21 (6.2) Buildings and Other Structures - Introduction

21.1 Functions, Basic Configuration and Interfaces

21.1.1 Functions

21.1.1.1 House and Support the Systems, Provide Adequate Space, Protect from External Hazards

Each building houses and supports the systems contained in that building, and provides the required services to the systems, and also provides space for system installation, operation, maintenance, and decommissioning.

Protect Materials Equipment and Personnel from External Hazards
Each building is capable of sustaining anticipated wind, snow and other environmental loads (see below).
Protection from the Weather
The ITER buildings and structures all provide the appropriate degree of protection from the weather, in accordance with the "ITER Site Requirements and ITER Site Design Assumptions" (in the PDS), as listed in Table 21(6.2)-1.

Table 21 (6.2) -1 Generic Meteorological Conditions

Meteorological Characteristics	**Design Point**	**Remarks**
Maximum steady, horizontal wind	≤ 140 km/hr	at 10 m elevation
Maximum air temperature	≤ 35°C	24 hr average ≤ 30°C
Minimum air temperature	≥ -25°C	24 hr average ≥ -15°C
Maximum rel. humidity	≤ 95%	24 hr average
Maximum rel. humidity	≤ 90%	30 day average
Barometric pressure	Sea level to 500 m	
Maximum snow load	150 kg/m^2	
Maximum icing	10 mm	
Maximum rainfall	20 cm	24 hr
Maximum rainfall	5 cm	1 hr
Heavy air pollution	Level 3 (according to IEC 71-2)	

Hydrological Characteristics
Ground water is assumed to be present at 10 m below nominal grade (see the PDS), well above the tokamak building embedment of up to 25 m below nominal grade. This assumption will require engineered ground water control during the construction of the tokamak building pit. Further, the building shall resist the pressure resulting from being embedded into the ground water table.
Protection against Earthquake Damage
The ITER buildings and structures all provide the appropriate degree of protection from damage from earthquakes, as listed in Table 21(6.2)-2.

Table 21 (6.2) -2 Seismic Characteristics

Assumption The ITER seismic design specifications for the applicable safety importance class (SIC) are based on an assumed seismic hazard curve. Using the IAEA seismic classification levels of SL-2, SL-1, and SL-0 and the assumed seismic hazard curves, the following seismic specifications are derived			
SIC	**IAEA level**	**Return Period (years)**	**Peak* Ground Acc.**
SIC	SL-2	10^4	0.20
SIC	SL-1	10^2	0.05
Not SIC	SL-0	short	0.05
* Peak ground acceleration is for both horizontal and vertical components in units of the gravitational acceleration, g.			
Bases Safety assessments of external accident initiators for facilities, particularly when framed in a probabilistic risk approach, may be dominated by seismic events. Assumed seismic hazard curves are used in a probabilistic approach which is consistent with IAEA recommendations for classification as a function of return period. The selection of the assumed seismic hazard curve is relevant to regions of low to moderate seismic activity. Prior to site selection, specification of the peak horizontal and vertical ground acceleration provide the ITER designers guidelines according to the methodology to be used for seismic analysis, which will rely on a specified ground motion design response spectrum and a superposition of modal responses of the structures (according to NRC recommendations). After site selection the actual seismic specifications will be used to adjust the design, in particular by adding seismic isolation, if necessary.			

Table 21(6.2)-3 lists the ITER building specific their assigned seismic levels.

