Department of **Consumer and Employment Protection**

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

ESWA T002 0402

Preface

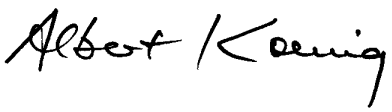
This Code details requirements for vegetation control work carried out near the live conductors of overhead power lines and is to be read in conjunction with regulation 316A of the *Electricity Regulations 1947*.

The Code and regulation 316A have been introduced in the interests of the safety of workers cutting trees near power lines. Careful adherence to the Code will ensure the safety of those workers.

Specific areas covered are:

- Training of workers
- Worker's skills
- Electrical safety requirements for safety equipment
- General electrical safety requirements
- Electrical safety requirements for carrying out vegetation control work:
  - from an insulated elevating work platform;
  - from an uninsulated elevating work platform;
  - from the ground;
  - by a climber; and
  - from a wooden or fibreglass ladder.
- Electrical safety requirements for the use of safety and personal safety equipment, tools and vehicles.

I therefore strongly encourage you to make sure your work practices comply with this mandatory Code.



ALBERT KOENIG
DIRECTOR OF ENERGY SAFETY

April 2002

Acknowledgment

Energy Safety WA gratefully acknowledges the assistance of:

- The Tree Guild of WA Inc.;
- Western Power; and
- WorkSafe WA,

in compiling this Code of Practice.

Appendix A 'General Safety Guidelines for Vegetation Control Work' is taken from the 'Standard for Safe Work Practices 1993' issued by The Tree Guild of WA Inc. and is reproduced with the kind permission of the Guild.

Table of Contents

Contents - Appendices

1. Objective

The objective of this Code is to provide the necessary electrical safety information to be used in conjunction with other general work requirements (eg. WorkSafe WA requirements) that will enable workers to:

- assess whether it is safe to carry out work relating to pruning, cutting, maintaining or trimming vegetation that is near power lines; and
- to 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 of the *Electricity Regulations 1947* (the full text of the regulation is contained in Appendix B).

2. Application

This Code applies to vegetation control work which is to be performed within the 'danger zone' surrounding any overhead power line, as defined in regulation 316A of the *Electricity Regulations 1947* (refer to Appendix B).

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

(a) to be trained in:

(i) electrical linework to the satisfaction of the Director of Energy Safety; or
(ii) vegetation control work by a training provider approved by the Director of Energy Safety;

and

(b) to carry out that work in accordance with the electrical safety requirements of this Code or an alternative work practice approved by the Director of Energy Safety.

The Code does not apply to:

- The pruning, cutting, trimming or felling vegetation where:

  - that vegetation; or

  - any person or any tool, vehicle or equipment used by that person,

  is outside the 'danger zone' defined in regulation 316A of the *Electricity Regulations 1947*; or

- the clearances to which vegetation must be cut or pruned.

3. Definitions and Interpretations

3.1 Definitions

Within this Code, unless the context implies otherwise:

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

'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 as a fulcrum point for their climbing rope.

'**bare'** means uninsulated.

'clearance' means the minimum distance, **'vertical'** and **'horizontal',** between any vegetation and any conductor of a power line, taking into consideration conductor sag under temperature and movement of vegetation and/or the power line under windy conditions.

'climber' means a tree worker who works on vegetation while supported by that vegetation.

'climbing rope' means a rope that is used solely for attaching a climber to a tree.

'Code' means this Code of Practice.

'conductors' means live electrical conductors of a power line including active and neutral conductors (bare, insulated or double insulated), catenary supported, neutral screened lines or ABC, at any operating voltage.

'covered conductor' means a conductor covered by a type of insulation that **may** prevent danger of electric shock.

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

'ground worker' means a worker who is competent in the skills listed in clause 5.1 of this Code.

'high voltage' means a voltage of over 1,000 volts a.c.

'insulated conductor' means a conductor covered by a type of insulation that prevents the danger of electric shock.

'insulated tool' means a tool

- covered by insulation; or
- which has the portion that is intended to be held covered by insulation or made of insulating material,

and which prevents danger of electric shock should the end of the tool, opposite to that which is held, contact a live conductor.

'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 cable from the supply authority to a customer. This type of cable includes a neutral screen cable.

'limit of approach' means the minimum distance, either **'vertical'** or **'horizontal'**, between any part of a person's body or part of any tool, equipment or vehicle and the conductor of a power line where work can be safely carried out.

'low voltage' means a voltage of up to 1,000 volts a.c.

