURN
END

```

```

*****
* This subroutine retrieves the fuel and burnable *
* poison composition information from the previous *
* depletion and decay calculation for the assembly.*
*****

```

```

SUBROUTINE RETRIEVER (OXYGMS, MASSTOTAL,
c FUELISONAME, FUELISOWTPCT, BPRAISONAME,
c BPRAISOVALUE, LEFTLIST, CARRYCOUNTER,
c PREVIOUSNAME, LEFTVAL, NM, BPRA_INSERTED,
c LIMFLAG)

```

```

*
INTEGER*4 COLUMNSTART, COLUMNEND, ISONUMBER, CT1,
c LEFTCOUNTER, CARRYCOUNTER, CT2, ISOFLAG(1000), Z,
c ISOLIMIT, J, K, FIRST, LAST, PTR

```

```

*
REAL ISOVALUE(1000), BPRAISOVALUE(2), MASSTOTAL,
c FUELISOVALUE(1000), FUELISOWTPCT(1000), OXYGMS,
c LEFTVAL(1000), HOLD1

```

```

*
CHARACTER ROWFLAG*7, COL1*8, COL2*8, COL3*8, COL4*8,
c COL5*8, COL6*8, COL7*8, COL8*8, ACTINIDELABEL*9,
c FORMATLABEL*29, ISOLABEL*6, ISONAME(1000)*6,
c FISSPRODLABEL*16, BPRAISONAME(2)*6, ORIGNAME(297)*6,
c LIBRARYID(297)*5, FUELISONAME(1000)*5, LEFTLIST(1000)*6,
c PREVIOUSNAME*25, RETRIEVALFILE*29, BPLABEL*14, NM*31,
c NOTESFILE*31, LIMFLAG*1, HOLD2*6

```

```

*
LOGICAL ROWFLAGLOG, ACTINIDEFIND, FISSPRODFIND, BPFIND,
c BPRA_INSERTED

```

```

*
DATA (LIBRARYID(Z),Z=1,297) /' 1001',
c ' 1002',' 1003',' 2003',' 2004',' 3006',
c ' 3007',' 4009',' 5010',' 5011',' 6012',' 7014',
c ' 7015',' 8016',' 8017',' 9019',' 11023',' 12000',
c ' 13027',' 14000',' 15031',' 16000',' 16032',' 17000',
c ' 19000',' 20000',' 22000',' 23000',' 24000',' 25055',

```


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```

c '26000', '27059', '28000', '29000', '31000', '32072',
c '32073', '32074', '32076', '33075', '34074', '34076',
c '34077', '34078', '34080', '34082', '35079', '35081',
c '36078', '36080', '36082', '36083', '36084', '36085',
c '36086', '37085', '37086', '37087', '38084', '38086',
c '38087', '38088', '38089', '38090', '39089', '39090',
c '39091', '40000', '40090', '40091', '40092', '40093',
c '40094', '40095', '40096', '41093', '41094', '41095',
c '42000', '42092', '42094', '42095', '42096', '42097',
c '42098', '42099', '42100', '43099', '44096', '44098',
c '44099', '44100', '44101', '44102', '44103', '44104',
c '44105', '44106', '45103', '45105', '46102', '46104',
c '46105', '46106', '46107', '46108', '46110', '47107',
c '47109', '47111', '48000', '48106', '48108', '48110',
c '48111', '48112', '48113', '48114', '48116', '48601',
c '49113', '49115', '50112', '50114', '50115', '50116',
c '50117', '50118', '50119', '50120', '50122', '50123',
c '50124', '50125', '50126', '51121', '51123', '51124',
c '51125', '51126', '52120', '52122', '52123', '52124',
c '52125', '52126', '52128', '52130', '52132', '52601',
c '52611', '53127', '53129', '53130', '53131', '53135',
c '54124', '54126', '54128', '54129', '54130', '54131',
c '54132', '54133', '54134', '54135', '54136', '55133',
c '55134', '55135', '55136', '55137', '56134', '56135',
c '56136', '56137', '56138', '56140', '57139', '57140',
c '58140', '58141', '58142', '58143', '58144', '59141',
c '59142', '59143', '60142', '60143', '60144', '60145',
c '60146', '60147', '60148', '60150', '61147', '61148',
c '61149', '61151', '61601', '62144', '62147', '62148',
c '62149', '62150', '62151', '62152', '62153', '62154',
c '63000', '63151', '63152', '63153', '63154', '63155',
c '63156', '63157', '64152', '64154', '64155', '64156',
c '64157', '64158', '64160', '65159', '65160', '66160',
c '66161', '66162', '66163', '66164', '67165', '68166',
c '68167', '71175', '71176', '72000', '72174', '72176',
c '72177', '72178', '72179', '72180', '73181', '73182',
c '74000', '74182', '74183', '74184', '74186', '75185',
c '75187', '79197', '82000', '83209', '90230', '90232',
c '91231', '91233', '92232', '92233', '92234', '92235',
c '92236', '92237', '92238', '93237', '93238', '94236',
c '94237', '94238', '94239', '94240', '94241', '94242',
c '94243', '94244', '95241', '95242', '95243', '95601',
c '96241', '96242', '96243', '96244', '96245', '96246',
c '96247', '96248', '97249', '98249', '98250', '98251',
c '98252', '98253', '99253' /

