APPENDIX C

ZA Designations of Materials and MAT Numbers

A floating-point number, ZA, is used to identify materials. If Z is the charge number and A the mass number then ZA is computed from

$$ZA = (1000.0*Z) + A$$

For example, ZA for ^{238}U is 92238.0, and ZA for beryllium is 4009.0. For materials other than isotopes, the following rules apply. The MAT number is 100*Z+I where I is unique for the isotope and its isomer state.

1.) If the material is an element that has more than one naturally occurring isotope, then A is set to 0.0. For example, ZA for the element tungsten is 74000.0. The MAT number is 100*Z.

2.) For compounds, the ZA is arbitrary and is calculated from ZA=MAT+100. The MAT number assignments for compounds have the following structure.

Hydrogen (except organics)	1-10
Deuterium	11-20
Lithium	21-25
Beryllium	26-30
Carbon (including organics)	31-44
Oxygen	45-50
Metals	51-70
Fuels	71-99

The presently recognized assignments are

Compound	MAT Number
Water	1
Para Hydrogen	2
Ortho Hydrogen	3
H in ZrH	7
Heavy Water	11
Para Deuterium	12
Ortho Deuterium	13
Be	26
BeO	27
Be_2C	28
Be in BeO	29
Graphite	31
l-Methane	33
s-methane	34
Polyethylene	37
Benzene	40
O in BeO	46
Zr in ZrH	58
UO_2	75
UC	76