WIMS-AECL/RFSP-IST Interface

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Outlines

- Part 1: Description of the WIMS-AECL TAPE16 File
- Part 2: Description of the WIMS-AECL Post-Processing Utilities
- Part 3: Generation of the WIMS Tables with PROC16
- Part 4: Generation of the WIMS Fuel Tables with WIMSPAR and CELLPAR
- Part 5: Generation of the Kinetics-Parameter Table with KINPAR
- Part 6: Generation of the WIMS Micro-Depletion Tables

- Part 1: Description of the WIMS-AECL TAPE16 File

WIMS-AECL TAPE16 Files

- Binary Files
- Relatively Simple Structure, composed of a series of sequential records, each structured as

  Key1, key2, n, (x(i), i=1,n)

Where	key1	is the major 10-character key for the record
	key2	is the minor 10-character key for the record
	n	is the number of words of data in the record, and
	x(i)	is the ith worth of data in the record

- Primarily real numbers with some integer and character numbers

WIMS-AECL TAPE16 Files (cont.)

- Records saved in TAPE16 files
  - General information records
  - MATSig records
  - ISOCyle records
  - MTRFlx records
  - CELLav records
  - REGIon records
- The advantage of post-processing TAPE16 files
  - Maximize flexibility for extension of the info to be generated
  - Avoid any application-specific processing within WIMS-AECL
  - Place the responsibility for post-processing with the application developers and users

WIMS-AECL TAPE16 Files (cont.)

- WIMS-AECL input cards in Edit Data that effect the contents saved in TAPE16 files
  - "*REACtion*": Select isotopes for inclusion in the reaction-rate edit
  - "*PARTition*": Select the reaction-rate edit group-structure
  - "*PRINt*": Control the reaction-rate edit output
  - "*CELLav*": Writes the cell average information to TAPE16
  - "*REGIon*": Write fluxes, spectra, cross sections, and reaction rates to TAPE16

- Part 2: Description of the WIMS-AECL Post-Processing Utilities

WIMS-AECL Post-Processing Utility

- PROC16 processing utilities
  - WIMS
  - CONDENS
  - MICROBURN
  - REGAV
  - WRFSP
  - PMAT2LIB
  - …
- Other post-processing utilities
  - WIMSPAR
  - CELLPAR
  - KINPAR
  - FFACTOR
  - …

WIMS-AECL Post-Processing Utility PROC16

- Perl utility for performing WIMS-AECL calculations and post-processing the TAPE16 file for use in RFSP-IST
- Pert utility calls other utilities (modules)
- The input file extension must be ".pin".
- Inputs to PROC16 begin with "@" such as "@wims" and "@wrfsp", and end with "@end" for each module
- Commands to run PROC16

```
proc16 filename.pin
```

or

```
proc16 filename
```

CONDENS

- Condense the energy group structure of the data (cell-average data, multi-region data) saved on an input TAPE16 file, and write to an output TAPE16 file
- Sample PROC16 input

```
@condens  temp1 temp2
65 89
@end
```

← Read an input TAPE16 file “temp1.t16”
← Condense the WIMS-AECL calculations from 89 to 2 energy groups
← Write an output TAPE16 file “temp2.t16”

MICROBURN

- Convert the isotopic reactions and neutron fluxes, saved on an input TAPE16 file, over the whole cell or selected regions of the cell into isotopic microscopic XS, and write to an output TAPE16 file
- Sample PROC16 input

```
@microburn  temp1 temp2
select 1 2 5 6 7 8 11 12 13 14 17 18 19 20
@end
```

← Read an input TAPE16 file "temp1.t16"
← Select fuel regions and calculate fuel isotopic microscopic XS
← Write an output TAPE16 file "temp2.t16"

- By default, all regions in the cell are included in the calculation

REGAV

- Process multi-region data, saved on an input TAPE16 file, into homogenized-cell properties for a subset of regions in the original cell, and write to an output TAPE16 file
- Sample PROC16 input

```
@regav  temp1 temp2
select 27
@end
```