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

'must' or **'shall'** within this Code, denotes a mandatory requirement.

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

'power line' or **'line'** means overhead lines for the transmission of electrical energy.

'safety observer' means a ground worker or tree worker who observes the work being carried out and whose primary purpose is to inform any tree worker when a dangerous condition is likely to occur or to ensure work stops if a dangerous condition does occur.

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

'tree worker' means a person who is competent in the skills listed in clause 5.1 and subclause 5.2.1 and at least one of the skills in subclause 5.2.2 of this Code.

'vegetation' means any living or non-living plant or part of that plant.

'vegetation control work' or **'work'** means the pruning, cutting, trimming or felling of vegetation and the assisting to prune, cut, trim or fell vegetation:

- where the vegetation is; or
- the work requires any person, tool equipment or vehicle to be:

  (a) above a power line; or

  (b) closer than:

    (i) 3 metres to a power line of a voltage up to 33,000 volts; or
    (ii) 6 metres to a power line of a voltage greater than 33,000 volts.

'voltage' means the difference of electrical potential normally existing between conductors and between conductors and earth.

'worker' means a tree worker or a ground worker.

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 above a power line or conductor including the area above the limit of approach and vegetation clearance distance.

This is shown in Figure 1 and Figure 2 with 'above' being the shaded area and the area directly above that shaded area.

Figure 1

'Above the power line'

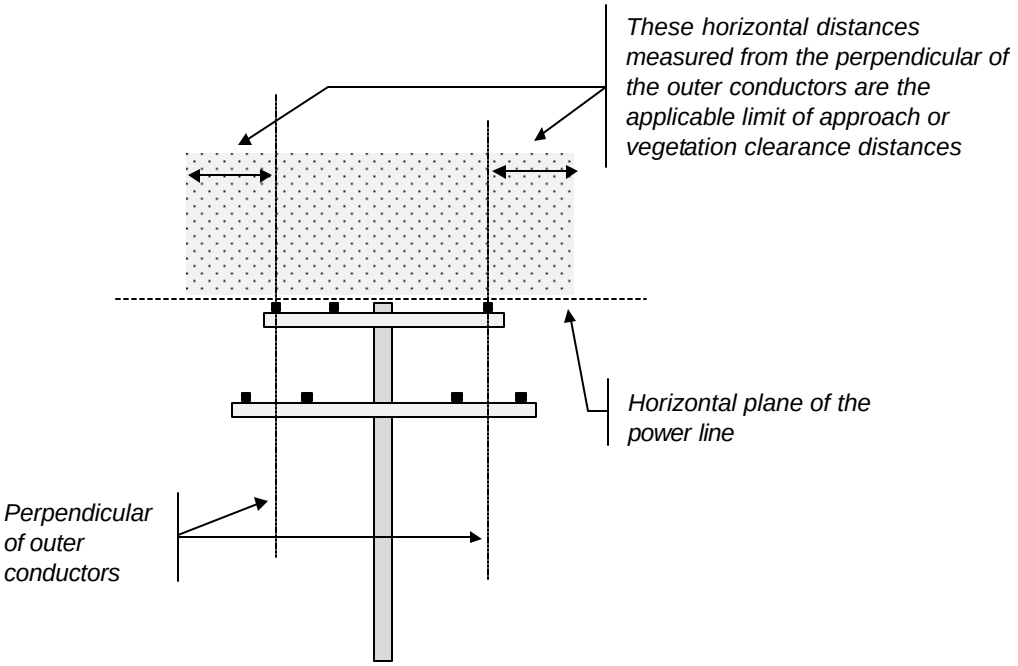
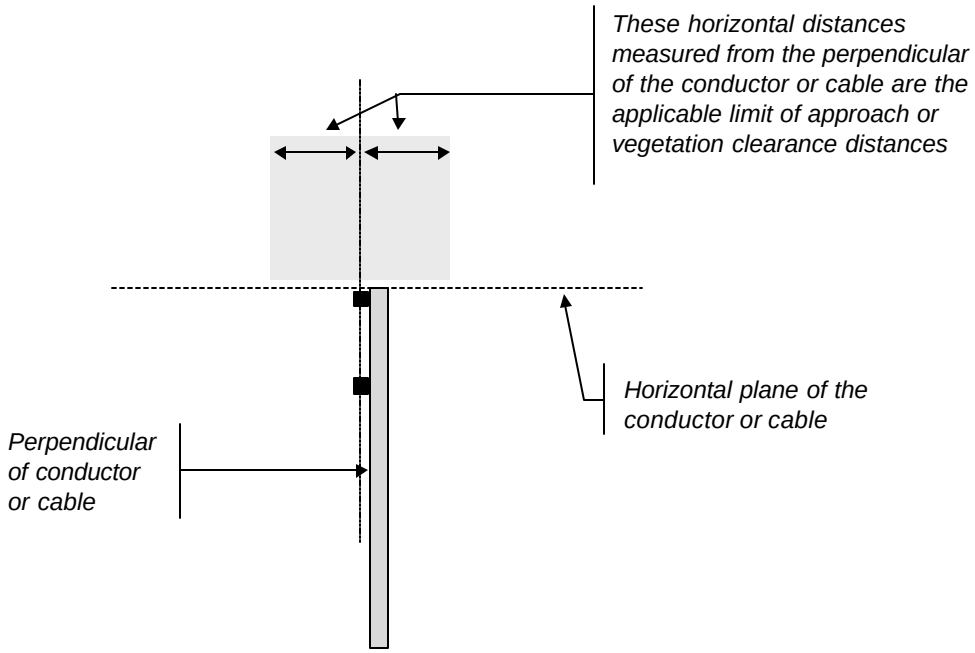


