GB SQSS

9th June – Andy Hiorns

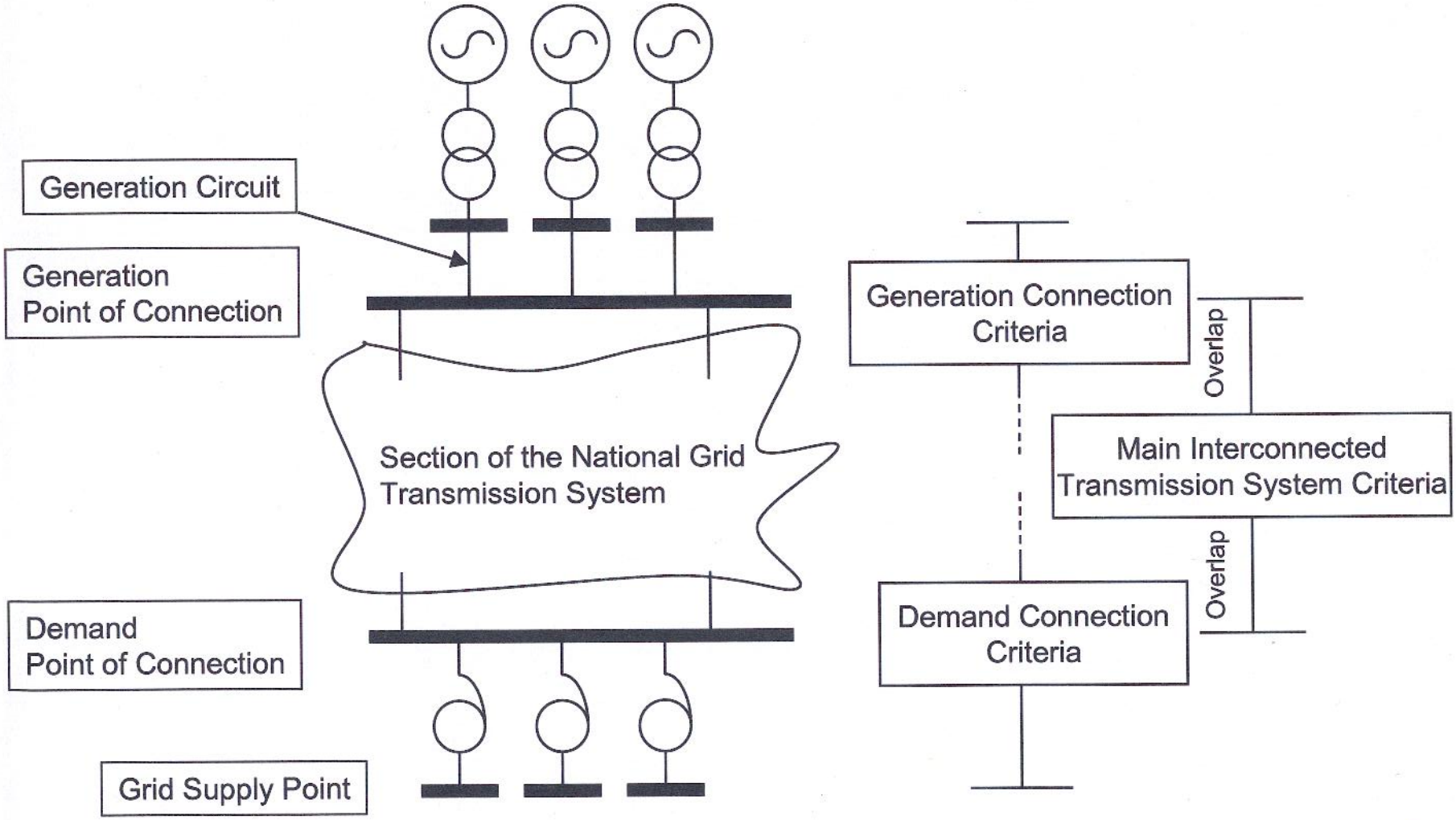
nationalgrid

Structure of GB SQSS

- Introduction
- Generation connection planning criteria
- Demand connection planning criteria
- MITS planning criteria
- Operational criteria
- Voltage criteria
- Terms and definitions
- Appendices

nationalgrid

Where the chapters apply



nationalgrid

What is a 'security standard'

