Government of **Western Australia**
Department of **Commerce**
Energy*Safety*

Code of Practice
for
Personnel Electrical Safety for Vegetation Control Work Near Live Power Lines

Issued by the Director of Energy Safety

Energy*Safety* WA

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Preface

This Code details the requirements for vegetation control work carried out near the live conductors of overhead power lines and is to be read in conjunction with Electricity Regulations 1947 Regulation 316A.

The Code has been developed to ensure the safety of the general public and workers cutting trees near power lines.

Specific areas covered are:

- General Principles
- General Safety Requirements
- Safe Approach Distances
- Vegetation Clearances
- Work Procedures
- Competency and Authorisation
- Plant, Tools and Equipment

Your work practices must comply with this mandatory Code.

KEN BOWRON
DIRECTOR OF ENERGY SAFETY

July 2012

Acknowledgment

Energy*Safety* gratefully acknowledges the assistance of the following authorities/ organisations in compiling this Code of Practice:

- The Tree Guild of WA Inc
- WorkSafe WA
- Western Power
- Horizon Power
- Energy Networks Association
- WA Local Government Association
- Arboricultural Practitioners
- Registered Training Organisations

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1. Objective

The objective of this Code is to establish the principles applicable to safe vegetation management work near live overhead lines for various classes of persons.

It specifies the minimum standards required for mobile plant, tools and equipment used in vegetation management work near live overhead power lines and provides the basic technical material necessary for service providers to develop work procedures, related training and awareness programs.

The Code provides electrical safety information to be used, in addition to other occupational safety and health requirements, to enable workers to:

- assess whether it is safe to carry out pruning, cutting, maintaining or trimming vegetation near power lines;
- prune, cut, maintain or trim vegetation in a manner that is safe for themselves, other workers and the general public; and
- comply with Regulation 316A.

2. Application

This Code applies to vegetation control work performed within the ‘danger zone’ surrounding any overhead power line, as defined in Regulation 316A (reproduced in Appendix A).

Persons carrying out or assisting to carrying out that work for reward are required:

(a) to be trained to the requirements in this Code for vegetation control work by a registered training organisation; and

(b) to carry out that work in accordance with the electrical safety requirements of this Code.

This Code excludes vegetation management using high voltage live work techniques.

3. Definitions and Interpretations

3.1 DEFINITIONS

Within this Code, unless the context implies otherwise:

'Access Authority' means written authorisation allowing access to, work on or *near*, or testing of a Network Operator's or consumer's *electrical apparatus*.

'Aerial bundled cable' or **'ABC'** means conductors that are insulated and twisted together to form a single unit.

'Approved' means having the appropriate organisation endorsement in writing for a specific function.

'Assistant' means a person carrying out duties at the work site that are not directly related to high voltage vegetation work.

Note: An assistant would perform such duties as traffic control, clearing vegetation that is lying on the ground or feeding vegetation into a chipper.

'Anchor point' means any fork formed by a junction of two branches or a branch and the trunk which can be used safely by a climber to secure their climbing rope.

'Authorised Person' means a person with technical knowledge or sufficient experience who has been approved, or has the delegated authority to perform the duty concerned.

'Bare' means, in relation to a conductor, not insulated.

'Cable' means an *insulated conductor* or two or more such *conductors* laid together, whether with or without fillings, reinforcements or protective coverings.

'Climber' means a vegetation management worker cutting vegetation while supported by that vegetation.

'Climbing rope' means a rope used solely for attaching a climber to a tree.

'Code' means this Code of Practice.

'Conductor' means a metal wire, or cable designed for carrying electric current.

'Contract Principal' means the party who engages the vegetation contractor.

'Contractor' see **'Service Provider'.**

'Covered conductor' means a conductor covered by a type of insulation to prevent electric shock.

'Competent' means having the skills, knowledge and attributes a person needs to complete a task.

'Danger zone' means the minimum clearance as defined in the Electricity Regulations 1947 Regulation 316A (see Appendix A).

'De-energised' means not connected to any source of electrical supply but not necessarily isolated.

'Direct supervision' means a vegetation management worker in constant attendance at the work position to exercise visual and audible control of a supervised person's actions while carrying out the task at hand.

'Earthed' means directly electrically connected to the general mass of earth, so as to ensure and maintain the effective dissipation of electrical energy.

'Electrical apparatus' means any electrical equipment, including overhead lines and underground cables, the conductors of which are *live* or can be made *live*.

'Elevating work platform' or 'EWP' means a vehicle on which a boom mechanism, either articulating or telescoping, is installed. The mechanism is designed and used for the positioning of personnel and their equipment at work sites.

'**ENA'** means Energy Networks Association.

'Energised' means connected to a source of electrical supply. (also see 'Live')

'Exposed conductor' means an electrical conductor, approach to which is not prevented by a barrier of rigid material or by insulation which is adequate under a relevant Australian Standard specification for the voltage concerned.

'Ground Approach Distance' means the distance to be maintained by all ground personnel from the mobile plant (vehicle, stabilizers, outriggers and attachments) when deployed within the danger zone of electrical apparatus.

'Ground Worker' means a worker considered as an ordinary person, working in a vegetation management team.

'High voltage' or **'HV'** means a nominal voltage exceeding 1,000V ac or 1,500V dc.

'HV Worker' means a person trained and assessed as being a competent high Voltage Vegetation Management Worker.

'Instructed person' means a person adequately advised or supervised by an authorised person to enable them to avoid the dangers which electricity may create.

'Insulated' means separated from adjoining conducting material by a non-conducting substance which provides adequate resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, and to mitigate the danger of shock or injurious leakage of current.

'Insulated conductor' means a conductor covered by insulation to prevent electric shock.

'Insulated Plant, means plant, specifically designed, approved, tested and maintained for use on or near live electrical apparatus. They must be used only on or near electrical apparatus, energised at a voltage equal to or less than the voltage rating marked on the plant.

'Insulated Tools and Equipment' means tools, equipment or any attachable extension specifically designed, approved, tested and maintained for use on or near live electrical apparatus. They must be used only on or near electrical apparatus, energised at a voltage equal to or less than the voltage rating marked on the tool, equipment or extension.

'Insulated Elevating Work Platform' or 'Insulated EWP' means an elevating work platform that complies with the design and electrical testing requirements of AS 1418.10 'SAA Crane Code Part 10 'Elevating Work Platforms' as modified by this Code.

'Insulated service cable' means an insulated overhead cable from the Network Operator's electricity supply to a customer.

'Insulating Barrier' (also called Cover-up equipment) means a barrier of insulating material specifically designed, approved and tested for use as a line cover, or as a cover for similar equipment. Insulating barriers may be rigid or flexible and are intended to prevent vegetation management workers, tools, equipment, plant and vegetation from making inadvertent contact with live overhead lines.

'Isolated' means disconnected from all possible connection sources of electricity supply by means which will prevent unintentional energisation of the apparatus and which is assessed as a suitable step in the process of making safe for access purposes.

'Issuer' means the person authorised in writing by the person or organisation in control of a power line to issue a Vicinity Authority for that power line.

'Live' means energised or subject to hazardous induced or capacitive voltages.

'Low voltage' or **'LV'** means nominal voltage exceeding 50V ac or 120V dc but not exceeding 1000V ac or 1500V dc.

'LV Worker' means a person trained and assessed as being a competent Low Voltage Vegetation Management Worker.

'May' or **'should'** within this Code, denotes an optional requirement.

'Must' within this Code, denotes a mandatory requirement.

'Mobile Plant' means cranes, elevating work platforms, tip trucks or similar plant, any equipment fitted with a jib or boom and any device capable of raising or lowering a load.

'Near' means a situation where there is a reasonable possibility of a person, mobile plant or equipment (other than approved insulated tools and equipment) either directly or through any conducting medium, coming within the relevant safe approach distances of energised electrical apparatus.

'Network Operator' means the owner, controller or operator of an electricity network.

'Operator' means the person, appointed by the owner of the power line, to control the power line near which the work is carried out or intended to be carried out.

'Ordinary Person' means a person without sufficient instruction, training or experience to enable them to avoid the dangers which electrical apparatus may create.

'Physical Clearance' means that no contact is made with the electricity network.