Figure 2

'Above a conductor or cable'



4. Training

4.1 Training Providers

Persons or organisations providing training for persons who want to carry out vegetation control work under the provisions of this Code must be approved by the Director of Energy Safety (refer to regulation 316A of the *Electricity Regulations 1947*).

This will apply, for the most part, to training providers in Western Australia. However the Director can also recognise training providers outside the State and, therefore, the persons who have been trained by those providers.

4.2 Courses

Courses must include the following:

4.2.1 Course Content

The content of a course will include a range of subject matter covering the skills listed in section 5 that:

- takes into account the existing knowledge, experience and skills of the course candidates; and

- is relative to the skills that a candidate should have acquired at the completion of the course.

For example:

Where the candidates are qualified tree surgeons:
- the subject matter regarding the skills listed in subclause 5.2.2 may not be included; or
- the subject matter regarding the skills listed in subclause 5.2.2 would be included only in relation to the skills the candidates do not have.

Where the candidates hold a current Senior First Aid Certificate, resuscitation would not be included in the course.

Note: There are related subjects (which are outside the scope of this Code) that are also likely to be included in a course, for example:

- Pedestrian/vehicular traffic control and the placing of signs.
- Operating machinery such as wood chippers or stump grinders.
- Communicating with consumers regarding the isolation of their electricity supply.
- Requirements specific to a particular supply authority.

4.2.2 Practical Exercises

Practical exercises, one of which shall be the identification of types and voltages of power lines.

4.2.3 Examination

A written examination at the end of the course.

5. Worker's Skills

5.1 Ground Workers

Ground workers shall have the following skills:

5.1.1 Code of Practice

Understanding of the electrical safety requirements of this Code of Practice.

5.1.2 Fire Prevention

(a) Equipment

Identification of the relevant fire prevention equipment that must be carried when working near power lines, including:

(i) fire extinguishers;
(ii) rake;
(iii) hoe; and
(iv) knapsack sprayer.

(b) Proper use of fire prevention equipment to extinguish small fires.

5.1.3 Hazard Awareness

(a) Power line conductors

Understand the safety procedures and be aware of responsibilities relating to:

(i) arcing conductors;
(ii) fallen conductors;
(iii) removing branches from low voltage conductors; and
(iv) damage to power lines.

(b) Direct contact

Understand the hazards of coming into direct contact with a live power line.

(c) Indirect contact

Understand the hazards of indirect contact with power line conductors with particular reference to:

(i) branches;
(ii) tools and equipment; and
(iii) EWP's.

5.1.4 Isolation of Power Lines

(a) Identify situations where the isolation of a power line is required;

(b) Understand the planning necessary to undertake such an isolation;

(c) Identify the section of power line that is required to be isolated; and

(d) Recognise and understand the access permit system that permits vegetation control work to be carried out once a high voltage power line has been isolated.

5.1.5 Resuscitation

Understand and be able to carry out cardio-pulmonary resuscitation.

5.1.6 Safety Observer Duties

(a) Understand the hazards relating to a tree worker carrying out work including:

(i) limit of approach distances; and
(ii) vegetation clearance distances.

(b) Knowing how to position themselves to be able to constantly observe the distances between any part of tree worker, tool, equipment, EWP or vegetation and the conductors of a power line.