```

DATA (ORIGNAME(Z), Z=1, 297) / ' h 1 '

```

c ' h 2 ', ' h 3 ', 'he 3 ', 'he 4 ', 'li 6 ',
c 'li 7 ', 'be 9 ', ' b 10 ', ' b 11 ', ' c 12 ',
c ' n 14 ', ' n 15 ', ' o 16 ', ' o 17 ', ' f 19 ',
c 'na 23 ', ' mg ', 'al 27 ', ' si ', ' p 31 ',
c ' s ', ' s 32 ', ' cl ', ' k ', ' ca ',
c ' ti ', ' v ', ' cr ', 'mn 55 ', ' fe ',
c 'co 59 ', ' ni ', ' cu ', ' ga ', 'ge 72 ',
c 'ge 73 ', 'ge 74 ', 'ge 76 ', 'as 75 ', 'se 74 ',
c 'se 76 ', 'se 77 ', 'se 78 ', 'se 80 ', 'se 82 ',
c 'br 79 ', 'br 81 ', 'kr 78 ', 'kr 80 ', 'kr 82 ',
c 'kr 83 ', 'kr 84 ', 'kr 85 ', 'kr 86 ', 'rb 85 ',
c 'rb 86 ', 'rb 87 ', 'sr 84 ', 'sr 86 ', 'sr 87 '