← Read an input TAPE16 file “temp1.t16”
← Select reflector region and calculate reflector XS
← Write an output TAPE16 file “temp2.t16”

FFACTOR

- After processing, the record "CELLAV F-FACTOR" on an input TAPE16 file is updated to record the ratio of fuel flux to cell flux for each energy group, while the rest of the TAPE16 file is kept unchanged.
  - No input card is required
  - REGION card has to be provided in WIMS-AECL input
- Sample PROC16 input

```
@ffactor  temp1 temp2
@end
```

← Read an input TAPE16 file "temp1.t16"
← Write an output TAPE16 file "temp2.t16"

WRFSP

- Process information saved in one or more existing TAPE16 files into information to be used in RFSP-IST
- WRFSP is used to produce the following tables for use in RFSP-IST
  - WIMS Fuel Table
  - WIMS Reflector Table
  - SCM (Simple-Cell Method) Fuel Table
  - SCM Reflector Table
  - WIMS Grid-Based Table
  - WIMS Micro-Depletion Fuel Table
  - WIMS Micro-Depletion Reflector Table

WRFSP Input Card Instruction

Type n	Type of the table to be generated, 5 values of "n" are recognized: n=1 WIMS fuel, reflector, or grid-based tables (default) n=2 SCM fuel table, n=3 SCM reflector table, n=4 WIMS micro-depletion fuel table, n=5 WIMS micro-depletion reflector table,
Vcell v	Volume of the cell, in cm^3 (default: 40442.8 cm^3)
Lcell l	Axial length of the cell, in cm (default: 49.53 cm)
Nstep n	Number of burnup steps in the case
Irrad x1,…yn	Fuel irradiation for each step, n/kb
Burnup y1,…yn	Fuel burnup for each step, MWD/T

WRFSP Input Card Instruction (cont.)

Reference		Specify that the number of burnup steps, the values of fuel irradiation and burnup are to be calculated from this case. Otherwise, i.e., without specify “reference” (default), the number of burnup steps, the values of fuel irradiation and burnup must be provided
Reflector		Specify for WIMS reflector table (for Type 1 only)
Xenon		Include xenon data in WIMS fuel table (for Type 1 only)
Ngtherm m		Specify the number of thermal groups (for Type 2 to Type 5, default: 1)
Twogroup		Specify that the table is in 2-group form (for Type 1 only, default: 1.5-group)
Pert	CD	x1 x2 x3…
	FT	y1 y2 y3…
	…	

WRFSP Input Card Instruction (cont.)

Pert list Specify a set of perturbation data for the table

CD	coolant density, g/cc
CT	coolant temperature, ^{o}C
CP	coolant purity, at%
FT	fuel temperature, ^{o}C
MD	moderator density, g/cc
MTS	moderator temperature, ^{o}C
MP	moderator purity, at%
MB	moderator boron, ppm
MGD	moderator gadolinium, ppm
FTCD (or CDFT)	combined coolant density and fuel temperature perturbation

WRFSP Input TAPE16 files

- For Type 1, information is read from an input TAPE16 file “wrfsp.t16” or any filename specified following the “@wrfsp” command
- For Type 2 and Type 3, four input TAPE16 files are required:
  - “wrfsp_f.t16” containing the properties for the fuel-clad-coolant region
  - “wrfsp_t.t16” containing the properties for the tube region
  - “wrfsp_m.t16” containing the properties for the moderator region
  - “wrfsp_mic.t16” containing the isotopic microscopic properties
- For Type 4, three input TAPE16 files are required:
  - “wrfsp_f.t16” containing the lattice properties with perturbations on the fuel and coolant
  - “wrfsp_m.t16” containing the lattice properties with perturbations on the moderator
  - “wrfsp_mic.t16” containing the isotopic microscopic properties
- For Type 5, information is read from an input TAPE16 file “wrfsp_m.t16” containing the properties for the moderator region

