

Model WTSR (3rd Edition) Training Course

Company 'A'

Wind Turbine Safety Rules

Introduction

Purpose of the Course

- To provide theoretical training in the Company 'A' Wind Turbine Safety Rules
- Persons need to have an understanding of Wind Turbine Safety Rules and Procedures
- Persons also need practical knowledge of the Wind Turbines (and associated maintenance procedures) on which they work

Wind Turbine Safety Rules

Systems and Boundaries

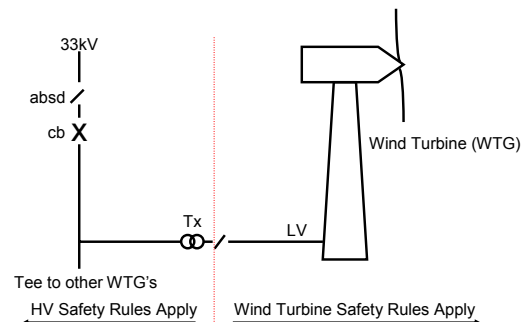
Systems and Boundaries

A typical Wind Farm consists of two distinct Systems:

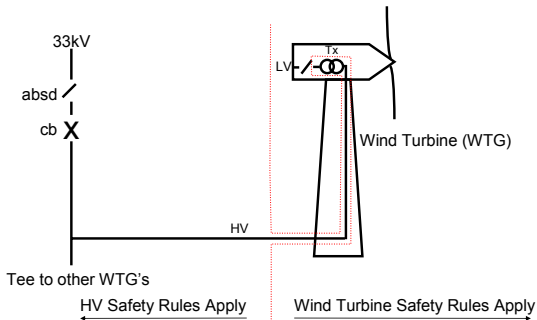
1. The Wind Turbine, its Plant and associated (LV) infrastructure
 - Where LV means $\leq 1000V$ AC / $1500V$ DC
 - The WTSR apply to this System
2. The High Voltage (HV) infrastructure
 - Where HV means $>1000V$ AC / $1500V$ DC
 - Approved HV Safety Rules must be used for such Systems

On each site, the System to which any Safety Rules apply must be clearly defined in a Management Instruction

Typical Boundary between HV & LV System



Typical Boundary between HV & LV System



Wind Turbine Safety Rules

Foreword
Policy
Philosophy
Principles

Foreword to the Safety Rules

- Rules ensure work can be undertaken without hazard from mechanical or low voltage electrical equipment
- Safety Rules are mandatory
- Based on a Policy, Philosophy & Principles
- Duty of Persons to be thoroughly familiar with the Rules and statutory requirements

Foreword - Defined Terms

SHALL

- Mandatory; no discretion

SHALL, WHERE PRACTICABLE

- Within the bounds of current knowledge and/or invention

SHALL, WHERE REASONABLY PRACTICABLE

- Balance of risk against time, trouble, effort, or cost (Risk Assessment)

Policy

The Health & Safety at Work Etc. Act 1974

Section 2 (1) - General Duties of Employers

"It SHALL be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees..."

The phrase "so far as is reasonably practicable" has been interpreted by the courts as:

- "A calculation must be made in which the risk is placed on one scale and the sacrifice in averting the risk on the other"
- In effect, a RISK ASSESSMENT identifying the hazards, assessing the likelihood and severity of the risks and balancing against the cost of controls in terms of time, trouble, effort and finance (costs)

Policy

The Health & Safety at Work Etc. Act 1974

Section 2 (2) - General Duties of Employers

1. provision & maintenance of safe plant and SAFE SYSTEMS OF WORK
2. safe handling, storage, maintenance and transport of articles and substances
3. information, training, instruction and supervision
4. safe place of work with safe access and egress
5. provision & maintenance of safe working environment

Policy

Responsibilities of Employees

- Co-operating with management
- Taking reasonable care of their own health and safety at work and for that of others
- Reporting any shortcomings that could present serious and imminent danger

Responsibilities of Company 'A'

- To update the WTSR
- Monitor effectiveness of WTSR

Philosophy of the WTSRs

Plant (the mechanical parts) and LV Apparatus (the electrical parts) combine together to form electro-mechanical systems which is generally referred to as:

"THE SYSTEM"

The System contains "Inherent Dangers"

- Mechanical (e.g. rotating parts; temperature; pressure)
- Electrical (e.g. Low Voltage electricity)
- Substances (e.g. chemicals; lubricants)

Philosophy of the WTSRs

The Wind Turbines operate safely through:

- design,
- operating procedures
- competence of the operators and technicians (Competent Technician)

When work changes from 'normal' operating mode, it is necessary to specify rules and procedures to protect persons from the inherent dangers

Wind Turbine Safety Rules establish a SAFE SYSTEM OF WORK from 'system derived hazards'

Persons "appointed" to have duties and responsibilities

Philosophy of the WTSRs

Wind Farms consists of two distinct systems:

- The High Voltage Infrastructure (>1,000V AC/1500V DC)
- The Wind Turbine Plant & associated Low Voltage infrastructure

Boundary between the two Systems must be clearly defined and understood - historically recognised within the industry as the switchgear associated with the LV side of the WTG transformer

Philosophy of the WTSRs

The High Voltage Infrastructure:

- Recognised set of 'High Voltage' Safety Rules apply
- Require competent formally appointed Persons to implement HV Rules
- HV System may be *within* the Wind Turbine structure

Philosophy of the WTSRs

Wind Turbine & associated Plant / LV Apparatus

- Relatively simple systems with virtually identical equipment in each particular model of turbine
- Highly trained and competent technicians
- Usually small working parties, sometimes on very remote locations
- Most work localized which does not impact on other turbines
- Work generally numerous small tasks requiring different requirements and safety precautions
- Practical nature of the rules implemented on site by Authorised Technicians

Philosophy of the WTSRs

When work is carried out on Plant / LV Apparatus, there are two types of Danger that might arise:

1. Danger inherent in the System
 - implementation of the WTSR will achieve safety from the inherent dangers
2. Dangers arising from the work environment and in the vicinity of the work but not associated with the System
 - WTSR do not specify how safety from this "environmental danger" is achieved but they do allocate responsibility for achieving safety from this type of danger

Philosophy of the WTSRs

When carrying out work on the 'System' the five key stages are:

1. Release from operation - making available
2. Establish safe conditions from inherent dangers to protect persons at work
3. Execution of the work
4. Clearance on completion of work (confirm WTG is in a safe condition to return to service)
5. Restoration and return to operational control

Philosophy of the WTSRs

The Authorised Technician is responsible for:

- Transfer Of Control of the WTG
- Establishing safe conditions for work
- Checking safe conditions have been established or implementing specialist procedures that apply if equipment is still energised
- Confirming in writing that it is safe to commence work
- Supervising safety during the course of the work
- Confirming that the procedure is complete, return the WTG to an operational state and transfer operational control (Transfer Of Control)

This is achieved by following written procedures with signature checkpoints

Philosophy of the WTSRs

Approved Written Procedure (AWP) to specify:

- Actions necessary to prevent Danger from Plant / LV Apparatus
- Responsibilities for achieving those actions (including those for General Safety)
- AWP's may be supported by other local procedures
- AWP's prepared for each work package by experienced, knowledgeable Persons and shall be reviewed, agreed & Approved by Authorising Engineer

Essentially the whole process is formalised and auditable

Principles of the WTSRs

PRINCIPLES

- WTSR only concerned with achieving safety for Persons
- separate HV Rules applied to HV Systems
- LV Apparatus - isolation where practicable
- Plant - isolation followed by draining and venting (unless the work requires the Plant to remain energised)
- primary precautions to be maintained
- rules implemented by formally appointed persons (written)
- cross boundary procedures shall be implemented

Principles of the WTSRs

To achieve Safety From The System one or more of the following functions will be involved:

1. Safety Co-ordination
2. Making Safe / Restoration of Plant and Apparatus
3. Work

THE RULES DO NOT PRECLUDE ONE PERSON FROM PERSONALLY PERFORMING ALL THREE OF THESE FUNCTIONS BUT IT WILL FREQUENTLY BE NECESSARY FOR TWO OR MORE PERSONS TO BE INVOLVED

Principles of the WTSRs

Where more than one member of the working party can carry out the role of Authorised Technician, then it must be made clear to all parties who is performing that role for the duration of each work period

Wind Turbine Safety Rules

General Provisions

General Provision 1 (GP1): General Safety

Authorised/Competent Technician must ensure General Safety is established, and as the 'leader' of the Working Party must ensure that it is maintained.