Table 21 (6.2) -3 Application of Seismic Approach to the ITER-FEAT Buildings

WBS #	Short Building Name	IAEA Earthquake Level for Design
6.2.A.01	Tokamak Complex	SL-2
6.2.A.04	LA & RFH Hall	SL-2
6.2.A.06	Diagnostic Hall	SL-2
6.2.B	Hot Cell Building	SL-2
6.2.G.01	Radwaste Building	SL-2
6.2.G.02	Personnel Building	SL-2
6.2.E.01	MPC Buildings	SL-0
6.2.E.02	MPSSN Building	SL-0
6.2.E.03	AC Distribution Building	SL-0
6.2.E.04	NB PS Building	SL-0
6.2.L.01	EPS Building	SL-2
6.2.L.02	3.3 kV Switchgear Structure	SL-0
6.2.L.03	Load Centres	SL-0, SL-2
6.2.J.01	Cryoplant Compressor Building	SL-0
6.2.J.02	Cryoplant Coldbox Building	SL-0
6.2.M	Site Services Building	SL-2
	Hot Basin & Cooling Tower	SL-0
	Cooling Water Pumping Station	SL-0
6.2.H	Lab/Office Building	SL-0
6.2.K.01	Control Building	SL-2
6.2.K.02	Gatehouse	SL-0
6.2.S	Utility Tunnels and Service Structures	SL-2

Table 21(6.2)-4 gives a guideline for the allocation of design margins, such as safety factors specified in structural design codes, to individual loading events.

Table 21 (6.2) -4 Damage Limits in Plant and Component Level

Damage Limits	Damage Limits to Components	Damage Limits in the Plant and Recovery of the Plant (Plant Operational Condition)
Normal	The component should maintain specified service function.	• Within specified operational limit. • No special inspection will be required other than routine maintenance and minor adjustment.
Upset	The component must withstand these loadings without significant damage requiring special inspection or repair.	• After minor adjustment, or replacement of the faulty component, the plant can be brought back to normal operation. • No effect on other components that may call for special inspection or repair.
Emergency	• Large deformations in areas of structural discontinuity, such as at nozzles, which may necessitate removal of the component from service for inspection or repair. • Insignificant general permanent deformation that may affect the safety function of the component concerned. General strains should be within elastic limits. • Active components should be functional at least after transient.	• The plant may require decontamination, major replacement of damaged component or major repair work. • In addition to the damaged component, inspection may reveal localized large deformation in other components, which may call for the repair of the affected components. • Nevertheless, the plant maintains the specified minimum safety function during and after the events.
Faulted	• Gross general deformations with some consequent loss of dimensional stability and damage requiring repair, which may require removal of component from service. • Nevertheless deformation should not lead to structural collapse which could damage other components. • The fluid boundary maintains degraded but reasonable leak tightness and flow passage. • Active components may not be functional after transient.	• Gross damage to the affected system or component. No loss of safety function which could lead to doses in excess of the limits established for category IV extremely unlikely event. • No design consideration will be given for recovery. The recovery of the plant may be judged from the severity of damage. • This level of accident state is not expected to occur, but is postulated because its consequences would include the potential for the release of significant amounts of radioactive material.

21.1.1.2 Provide a Suitable Environment for the Systems, Equipment, and Personnel

Each building provides a suitable environment for personnel and provides services to the components systems and operations inside, with appropriate levels of air temperature and humidity control. Services and support systems provided include; lighting, potable water, steam, cooling fluids, low and medium voltage electricity, grounding connections, compressed air, collection of rain water and floor drainage, access control, HVAC, fire protection, communication and appropriate instrumentation and cabling.). Also provided are;

- a means for transporting staff within areas and levels in the buildings (stairs, lifts, paths and roadways, and parking),
- suitable services, such as lighting, service power, welding outlets, drainage, potable water and sanitary sewage, (but not in areas that may contain tritium, activated materials, or beryllium dust),
- lunch and rest break facilities in appropriate areas (but not in areas that may contain tritium and activated materials, and of beryllium dust),
- fire protection, alarm, and suppression, breathing air where required,
- emergency egress routes, access control where needed, electrical grounding, HVAC, etc.

Appropriate architecture of the buildings and landscaping of the areas around the buildings are a part of the site layout design, provided to maintain an attractive environment for the entire site.

21.1.1.3 Provide a Confinement Boundary

In some cases, the buildings must provide a confinement boundary for the release of tritium and activated materials, and of beryllium dust. In one case, the tokamak building must provide pressure for an ex-vessel LOCA containment in the “containment volume”.