- Part 3: Generation of the WIMS Tables with PROC16

Generation of WIMS Fuel Table

```
@wims temp1
…
CELLAV
PRINT -2 -2 1 1  1 0
REACTION U235=0  U238=0  NP239=0                 $
         PU239=0 PU240=0 PU241=0 PU242=0         $
         I135=0  XE135=0 SM149=0
PARTITION 65 89
…
@end
@microburn temp1 temp2
@end
@condens temp2 rkin
65 89
@end
@wrfsp rkin
Vcell 23972.52
reference
twogroup
xenon
@end
```

Generation of WIMS Reflector Table

- PROC16 input for the reflector is similar to that for the fuel, with the following exceptions:
  - No REACTION card
  - No burnup calculation
  - Mid-burnup fuel properties are used
  - REGION card is required
  - No MICROBURN
  - With REGAV

Generation of WIMS Reflector Table (cont.)

```
@wims temp1
…
CELLAV
Region
…
@end
@condens temp1 temp2
65 89
@end
@regav temp2 temp3
select 27
@end
@wrfsp temp3
Vcell 23972.52
reference
twogroup
reflector
@end
```

Generation of WIMS Grid-Based Table

Generation of WIMS Grid-Based Table (cont.)

- "ref_buir.dat" File

```
burnup  0.000000E+00 3.415888E+01 6.832661E+01 1.025011E+02 1.366806E+02 $
 1.708639E+02 2.050497E+02 2.392376E+02 2.734268E+02 3.076169E+02 $
 3.418079E+02 3.759994E+02 7.181011E+02 1.060121E+03 1.402012E+03 $
 1.743787E+03 2.426571E+03 3.108678E+03 3.790215E+03 4.471321E+03 $
 5.151981E+03 5.832283E+03 6.512284E+03 7.191981E+03 7.871451E+03 $
 8.550502E+03 9.229326E+03 9.907979E+03 1.058646E+04 1.126504E+04 $
 1.194327E+04 1.262141E+04 1.329936E+04 1.397737E+04 1.465508E+04 $
 1.533280E+04 1.601068E+04 1.668820E+04 1.736593E+04 1.804355E+04 $
 1.872104E+04 1.939853E+04 2.007628E+04 2.075414E+04 2.143175E+04 $
 2.210973E+04 2.278781E+04 2.346579E+04 2.414385E+04 2.482218E+04 $
 2.550046E+04 2.617874E+04 2.685725E+04 2.753590E+04 2.821469E+04 $
 2.889364E+04 2.957279E+04 3.025209E+04 3.093144E+04
irrad  0.000000E+00 4.873859E-03 9.764938E-03 1.466290E-02 1.956484E-02 $
 2.446917E-02 2.937472E-02 3.428065E-02 3.918635E-02 4.409139E-02 $
 4.899544E-02 5.389828E-02 1.029133E-01 1.517832E-01 2.005465E-01 $
 2.492499E-01 3.466153E-01 4.441261E-01 5.420136E-01 6.404723E-01 $
 7.396669E-01 8.397392E-01 9.408132E-01 1.043001E+00 1.146395E+00 $
 1.251083E+00 1.357176E+00 1.464765E+00 1.573923E+00 1.684745E+00 $
 1.797306E+00 1.911682E+00 2.027927E+00 2.146116E+00 2.266315E+00 $
 2.388580E+00 2.512971E+00 2.639540E+00 2.768339E+00 2.899417E+00 $
 3.032815E+00 3.168567E+00 3.306708E+00 3.447274E+00 3.590289E+00 $
 3.735771E+00 3.883738E+00 4.034203E+00 4.187166E+00 4.342631E+00 $
 4.500593E+00 4.661042E+00 4.823963E+00 4.989337E+00 5.157138E+00 $
 5.327340E+00 5.499909E+00 5.674807E+00 5.851994E+00
```

WIMS Fuel Table

WIMS Fuel Table (cont.)