'Power line' or **'line'** means any aerial conductor or conductors with associated supports, insulators and other apparatus erected, or in the course of erection, to convey electrical energy.

'Procedure' means the documentation of a systematic series of actions (or activities) directed to achieve a desired result.

'Recipient in charge' means a vegetation management worker who has been authorised in writing by the Network Operator to receive and be in charge of a Vicinity Authority and a work site.

'Running Earth' means a conductor at earth, or close to earth, potential running with and operating as, an integral part of the HV system.

'Safe' means not posing an unacceptable risk to life, health or property.

'Safe Approach Distance' means the minimum separation in air from electrical apparatus that must be maintained by a person, or any object held by or in contact with that person while performing vegetation management work.

'Safety Observer' means a person competent for the task at hand and specifically assigned the sole duty of observing and warning of un-Safe approach to electrical apparatus or other hazards.

Any person, while carrying out the role of a safety observer, must have no other duties while work is in progress.

'Screened cable' means insulation covering conductor cores is covered by a conducting or semi-conducting material, which is connected to a neutral, or earth.

'Service Provider' (contractor or Local Council) means a person or organisation undertaking vegetation management work near an electricity network.

'Tested' means tested in accordance with the relevant standards.

'Training Provider' (Registered Training Organisation) means an education or training organisation, which is registered under the appropriate state or federal legislation.

'Vegetation' means any living or non-living plant or part thereof.

'Vegetation Clearance' means the minimum separation in air that must be maintained between vegetation and live electrical apparatus when performing vegetation management work.

'Vegetation Management Work' means the pruning, cutting, trimming or felling of, or application of herbicides to, vegetation and the assisting to prune, cut, trim or fell, or apply herbicides to, vegetation, where any part of the vegetation is or may come within, or the work requires any person, tool, equipment or vehicle to come within, the safe approach distance for ordinary persons for live overhead lines.

'Vegetation Management Worker' means an employee whose qualifications, experience, training and assessment ensure competency in the performance of vegetation management work near live overhead lines.

'Vicinity Authority' means a written authorisation from the Network Operator or power line owner to work in the vicinity of high voltage electrical apparatus.

'Voltage' means a difference of electrical potential normally existing between conductors or between earth and conductors.

3.2 INTERPRETATIONS

Where the following phrases are used in this Code:

- 'above the power line'
- 'above a power line'
- 'above a low voltage power line':

'Above' means all the area as defined in, **Section 6, Figure 1** as the "vegetation clearing exclusion zone"

4. General Principles

This Code assumes that:

(a) The service provider maintains an effective risk management process, as part of a safety management system.

(b) Appropriate workplace hazard and risk assessments are carried out as required, prior to the commencement of the work.

(c) The safe approach distances used are appropriate for the class of person, training and work to be performed.

(d) The safe approach distances in this Code are based on an “exclusion zone” principle. This principle defines an area near the live electrical apparatus into which no part of the person, mobile plant, tools and equipment can encroach.

(e) Guidelines applicable to particular work processes are to be used.

(f) All the requirements of this Code are met.

(g) An effective process is in place to audit administrative compliance against adopted standards.

(h) An effective process is in place to undertake regular field audits of vegetation management work near live overhead lines. Field audits must address worker competency records, safe work practices and compliance with documented techniques at intervals based on the findings of prior audits.

(I) When pruning vegetation near live overhead lines, arboriculture techniques, wherever practicable, should be in accordance with the appropriate Australian Standard.

5. General Safety Requirements

When vegetation management work is being performed near live overhead lines, no other simultaneous activity that could compromise the safety of the work team must be carried out.

5.1 REQUIREMENTS OF RELATED LEGISLATION

The Service Provider must ensure all persons, where appropriate, meet the requirements of:

- The *Occupational Safety and Health Act 1984*, the Occupational Safety and Health Regulations 1996 and the guidelines and safety documentation issued by WorkSafe Western Australia relating to safety in the workplace.

- Local authority requirements for the control of pedestrian and vehicular traffic. Further information appears in the Main Roads Western Australia Code of Practice 'Traffic Management for Road Works'.

- Providing the required fire protection when carrying out work, particularly during restricted and prohibitive burning periods.

These are the only requirements for persons who perform work outside the danger zone as part of the vegetation control work team.

5.2 VEGETATION MANAGEMENT WORKERS

This code contains the vegetation management worker categories and the Australian Qualifications Framework training units relating to the work undertaken in each of those categories. (Refer to **Section 8**)

All persons who are required to undertake vegetation management work near live overhead power lines must be trained and assessed as competent for work undertaken in the selected category prior to commencing the work.

Only those Vegetation Management Workers who have successfully completed Energy*Safety*'s online course of instruction in the requirements that apply to the work covered by this Code can carry out work on vegetation management within the danger zone.

Trainees may assist a suitably authorised vegetation management worker but only under the direct supervision of that vegetation management worker.

Note: 'Direct supervision' means that the vegetation management worker is in constant attendance and is able to exercise visual and audible control of the trainee's work.

5.3 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Prior to commencing vegetation management work near live overhead power lines, a documented hazard identification and risk management process must be in place to address hazards associated with work practices, the work environment, the use of materials, plant, tools and equipment.

Such a process must:

(a) identify the hazard;

(b) assess the risk;

(c) determine the minimum number of workers required at the worksite;

(d) determine control measures; and

(e) monitor and review the effectiveness of the control measures.

5.3.1 Hazards

Hazards that may be encountered include but are not limited to:

(a) Unexpected movement of the worker, mobile plant or the vegetation relative to the electrical apparatus.

(b) Unexpected lateral movement (sway) of the conductors or tree branch due to wind, particularly in gusty conditions.

(c) Unexpected drop in height (sag) of the conductors due to temperature rise associated with changes in electrical load, solar radiation or reduced cooling under light or still wind.

(d) The integrity of the adjacent structures, conductor spans and of any insulation on live conductors.

(e) Site conditions (stability of equipment and footing), vehicular traffic, pedestrians, or livestock management (interference with the work).

(f) Direct or indirect contact with live overhead lines via vegetation or uninsulated tools and equipment.

(g) Hazardous voltages that may be present in all parts including the base of vegetation where it is in contact with live overhead lines, particularly during wet and/or windy conditions or with high voltage power lines.

5.3.2 Controlling Hazardous Situations

Measures must be taken by authorised and instructed persons to control the risks from hazardous situations in accordance with approved Service Provider procedures.

This may be achieved by, but not limited to, one or more of the following methods:

(a) Making arrangements with the Network Operator to take the electrical apparatus out of service.

(b) Making arrangements with the Network Operator to cut vegetation clear sufficiently to allow the Service Provider to safely complete the clearing profile.

(c) The use of fully insulated mobile plant, tools and equipment.

(d) Making arrangements with the Network Operator to install appropriate temporary insulating barriers/covers.

(e) Provision of a suitably trained and equipped safety observer.

(f) Increasing the minimum distances required to carry out the vegetation management work safely, including allowance for unexpected conductor movement.

(g) The use of suitable personal protective equipment.

5.4 EMERGENCIES

Where an emergency develops, for example:

(a) vegetation making contact with a high voltage power line;

(b) conductors clashing and arcing; and

(c) conductors falling to the ground,

work must be suspended and the Network Operator notified immediately. All workers must move out of the work area and the public must be kept a safe distance away.

Work must not recommence until permitted by the Network Operator.

5.5 WEATHER CONDITIONS

Vegetation management work near live overhead lines must not proceed in the event of the following weather conditions:

(a) An electrical storm is observed from the worksite.

(b) Any significant rain (beyond intermittent spotting), mist, or fog, unless using methods and equipment specifically designed and tested as being able to operate while wet.

(c) Wind velocities that may cause conductor, EWP or vegetation unexpected movement sufficient to breach safe approach distances.

(d) Excessive wind such that work cannot be carried out safely (work must not be carried out where constant winds exceed 40 km/hr).

(e) Lighting is not adequate.

5.6 PERSONAL PROTECTIVE EQUIPMENT

When undertaking vegetation management work near live overhead power lines, the following minimum personal protective equipment must be approved, comply with the relevant Australian Standards and be worn.

(a) Clothing:

(i). Clothing to be appropriate for the task to be undertaken and should comply to the WorkSafe Code of Practice for Personal Protective Clothing and Equipment.