21.1.1.4 Provide Radiation Shielding

ITER buildings provide suitable radiation protection to plant workers. Radiation sources include gamma and neutron radiation from neutral beam injectors, residual gamma and neutron radiation outside the primary shield of the vacuum vessel (VV), gamma radiation from activated coolant, and gamma radiation from components which have been removed from inside the VV through ports.

21.1.1.5 Other

Because of their somewhat different nature from the buildings, the utility tunnels and service structures have their functions expressed in a slightly different way from the above (21.1.1.1 to 4).

21.1.2 Basic Configuration

21.1.2.1 Site Configuration

The ITER site consists of a number of buildings and other structures and areas. These are indicated in Tables 21(6.2)-5 and 6.

Table 21 (6.2) -5 ITER-FEAT Buildings and Structures

WBS #	Building Number on Site Layout Drawing	Complete Building Name	Short Building Name
1X - Tokamak Core Buildings			
6.2.A.01	11	Tokamak Building	Tokamak Building
6.2.A.02	14	Tritium, Vacuum, Fuelling and Services Building	Tritium Building
6.2.A.04	13	Laydown, Assembly and RF Heating Building	LA & RFH Hall
6.2.A.06	74	Diagnostic Hall and RF Fast Discharge Resistors and Capacitors	Diagnostic Hall
Note that the **Tokamak Building** (11) and the **Tritium Building** (14) share the same basemat and, collectively, are referred to as the **Tokamak Complex**			
2X - Hot Cell & Radwaste Complex			
6.2.B	21	Hot Cell Building	Hot Cell Building
6.2.G.01	23	Low Level Radwaste Building	Radwaste Building
6.2.G.02	24	Personnel Access Control Building	Personnel Building
3X - Pulsed Power Supply Complex			
6.2.E.01.1	32	North Magnet Power Conversion Building	N-MPC Building
6.2.E.01.2	33	South Magnet Power Conversion Building	S-MPC Building
6.2.E.02	31	Magnet Power Supply Switching Network Building	MPSSN Building
6.2.E.04	34	NB Power Supply Building	NB PS Building
6.2.E.05	36	Alternating Current Distribution Building	AC Distribution Building
6.2.E.06	44	3.3 kV Switchgear Buildings (split into 44-1 and 44-2, for convenience)	3.3 kV Switchgear Buildings

Table 21 (6.2) -5 (cont.) ITER-FEAT Buildings and Structures

WBS #	Building Number on Site Layout Drawing	Complete Building Name	Short Building Name
4X - Steady State Power Supply Complex			
6.2.L.01	41	Emergency Power Supply Building	EPS Building
6.2.L.03	LC1 - LC12	Electrical Load Centres	Load Centres
5X - Cryoplant Complex			
6.2.J.01	52	Cryoplant Compressor Building (and PF Coil Fabrication Building 2)	Cryoplant Compressor Building
6.2.J.02	51	Cryoplant Coldbox Building (and PF Fabrication Building 1)	Cryoplant Coldbox Building
6X - Laboratory Support Complex			
6.2.M	61	Site Services Building	Site Services Building
	67	Hot Basin and Cooling **Towers**	Cooling **Towers**
	68	Cooling Water Pumping Station	Pumping Station
7X - Control Complex			
6.2.H	72	Laboratory/Office Building	Lab/Office Building
6.2.K.01	71	Control Building	Control Building
6.2.K.02	73	Personnel and Vehicle Access Control Gatehouse	Gatehouse
6.2.S	not applicable	Utility Tunnels and Service Structures	various