```

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```

c 'sr 88 ','sr 89 ','sr 90 ',' y 89 ',' y 90 '
c ' y 91 ',' zr 91 ',' zr 90 ',' zr 91 ',' zr 92 '
c ' zr 93 ',' zr 94 ',' zr 95 ',' zr 96 ',' nb 93 '
c ' nb 94 ',' nb 95 ',' mo 92 ',' mo 92 ',' mo 94 '
c ' mo 95 ',' mo 96 ',' mo 97 ',' mo 98 ',' mo 99 '
c ' mo100 ',' tc 99 ',' ru 96 ',' ru 98 ',' ru 99 '
c ' ru100 ',' ru101 ',' ru102 ',' ru103 ',' ru104 '
c ' ru105 ',' ru106 ',' rh103 ',' rh105 ',' pd102 '
c ' pd104 ',' pd105 ',' pd106 ',' pd107 ',' pd108 '
c ' pd110 ',' ag107 ',' ag109 ',' ag111 ',' cd '
c ' cd106 ',' cd108 ',' cd110 ',' cd111 ',' cd112 '
c ' cd113 ',' cd114 ',' cd116 ',' cd115m ',' in113 '
c ' in115 ',' sn112 ',' sn114 ',' sn115 ',' sn116 '
c ' sn117 ',' sn118 ',' sn119 ',' sn120 ',' sn122 '
c ' sn123 ',' sn124 ',' sn125 ',' sn126 ',' sb121 '
c ' sb123 ',' sb124 ',' sb125 ',' sb126 ',' tel20 '
c ' tel22 ',' tel23 ',' tel24 ',' tel25 ',' tel26 '
c ' tel28 ',' tel30 ',' tel32 ',' tel27m ',' tel29m '
c ' i127 ',' i129 ',' i130 ',' i131 ',' i135 '
c ' xel124 ',' xel126 ',' xel128 ',' xel129 ',' xel130 '
c ' xel131 ',' xel132 ',' xel133 ',' xel134 ',' xel135 '
c ' xel136 ',' cs133 ',' cs134 ',' cs135 ',' cs136 '
c ' cs137 ',' ba134 ',' ba135 ',' ba136 ',' ba137 '
c ' ba138 ',' ba140 ',' la139 ',' la140 ',' ce140 '
c ' ce141 ',' ce142 ',' ce143 ',' ce144 ',' pr141 '
c ' pr142 ',' pr143 ',' nd142 ',' nd143 ',' nd144 '
c ' nd145 ',' nd146 ',' nd147 ',' nd148 ',' nd150 '
c ' pml147 ',' pml148 ',' pml149 ',' pml151 ',' pml148m '
c ' sm144 ',' sm147 ',' sm148 ',' sm149 ',' sm150 '
c ' sm151 ',' sm152 ',' sm153 ',' sm154 ',' eu '
c ' eu151 ',' eu152 ',' eu153 ',' eu154 ',' eu155 '
c ' eu156 ',' eu157 ',' gd152 ',' gd154 ',' gd155 '
c ' gd156 ',' gd157 ',' gd158 ',' gd160 ',' tb159 '
c ' tb160 ',' dy160 ',' dy161 ',' dy162 ',' dy163 '
c ' dy164 ',' ho165 ',' er166 ',' er167 ',' lu175 '
c ' lu176 ',' hf ',' hf174 ',' hf176 ',' hf177 '
c ' hf178 ',' hf179 ',' hf180 ',' ta181 ',' ta182 '
c ' w ',' w182 ',' w183 ',' w184 ',' w186 '
c ' re185 ',' re187 ',' au197 ',' pb ',' bi209 '
c ' th230 ',' th232 ',' pa231 ',' pa233 ',' u232 '
c ' u233 ',' u234 ',' u235 ',' u236 ',' u237 '
c ' u238 ',' np237 ',' np238 ',' pu236 ',' pu237 '
c ' pu238 ',' pu239 ',' pu240 ',' pu241 ',' pu242 '
c ' pu243 ',' pu244 ',' am241 ',' am242 ',' am243 '
c ' am242m ',' cm241 ',' cm242 ',' cm243 ',' cm244 '
c ' cm245 ',' cm246 ',' cm247 ',' cm248 ',' bk249 '
c ' cf249 ',' cf250 ',' cf251 ',' cf252 ',' cf253 '
c ' es253 ' /

```