(ii). When working in the vicinity of live overhead power lines, a minimum 185gsm 100% cotton drill, or equivalent fire retardant material, overalls or long sleeve shirt and trousers that cover the arms and legs with no metal fasteners. Consideration should be given to wearing non-melting underclothing of flame resistant material, such as cotton, to reduce the severity of injuries in the event of exposure to flashover.

(b) Safety helmets must comply with the applicable provisions of AS 1801 - 1997 “Occupational Protective Helmets”.

(c) Protective footwear with non-slip soles.

(d) Eye protection must comply with AS/NZS 1337.1:2010 Personal eye protection - Eye and face protectors for occupational applications.

(e) Hearing protection, as required by the nature of the work being performed.

(f) Working gloves or insulating gloves as required by the nature of the task being performed.

5.7 IDENTIFICATION OF POWER LINES

All electrical apparatus must be considered to be live unless confirmed otherwise by the Network Operator.

The voltage and type of power line must be positively identified. Where this is not possible, further information must be obtained from the Network Operator to enable a positive identification to be made.

If it cannot be determined whether:

(a) the conductors of a low voltage power line are insulated, the conductors must be considered bare; or

(b) a high voltage cable is insulated; the cable must be considered a bare high voltage conductor.

5.8 TELECOMMUNICATION LINES

Where there are also telecommunication lines (broadband network, telephone, cable TV, pilot cables) at the work site, the requirements within this Code that relates to low voltage service lines or Aerial Bundled Conductor must apply to the telecommunication lines.

5.9 WORK METHODS PROHIBITED

The following work methods are prohibited:

(a) working while standing on a metal ladder;

(b) working near high voltage conductors or working on vegetation that is near high voltage conductors while standing on a wooden or fibreglass ladder;

(c) moving a high voltage conductor or low voltage conductor to enable work to be carried out;

(d) working before dawn or after dusk, unless there has been a full risk assessment undertaken;

(e) using an insulated EWP where proof cannot be produced that it has been electrically tested within the previous six months and has passed that test; and

(f) using a high voltage insulated tool or live line stick where proof cannot be produced that the tool or stick has been electrically tested within the previous six months and has passed that test.

5.10 RESTRICTIONS ON WORKING ABOVE A POWER LINE

Work can only be carried out on vegetation that is above a high voltage power line, where feathering techniques are used to ensure falling vegetation is of a size that cannot bridge the conductors. Work can only be carried out using insulated mobile plant, insulated tools and equipment as detailed in **Section 6.5.4.**

It is recommended, however, that a risk assessment be carried out to determine whether this work should be reallocated to the Network Operator who will provide workers qualified beyond the requirements of **Section 8** of this Code.

5.11 APPOINTMENT OF A SAFETY OBSERVER

A competent safety observer(s), as per **Section 8**, must be appointed when plant is being positioned or when work has commenced where any person, mobile plant or EW P is in a position where any part could inadvertently come within the safe approach distances.

Depending on the position and complexity of the work, more than one safety observer may be required. At least one safety observer must be positioned at ground level at all times.

The Safety Observer must:

(a) Ensure that all persons, tools, plant and equipment remain outside the specified safe approach distance unless performing a rescue in accordance with approved procedures.

(b) Ensure the documented hazards and control measures are being managed.

(c) Be positioned at a suitable location to observe effectively the work being performed.

(d) Not observe more than one vegetation management work activity at any time.

(e) Immediately inform vegetation management workers that a dangerous condition is likely to occur.

(f) Have the authority to suspend the work at any time should a dangerous condition occur.

(g) Maintain effective and immediate communication with the work team at all times, taking in to account noise from operating machinery, road traffic or other sources of loud sound.

(h) Not perform any other task while acting as a safety observer, which includes the passing of tools directly to the person performing the work.

(i) Suspend all work in the event of having to leave the site or significantly change position until returning/reaching a new location or being replaced.

To minimise fatigue and maintain skills, the safety observer's role may be rotated between members of the work team. When this occurs it must be formally handled such that all members of the work party are aware at all times who is performing the role of the safety observer(s).

5.12 VICINITY AUTHORITY (VA)

Where vegetation is, or is likely to come, within the safe approach distances as specified in **Section 6.4, Table 2** for live exposed high voltage overhead power lines of this Code, a Vicinity Authority work permit must be issued by the Network Operator. The reclosing function of high voltage circuits must be in accordance with the Network Operator's requirements and be itemised on the permit. Issuing a Vicinity Authority, makes the Network Operator aware of workers very close to a designated high voltage power line. In such cases the control circuit to reconnect the switch in the event of a fault, is disabled.

However, an arcing incident covered by a VA, would have already discharged immense energy (as described in Appendix B), so the disabling of the switch to prevent a second arc a few seconds later may do little to improve overall safety.

Where safe approach distances to high voltage power lines cannot be maintained, then this situation must be reported to the contract principal to refer to the Network Operator.

The Vicinity Authority must be cancelled on completion of the work.

5.13 NUMBER OF WORKERS AT A WORK SITE

The minimum number of workers that must be present at a work site is:

(a) Low Voltage – two vegetation management workers, one of whom must be a Low Voltage worker.

(b) High Voltage – two vegetation management workers, one of whom must be a High Voltage worker.

A trainee and a ground worker must not be considered a worker for the purpose of this subclause.

The risk assessment should determine if additional workers are required.

5.14 WORK SITE BRIEFING

Before work commences, a vegetation management worker must conduct a work site briefing session at which an explanation of the following is included:

(a) WHY the work is to be done;

(b) WHAT is to be accomplished;

(c) HOW the work is to be carried out;

(d) WHERE the work area limits are; and

(e) WHO will carry out the designated tasks.

The briefing must address factors which affect the safety of the work such as:

- the voltage or voltages of the power lines near which the work is to be carried out;
- the limit of the work area;
- the safe approach distances for those voltages;
- the vegetation clearance distances for those voltages;
- the appointment of safety observers; and
- hazards that exist and how those hazards are to be handled to ensure the safety of workers and the public.

5.15 PUBLIC SAFETY

The Service Provider must adhere to documented work procedures to ensure that all members of the public are kept clear of the work site while vegetation management work is in progress.

A work practice must be adopted that ensures ground workers and the public are kept clear of mobile plant when vegetation control work is being performed.

Ropes/tapes/barriers and signs may be used to advise persons to keep away from the crane, mobile plant or EW P.

5.16 WEARING OF METALLIC OBJECTS AND ASSOCIATED HAZARDS

Metallic objects such hanging jewellery, and loose bracelets must not be worn while carrying out vegetation management work near live overhead lines**.** Similarly, long hair, long beards and loose non-conductive adornments must be securely fixed or confined close to the head or body.

5.17 FIRST AID KITS

First aid kits must be available at the worksite, be clearly identified, easily accessible and adequately stocked with appropriate supplies.

6. Safe Approach Distances and Vegetation Clearances

6.1 GENERAL

The safe approach distances and vegetation clearance specified in this section apply to bare, covered and insulated conductors, but **exclude** high voltage Aerial Bundled Cable (ABC), Hendrix and covered HV conductor with earthed metallic or non-metallic screens. Safe approach distances for these excluded high voltage circuit conductors must be approved by the Network Operator. The running earth or return neutral conductor on high voltage single phase and three phase overhead power lines forms part of the HV system and the safe approach distances to these conductors will be 300mm. Work practices, equipment and operator competence will be the same as those required for the HV system.

The safe approach distances and vegetation clearances detailed in this Code are the minimum distances and must be applied by authorised and instructed persons performing vegetation management work.

Under all circumstances, cut, pruned or falling vegetation, tools, equipment, persons and mobile plant must remain at a distance greater than those distances listed in **Tables 1 to 5** of this section.

Vegetation must be cut, felled or pruned using controlled movements. The vegetation can either be controlled using an insulated stick utilising a gripping tool, by ropes, or cut so as to fall away from the overhead line.

Where such control of the vegetation is not possible vegetation must be cut into small pieces (feathering) to prevent damage or shorting out of the conductors as the vegetation falls.

These pruning methods form an important part of the recommended training procedure.

Un-insulated tools, equipment and extensions held by the person are considered part of the person in applying Safe Approach Distances in this Code.