Authorised/Competent Technician shall also ensure that other work areas are not adversely affected by his / her work activity.

General Provision 2 (GP2): Additional Safety Rules and Procedures

A range of additional rules, procedures & support documents must be also complied with:

- Management Instructions
- WTSR Support Procedures (P1 to P6)
- Distribution Network Operator Safety Rules
- HV Safety Rules
- Method Statements
- Work Instructions
- Risk Assessments
- Company Safety Rules

General Provision 3 (GP3): Special Instructions

If the Wind Turbine Safety Rules either:

- CANNOT be applied or for some very good reason
- SHOULD NOT be applied,

then work will be carried out in an APPROVED manner that shall be confirmed in writing

Example where WTSR cannot be applied:

- Procedure for lost keys or lost AWP or absence of AWP recipient

General Provision 4 (GP4): Objections on Safety Grounds

Formal Approved procedure for dealing with such objections which shall be described within a Management Instruction

Wind Turbine Safety Rules

PART A The Basic Safety Rules

Rule A1: Application of the Rules

A1.1 WTSR shall be applied to enable work on and testing of Plant & LV Apparatus to take place without Danger by achieving Safety From The System

- The 'SYSTEM' is the Wind Turbine Generator Plant and LV Apparatus
- System boundaries are defined

A1.2 Plant & Apparatus added or removed from the System shall be to an approved procedure

- WTSR Procedure P4 'Procedure for the Addition of Plant and Apparatus to the System'
- WTSR Procedure P5 'Procedure for the Removal of Plant and Apparatus from the System'

Rule A1: Application of the Rules

A1.3 Approved Written Procedures shall be updated / reviewed

A1.4 Approved HV Rules shall be applied to HV Apparatus

Rule A2: Safety Precautions For Work / Testing on or Adjacent to Plant

A2.1 Work on or adjacent to Plant under an AWP

A2.2 When Safety From The System is achieved by "limits" then these shall be stated on an AWP

A2.3 Requirements for work under Approved Written Procedure

- Plant shall be clearly defined
- Plant shall be isolated, locked where practicable & Caution Notices shall be attached
- Contents adjusted (drained)
- De-pressurisation, if necessary (vented)
- For internal access, purge if residue of contents could cause Danger
- Stored Energy - contain or dissipate

Rule A2: Safety Precautions For Work / Testing on or Adjacent to Plant

A2.4 When it is essential to restore motive power supplies the AWP shall:

- specify the method of dealing with hazards
- ensure Safety From The System is maintained at all times
- require all personnel in the vicinity to be notified

A2.5 Only undertake the work / testing specified on the AWP

Rule A3: Safety Precautions for Work or Testing on or adjacent to LV Apparatus

A3.1 Dangers to personnel from LV Apparatus

- Mistaking unsafe parts
- Inadvertent re-energisation
- Inadequate precautions (familiarity / complacency)
- Uncontrolled release of stored energy

A3.2 Precautions shall be taken to achieve Safety From The System

A3.3 Where Practicable isolate, immobilise and lock

A3.4 Caution Notices shall be affixed to points of isolation

Rule A3: Safety Precautions for Work or Testing on or adjacent to LV Apparatus

A3.5 Work or testing only under an AWP

A3.6 LV Apparatus shall be clearly defined and only undertake work / testing specified on the AWP

A3.7 Preferred method is to work / test Isolated but if not practicable to do so then no persons shall work on, or near, any LIVE conductor unless

- It is UNREASONABLE in all circumstances for it to be made DEAD
- It is REASONABLE in all circumstances to work LIVE
- Suitable precautions are taken to prevent injury

Rule A3: Safety Precautions for Work or Testing on or adjacent to LV Apparatus

A3.8 Even though LIVE testing might be justified all repairs shall be carried out with LV Apparatus Isolated unless live repairs can be justified using criteria in A3.7