- A set of 'credible events', e.g.
  - single / double circuit fault outage
  - loss of infeed
  - fault outage of a section of busbar
- A set of consequences to be avoided, e.g.
  - overloads
  - voltages outside limits
  - system instability
  - system frequency outside limits
  - loss of demand

nationalgrid

Generation connection planning criteria

- Criteria for connection of one or more power stations to the GB transmission system
- Applied in conjunction with MITS and/or Demand criteria where appropriate
- Generation connections are planned to be compliant with the deterministic criteria

nationalgrid

Generation connection planning Criteria

- Deterministic Criteria
  - Limits to loss of power infeed risks
  - Generation connection capacity requirements
- Customer Choice Variation
  - does not reduce security of MITS
  - does not result in additional investment or operational costs
  - does not compromise NGC's ability to meet statutory or licence obligations

nationalgrid

Generation connection planning criteria

- Limits to loss of power infeed risks
  - single transmission circuit fault outage - no loss of power infeed
  - single generation circuit or busbar section - max loss of power infeed = 1000MW
  - fault outage of two transmission circuit - max loss of power infeed = 1320MW
- Generation connection capacity requirements
  - power station at full output
  - year round conditions
  - fault outage of two circuits
  - there must be no:
    - loss of supply capacity
    - unacceptable overloading / voltage conditions
    - system instability

nationalgrid

Security of generation connection

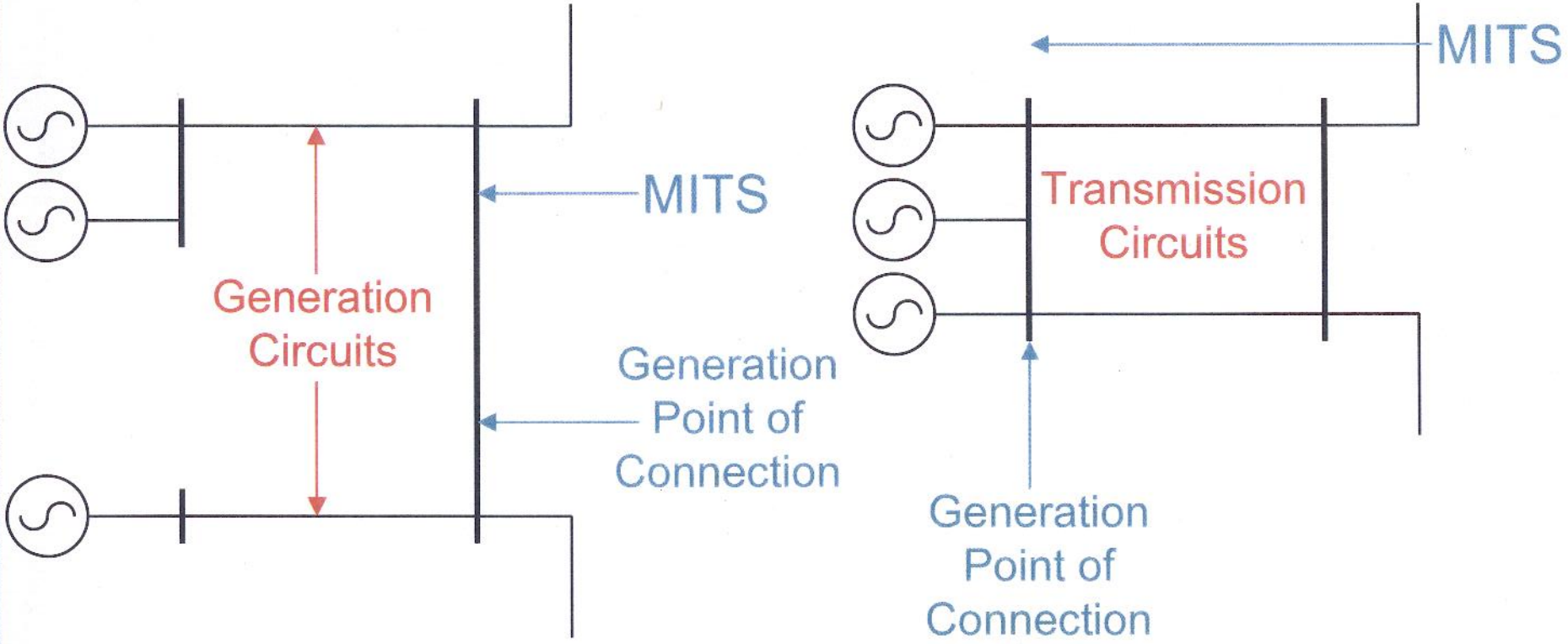
Security requirements for outages on transmission circuits

Capacity	Permissible loss of infeed			Connection requirements
	Intact	N-1	N-2	
<1320MW	0	0	All	2 transmission circuits
>1320MW	0	0	None	3 transmission circuits

nationalgrid

Generation Circuit: Definition

'the sole electrical connection between one or more generating units and the MITS, ie a radial circuit which if removed would disconnect the generating units'