To provide mechanical protection of the overhead line, the distances indicated for insulated tools in the tables, relate to the cutting edge of the tool.

When utilising insulated tools and equipment, the insulation length between the operating head attachment and the closest point of contact with the worker must be equal to or greater than the appropriate personal safe approach distances listed in **Tables 1 to 5** of this section.

Persons in training performing vegetation management work near live overhead lines must work to the safe approach distances for instructed or authorised persons. During training, instructed persons must be under direct supervision of an authorised person.

6.2 CONDUCTOR SAG AND SWAY EXCLUSION

The safe approach distances and vegetation clearances detailed in this Code make **no** provision for conductor movement due to wind or change in conductor temperature. Unexpected conductor movement may occur under moderate wind or changes in conductor heating or cooling factors. Conductor movement of several metres may result from the span lengths typical of transmission lines.

Appropriate increase in the safe approach distances for sway and sag changes must be applied in accordance with advice sought from the Network Operator.

6.3 ORDINARY PERSONS

By definition within this Code, ordinary persons are not considered as vegetation management workers.

Table 1 below provides a guide for Service Providers giving advice to ordinary persons carrying out tree clearing and pruning work near live overhead lines.

Ordinary persons can undertake tree clearing and pruning work which is at a distance greater and remains greater than the safe approach distances outlined in **Table 1.**

Ordinary persons are not permitted to:

a) operate mobile plant above overhead lines; or

b) cut vegetation that is vertically above overhead lines.

Ground Workers are considered as Ordinary Persons for the purpose of determining Safe Approach Distances to electrical apparatus.

Table 1

Safe Approach Distances and Vegetation Clearance for Ordinary Persons and Ground Workers

Nominal Phase to Phase ac Voltage (V)	Person, Tools & Equipment (mm)	Mobile Plant (mm)	Cannot cut Vegetation that is Closer than: (mm)
LV Insulated	3000	3000	500
LV Bare	3000	3000	1000
1,000 to 33,000	3000	3000	3000
66,000 to 132,000	6000	6000	3000
Over 132,000	6000	6000	6000

6.4 VEGETATION MANAGEMENT WORKERS

Vegetation management workers performing vegetation management work from either within a tree or from the ground near live overhead power lines must be instructed or authorised persons and maintain the distances listed in **Table 2**.

Climbers must not climb any vegetation where any part of it is within or may move within the vegetation clearance distances noted in **Column D of Table 2** during the work activity.

Climbers must be attached to the tree at all times by means of a climbing rope, sling or safety line and must not position themselves so that they could fall or swing into the conductors or in any way breach the distances listed in **Table 2.**

A safety observer must be used in accordance with the requirements of **Section 5.11** of this Code.

The safe approach distances for tools and equipment are intended to prevent physical damage to conductors and insulators.

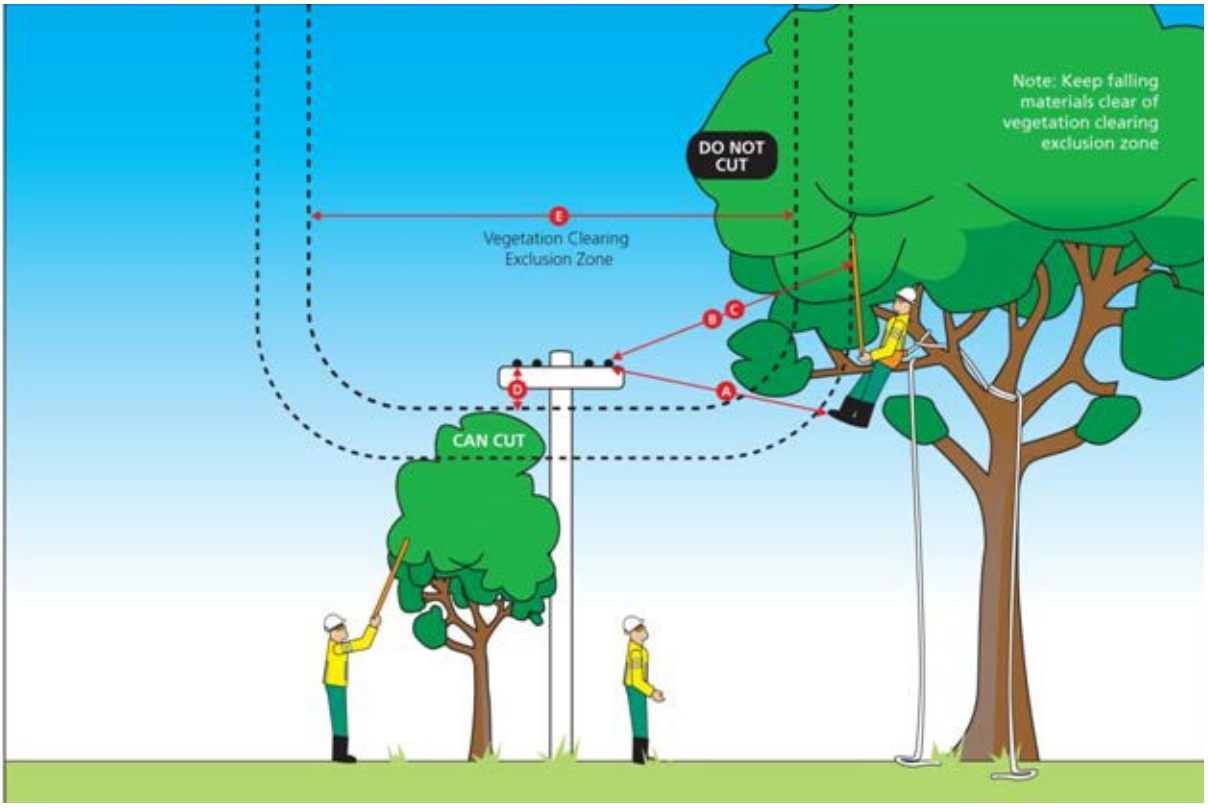
Table 2

Safe Approach Distances and Vegetation Clearance for Vegetation Management Workers

Nominal Phase to Phase ac Voltage (V)	Vegetation Management Worker (Climber) (mm) (A)	Insulated Tool (mm) (B)	Uninsulated Tool (mm) (C)	Vegetation below and beside Overhead line (mm) (D)	Vegetation overhanging the overhead line (E)
Insulated LV	200	Physical Clearance	200	No clearance	No clearance
Bare LV	1000	200	1000		Not permitted
6,600	1200	700	1200	700	
11,000	1200	700	1200	700	
22,000	1200	700	1200	700	
33,000	1200	700	1200	700	
66,000	1400	1000	1400	1000	
132,000	1800	1200	1800	1200	
Over 132,000 volts contact network operator					

Figure 1

Safe Approach Distances for Vegetation Workers (Refer Table 2)



6.5 MOBILE PLANT, TOOLS AND EQUIPMENT

6.5.1 General

Instructed and authorised persons performing vegetation management work near live overhead power lines using mobile plant, tools and equipment must maintain the safe approach distances listed in **Tables 3, 4 and 5**.

An uninsulated EW P must not go higher than the safe approach distance below the lowest live conductor, unless working at distances greater than **Table 1**.

A safety observer must be used in accordance with the requirements of **Section 5.11** of this Code.

The safe approach distances for tools and equipment are intended to prevent physical damage to conductors and insulators.

Low voltage conductors can be considered a barrier to high voltage conductors above, providing equipment and vegetation is below the LV conductors.