A3.9 When it is not reasonably practicable to isolate LV Apparatus the AWP shall specify the method of dealing with hazards

A3.10 If LV Apparatus is part of HV System, or in proximity to HV System, then suitable precautions to be taken as per HV Safety Rules

A3.11 Only fused leads for portable test instruments should be used to safeguard persons from Danger

Rule A3: Safety Precautions for Work or Testing on or adjacent to LV Apparatus

A3.12 Work or testing on Isolated LV Apparatus (guidance)

- Isolation by fuses, links isolators or other isolating devices only the use of time or float switches, thermostats, Emergency Stop Buttons etc. is not acceptable
- Where reasonably practicable immobilise and lock isolations
- Hand-held Apparatus - Remove plug and ensure that it is not replaced during work or testing (i.e. controller)
- Safety Keys and removable isolating devices retained by AT in safe custody, (must be readily identifiable)
- Management Instruction states how AT retains items taken into safe custody
- For ongoing work transfer process as per Rule B2.3
- Precautions for adjacent Live conductors (e.g. specifically appointed AT; screen off adjacent hazards; use insulated tools; mats; PPE; remove metal jewellery; consider accompaniment etc.)
- Always prove 'dead' with Approved tester (at start and resumption of work and following any interruption)

Rule A3: Safety Precautions for Work or Testing on or adjacent to LV Apparatus

A3.13 Work / Testing on Live LV Apparatus

- Live work / testing must be justified
- AWP shall specify how the requirements of rule A3.13 are to be met
- Carried out by AT specifically Appointed for Live working
- No metallic jewellery (watches, rings, pendants etc)
- Screen all adjacent earthed metalwork / live conductors @ different potential
- Approved insulated tools, insulating stands, mats, gloves, goggles, faceshields, flame retardant coveralls etc. (take account of fault levels)
- Only use suitable test instruments / probes
- Consider accompaniment by a second AT
- If working in ducting, trenches or other confined spaces a Selected Persons Report shall be obtained if there is foreseeable presence of any flammable gas

Rule A4: Operation of Plant and Apparatus

A4.1 The operation of Plant or LV Apparatus to achieve Safety From The System shall NEVER involve pre-arranged signals or time intervals

Rule A5: Demarcation of Work Areas

A5.1 Work area to be clearly defined and, where necessary, physically protected to prevent danger to personnel from adjacent hazards

Rule A6: Identification of Plant and Apparatus

A6.1 Plant and LV Apparatus to be clearly identified before work starts

AT must ensure that identification remains effective during the work

Rule A7: Automatically or Remotely Controlled Plant and Apparatus

A7.1 Wind Turbines shall be considered as automatically or remotely controlled, (operation can be controlled by 'local' on site or 'remote' off site means)

A7.2 All automatic or local / remote controlled operation shall be prevented whilst work / testing is taking place

A7.3 All automatic or local / remote control features shall be isolated and where practicable locked

A7.4 Requirements to isolate automatic or local / remote control features shall be specified on AWP

Rule A7: Automatically or Remotely Controlled Plant and Apparatus

A7.5 If during any essential requirement to restore motive power supplies the automatic or local / remote features would become operable then AWP shall specify how Safety From The System will be maintained

A7.6 Adjustments to controlling features whilst the Wind Turbine is in an operational mode shall only be carried out by a specifically trained AT as specified in a Management Instruction

A7.7 No other work or testing is permitted when making adjustments to controlling features with those features operational but whilst the Wind Turbine is NOT in an operational mode

Rule A8: Excavation

A8.1 All work or testing involving "excavation" shall only take place in accordance with the requirements of HV Safety Rules

Rule A9: Confined Spaces

A9.1 A Management Instruction shall specify the precautions to be followed when working in a confined space where there is a reasonably foreseeable 'specified risk' (Confined Spaces Regulations 1997)

A9.2 The nature of work / testing shall be taken into account in deciding whether there is a 'specified risk'