Table 21 (6.2) -6 ITER-FEAT Site Areas

WBS #	AREA Number on Site Layout Drawing	Complete Name	Short Name
6.1.A	not applicable	ITER-FEAT General Site Layout	Site Layout
6.1.A.01	35	Pulsed Power High Voltage Substation Area	Pulsed Power HV Substation Area
6.1.A.02	42	Steady State Power High Voltage Substation Area	Steady State Power HV Substation Area
6.1.A.03	37	NB Power Supply Area	NB PS Area
6.1.A.04	43	Emergency Power Supply Fuel Tank	EPS Fuel Tank
6.1.A.05	53	Cryoplant Storage Tanks	Cryoplant Storage Tanks
6.1.A.06	64	Water Storage	Water Storage
6.1.A.07	65	Make up Basin	Make up Basin
6.1.A.08	66	Gas Storage Area	Gas Storage Area
6.1.A.09	not applicable	Vehicle Parking Areas	Parking Areas
6.1.A.10	not applicable	Future Expansion Areas	Future

21.1.2.2 The Tokamak Complex

The tokamak complex consists of a large building on a common basemat, the main portion of which is the tokamak building, with the adjacent eastern portion housing the tritium, vacuum, fuelling and services building. The complex is embedded to a depth of approximately 16 meters (at the bottom of the basemat slab).

The tokamak building is arranged to permit top entry of all major components for assembly and major maintenance.

There is a "containment volume" to contain pressure resulting from an ex-vessel LOCA. This volume includes all areas of the tokamak water cooling system external to the pit.

The tokamak crane hall (immediately above the bioshield), and the laydown, assembly & RF heating building form a contiguous crane hall. The south end of the crane hall is unobstructed to allow for possible expansion.

The layout in the tokamak galleries is organised to allow separation of cryogenic magnet feed penetrations from cooling system penetrations.

The arrangement in the tokamak building accommodates the combination of heating and current drive systems (EC H&CD, IC H&CD or LC H&CD), plus additional power from up to 3 NB H&CD systems (along with a diagnostic neutral beam system).

The tokamak pit is configured to support the replacement of the central solenoid, the replacement or repair in situ of any PF coil, and any TF coil and sector of the vacuum vessel without the need to dismount all other TF coils and to cut leads/pipes pertaining to other coils/sectors.

The tokamak building accommodates the transportation of objects removed from horizontal ports at the divertor, the equatorial, and the upper port levels to the building high capacity (100 t) lift. The lift opens into the passageway to the hot cell at the equatorial (grade) level, and the building provides radiation shielding for objects moving in the passageway. Radioactive objects transported along this passageway and tunnel are contained in sealed, but not shielded, casks. The building wall and floor (and ceiling) slabs provide the shielding.

The tokamak building supports the performance of parallel maintenance operations on adjacent sectors of the machine by providing shielding for those ports which are expected to require class I remote handling operations. For ports requiring class II or III remote handling operations, shielding for parallel maintenance is to be decided on a case-by-case evaluation. However, human maintenance operations will be interrupted during the time the sealed cask containing an irradiated component is en-route to the hot cell, since the cask does not provide shielding against gamma rays.

The tokamak building design is capable of accommodating seismic isolators if the actual ITER site has an SL-2 earthquake significantly greater than 0.2 g peak horizontal and vertical ground acceleration.

21.1.2.3 Access to Buildings near the Tokamak

Plant workers may occupy the assembly, laydown, and RF heating, and the tritium buildings, as well as the other buildings on the site (except for the tokamak building) while the tokamak is pulsing.

The level of ionizing radiation outside the biological shield immediately surrounding the tokamak (24 h after shutdown) is limited to 10 μSv/h, and allows plant workers to access those areas.

21.1.3 Interfaces

Each building has interfaces with the systems it contains. These are indicated using the work breakdown structure (WBS) item numbers of those systems without further details (some of which will be found in the DDD (62) for the buildings).

21.2 Requirements

21.2.1 Design

The requirements for each building are derived from DRG1 and section 21.1.1. The requirements may not be complete as some equipment is still being designed. However, it is expected that the requirements for the overall configuration and general conceptual design, have been identified.

21.2.1.1 General

For each building the general requirements are partly common to other buildings and partly building specific.