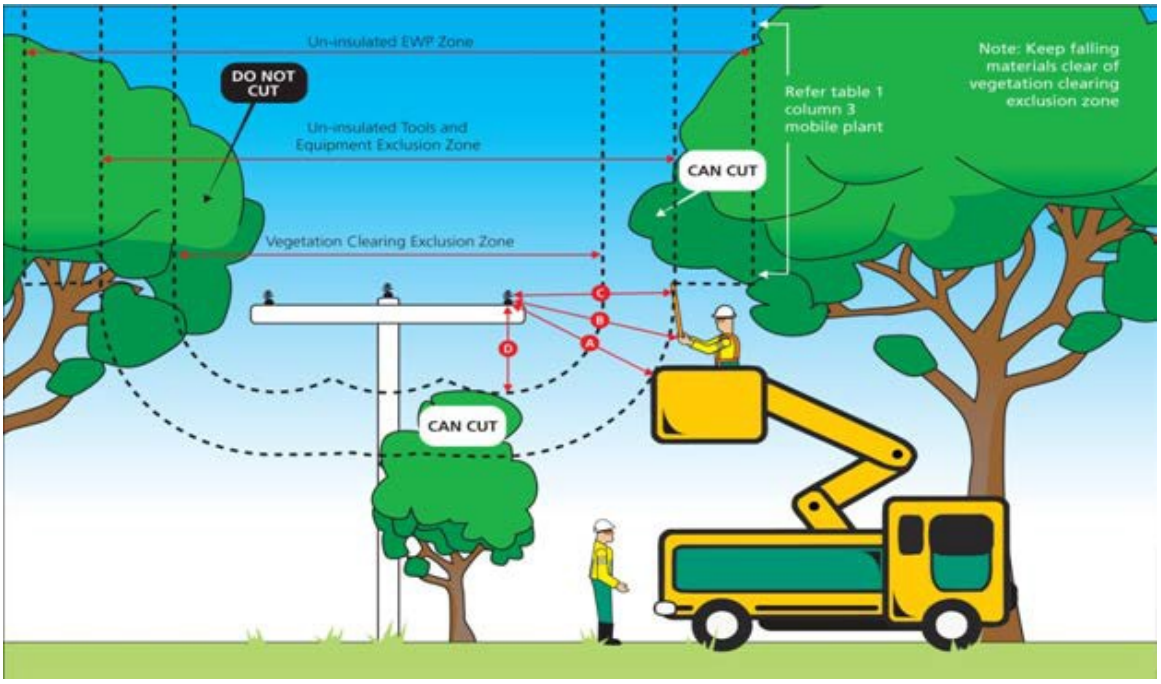
6.5.2 Un-insulated Mobile Plant, Tools and Equipment.

Table 3

Safe Approach Distances and Vegetation Clearance for Vegetation Management Workers utilising un-insulated Mobile Plant, un-insulated tools and equipment

Nominal Phase to Phase ac Voltage (V)	Un-insulated Mobile Plant (mm) (A)	Vegetation Management Worker (mm) (B)	Un-insulated tool (mm) (C)	Vegetation below and beside line (mm) (D)	Vegetation overhanging the overhead line (mm) (E)
Insulated LV	200	200	200	No clearance	No clearance
Bare LV	1000	1000	1000	Physical clearance	Not permitted
6,600	1200	1200	1200	700	
11,000	1200	1200	1200	700	
22,000	1200	1200	1200	700	
33,000	1200	1200	1200	700	
66,000	1400	1400	1400	1000	
132,000	1800	1800	1800	1200	
Over 132,000 volts contact network operator					

Figure 2
Safe Approach Distances Utilising Un-insulated Mobile Plant, Tools and Equipment (Refer to Table 3)



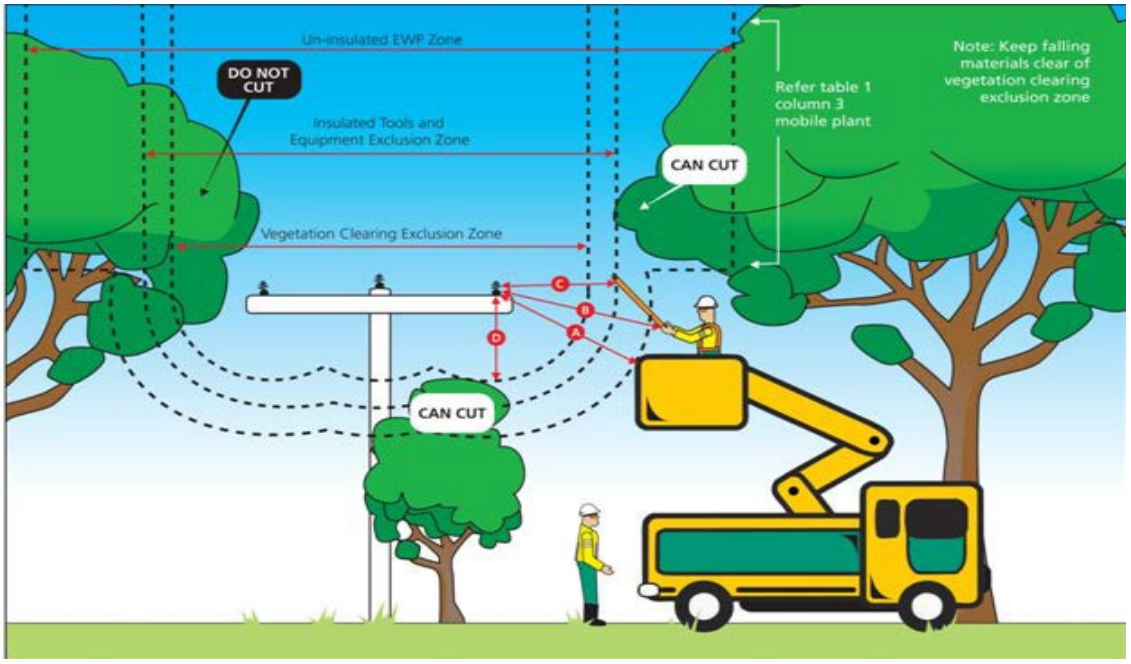
6.5.3 Un-insulated Mobile Plant, with Insulated Tools and Equipment

Table 4
Safe Approach Distances and Vegetation Clearance for Vegetation Management Workers utilising un-insulated Mobile Plant, with insulated tools and equipment

Nominal Phase to Phase ac Voltage (V)	Un-insulated Mobile Plant (mm) (A)	Vegetation Management Worker (mm) (B)	Insulated tool (mm) (C)	Vegetation below and beside line (mm) (D)	Vegetation overhanging the overhead line (mm) (E)
Insulated LV	200	200	No clearance	No clearance	No clearance
Bare LV	1000	1000	Physical clearance	No clearance	Not permitted
6,600	1200	1200	300	300	
11,000	1200	1200	300	300	
22,000	1200	1200	350	350	
33,000	1200	1200	400	400	
66,000	1400	1400	600	600	
132,000	1800	1800	800	800	
Over 132,000 volts contact network operator					

Figure 3

Safe Approach Distances Utilising Un-insulated Mobile Plant, Insulated Tools and Equipment (Refer to Table 4)



6.5.4 Insulated Mobile Plant, Insulated Tools and Equipment

Insulated mobile plant considered in this section must comply with the requirements of **Section 10** of this Code.

Note: The safe approach distances for the un-insulated sections of the EWP must be maintained as per **Table 4** of this Code.