A9.3 Any necessary precautions shall be stated on the AWP

Wind Turbine Safety Rules

PART B Procedures and Keys

Rule B1: General

- B1.1 All Persons must realise their responsibilities and must understand and correctly enact their roles
- B1.2 WTSRs detail principles of achieving Safety From The System, all site specific detail is contained in Management Instructions
- B1.3 Part B includes a process for Transfer of work being carried out under an AWP to be applied when there is a change of Authorised Technician or work continues beyond one day

Rule B2: Approved Written Procedures

- B2.1 Preparation
 - B2.1.1 Only Persons with appropriate knowledge & expertise of WTSR to produce an AWP (normally an AE) – Approved by an Authorising Engineer

Each AWP must include Signature Checkpoints for confirmation of safety precautions established by Authorised Technician
 - B2.1.2 AWP identifies all foreseeable circumstances when Selected Person's Report is required
 - B2.1.3 Where appropriate, the AWP shall state any requirements to provide Personal Supervision

Rule B2: Approved Written Procedures

- B2.2 Implementation
 - B2.2.1 AT shall only carry out work specified on the AWP
 - B2.2.2 AT shall be issued with a copy of the AWP and keeps it in his safe custody at all times.
 - B2.2.3 AT shall enact Transfer Of Control with the appropriate OC
 - B2.2.4 AT shall implement the safety precautions described in the AWP step by step and personally secure the isolation keys where appropriate
 - B2.2.5 AT shall sign each Signature Checkpoint, including Clearance, Cancellation and where appropriate Transfer

Rule B2: Approved Written Procedures

- B2.2 Implementation
 - B2.2.6 When work is in progress under an AWP then no other AWP shall be in force on same item of Plant / LV Apparatus at the same time
 - B2.2.7 If AT identifies any additional work then job stops and AE is informed, AE prepares a new AWP to include the additional work
 - B2.2.8 AT must follow any requirements specified on AWP to obtain a Selected Person's Report and then implement any additional precautions

Transfer of Control Process

The Transfer Of Control process must take place between an Operational Controller and an Authorised Technician before the work or testing can start under an Approved Written Procedure.

Authorised Technician reports to Operational Controller when on-site and ready to start work

Transfer Of Control of specific WTG from Operational Controller to Authorised Technician (details logged in accordance with a Management Instruction)

Authorised Technician retains responsibility of that WTG until control is transferred back to the Operational Controller

Rule B2: Approved Written Procedures

- B2.3 Transfer
 - B2.3.1 Each AWP includes a Transfer Record to be used when work transfers from one AT to another or to record the progress of work beyond one working day
 - B2.3.2 When work under an AWP is to stop, and be resumed later, then the AT shall complete Part 1 of the Transfer Record and then place the AWP in safe custody as described in Management Instructions

Rule B2: Approved Written Procedures

B2.3 Transfer

B2.3.3 When work is to be resumed by the same AT he/she first signs Part 2 of the Transfer Record

If AT suspects any safety precautions have been tampered with then he/she must check and confirm all precautions and initial Signature Checkpoints before resuming work

Rule B2: Approved Written Procedures

B2.3 Transfer

B2.3.4 Where a new AT is to continue work then face to face transfer where reasonably practicable, new AT signs Part 2 of Transfer Record

If not face to face then new AT checks all safety precautions to confirm and initials Signature Checkpoints before signing Part 2 of the Transfer Record and continuing work

Rule B2: Approved Written Procedures

B2.3 Transfer

B2.3.5 If necessary to temporarily discontinue work then the AT shall record the reasons against an appropriate Signature Checkpoint, requirements of Rules B2.3.2; B2.3.3 and B2.3.4 shall be followed as appropriate

B2.3.6 The Operational Controller shall be informed of operational state of Plant / LV Apparatus at start / end of each work period and shall be informed immediately of any transfer of work to a new AT

Rule B2: Approved Written Procedures

B2.4 Clearance and Cancellation

B2.4.1 When work is completed the AT signs a "Clearance" Signature Checkpoint to confirm that

- (i) all Persons in the Working Party have been warned not to work
- (ii) that the work area is clean and tidy (from tools, gear and other loose materials)
- (iii) that guards / covers etc have been replaced
- (iv) that the WTG is in a safe condition to be returned to service