```

IF (LIMFLAG.EQ.'Y') THEN

```

```

  ISOLIMIT=200

```

```

ENDIF

```

```

RETRIEVALFILE(1:25)=PREVIOUSNAME

```

```

RETRIEVALFILE(26:29)='.cut'

```

```

NOTESFILE(1:25)=NM(1:25)

```

```

NOTESFILE(26:31)='.notes'

```

```

OPEN(UNIT=300, FILE=RETRIEVALFILE, STATUS='OLD')

```

```

OPEN(UNIT=500, FILE=NOTESFILE, STATUS='UNKNOWN')

```

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```
REWIND(300)
REWIND(500)
DO 5 CT1=1,1000
  ISOVALUE(CT1)=0.0
  FUELISOVALUE(CT1)=0.0
  FUELISOWTPCT(CT1)=0.0
  LEFTVAL=0.0
  ISONAME=' '
  FUELISONAME=' '
  LEFTLIST=' '
  ISOFLAG=0
5 CONTINUE
ROWFLAGLOG=.FALSE.
DO 11 WHILE (ROWFLAGLOG.EQ..FALSE.)
  READ (300,10) ROWFLAG, COL1, COL2, COL3,
c   COL4, COL5, COL6, COL7, COL8
10  FORMAT (T15,A7,T24,A8,T34,A8,T44,A8,T54,A8,
c   T64,A8,T74,A8,T84,A8,T94,A8)
  IF (ROWFLAG.EQ.'initial') THEN
    ROWFLAGLOG=.TRUE.
  ENDIF
11 CONTINUE
  IF (COL1.NE.' ') THEN
    COLUMNSTART=23
    COLUMNEND=32
  ENDIF
  IF (COL2.NE.' ') THEN
    COLUMNSTART=33
    COLUMNEND=42
  ENDIF
  IF (COL3.NE.' ') THEN
    COLUMNSTART=43
    COLUMNEND=52
  ENDIF
  IF (COL4.NE.' ') THEN
    COLUMNSTART=53
    COLUMNEND=62
  ENDIF
  IF (COL5.NE.' ') THEN
    COLUMNSTART=63
    COLUMNEND=72
  ENDIF
  IF (COL6.NE.' ') THEN
    COLUMNSTART=73
    COLUMNEND=82
  ENDIF
  IF (COL7.NE.' ') THEN
    COLUMNSTART=83
    COLUMNEND=92
  ENDIF
  IF (COL8.NE.' ') THEN
    COLUMNSTART=93
    COLUMNEND=102
  ENDIF
* Get B-10 and B-11 composition data for BPRA
  IF (BPRA INSERTED.EQ..TRUE.) THEN
    BPRAISOVALUE(1)=0.0
    BPRAISOVALUE(2)=0.0
```