- Consists of irradiation-dependent lattice properties and xenon properties
- 1st line: Name of the fuel type
- 2nd line: Two INTEGER values
  - 1st value is set to 0 for lattice-property table
  - 1st value is set to 1 for xenon-property table
  - 2nd value is the number of irradiation steps contained in the table
- Rest of the file
  - One REAL variable that is equal to the irradiation interval contained in the fuel table
  - The rest of the file contains the cell properties. The file contains N irradiation values for property 1, followed by N irradiation values for property 2 and so on

WIMS Fuel Table (cont.)

- Lattice Properties

Property Number	Cross Section		Description
	Symbol	Name	
1	$\sum_{a1}$	2GSIGA1	Fast Absorption
2	$\sum_{a2}$	2GSIGA2	Thermal Absorption
3	$\sum_{12}$	2GSIGR12	Downscattering
4	$\sum_{21}$	2GSIGR21	Upscattering
5	$\sum_{tr1}$	2GSIGTR1	Fast Transport
6	$\sum_{tr2}$	2GSIGTR2	Thermal Transport
7	$\nu\sum_{f1}$	2GNUSIG1	Fast Production
8	$\nu\sum_{f2}$	2GNUSIG2	Thermal Production
9	F	2GFFACTOR	F Factor
10	H_1	2GH1FACTOR	H Factor (Fast Group)
11	H_2	2GH2FACTOR	H Factor (Thermal Group)

WIMS Fuel Table (cont.)

- Xenon Properties

Property Number	Property	Description
1	$\gamma_I / (\gamma_I + \gamma_{Xe})$	γ_I = Average direct plus indirect yield of ^{135}I per fission. γ_{Xe} = Average direct yield of ^{135}Xe per fission.
2	$(\sigma_{Xe}\,\phi_f) / (\lambda_{Xe}+\sigma_{Xe}\phi_f)$	Average concentration of ^{135}Xe, relative to its concentration in an infinite flux. ϕ_f = fuel-average thermal-neutron flux
3	$\Sigma_f(\gamma_I + \gamma_{Xe})$	Effective cumulative ^{135}Xe yield cross sections from fission.

WIMS Fuel Table (cont.)

- RFSP-IST input cards for reading the table illustrated above (named "seu21dy75c"). The lattice properties are saved in the "SEU21DY75C" record under the "LATPROPS2G" index, and the xenon properties are saved in the "SEU21DY75C" record under the "XENONPROP2" index:

```
*READ CARD
BLOCK      LATPROPS2GSEU21DY75C
FORMAT     (-A10)
READ       seu21dy75c          1          1
FORMAT     (2I10)
READ       seu21dy75c          3          4
FORMAT     (6E20.11)
READ       seu21dy75c          5       1952
BLOCK      XENONPROP2SEU21DY75C
FORMAT     (-A10)
READ       seu21dy75c          1          1
FORMAT     (2I10)
READ       seu21dy75c          3          4
FORMAT     (6E20.11)
READ       seu21dy75c          5        536
```

WIMS Reflector Table

- Sample WIMS reflector table

```
   13       1
6.13415522821E-06   7.04864141881E-05   1.25240786001E-02   4.98910267197E-05   2.60667234659E-01   3.98546367884E-01
0.00000000000E+00   0.00000000000E+00   0.00000000000E+00   0.00000000000E+00   0.00000000000E+00
```

- 1st value (13) is the total number of records in the table
- 2nd value (1) is the number of irradiation steps contained in the table
- The rest are the 11 types of cross sections, in the same order as in the fuel table

WIMS Reflector Table (cont.)