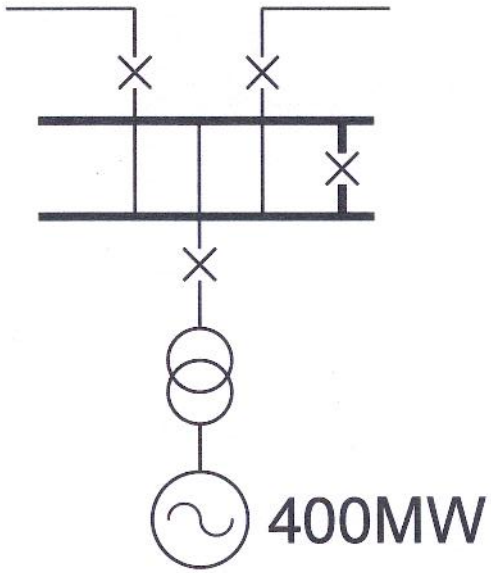
nationalgrid

Generation Circuits

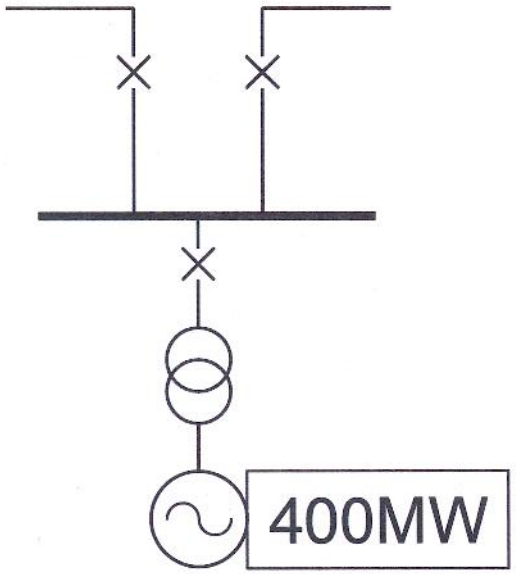
- Maximum Length
  - Generating Units with expected Annual Load Factor **>** 30%
    - 5km
  - Generating Units with expected Annual Load Factor < 30%
    - 20km
  - **Restrictions to overhead lines only; not cables**

nationalgrid

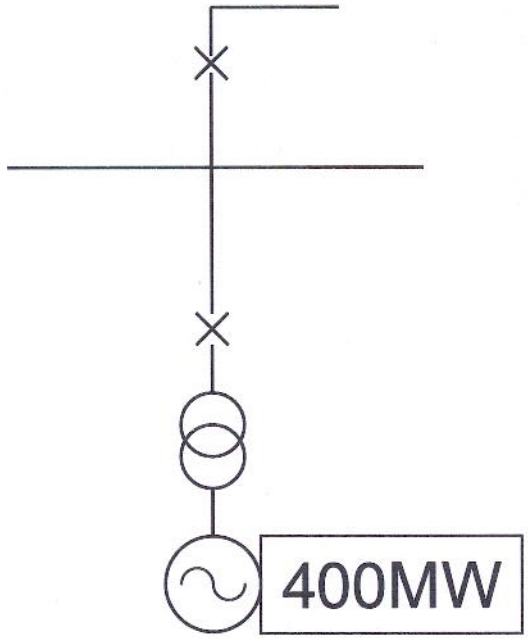
Variations to Generation Connection Designs



Compliant



Non-compliant
See 2.6 (ii) and A3



Non-compliant
See 2.6 (i) and A3

nationalgrid

MITS planning criteria

- Planning criteria for the Main Interconnected transmission system

- Minimum transmission capacity requirements
  - Capacity requirements at GB ACS peak demand
  - Capacity requirements during the course of a normal year of operation

nationalgrid

MITS planning criteria

- Minimum Transmission Capacity Requirements at GB ACS peak demand
  - Requires simulation of system transfer conditions defined by reference to 'planned transfer' and 'interconnection allowance'

- Minimum Transmission Capacity Requirements during the course of a normal year of operation
  - Conditions which 'ought to be reasonably foreseen
    - demand cycles
    - power station operating regimes
    - typical arranged outage patterns
    - expected availability of generation reactive capability

nationalgrid

MITS Planning Criteria

- fault outage of two circuits
  - there must be no:
    - loss of supply capacity
    - unacceptable overloading / voltage conditions
    - system instability

Conclusion

- Chapters for development
  - Generation connection criteria
    - Customer choice variations
  - MITS - Explore implications of single point of connection

- Areas for further discussion
  - Substation configuration and switching arrangements
  - Network voltage performance
    - With / without demand connected

nationalgrid