Rule B2: Approved Written Procedures

B2.4 Clearance and Cancellation

B2.4.2 When the Clearance has been signed the AT confirms all associated documents / items are accounted for and that it is safe to remove all remaining Points of Isolation before:

- (i) signing a "Cancellation" Signature Checkpoint
- (ii) removing all remaining Points of Isolation
- (iii) returning the WTG to an operational condition

B2.4.3 The AT then enacts Transfer Of Control with the OC confirming that work is complete, the AWP is cancelled and informing them of any restrictions or limitations

B2.4.4 Copies of completed AWP's shall be retained in accordance with a Management Instruction

Rule B3: Routine Operating Procedures

B3.1 Routine Operating Procedures shall only be used with agreement of Company 'A'

B3.2 AE shall agree that no AWP is required and that work can be done under a Routine Operating Procedure

B3.3 Company 'A' will decide on the pro-forma to be used for Routine Operating Procedures

B3.4 Work under a Routine Operating Procedure shall only take place with Consent from the OC

Rule C2: Authorised Technicians

C2.4 AT also responsible for:

- (i) Retaining AWP & keys in safe custody
- (ii) Providing Immediate or Personal Supervision as appropriate
- (iii) Stopping work if Danger arises and report to AE

C2.5 Correctly enacting the procedure for Transfer of an AWP:

- (i) Warn all persons to stop work, account for all items, sign Part 1 of Transfer Record and place in safe custody
- (ii) Sign Part 1 of Transfer Record and enact face to face Transfer
- (iii) Resume work as original recipient
- (iv) Resume work as new recipient
- (v) Inform OC at start and end of working period
- (vi) Immediately inform OC of any change to AT

Rule C2: Authorised Technicians

C2.6 Setting the Working Party to work and establishing and maintaining General Safety

C2.7 Implementing the requirements of an AWP to include:

- (i) following procedures under Part B of the WTSR for documents & keys
- (ii) following instructions on AWP and signing Signature Checkpoints
- (iii) maintaining safety precautions throughout the work
- (iv) retain the AWP and associated documents / keys in safe custody
- (v) provide Immediate or Personal Supervision, as required by the AWP

Rule C2: Authorised Technicians

C2.8 When an AWP has provision for restoration of motive power:

- (i) following procedures under Part B of the WTSR for documents & keys
- (ii) providing Personal Supervision during periods when motive power is restored
- (iii) giving instructions for the removal and re-application of safety precautions specified on the AWP
- (iv) implementing procedures to ensure safety during any testing

Rule C2: Authorised Technicians

C2.9 Signing a "Clearance" section on an AWP after ensuring that: all Persons in the Working Party warned work is completed; all tools, gear and loose material removed; guards and access doors replaced; work area clean and tidy; WTG in a safe condition to be returned to service; appropriate "exceptions" noted

C2.10 When Cancelling an AWP:

- (i) ensuring the Clearance is correctly completed
- (ii) checking all associated items are accounted for
- (iii) understanding the operational condition of the Wind Turbine
- (iv) Confirming that it is safe to remove remaining POI

Rule C3: Authorising Engineer

C3.1 Authorising Engineers responsibilities include:

C3.1.1 Approving AWP's after confirming they include:

- (i) safety precautions to establish Safety From The System
- (ii) all necessary Signature Checkpoints
- (iii) guidelines to ensure Safety From The System is maintained from start to completion of work / testing

Rule C3: Authorising Engineer

C3.1 Authorising Engineers responsibilities include:

C3.1.2 Before approving an AWP confirming that:

- (i) states requirements to vent; drain; purge and contain / dissipate any stored energy
- (ii) states requirements to obtain Selected Person's Report
- (iii) states provisions for restoration of motive power
- (iv) confirms that precautions achieve Safety From The System
- (v) states any requirements for Personal Supervision
- (vi) is correct and unambiguous

Rule C3: Authorising Engineer

C3.2 The AE shall confirm that no AWP is required for operational work and that it can be carried out under a Routine Operating Procedure

Rule C4: Competent Technician

- C4.1 Competent Technicians responsibilities include:
 - C4.1.1 Comply with the WTSR for work under a Routine Operating Procedure
 - C4.1.2 Ensure the use of safe working methods, safe means of access / egress and use appropriate PPE
 - C4.1.3 Ensure Routine Operating Procedures have been agreed by Company 'A'
 - C4.1.4 Follow safety requirements specified on Routine Operating Procedures