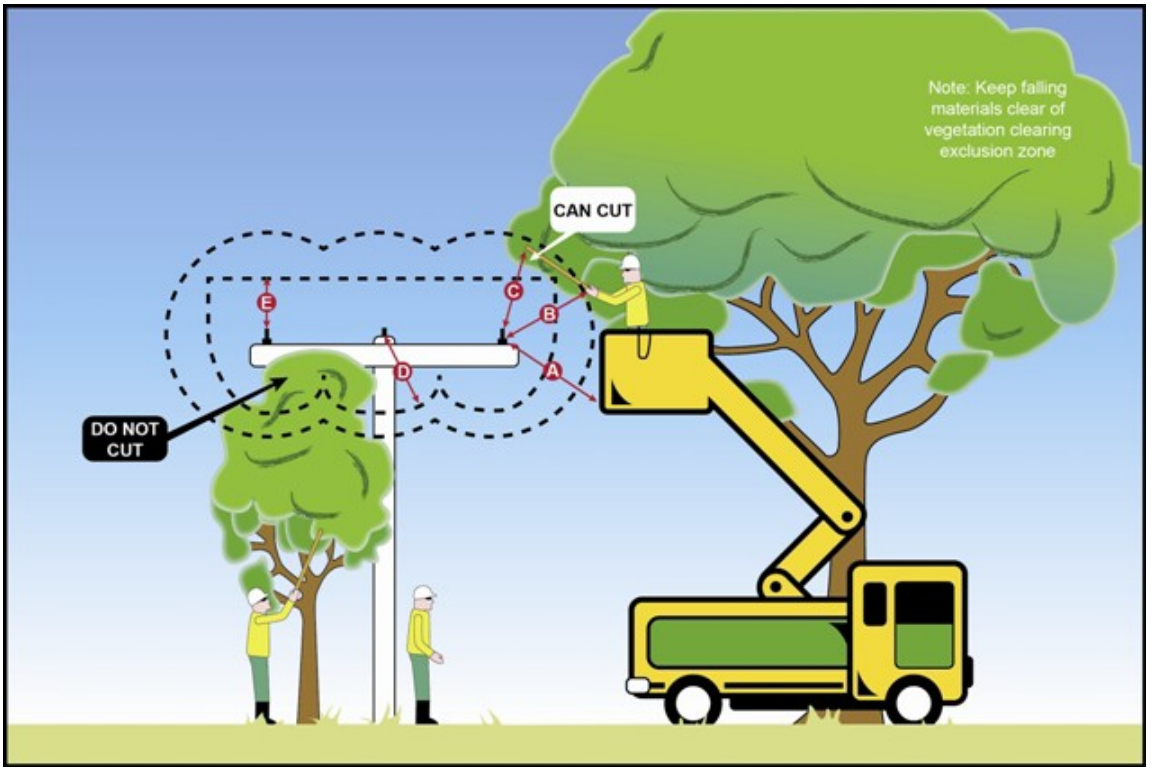
Table 5

Safe Approach Distances and Vegetation Clearance for Vegetation Management Workers utilising insulated mobile plant, tools and equipment

Nominal Phase to Phase ac Voltage (V)	Insulated Mobile Plant (mm) (A)	Vegetation Management Worker (mm) (B) and GAD	Insulated Tool (mm) (C)	Vegetation below and beside line (mm) (D)	Vegetation overhanging the overhead line (mm) (E)
Insulated LV	Physical clearance	200	No clearance	No clearance	No clearance
Bare LV	Physical clearance	700	No clearance	No clearance	Physical clearance
6,600	700	1000	300	100	700
11,000	700	1000	300	100	700
22,000	700	1000	350	150	700
33,000	700	1000	400	200	700
66,000	1000	1200	600	400	1000
132,000	1200	1400	800	800	1200
Over 132,000 volts contact network operator					

Figure 4

Safe Approach Distances Utilising Insulated Mobile Plant, Tools and Equipment (Refer to Table 5)



6.6 SPECIALISED INSULATED GROUND OPERATED PLANT

Specialised insulated plant is permitted to operate from the ground if a competent operator is completely enclosed within the plant or can remotely operate the plant always maintaining it beyond the safe approach distance (**Table 5 Column C**) and in either situation all persons are to maintain the minimum ground approach distance from this plant (**Table 5 Column B**) and be outside the danger zone and the drop zone.

A safety observer must be used in accordance with the requirements of **Section 5.11** of this Code.

7. Work Procedures

The Service Provider must develop and document approved work procedures in accordance with this Code to ensure the safety of workers and the public, when vegetation management work is undertaken near live overhead lines.

Approved work procedures must not be changed on site without the approval of the Service Provider.

The approved work procedures must include but are not limited to:

(a) A description of vegetation management principles and requirements.

(b) Instructions on caring for the tools and equipment.

(c) Testing requirements for plant, insulated tools and equipment.

(d) A set of vegetation management work techniques or procedures**.**

(e) The safe approach distances applicable to the worker and the voltage.

(f) The minimum vegetation clearances to all voltages.

(g) Emergency procedures.

8. Training, Competency and Authorisation

8.1 GENERAL

The Service Provider must ensure all persons have current competency to carry out vegetation management work near live overhead lines.

Only Registered Training Organisations certified to deliver the vegetation control worker competencies described in **Section 8.3** can provide training for persons to carry out vegetation control work under the provisions of this Code.

Competencies for vegetation management work must be audited at intervals of not more than three years.

The Service Provider must ensure that records are kept of training undertaken by their respective employees.

8.2 TRAINING

Training must be competency-based and aligned to the Industry Training Package and records documented for each individual.

All persons undertaking vegetation management work training must be monitored during the training program to assess their understanding of work processes, their ability to perform work processes and their responsibility, maturity, concentration and the ability to work in a team.

8.3 TRAINING COURSES

All persons who are required to undertake vegetation management work near live power lines must be trained and assessed as competent prior to commencing the work.

There are a number of vegetation management worker categories and the following National Industry training units relate to the type of work undertaken near “Live Overhead Power Lines” in each of those categories.

The training units listed were correct at the time of publication of this Code. Over time, changes in training standards will result in changes to the training units contained in this Code. Accordingly, the RTO is to ensure that appropriate units are selected for training which will deliver the underlying intent of this Code in ensuring competency levels of Vegetation Workers is maintained.

8.3.1 GROUND WORKER

A Ground Worker must hold a WorkSafe white card and must complete the on site safety induction training.

8.3.2 SAFETY OBSERVER

A Safety Observer must:

- successfully complete Energy*Safety*’s online course of instruction in the requirements that apply to the work covered by this Code;
- have documentary evidence recorded by a supervisor of having worked for 150 hours as a Ground Worker in a vegetation management team comprising at least 2 LV workers; and
- have been assessed as competent in at least the following training units:

Mandatory units

- **CPCCOHS2001A** - Construction Site Safety Awareness
- **HLTAID002** - Provide basic emergency life support
- **UEENEEE101A** - Apply Occupational Health Safety regulations, codes and practices in the workplace
- **UETTDREL13A** - Comply with sustainability, environmental and incidental response policies and procedures
- **UETTDREL14A** - Working safely near live electrical apparatus as a non- electrical worker
- **UETTDRVC23A** - Plan the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
- **UETTDRVC27A** - Monitor safety compliance of vegetation control work in an ESI environment
- **UETTDRRF03B** - Perform EWP rescue (Where the Safety Observer will be at a work site where an EWP is being used)

Optional (must have any of the following relevant to the task undertaken)

- **AHCPGD101S** - Support gardening work
- **AHCARB205A** - Operate and maintain chainsaws
- **AHCPCM201A** - Recognise Plants
- **AHCPGD203A** - Prune shrubs and small trees
- **AHCARB202A** - Fell small trees
- **AHCARB304A** - Fell trees with advanced techniques
- **AHCMOM203A** - Operate basic machinery and equipment
- **HLTFA301C** - Apply First Aid
- **RIIOSH302D** - Implement traffic management plan
- **RIIOSH205D** - Control traffic with a stop-slow bat

Note-

- Assessments for AHCMOM203A must occur on the same machinery used by the worker for vegetation control work.
- Where an EWP is being utilised, the Safety Observer must be trained and be familiar with the emergency controls of the particular EWP being used.

8.3.3 LV Vegetation Management Worker (LV worker)

Provide evidence of having been assessed as a competent Safety Observer and be assessed as competent in the following **Mandatory** units:

- **UETTDRVC33A** - Apply pruning techniques to vegetation control near live electrical apparatus
- **UETTDRVC26A** - Cut vegetation at ground level near live electrical apparatus

- **HLTFA301C** - Apply First Aid

AND

- **UETTDRVC25A** - Use elevated platform to cut vegetation above ground level near live electrical apparatus – LV component

OR

- **UETTDRVC34A** - Undertake release and rescue from a tree near live electrical apparatus
- **AHCARB204A** - Undertake standard climbing techniques
- **UETTDRVC21A** - Use climbing techniques to cut vegetation above ground near live electrical apparatus – LV component

Optional (must have any of the following relevant to the task undertaken)

- **UETTDRVC24A** - Assess vegetation and recommend control measures in an ESI environment
- **TLILIC2005A** - Licence to operate a boom-type elevating work platform (boom length 11 metres or more)

8.3.4 HV Vegetation Management Worker (HV worker)

Provide evidence of having completed 150 hours of vegetation management near live power lines as an LV Vegetation Management Worker and be assessed as competent in the following **Mandatory** unit:

- **UETTDRVC25A** - Use elevated platform to cut vegetation above ground level near live electrical apparatus – HV component

OR

- **UETTDRVC21A** - Use climbing techniques to cut vegetation above ground near live electrical apparatus – HV component

Optional (must have any of the following relevant to the task undertaken)

Optional units listed for the LV worker plus

- **AHCARB307A** - Undertake complex tree climbing

Note-

Training needs to take into account the existing knowledge, experience and skills of the course candidates. Where the candidates are identified as having current competency the worker may undertake Recognition of Prior Learning with an RTO.