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```

      BPRAISONAME(1)='
      BPRAISONAME(2)='
      REWIND(300)
      BPFIND=.FALSE.
      DO 14 WHILE (BPFIND.EQ..FALSE.)
        READ(300,12) BPLABEL
12      FORMAT (T98,A14)
        IF (BPLABEL.EQ.'light elements') THEN
          READ(300,*)
          READ(300,13) FORMATLABEL
13      FORMAT (T46,A29)
          IF (FORMATLABEL.EQ.'nuclide concentrations, grams') THEN
            BPFIND=.TRUE.
          ENDIF
        ENDIF
14      CONTINUE
      DO 24 CT1=1,25
        READ (300,22) BPRAISONAME(1)
22      FORMAT (T6,A6)
        IF (BPRAISONAME(1).EQ.' b 10 ') THEN
          BACKSPACE(300)
          EXIT
        ENDIF
24      CONTINUE
        READ (300,26) BPRAISONAME(1), BPRAISOVALUE(1).
26      FORMAT (T6,A6,T<COLUMNSTART>,G10.2)
        READ (300,29) BPRAISONAME(2), BPRAISOVALUE(2)
29      FORMAT (T6,A6,T<COLUMNSTART>,G10.2)
        IF (BPRAISONAME(1).EQ.' b 10 ') THEN
          BPRAISONAME(1)=' 5010'
        ENDIF
        IF (BPRAISONAME(2).EQ.' b 11 ') THEN
          BPRAISONAME(2)=' 5011'
        ENDIF
      ENDIF
* Get fuel composition data
      REWIND(300)
      ACTINIDEFIND=.FALSE.
      DO 50 WHILE (ACTINIDEFIND.EQ..FALSE.)
        READ(300,30) ACTINIDELABEL
30      FORMAT (T103,A9)
        IF (ACTINIDELABEL.EQ.'actinides') THEN
          READ(300,*)
          READ(300,40) FORMATLABEL
40      FORMAT (T46,A29)
          IF (FORMATLABEL.EQ.'nuclide concentrations, grams') THEN
            ACTINIDEFIND=.TRUE.
          ENDIF
        ENDIF
      ENDIF
50 CONTINUE
      READ(300,*)
      READ(300,*)
      ISOLABEL='
      ISONUMBER=0
      DO 70 WHILE (ISOLABEL.NE.'tal ')
        ISONUMBER=ISONUMBER+1
        READ(300,60) ISONAME(ISONUMBER), ISOVALUE(ISONUMBER)
60      FORMAT (T6,A6,T<COLUMNSTART>,G10.2)
```

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```
ISOLABEL=ISONAME (ISONUMBER)
IF (ISOLABEL.EQ.'tal ') THEN
  ISONAME (ISONUMBER)='
  ISOVALUE (ISONUMBER)=0
ENDIF
70 CONTINUE
  ISONUMBER=ISONUMBER-1
  REWIND (300)
  FISSPRODFIND=.FALSE.
  DO 110 WHILE (FISSPRODFIND.EQ..FALSE.)
    READ (300,90) FISSPRODLABEL
  90   FORMAT (T96,A16)
    IF (FISSPRODLABEL.EQ.'fission products') THEN
      READ (300,*)
      READ (300,100) FORMATLABEL
  100  FORMAT (T46,A29)
      IF (FORMATLABEL.EQ.'nuclide concentrations, grams') THEN
        FISSPRODFIND=.TRUE.
      ENDIF
    ENDIF
  110 CONTINUE
    READ (300,*)
    READ (300,*)
    ISOLABEL='
    DO 130 WHILE (ISOLABEL.NE.'tal ')
      ISONUMBER=ISONUMBER+1
      READ (300,120) ISONAME (ISONUMBER), ISOVALUE (ISONUMBER)
  120  FORMAT (T6,A6,T<COLUMNSTART>,G10.2)
      ISOLABEL=ISONAME (ISONUMBER)
      IF (ISOLABEL.EQ.' ') THEN
        ISONUMBER=ISONUMBER-1
        READ (300,*)
        READ (300,*)
        READ (300,*)
        READ (300,*)
        READ (300,*)
      ENDIF
      IF (ISOLABEL.EQ.'tal ') THEN
        ISONAME (ISONUMBER)='
        ISOVALUE (ISONUMBER)=0
      ENDIF
  130 CONTINUE
    ISONUMBER=ISONUMBER-1
    WRITE (500,*) 'FUEL COMPOSITION'
    DO 140 CT1=1,ISONUMBER
      WRITE (500,*) ISONAME (CT1), ' ', ISOVALUE (CT1)
  140 CONTINUE
    WRITE (500,*)
    IF (BPRA_INSERTED.EQ..TRUE.) THEN
      WRITE (500,*) 'B-10 AND B-11 IN BPRA'
      DO 150 CT1=1,2
        WRITE (500,*) BPRAISONAME (CT1), ' ',
          c BPRAISOVALUE (CT1)
  150 CONTINUE
    ENDIF
    MASSTOTAL=OXYGMS
    LEFTCOUNTER=0
    CARRYCOUNTER=0
```

