

CONTENTS OF VOLUME 1

I.	INTRODUCTION	1
II.	SUMMARY	3
1.	Role of ITER	3
2.	ITER objectives	3
3.	ITER concept	4
3.1.	Overview	5
3.2.	Physics basis and performance predictions	7
3.2.1.	Introduction	7
3.2.2.	Plasma performance and operational limits	9
3.2.3.	Axisymmetric magnetics	13
3.2.4.	Heating and current drive	14
3.2.5.	Power and particle exhaust	15
3.2.6.	Disruptions	17
3.2.7.	Operation and diagnostics	17
3.3.	Reactor configuration and containment structure	18
3.3.1.	Introduction	18
3.3.2.	Reactor configuration	19
3.3.3.	Vacuum vessel and ports	20
3.3.4.	Biological shield and cryostat concept	20
3.4.	Assembly and maintenance	21
3.4.1.	General requirements	21
3.4.2.	Assembly scenario and procedure	22
3.4.3.	Maintenance scenario and procedure	22
3.4.4.	Concluding remarks	24
3.5.	Magnets	25
3.5.1.	Introduction	25
3.5.2.	System requirements	26
3.5.3.	Design concept	26
3.6.	Poloidal field system	28
3.6.1.	Vertical position control system	28
3.6.2.	Poloidal coil system for slow plasma control	29
3.6.3.	Electromagnetic effects of disruption	30

3.7. Primary vacuum	30
3.8. Current drive and heating systems	31
3.8.1. Electron cyclotron system	32
3.8.2. Ion cyclotron system	33
3.8.3. Lower hybrid system	33
3.8.4. Neutral beam system	33
3.9. Plasma facing components	34
3.10. Blanket and shield	36
3.11. Fuel cycle	40
3.12. Plant systems	42
3.12.1. Plant systems description	42
3.12.2. Plant layout	44
4. Scoping studies and rationale for concept selection	44
4.1. Design space overview and ignition capability	44
4.2. Current drive capability over design space	46
4.3. Background for machine selection	48
4.4. ITER design choice and characteristics	50
5. ITER performance flexibility	50
5.1. Phased operational scenario with flexibility	50
5.2. Extended capability of plasma size and current	51
5.3. Flexibility of plasma operation	52
5.3.1. Flexibility of plasma parameters	52
5.3.2. Flexibility of plasma operation scenario	53
6. Technical issues	54
7. Operations and experimental testing programme	56
8. Safety and environment	60
8.1. Proposal of design targets	60
8.2. Evaluation of radioactivity doses	61
8.3. Accident analyses	61
8.4. Waste management	62
8.5. Handling of activated components	62
9. Reliability and availability	63
10. Cost	64
11. Research and development	67
12. Conclusions	70