8.4 TRAINING AND WORK RECORDS

The Service Provider must ensure:

- records are maintained for each worker which identifies units of competency and assessments; and
- records of work undertaken for each worker to demonstrate:
  - Work experience for progression to higher competency levels.
  - Current competency (activities undertaken within the previous 12 months) to carry out vegetation management work.
  - 8 hours of direct supervision of work for which qualifications are held but not practised within the previous 12 months.

8.5 AUTHORISATION

Authorisation is the process of the Service Provider being able to demonstrate an employee has currency of competency to undertake vegetation management work.

The authorisation must be revoked for failure to comply with the requirements of **Section 8** of this Code.

Proof of authorisation must be made available on request.

8.6 COMPLIANCE AUDITING

Service Providers and Contract Principals must audit the compliance of vegetation management worker(s) against documented vegetation management work procedures by conducting independent field audits at least annually.

Audits must be conducted by an authorised person who:

(a) Is appointed by the Contract Principal and/or Service Provider.

(b) Has a comprehensive understanding and experience of the work procedures being inspected.

(c) Is independent of the work party.

Audit findings that show the contractor or worker is not meeting the requirements of this Code of Practice must be forwarded to Energy*Safety* within 3 working days.

All audits are to be documented, and kept for 7 years.

8.7 REFRESHER TRAINING

Refresher training must be conducted if compliance auditing finds vegetation management work safety rules, concepts or techniques are deficient.

Refresher training can be done in conjunction with competency assessments.

9. Tools and Equipment

9.1 GENERAL

Care and maintenance of tools and equipment is essential for safe vegetation management work near live overhead lines**.** This is especially the case for insulated tools and equipment.

The Service Provider must ensure all tools and equipment used for vegetation management work are inspected, maintained and tested at appropriate intervals and in accordance with the manufacturer's recommendations and relevant Standards. Appropriate records must be kept in accordance with legislative requirements.

W here practicable, the tools and equipment must be marked with the date they were last inspected and/or tested.

All safety equipment must:

(a) either:

  (i) comply with the appropriate Australian Standard or any other equivalent or better standard; or

  (ii) where there is no standard (Australian or otherwise), be certified by the Service Provider as being of an appropriate design.

(b) comply with any other additional requirement in this Code specific to the particular type of equipment;

(c) be suitable for the purpose for which it is intended to be used; and

(d) be marked in such a way that it can be readily identified.

9.2 INSULATED TOOLS AND EQUIPMENT

Insulated tools and equipment for vegetation management are generally not available for voltages above 66kV.

All insulated tools and equipment used for vegetation management work must be designed, tested and approved specifically for work near live overhead lines.

All insulated tools and equipment must be rated for the voltage of the relevant overhead lines and certified for use by the manufacturer and must meet the relevant standards listed in **Appendix D** of this Code or equivalent.

All insulated tools and equipment must be maintained in a clean and dry condition.

Insulated tools and equipment must not be laid directly on the ground.

Insulated tools and equipment must not be exposed to excess moisture, dust, abrasion and other deteriorating effects when stored or transported.

Insulated tools and equipment must be visually inspected and cleaned prior to use. Any insulated tools and equipment appearing to be defective must be so labelled, and quarantined from service for further inspection, testing, repair or replacement.

All insulating tools and equipment must be kept clear of deteriorating contaminants such as hand creams, sunscreens, paint solvents, hydraulic oil or fuels, which may affect the insulation integrity.

9.3 INSULATING BARRIERS

Insulating barriers are intended to prevent vegetation management workers, tools, equipment, plant and vegetation from making inadvertent contact with live overhead lines.

They must not be used to reduce the safe approach distances for vegetation management workers as detailed in this Code.

Insulating barriers must only be inspected, installed and removed by persons authorised by the Network Operator.

Low voltage conductors can be considered a barrier to high voltage conductors above, providing equipment and vegetation is below the LV conductors and the required LV clearances are maintained.

9.4 SAFETY BELTS AND HARNESSES

Safety belts and harnesses must comply with AS/NZS 1891.1: 2007: "Industrial fall-arrest systems and devices - Harnesses and ancillary equipment" and/or AS/NZS 1891.4:2009 : "Industrial fall-arrest systems and devices - Selection, use and maintenance"

Safety belts and harnesses used by climbers may have a tool strap or "D" ring on the belt or harness used for attachment of tools. The tool strap or "D" ring must be sufficiently weak to snap under sudden pressure to prevent the climber being pulled to the ground if anything should fall onto their tools and drag them downwards.

The free end of body belts, pole straps and ropes must be restrained from encroaching into the safe approach distance.

9.5 LADDERS

Only ladders with insulating properties must be used to provide access for vegetation management workers to their work position near live overhead power lines.

Ladders must comply with the AS 1892.2- 1992 "Portable Ladders - Timber" and to AS/NZS 1892.3 – 1996 "Portable ladders – Reinforced plastic".

Note: Metal ladders or metal reinforced ladders must not be used for vegetation management work.

9.6 ROPES

Only synthetic ropes with a minimum breaking load of 24kN and mechanical properties not inferior to polypropylene rope manufactured to the Australian Standard AS 4142.2 must be used for vegetation management work near live overhead power lines.

All ropes used for vegetation management work must be used within their safe working load for the tension or mass to be supported.

As a guide the following formula may be used to calculate the SWL of a synthetic rope.

SW L = D^2 x 2 (Kg) W here D = Rope diameter (mm).

For a more accurate determination of the safe working load of a rope, a rope specification table as supplied by rope manufacturers should be consulted.

All ropes must be kept clean and clear of deteriorating contaminants such as hand creams, sunscreens, paint solvents, hydraulic oil or fuels which may affect their integrity.

Synthetic rope must be kept away from live components by a distance not less than the applicable safe approach distances in **Column "A**", **Table 5** in **Section 6** of this Code.

Note-

Climbing ropes must be of a Kernmantle, plaited or laid (twisted) type.

9.7 CARABINEERS

Carabineers used with climbing ropes or safety straps must be self-closing and lockable by a twist gate.

9.8 TESTING

The recommended maximum testing intervals are defined in appropriate internationally recognised standards. A summary of the testing frequency is set out in the **Table 6** below.

Table 6

Equipment	**Testing Intervals**
Insulated tools and equipment	Not exceeding 6 months
High voltage insulating line hoses, connectors, covers	Not exceeding 6 months
Insulated EW Ps	Not exceeding 6 months

The above testing intervals should be reduced for equipment with high usage or used in a dirty environment.

All insulated tools and equipment that have been tested must be marked with an appropriate electrical design rating suitable for the voltage of the overhead lines being approached.

10. Cranes and Elevated Work Platforms (EWP)

10.1 GENERAL

Cranes and EW Ps set up in accordance with the requirements of this section may be used to support vegetation, vegetation workers and equipment for vegetation management work near live overhead lines.

The EWP insulated sections must be maintained in a clean condition

Section 6 of this Code provides the safe approach distances for insulated and un-insulated sections of mobile plant operated by an instructed person or authorised person, with a safety observer.

10.2 ELEVATING WORK PLATFORMS

All elevating work platforms must comply with AS/NZS 1418.10 - 2011 “Cranes, hoists and winches - Elevating work platforms”

10.3 INSULATED ELEVATING WORK PLATFORMS

Insulated elevating work platforms must comply with the following requirements before being used:

(a) Electrical test certificate

Each EWP must have an electrical test certificate issued within the previous six months, stating the platform complies with the testing requirements for its rated voltage.

(b) Cleaning

On each EWP, the outer surfaces of the insulating boom, the inside of the basket and the basket insulation must be wiped thoroughly with a clean, dry cloth and all surfaces treated with a silicone impregnated cloth.

(c) Inspection

Each EWP must be inspected to ensure:

(i) the ground and basket controls operate correctly;

(ii) the main components of the boom are not distorted or cracked;

(iii) hydraulic hoses are not twisted, chafed or leaking and the oil levels are correct;

(iv) a controlled descent device is installed in the basket if required; and

(v) the safety harness attachment and the controlled descent device are in good operating condition.