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```

DO 190 CT1=1, ISONUMBER
  DO 180 CT2=1, 297
    IF (ISONAME(CT1).EQ.ORIGNAME(CT2)) THEN
      CARRYCOUNTER=CARRYCOUNTER+1
      ISOFLAG(CT1)=1
      FUELISONAME(CARRYCOUNTER)=LIBRARYID(CT2)
      FUELISOVALUE(CARRYCOUNTER)=ISOVALUE(CT1)
    ENDIF
    IF ((CT2.EQ.297).AND.(ISOFLAG(CT1).NE.1)) THEN
      LEFTCOUNTER=LEFTCOUNTER+1
      LEFTLIST(LEFTCOUNTER)=ISONAME(CT1)
      LEFTVAL(LEFTCOUNTER)=ISOVALUE(CT1)
    ENDIF
180   CONTINUE
190   CONTINUE
*
*   If carrycounter is larger than 200:
*   sort fuelisovalue in ascending order,
*   sort fuelisoname with isovalue,
*   use the largest 200 isotopic concentrations to
*   define fuelisovalue and fuelisoname.
*
IF (CARRYCOUNTER.LE.199) THEN
  DO 195 CT1=1, CARRYCOUNTER
    MASSTOTAL=MASSTOTAL+FUELISOVALUE(CT1)
195   CONTINUE
  DO 200 CT1=1, CARRYCOUNTER
    FUELISOWTPCT(CT1)=(FUELISOVALUE(CT1)/
  c     MASSTOTAL)*100.0
200   CONTINUE
  WRITE (500,*)
  c   'SAS2H FUEL COMPOSITION INPUT FROM ORIGIN OUTPUT'
  DO 230 CT1=1, CARRYCOUNTER
    WRITE (500,*) FUELISONAME(CT1),
  c     ' ', FUELISOVALUE(CT1)
230   CONTINUE
  WRITE (500,*)
  c   'ISOTOPES IN ORIGIN OUTPUT LEFT OUT OF SAS2H INPUT'
  DO 240 CT1=1, LEFTCOUNTER
    WRITE (500,*) LEFTLIST(CT1),
  c     ' ', LEFTVAL(CT1)
240   CONTINUE
  ELSEIF ((CARRYCOUNTER.GT.199).AND.
  c (LIMFLAG.EQ.'Y')) THEN
    LAST=CARRYCOUNTER
    DO 260 J=1, (CARRYCOUNTER-1)
      PTR=J
      FIRST=J+1
      DO 250 K=FIRST, LAST
        IF (FUELISOVALUE(K).GE.FUELISOVALUE(PTR)) THEN
          PTR=K
        ENDIF
250   CONTINUE
      HOLD1=FUELISOVALUE(J)
      HOLD2=FUELISONAME(J)
      FUELISOVALUE(J)=FUELISOVALUE(PTR)
      FUELISONAME(J)=FUELISONAME(PTR)
      FUELISOVALUE(PTR)=HOLD1

```

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```

      FUELISONAME (PTR) =HOLD2
260  CONTINUE
      DO 270 CT1=1,199
          MASSTOTAL=MASSTOTAL+FUELISOVALUE (CT1)
270  CONTINUE
      DO 280 CT1=1,199
          FUELISOWTPCT (CT1) = (FUELISOVALUE (CT1) /
c      MASSTOTAL) *100.0
280  CONTINUE
      WRITE (500,*)
c      'SAS2H FUEL COMPOSITION INPUT FROM ORIGIN OUTPUT'
      DO 290 CT1=1,199
          WRITE (500,*) FUELISONAME (CT1),
c      ' ', FUELISOVALUE (CT1)
290  CONTINUE
      WRITE (500,*)
c      'ISOTOPES IN ORIGIN OUTPUT LEFT OUT OF SAS2H INPUT'
      DO 300 CT1=1,LEFTCOUNTER
          WRITE (500,*) LEFTLIST (CT1),
c      ' ', LEFTVAL (CT1)
300  CONTINUE
      CARRYCOUNTER=199
      ENDIF

      RETURN
      END

```

```

*****
*      Two digit integer conversion subroutine which adds leading zeros      *
*****

```

```

SUBROUTINE ZEROS (IN,CHOUT)

INTEGER*4 IN
CHARACTER CHOUT*2, CH1, CH2

CH1=CHAR ((IN/10)+48)
CH2=CHAR ((IN- (INT (IN/10) *10) )+48)
CHOUT (1:1)=CH1
CHOUT (2:2)=CH2

RETURN
END

```