

Options Considered in Previous Studies

Type	Coolant/ moderator	Fuel	Breeder/ target
Fission			
IFR	Na		metallic
HTGR	He		coated oxide
Heavy metal	PbBi	metallic	
Fusion			
Molten salt	self-cooled	PuF	Flibe
HTGR	He	oxide	Li oxide
Accelerator			
Na-cooled	Na	metallic	W
PbBi-cooled	PbBi	metallic	PbBi
Aqueous	D ₂ O	oxide suspension	W/Pb
Non-aqueous	He/graphite	molten salt	Pb
HTGR	He/graphite	coated oxide	

1-GWe ARIES-NS* Parameters

Parameter	Case K	Case L
Plasma aspect ratio, $A = R_T/a_p$	1.6	1.6
Major toroidal radius, R_T (m)	3.04	2.82
Minor plasma radius, a_p (m)	1.90	1.76
On-axis magnetic-field strength, B_o (T)	1.9	1.7
B-field strength at TFC-CP, B_c (T)	7.0	6.4
Plasma current (MA) ($f_{bc} = 0.95$)	19.5	15.9
Confinement factor, H_{98}	2.04	2.47
14.1-MeV neutron wall load (MW/m ²)	0.32	0.17
2.45-MeV neutron wall load, (MW/m ²)	0.002	0.001
Peak neutron wall load, MW/m ²	0.48	0.26
NBI current-drive power, P_{CD} (MW)	156.	88.
Plasma temperature, T (keV)	18	18
Plasma fuel mix, d(90):t(10)		
Neutron energy multiplication, M_N^0	30	60
Fusion power, P_F (MW)	185	84
Total thermal power, P_{TH} (MW)	4,688	4,191
Fusion gain, $Q_p = P_F/P_{CD}$	1.18	0.95
Engineering gain,	2.56	3.14

* ST w/o stabilizing wall, with disrupting-avoidance margin
 (0.9), $\beta = 3.1$, $N = 504$, $\beta_{c0} = 0.266$, $\rho = 1.27$, $T_H = 0.35$, $p_f = 0.05$

1-GWe ARIES-NS* Parameters

Parameter	Case K	Case L
Neutron energy multiplication, M_N^o	30	60
14.1-MeV neutron wall load, (MW/m ²)	0.32	0.17
2.45-MeV neutron wall load, (MW/m ²)	0.002	0.001
Peak neutron wall load, (MW/m ²)	0.48	0.26
14.1-MeV-n source rate (n/s)	6.5×10^{19}	2.9×10^{19}
14.1-MeV-n source rate (mole/yr)	1.7×10^3	7.7×10^3
Fusion power, P_F (MW)(MW)	185	84
Fission power, P_{Fis} (MW)	4,440	4,032
Total thermal power, P_{Fis} (MW)	4,688	4,191
Cost of fusion neutrons (\$/mole)	365,000	706,000
$N_{fission}/N_{fusion}$ (est. *)	5.28	10.56
$(N_{fission} + N_{fusion})/N_{fusion}$	6.28	11.56
Cost of (all) neutrons (\$/mole)	58,100	61,100
1992-Cost of electricity, COE (mill/kWeh):		
w/o LSA credits (LSA=4)	150	132

Case K (99/12/16).

Case L (99/12/15).

^o Pu-burning outboard blanket, $0.90 < k_{eff} < 0.99$

*Assuming 200 MeV/fission and 2.5 fission neutrons per fission.