- RFSP-IST input cards for reading the table illustrated above (named “refl21dy75”). The reflector properties are saved in the “REFLECTOR” record under the “LATPROPS2G” index:

```
*READ CARD
BLOCK      LATPROPS2GREFLECTOR
FORMAT     (2I10)
READ       refl21dy75          1          2
FORMAT     (6E20.11)
READ       refl21dy75          3         13
```

WIMS Grid-Based Table

SEU21DY75C - STANDARD WIMS MODEL FOR ACR CALCULATIONS

14440

1.100000E+00	5.901000E+01	2.941832E-03	9.701333E-03	8.262638E-03	2.188123E-04
2.169210E-01	3.547627E-01	1.722565E-03	1.441166E-02	4.844537E-01	5.223133E-02
4.598740E-01	0.000000E+00	0.000000E+00	2.950394E-03	9.853201E-03	8.331717E-03
2.192790E-04	2.168855E-01	3.546157E-01	1.721602E-03	1.412402E-02	4.772730E-01
5.221533E-02	4.506769E-01	3.415888E+01	4.873859E-03	2.951870E-03	9.870434E-03
8.341508E-03	2.192465E-04	2.168807E-01	3.545964E-01	1.720179E-03	1.407886E-02
4.764305E-01	5.217132E-02	4.491835E-01	6.832661E+01	9.764939E-03	2.952532E-03
9.875386E-03	8.344724E-03	2.192100E-04	2.168787E-01	3.545949E-01	1.718894E-03
1.406356E-02	4.762131E-01	5.213010E-02	4.486183E-01	1.025011E+02	1.466290E-02
2.953065E-03	9.880728E-03	8.347281E-03	2.192048E-04	2.168775E-01	3.545938E-01
1.717721E-03	1.405321E-02	4.759881E-01	5.209221E-02	4.481936E-01	1.366806E+02
1.956484E-02	2.953571E-03	9.886669E-03	8.349540E-03	2.192215E-04	2.168772E-01
3.545924E-01	1.716666E-03	1.404576E-02	4.757375E-01	5.205797E-02	4.478481E-01
1.708639E+02	2.446917E-02	2.954024E-03	9.892903E-03	8.351459E-03	2.192530E-04
2.168741E-01	3.545903E-01	1.715673E-03	1.404057E-02	4.754723E-01	5.202552E-02

……

……

……

WIMS Grid-Based Table (cont.)

- 1st line: Name of the fuel type
- 2nd line: Number of values in the table
- Rest of the file
  - 1-D array of real values (the integer numbers listed in the table are all transferred to real values by adding 0.01)
  - Formatted as "(1P6E15.6)"
  - The table contains irradiation-dependent lattice properties for the reference condition followed by irradiation-dependent lattice properties for the perturbed conditions.

WIMS Grid-Based Table (cont.)

- RFSP-IST input instructions for reading the table illustrated above (named “acr.tab”). The table contents are saved in the “SEU21DY75C” record under the “WIMSGRID” index:

```
*READ CARD
BLOCK      WIMSGRID SEU21DY75C
FORMAT     (8A10)
READ       acr.tab            1          8
FORMAT     (3I10)
READ       acr.tab            1          1
FORMAT     (6E15.11)
READ       acr.tab            1      14440
```

- Part 4: Generation of the WIMS Fuel Table with WIMSPAR and CELLPAR

WIMSPAR

- Process TAPE16 to calculate 2-group lattice and xenon properties
- Input files
  - TAPE16
  - Screen input
- Output files
  - XENON: xenon parameters to be used by CELLPAR
  - TAPE9_2G: tabulated irradiation-dependent 2-group cell-average cross sections, to be used by CELLPAR
  - TAPE9_1G: tabulated irradiation-dependent 1.5-group cell-average cross sections (not used any more)
  - Out7: tabulated burnup-dependent 2-group cell-average cross sections, k-infinities, and fast-to-thermal-flux ratios
  - Out8: tabulated burnup-dependent 2-group cell-average cross sections, and k-infinities for NESTLE
  - MOD_PAR: tabulated burnup-dependent 2-group moderator cross sections