21.2.1.2 Seismic

Some of the buildings and structures shall be SIC and shall withstand SL-1 and seismic conditions as specified in the above, and in the PDS. The other structures shall be not SIC and shall withstand SL-0 seismic conditions as specified in PDS, or UBC and industrial health and safety requirements, which provide for a minimum of 0.05 g horizontal seismic force.

21.2.1.3 Structural

The buildings and structures support their own weight as well as the weight of all installed equipment in (or on) the structures.

They also support the weight and forces of all movable and active components and systems in (or on) the structures.

The buildings and structures are located so as to avoid interference with the other buildings and arranged so that the function of all buildings and structures can be accomplished. They are also arranged to facilitate interfaces with external facilities such as roadways, power grid, water supply, etc. provided by the ITER host.

21.2.1.4 Remote Handling

There is a requirement for remote handling only in the hot cell building.

21.2.1.5 Nuclear

There are nuclear requirements only for; the diagnostic hall, the low level radwaste building, and the personnel access control building.

21.2.1.6 Chemical

There is a chemical requirement only for the site services building.

21.2.1.7 Electromagnetic

There are electromagnetic requirements only in the tokamak building, and the laydown, assembly and RF heating building.

21.2.1.8 Construction

There are construction requirements only for the laydown, assembly and RF heating building, and the cryoplant/PF construction buildings.

21.2.1.9 Assembly

There are assembly requirements for; the tokamak building, the laydown, assembly and RF heating building, the hot cell building, and the cryoplant/PF construction buildings.

21.2.1.10 Testing

In general, it is assumed that each building is constructed to appropriate codes and standards, which include requirements for construction and commissioning testing of; materials, welding, piping systems, electrical systems, and other building service components. In addition, each building must be designed to accommodate functional testing of building support systems such as fire protection. For some buildings there are specific requirements of testing (e.g. crane testing, pressure/leakage testing).

21.2.1.11 Electrical

For each building this is broken down as follows;
Lighting, electrical services, grounding, lightning protection.

21.2.1.11.1 Lighting

The building shall have appropriate permanently installed lighting which shall include emergency lighting. In inaccessible areas (e.g. the hot cell) lighting shall be designed for the revamping and replacement of fixtures by withdrawal to an accessible area.

21.2.1.11.2 Electrical Services

The building shall have an appropriate distribution of low voltage power for services and welding points within the building. Usually class IV power (or class III power for safety systems) is required but for the control building class II power is also required.

21.2.1.11.3 Grounding

The building shall have an electrical grounding grid with connections to the plant-wide grounding grid network, and shall have robust grounding terminals at specified locations inside the building.

21.2.1.11.4 Lightning Protection

The building shall have a lightning protection system with connection to specified grounding grid terminals.

21.2.1.12 Potable Water and Drainage

Some buildings will provide potable water and sanitary drainage systems for lavatories, drinking fountains, and showers and kitchen facilities (if they exist). However, for some buildings there are considerations of the potential of worker ingestion of contaminated potable water and the potential for radioactive contamination of sanitary drains. The requirements are building-specific.

21.2.1.13 HVAC

Because the HVAC in some buildings (together with the detritiation systems), forms a confinement barrier, the requirements on the HVAC are building-specific. In general the HVAC will provide a uniform temperature distribution and air quality (temperature, humidity, purity and freshness) for the workers at acceptable levels. In addition, the HVAC may have specific requirements for the operation of equipment (e.g. environmental temperature limitations).

21.2.1.14 Fire Protection

The buildings and structures will have separate fire-rated zones for identified hazards, and protected exit routes. In addition, special provisions may be required (e.g. fire doors, fire-stops) to prevent the spread of fire.

The buildings and structures require fire detection, alarm, and mitigation systems (which include both installed suppression systems (either automatic, or manually operated) and portable extinguishers) commensurate with the occupancy and fire risk loading.