Rule C4: Competent Technician

- C4.2 Before starting work Competent Technicians shall obtain Consent from the OC
- C4.3 Setting the Working Party to work and establishing and maintaining General Safety
- C4.4 Ensure all safety precautions are in place before allowing work to start
- C4.5 Must always provide Personal Supervision for the work

Rule C4: Competent Technician

- C4.6 If Danger arises during the work, immediately stop and warn all other persons before informing the AE
- C4.7 On completion of work ensure that all persons are withdrawn and the area is left in a clean and tidy condition

Rule C5: Operational Controller

- C5.1 The Operational Controller is responsible for the Transfer Of Control of the WTG Plant and LV Apparatus, as appropriate, to either another Operational Controller or an Authorised Technician after first establishing that the Person requesting the Transfer Of Control has the necessary authority to receive it.
- C5.2 The Operational Controller is responsible for giving Consent to work under a Routine Operating Procedure (after first establishing that the Person requesting the Consent is a Competent Technician)

Rule C6: Selected Person

- C6.1 Uses technical knowledge and experience to make recommendations to overcome hazards that might otherwise prevent work or testing being performed safely
- C6.2 Carries out necessary tests / examinations and provides a written report (Selected Person's Report) containing recommendations and ensures that they are implemented

Wind Turbine Safety Rules

PART D Definitions

Definitions

Please note that only a few of the key definitions are discussed during this training course

Part D of the WTSR handbook contains 32 defined words and phrases which it is expected that Persons appointed under the WTSR will know and understand

Where words appear in "**bold**" type in the WTSR then this indicates that the meaning is defined in Part D

Definitions

D1 Apparatus

All LV equipment in which electrical conductors are used, supported, or of which they may form a part, and for which Company 'A' has a maintenance responsibility.

D3 Approved

- In the case of an **Approved Written Procedure** means sanctioned for use by the **Authorising Engineer**
- In all other cases means sanctioned for use by the Company 'A'

Definitions

D4 Approved Written Procedure

Approved Written Procedure - An **Approved** procedure written in a format indicated in these rules specifying the **Plant / LV Apparatus** on which work or testing can take place, without **Danger**, by an **Authorised Technician** following the precautions stated to achieve **Safety From The System**.

Definitions

D8 General Safety

The provision of safe access to and from the place of work, a safe place of work, safe methods of work and the use of correct work equipment and personal protective equipment.

D9 High Voltage (HV)

A voltage exceeding 1000 volts alternating current or 1500 volts direct current.

Definitions

D10 Isolated

Disconnected from associated **Plant** and/or **LV Apparatus** by an **Isolating Device(s)** in the isolating position, or by adequate physical separation or sufficient gap.

D15 Locked

A condition of **Plant** and/or **LV Apparatus** that cannot be altered without the operation of a locking device which is of a standard acceptable to the **Authorising Engineer** in charge of the **Location**.

Definitions

D16 Low Voltage (LV)

A voltage not exceeding 1000 volts alternating current or 1500V direct current.

D17 Management Instruction (MI)

An **Approved** procedure for use at an individual Wind Farm **Location** or series of Wind Farm **Locations**, that documents the Health & Safety Management Systems of Company 'A' that are to be applied to meet specified requirements.

Definitions

D19 Persons

Authorising Engineer - A **Person** who has sufficient technical knowledge and/or experience to enable him to avoid **Danger** and who has been **Appointed** by an appropriate officer of Company 'A' to carry out duties specified in writing, including the approval of **Approved Written Procedures**

Competent Technician - A **Person, Appointed** by Company 'A', who by virtue of their training; knowledge and experience is deemed to be competent to perform routine operation and maintenance work or testing on Wind Turbine **Plant / LV Apparatus** by following appropriate **Routine Operating Procedures** and using suitable tools / work equipment.