CELLPAR

- Process WIMSPAR output files to generate WIMS fuel table for use in RFSP-IST
- Input files
  - XENON: Xenon parameters to be used by CELLPAR
  - TAPE9_2G: Tabulated irradiation-dependent 2-group cell-average XS, to be used by CELLPAR
  - MOD_PAR: Tabulated burnup-dependent 2-group moderator XS
  - Screen input
- Output files
  - fueltab_ref: WIMS fuel table for the reference condition
  - fueltab_per: WIMS fuel table for the perturbed condition
  - Reflector: Tabulated 2-group moderator cross sections

Generation of WIMS Fuel Table with WIMSPAR and CELLPAR

- Sample WIMS-AECL input file

```
PRELUDE
Title "SEU21DY75C   -  Standard WIMS Model for ACR
   Calculations"
…
CELLAV
PRINT 1 1 -2 -2 0 0
REACTION U235=0  U238=0  NP239=0                $
         PU239=0 PU240=0 PU241=0 PU242=0        $
         I135=0  XE135=0 SM149=0
PARTITION 65 89

…
STOP
```

- Part 5: Generation of the Kinetics-Parameter Table with KINPAR

KINPAR

- Based on the isotopic reactions, saved on an input TAPE16 file, to calculate kinetics parameters for transient analysis in RFSP-IST
- Input files
  - Rkin.inp: the values of fuel irradiation and burnup for each burnup step in the WIMS-AECL run (obtained from WRFSP)
  - Rkin.irr: the values of fuel irradiation for each fuel bundle in the core (obtained from RFSP-IST)
  - Rkin.t16: input TAPE16 file
  - Screen input: specify 6 or 17 groups of delay-neutron data to be generated in the outputs
- Output files
  - Rkin.out: kinetics-parameter table for use in RFSP-IST
  - Out: kinetics parameters for each burnup step, and core-average kinetics parameters

Generation of Kinetics-Parameter Table

- Sample PROC16 input file

```
@wims temp1
…
CELLAV
PRINT -2 -2 1 1  1 0
REACTION oneonv=0 U235=0  U238=0  NP239=0        $
        PU239=0 PU240=0 PU241=0 PU242=0        $
        I135=0  XE135=0 SM149=0
PARTITION 65 89
…
@end
@microburn temp1 temp2
@end
@condens temp2 rkin
65 89
@end
```

Kinetics-Parameter Table

3.01318E-04 1.34094E-03 1.17219E-03 2.51778E-03 1.31563E-03 6.46931E-04
7.29480E-03 2.96036E-04 1.32307E-03 1.15459E-03 2.47825E-03 1.29467E-03
6.34636E-04 7.18125E-03 2.77349E-04 1.26058E-03 1.09274E-03 2.33973E-03
1.22138E-03 5.91416E-04 6.78319E-03 2.62097E-04 1.21130E-03 1.04315E-03
2.22955E-03 1.16348E-03 5.56714E-04 6.46629E-03 2.48632E-04 1.16977E-03
1.00035E-03 2.13546E-03 1.11443E-03 5.26687E-04 6.19534E-03 2.38029E-04
1.13861E-03 9.67405E-04 2.06377E-03 1.07739E-03 5.03505E-04 5.98871E-03
……
……
……
1.00036E-03 2.13547E-03 1.11444E-03 5.26693E-04 6.19538E-03 2.38031E-04
1.13861E-03 9.67410E-04 2.06378E-03 1.07740E-03 5.03509E-04 5.98874E-03
2.27195E-04 1.10827E-03 9.34474E-04 1.99290E-03 1.04109E-03 4.80270E-04
5.78420E-03 2.19264E-04 1.08702E-03 9.10842E-04 1.94253E-03 1.01551E-03
4.63553E-04 5.63873E-03 2.12307E-04 1.06902E-03 8.90422E-04 1.89935E-03
9.93731E-04 4.49079E-04 5.51392E-03 2.06784E-04 1.05513E-03 8.74403E-04
1.86569E-03 9.76838E-04 4.37706E-04 5.41655E-03 2.03135E-04 1.04613E-03
8.63910E-04 1.84374E-03 9.65871E-04 4.30247E-04 5.35304E-03 2.03103E-04
1.04605E-03 8.63819E-04 1.84355E-03 9.65776E-04 4.30183E-04 5.35249E-03
6.22021E-04 3.16917E-02 1.20005E-01 3.14345E-01 9.45123E-01 2.94649E+00