The detection systems shall be sensitive to flame, smoke or combustible gas, as appropriate. An automatic audible and visual alarm system incorporating a manually activated circuit shall be installed. The alarm system will provide independent signals to both the on-site incident response centre and to the CODAC system. The extinguishant will be chosen appropriate to the fire risk.

21.2.1.15 Internal Communication

Some of the buildings and strructures shall provide an internal communication system, including distribution of telephone connections, public address systems, CCTV, and appropriate warning systems (plant emergency, crane movement, fire, etc.). In some cases, special intercommunication systems may be required with the control room.

21.2.1.16 Access Control

There will be a computerised personnel safety and access control system to prevent unauthorised entry to areas where there are hazards to personnel (and for this it will require signals from other sources e.g. the radiation monitoring system). In addition, the system will provide signals to the interlock system to prevent operation which could be hazardous to personnel in neighbouring areas. The system will include audible and visual alarms to warn of potential hazards or the need for emergency exit from an area. The alarms will be activated automatically or manually by operator action.

Access control will be accomplished by a badge (or other identification)/reader system and door interlocks. The system will be independently connected to the interlock and CODAC systems. The access control system will provide for automatic tracking of individuals and the total number of workers in each controlled area.

21.2.1.17 Materials

21.2.1.17.1 Structural

Each building has its own structural requirements (e.g. steel and reinforced concrete, non-ferromagnetic material in the RF heating area of the laydown, assembly and RF heating building, materials not sensitive to gamma radiation in the hot cell building, low absorbtion of tritium as a hot cell liner).

21.2.1.17.2 Electrical

The following requirement applies to all buildings and structures on the ITER site. All metallic conductor cables will be made with copper and should have appropriate insulation level according to the nominal voltage of equipment to be supplied. Cable insulation should meet the following requirements:

- insulation material XLPE preferred, PVC not accepted;
- max. permissible temperature of conductor:
  - continuous 90°C,
  - under short circuit conditions 250°C;
- acid gas content zero halogen, according to IEC-754;
- fire retardancy according to IEC-332

Table 21 (6.2) -7 IEC Relevant Material

IEC #	Technical Committee	Title
332-1 to 3	SC 20C	Test on electric cables under fire conditions
728	SC 12G	Cable distribution systems
754	SC 20C	Tests on gases involved during combustion of electric cables
840	SC 20A	Test on electric cables 30 kV to 150 kV

21.2.1.18 Cranes, Lifts and Materials Handling

The requirements in general are to allow sufficient space for the handling of material but the detailed requirements are building-specific. In the tokamak, tritium, laboratory/office and control buildings there are requirements for lifts. In the tokamak and hot cell buildings there is the requirement for a guided transportation system capable of transporting air cushion vehicles required for remote handling casks movement. In other buildings there is a requirement for vehicle access, use of fork lifts, and for some the use of air cushion pallets which will be manually driven.

21.2.1.19 Decommissioning

The tokamak building, the tritium building, and the laydown, access and RF heating building have requirements to facilitate the decommissioning of the ITER machine and its systems.

21.2.1.20 Instrumentation and Control

Building systems which have actively controlled components (e.g. HVAC), access control systems, communications networks, etc.) shall comply with the ITER plant standards for control and communication protocols, and shall provide appropriate interfaces to the CODAC system.

21.2.2 Operation and Maintenance (O&M)

21.2.2.1 Operation and Control of Building Services

Building services shall incorporate appropriate instrumentation and control subsystems to manage system operation. Manual control over lighting, power distribution, doors, and fluid supply will be adequate. Manual control with safety interlocks will be provided for building cranes and lifting devices. Building systems with no safety or radiation control function (compressed air distribution, industrial drainage, grounding etc.) will be equipped with appropriate instrumentation and control to operate in a stand-alone mode. Operation and control of these building services will be centralised in building control panels located within the building. The status of these building services will be provided to the CODAC system. However, these services will not be controlled for the main control room.