Definitions

D19 Persons

Operational Controller - A **Person** who has been **Appointed** by an appropriate officer of Company 'A' to be responsible for:

- the **Operational Control** of Wind Farm **Plant** and **LV Apparatus**;
- enacting the process of **Transfer of Control**, in circumstances defined in these Safety Rules and/or **Management Instructions**;
- giving consent to allow work or testing under a **Routine Operating Procedure**;
- controlling and co-ordinating safety activities necessary to achieve **Safety From The System**.

Selected Person - A **Person** qualified by technical knowledge and experience and nominated by an appropriate officer of Company 'A' to carry out tests and examinations and make recommendations regarding additional special precautions to be taken to safeguard persons

Definitions

D19 Persons

Authorised Technician - A **Competent Technician**, who has sufficient technical knowledge and/or experience to enable him to avoid **Danger** and who has been **Appointed** by an appropriate officer of Company 'A' to be responsible for:

- enacting the process of **Transfer of Control**, in circumstances defined in these Safety Rules and/or **Management Instructions**;
- achieving **General Safety** prior to the commencement of work or testing and maintaining those conditions for the duration of the work or testing;
- implementing & confirming safety precautions during the work or testing in compliance with **Approved Written Procedures**;
- setting **Working Parties** to work and supervising certain associated Safety Rules procedures;
- the transfer, clearance and cancellation of **Approved Written Procedures**.

Definitions

D21 Purged

A condition of **Plant** and/or **LV Apparatus** from which any dangerous contents have been scavenged.

D22 Routine Operating Procedure

A written procedure, for use with the full knowledge and agreement of Company 'A', that defines operational work or testing, which is of a regular or routine nature, that may be carried out on **Plant** and/or **LV Apparatus** by a suitably trained **Competent Technician** without an **Approved Written Procedure**. It shall define the safety requirements whose application shall be within the capability of the **Competent Technician** who is to carry out the routine work or testing.

Definitions

D23 Safety From The System

That condition which safeguards persons working on or testing **Plant** and/or **LV Apparatus** from the **Dangers** that are inherent in the **System**.

Definitions

D24 Safety Key

A key unique at the **Location** capable of operating a lock which will cause an **Isolating Device**, vent or drain to be **Locked**.

D25 Signature Checkpoint

A point in an **Approved Written Procedure** at which an **Authorised Technician** signs to confirm that the actions/conditions specified at that stage in the procedure have been achieved / satisfied.

Definitions

D26 **Supervision**, being one of the following:

- (i) **Immediate Supervision - Supervision** by a **Person** who is continuously available at the **Location** where work or testing is in progress and who attends the work area as is necessary for the safe performance of the work.
- (ii) **Personal Supervision - Supervision** by a **Person** such that the supervising **Person** is at all times during the course of the work or testing in the presence of the person being supervised.

Wind Turbine Safety Rules

Company 'A'
Management Instructions

Management Instructions

Company 'A' Management Instructions relating to:

1. WTSR Procedure P1 'Procedure for Approval of General Provisions (GP3) Special Instructions and Other Procedures'
2. WTSR Procedure P2 'Procedure for Approval of Tools, Equipment and Processes'
3. WTSR Procedure P3 'Procedure for Objection on Safety Grounds'
4. WTSR Procedure P4 'Procedure for the Addition of Plant and Apparatus to the System'
5. WTSR Procedure P5 'Procedure for the Removal of Plant and Apparatus from the System'
6. WTSR Procedure P6 'Procedure for Appointment of Persons'

Management Instructions

Company 'A' Management Instructions relating to:

Implementation of the Wind Turbine Safety Rules (3rd Edition)
Excavation
Confined Spaces
Cross Boundary Procedures

Wind Turbine Safety Rules

Company 'A'
Additional Training

Control of Access

It is recommended that Company 'A' guidance is provided on the Safety Precautions for access into controlled areas on the Wind Farm such as Switchrooms and Substations

Requirements for Electrical Testing

It is recommended that Company 'A' guidance is provided on Safety Precautions for Electrical Testing, (e.g. HSE Guidance Note GS 38 "Electrical test equipment for use by electricians")

Wind Turbine Safety Rules

Company 'A'
End Test

End Test

It is recommended that Company 'A' develop an End Test to determine the effectiveness of their WTSR Training.

Wind Turbine Safety Rules

End