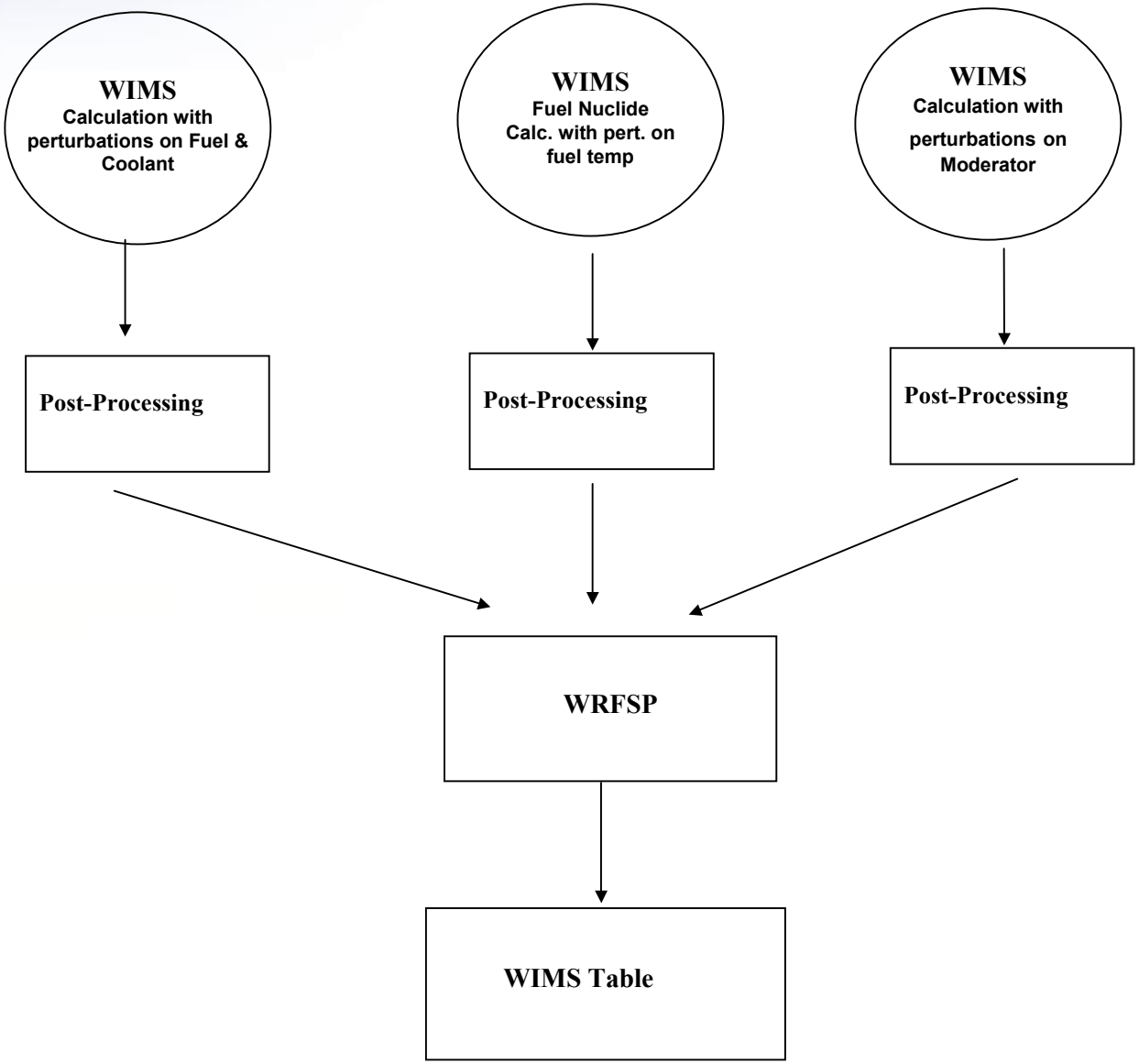
Kinetics-Parameter Table (cont.)