21.2.2.2 Maintenance of Building Services

Building maintenance requirements are standard to a large industrial building. It may simply involve periodic inspection and repair or system correction during or after these inspection periods. Operation of most systems may be interrupted for maintenance activities, however for some buildings the HVAC system with emergency isolation valves will include sufficient redundancy so that adequate service can be maintained when one unit is removed for service or maintenance.

21.2.2.3 Maintenance for Structures

This set of maintenance requirements applies to building features that provide general services for maintenance. Services unique to installed equipment are not included.

The building design shall provide (where appropriate) access and methods for maintaining expansion joint seal quality.

The building construction materials which may be degraded by corrosion have prevention and control measures which shall (where appropriate) be maintained over the life of the project including the decommissioning and dismantling of ITER.

21.2.3 Surveillance and In-Service Inspection

These requirements apply to building features that indicate the condition of the building (e.g. testing of safety functions (volume leakage rates, pressure retention, cranes, lifts, hoists, HVAC, access control and fire protection systems operation etc.), and those unique to installed equipment are not included here.

21.2.4 Quality Assurance (QA)

The buildings and structures are designed and constructed in compliance with the ITER QA program. The buildings and structures which are SIC are designed and constructed in accordance with American Concrete Institute (ACI)-349 (or equivalent) and all the quality assurance and inspections contained therein, plus any additional requirements specified by the ITER QA program. The buildings and structures which are not SIC shall be designed and constructed in accordance with ACI-318 (or equivalent) and subject to all the quality assurance and inspection requirements contained therein, plus any additional requirements specified by the ITER QA program.

Structural elements within the tokamak complex, which form containment boundaries, shall be subject to acceptance and periodic testing in accordance with ASME section 11 (or equivalent).

The steel (non-reinforced concrete) buildings have no specific QA requirements beyond those contained in the uniform building code (or equivalent) and the ITER QA manual.

21.2.5 Reliability Assurance

There are no special reliability assurance requirements for buildings or building services except where this is required because of the ITER safety case. By choosing appropriate codes and QA requirements the primary structures can reasonably be assured to meet the failure expectancy assumed in the safety evaluations (10^{-6} per year). Other measures taken to assure that building systems meet or exceed the reliability assumed in safety analyses shall include continuous monitoring with instrumentation, periodic functional testing, and suitable preventative maintenance programmes.

21.3 Codes and Standards

The site-specific design shall be in accordance with codes and standards acceptable to the regulatory agencies which approve the construction and operation of the facility.

Engineering and construction shall be done in compliance with ASTM Codes, ACI Codes, AISC Code, AWS Codes, UBC Codes, and other related US codes, or their equivalent.

All materials, procedures, and works will be subject to the quality assurance tests that are indicated in these codes.

21.4 Building Documents for DRG2

The following is a list of the sections of the DRG2, each covering a specific building/structure or buildings/structures.

Chapter	DRG-2 Attachment Title
21(6.2.A.01)	Tokamak Complex (Tokamak + Tritium)
21(6.2.A.04)	Laydown, Assembly & RF Heating
21(6.2.A.06)	Diagnostic Hall & TF Fast Discharge Resistors & Capacitors
21(6.2.B)	Hot Cell Building
21(6.2.E.01)	Magnet Power Conversion Buildings, North & South
21(6.2.E.02)	Magnet Power Supply Switching Network Building
21(6.2.E.04)	NB Injector PS Building
21(6.2.E.05)	AC Distribution Building
21(6.2.E.06)	3.3 kV Power Supply
21(6.2.G.01)	Low Level Radwaste Building
21(6.2.G.02)	Personnel Access Control Building
21(6.2.H)	Laboratory Office Building

Chapter	DRG-2 Attachment Title
21(6.2.J.01)	Cryoplant Compressor Building
21(6.2.J.02)	Cryoplant Coldbox Building
21(6.2.K)	Control Building
21(6.2.L)	Emergency Power Supply Building
21(6.2.M)	Site Services Building
21(6.2.S)	Utility Tunnels & Site Improvements