An insulated EWP must only be operated to the safe approach distances in the area level with or below the conductors for which it is rated.

In all other cases, it must be operated to the safe approach for un-insulated EWPs.

10.4 SUPPORTING VEGETATION WITHIN THE SAFE APPROACH DISTANCE

When supporting vegetation that has any part within the safe approach distance for mobile plant operated by instructed persons or authorised persons of live high voltage overhead lines, appropriate insulating barriers, rated to meet the electrical and mechanical loads, must be installed by the Network Operator between the crane or EW P and the vegetation.

10.5 EARTHING AND BONDING OF THE CRANE OR EWP CHASSIS

The chassis of the crane or EW P must be connected to earth by means of a braided copper cable and metal earthing spike driven into the ground when vegetation control work is carried out within the danger zone of a high voltage power line.

Care must be taken to avoid driving the spike into underground services. Information on the location of underground services in the area where vegetation control work is to be carried out must be obtained from the local shire, Water Authority, Alinta Gas, Horizon Power, Western Power, Telstra or any other utility service provider, through “dial before you dig”, before work commences.

Note: For vegetation control work within the danger zone of a low voltage power line, the EWP does not need to be earthed provided no work is carried out above the level of the low voltage conductors.

10.6 ELECTRICAL CABLES AND CONDUCTIVE HOSES

Electric cables (for portable electrical appliances) and electrically conductive hoses or pipes must not be run from the vehicle or the ground to the bucket of the EWP.

11. Procedures in the Event of an Incident

11.1 EVENTS CONSTITUTING AN INCIDENT

For the purpose of this Code, an incident is defined as any of the following events:

(a) An electric shock or other serious injury received by any member of the work team or member of the public.

(b) A flashover at, or close to, the worksite for any reason.

(c) Complete or partial breakdown of any insulating tool or equipment irrespective of whether flashover occurred.

(d) The electrical or mechanical failures of any insulating tool, which did, or could have the potential to, cause an accident.

(e) Any occurrence, which is life threatening or has the potential to cause personal injury or damage to property.

11.2 PROCEDURES FOR RESPONDING TO INCIDENTS

The Service Provider must comply with documented procedures for responding to incidents. These procedures must address, as appropriate, the following items:

(a) The rescue of injured persons or those at risk.

(b) The immediate first aid and medical needs of any injured person and the safety of other persons at the worksite.

(c) Investigation and reporting requirements to determine the cause of the incident and the implementation of appropriate remedial measures.

(d) Notification of all parties required under relevant regulations and industry agreements.

APPENDIX A – Vegetation Regulations

Extract from Electricity Regulations 1947

Regulation 316A. Vegetation control work near overhead power lines

(1) A person performing vegetation control work for reward must not do so within the danger zone of overhead power lines unless exempted by sub-regulation (4).

(2) The danger zone of an overhead power line is anywhere that:

(a) is at the same height as, higher than, or not more than the specified distance lower than, the power line conductors; and

(b) is directly above or below, or not more than the specified distance to either side of, the power line conductors.

(3) The specified distance is:

(a) 3 metres for an overhead power line carrying electricity at a nominal voltage of not more than 33 000 volts; and

(b) 6 metres for an overhead power line carrying electricity at a nominal voltage of more than 33 000 volts.

(4) A person is exempt from sub-regulation (1) if:

(a) the person:

(i) has been trained in accordance with electrical linework to the satisfaction of the Director; or

(ii) has been trained in vegetation control work by a person or training authority approved by the Director by notice published in the Gazette; and

(b) the work is carried out in accordance with:

(i) the electrical safety requirements described in the *Code of Practice for Personnel Electrical Safety for Vegetation Control Work Near Live Power Lines* issued by the Director (as from time to time amended and for the time being in force); or

(ii) such other safety requirements as the Director has approved in writing.

(5) For the purposes of this regulation:

(a) ***conductors*** includes active or neutral conductors (whether bare, insulated or double insulated), catenary supported conductors, neutral screened conductors, and aerial bundled cable;
overhead power lines means overhead lines for the transmission of electrical energy;

(b) a reference to performing work includes a reference to assisting to perform work;

(c) performing work in the course of employment is to be regarded as being for reward; and

(d) vegetation control work is performed within a danger zone if any part of:

(i) the vegetation; or

(ii) the body of, or any tool, vehicle, or other equipment used by, a person performing the work,

comes within the danger zone at any time while the work is being performed.

APPENDIX B – Effects of Vegetation Contact with HV

If vegetation touches live power lines, or comes close enough to high voltage that an electric arc can form across the air gap, the sap in the vegetation will provide a low resistance path to earth which, depending on weather and equipment conditions, may include the vegetation worker. In the case of high voltage, the sap will be immediately transformed to steam internally in the vegetation, which will explode. At the same time, the arc drawn across the air gap will release thermal energy which can be up 20,000 ^{o}C. Any worker near or looking at the arc does not need to be part of the path to earth, to suffer significant injuries.

Very often the vegetation is destroyed in an arcing incident, so the fault is removed when the power is turned off. The vast majority of these incidents occur when no-one is present, so to save many hours of power interruption and workers' time looking for a fault that no longer exists, the switch that turned the power off when detecting the fault current, switches back on a few seconds later. In 70% of these incidents the power is successfully reconnected without further damage or delay.

Issuing a Vicinity Authority, makes the Network Operator aware of workers very close to a designated high voltage power line. In such cases the program to reconnect the switch in the event of a fault, is disabled. However, an arcing incident covered by a VA, has discharged immense energy, so the disabling of the switch to prevent a second arc a few seconds later may do little to improve overall safety.

APPENDIX C – Training Transition Process

Application of Code Requirements

Any person first employed as a vegetation management worker after this Code is gazetted must meet all requirements of the Code.

Existing Vegetation Control Workers when this Code is gazetted

At the time this Code is gazetted existing vegetation management workers will be required:

- by 30 September 2012 to work in accordance with **Section 8.4** of this Code including a record of accumulated time, for each category, working as a Safety Observer, LV Worker and HV Worker;
- by 30 June 2013 to successfully complete Energy*Safety*'s online course of instruction in the requirements that apply to the work covered by this Code;
- to comply with only the hours worked requirements in **Section 8.3** to qualify as a Safety Observer, LV Worker or HV Worker; and
- to work in accordance with **Sections 8.5, 8.6, 8.7** in order to continue carrying out work on vegetation management within the danger zone.

APPENDIX D – References

Australian Standards

AS5804.1 – High Voltage Live Working Part 1: General, provides useful reference material relating to the selection and care of mobile plant, tools and equipment used for vegetation control work near live power lines.

ENA Codes/Guidelines

ENA DOC 001 - 2008 – National Electricity Network Safety Code.

ENA DOC 023 - 2009 – ENA Guidelines For Safe Vegetation Management Work Near Live Overhead Lines

ENA Doc 024 - 2009 – National Guideline for the Management of Tools and Equipment used in the Electricity Supply Industry

ENA NENS 04 – National Guidelines for Safe Approach Distances to Electrical Apparatus.

ENA NENS 05 – National Fall Protection Guidelines for the Electricity Industry

ENA NENS 09 – National Guidelines for the selection, use and maintenance of personal protective equipment for electrical hazards

Other References

The following documents provide useful reference material relating to vegetation management work practices:

- AS 4373:2007 Pruning of Amenity Trees
- Code of Practice for Safety and Health in Tree Work – Part 2 Maintenance of Trees Around Power Lines (NZ)
- AS/NZS 1418.10:2011 “Cranes, hoists and winches - Elevating work platforms”
- AS/NZS 1891.1:2007 “Industrial fall-arrest systems and devices - Harnesses and ancillary equipment”
- AS/NZS 1891.4:2009 “Industrial fall-arrest systems and devices - selection, use and maintenance”
- AS 1892.2:1992 “Portable Ladders - Timber”
- AS/NZS 1892.3:1996 “Portable ladders – Reinforced plastic”
- AS 2726.1:2004 “Chainsaws - Safety requirements - Chainsaws for general use”

  AS 2726.2:2004 “Chainsaws - Safety requirements - Chainsaws for tree service”
- Code of Practice –Personal Protective Clothing and Equipment - WorkSafe