- Contents of the table
  - delayed-neutron partial fractions for each bundle
  - core-average precursor decay constants
- RFSP-IST input cards for reading the table illustrated above (named "rkin_700"). The table is saved in the "BETAS " and "LAMBDAS " records under the "SIMULADATA" CERBERUS Case 1 index:

```
*READ CARD
FORMAT     (6E12.5)
BLOCK      SIMULDATA ACR700              0          0ACRSLB    ACRSLB    1BETAS
READ       rkin_700            1     23856
FORMAT     (6E12.5)
BLOCK      SIMULDATA ACR700              0          0ACRSLB    ACRSLB    1LAMBDAS
READ       rkin_700            1          6     20448
```

- Part 6: Generation of the WIMS Micro-Depletion Tables

Generation of the WIMS Micro-Depletion Tables



Generation of the WIMS Micro-Depletion Tables (cont.)

- To generate WIMS micro-depletion fuel table with WRFSP, three TAPE16 files and a "burnup.dat" file are required:
  - "wrfsp_f.t16" containing the lattice properties with perturbations on the fuel and coolant
  - "wrfsp_m.t16" containing the lattice properties with perturbations on the moderator
  - "wrfsp_mic.t16" containing the isotopic microscopic properties
  - "burnup.dat" containing the information for burnup calculation
- To generate WIMS micro-depletion reflector table with WRFSP, only one TAPE16 file is required:
  - "wrfsp_m.t16" containing properties for the moderator region

Description of the “burnup.dat” File

- ASCII file
- Contains the burnup information saved in the WIMS-AECL nuclear data library
- Used by WRFSP for saving the burnup information in the SCM tables and WIMS micro-depletion tables for the depletion calculation to be performed in RFSP-IST
- library dependent: has been generated for ENDF/B-V, ENDF/B-VI, and E65ACR libraries

Description of “burnup.dat” File (cont.)

WIMS Micro-Depletion Fuel Table

WIMS Micro-Depletion Fuel Table (cont.)

WIMS Micro-Depletion Fuel Table (cont.)

WIMS Micro-Depletion Fuel Table (cont.)

WIMS Micro-Depletion Fuel Table (cont.)

WIMS Micro-Depletion Fuel Table (cont.)

WIMS Micro-Depletion Reflector Table

WIMS Micro-Depletion Reflector Table (cont.)

WIMS Micro-Depletion Reflector Table (cont.)

- 1st line: "REFLECTOR"
- 2nd line: Number of values in the table
- Rest of the file
  - 1-D array of real values (the integer numbers listed in the table are all transferred to real values by adding 0.1)
  - Formatted as "(1P6E15.6)"
  - The table contains reflector properties for the reference condition followed by reflector properties for the perturbed conditions.

WIMS Micro-Depletion Reflector Table (cont.)

- RFSP-IST input cards for reading the table illustrated above (named “wrfsp.out”). The table is saved in the “REFLECTOR” record under the “WIMSTABLES” index:

```
*READ CARD
BLOCK      WIMSTABLESREFLECTOR
FORMAT     (-A10)
READ       wrfsp.out          1          1
FORMAT     (1I10)
READ       wrfsp.out          3          3
FORMAT     (6E15.6)
READ       wrfsp.out          4        300
```

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