(c) Understand the situations where there is a need to:

(i) advise tree workers that a dangerous situation is likely to occur; and
(ii) ensure work is stopped when a dangerous situation occurs.

5.1.7 Use and Care of Safety Equipment

(a) Recognise the situations where particular types of safety equipment need to be used;

(b) Knowledge of what clothing is to be worn particularly when working on vegetation that is touching or above a low voltage power line;

(c) Techniques for the in-field inspection and testing of safety equipment to determine whether it is safe to use; and

(d) Understand the system for:

(i) acceptance inspection and testing of safety equipment; and
(ii) the testing and inspection of safety equipment at regular intervals

5.2 Tree Workers

Tree workers shall have the skills set out in clause 5.1 and subclause 5.2.1 and at least one of the skills listed in subclause 5.2.2.

5.2.1 General Skills

(a) Limit of approach and vegetation clearance distances

Be able to determine in respect to a power line:

(i) Limits of approach distances
The limit of approach distances for that particular line taking into account factors such as terrain, wind, temperature and the length of the conductor span.
(ii) Vegetation clearance distances
The minimum clearance of vegetation from the power line that will permit work to be carried out.

(b) Recognition of electrical equipment and voltages

Be able to identify power lines in relation to:

(i) voltages; and
(ii) type and condition of insulation.

5.2.2 Specific Skills

(a) Working from a Tree

Understand and demonstrate safe techniques for climbing a tree and working from a tree including:

(i) techniques for climbing trees that are near power lines;
(ii) the use of climbing ropes;
(iii) how to select and use an anchor point for a climbing rope;
(iv) control of branches and limbs;
(v) pruning and trimming;
(vi) working with tools;
(vii) lowering limbs, topping and blocking; and
(viii) in emergencies, be able to rescue a tree worker from a tree.

(b) Working from elevating work platforms (EWP)

Understand and demonstrate safe techniques for working from an EWP including:

(i) control of branches and limbs;
(ii) pruning and trimming;
(iii) working with tools;
(iv) lowering limbs, topping and blocking;
(v) carrying out an inspection of an EWP to ensure it is safe to use;
(vi) use of elevating work platforms near live conductors including:
- carrying out procedures for the earthing of the chassis of an EWP;
- directing the safe positioning of an EWP in relation to the conductors of a power line; and
- maintaining limit of approach distances while operating an EWP; and

(vii) in emergencies, be able to rescue a tree worker from an EWP.

(c) Working from the Ground

Understand and demonstrate safe techniques for working from the ground including:

(i) control of branches and limbs;
(ii) pruning and trimming; and
(iii) working with insulated tools.

(d) Working From Ladders

Understand and demonstrate safe techniques for working from ladders including:

(i) control of branches and limbs;
(ii) pruning and trimming;
(iii) working with tools; and
(iv) lowering limbs, topping and blocking.

6. Electrical Safety Requirements for Safety Equipment

6.1 Safety Requirements

All safety equipment shall:

(a) Either:

(i) comply with the appropriate Australian Standard or any other standard equivalent to or better than the Australian Standard; or
(ii) where there is no standard (Australian or otherwise), be certified by an employer as being of an appropriate design;

(b) Comply with any other additional requirement in this section 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.

6.2 Standards for Specific Equipment

6.2.1 Carabiners

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

6.2.2 Chainsaws

Chainsaws shall comply with, as applicable, AS 2726.1 - 1995 ‘Chainsaws for general use’ or AS 2726.2 - 1995 ‘Chainsaws for tree service’.

6.2.3 Climbing Ropes

Climbing ropes must:

(a) Be of a Kernmantle, plaited or laid (twisted) type;

(b) Have a minimum diameter of 11 mm;

(c) Have a minimum breaking strength of:

(i) 3000 kg; or
(ii) 10 times the weight of a climber and their equipment;

(d) Adequate friction resistance; and

(e) Adequate heat resistance.

6.2.4 Elevating Work Platforms

All elevating work platforms shall:

(a) Comply with AS 1418.10 - 1987 'SAA Crane Code Part 10 - Elevating Work Platforms';

(b) Have a means of anchorage on the bucket, platform or boom to which a safety harness can be attached; and

(c) Not have holes drilled in the basket.

6.2.5 Insulated Elevating Work Platforms

(a) For high voltage and/or low voltage work

EWPs that are to be used as insulated elevating work platforms for work near power lines comprising high and low voltage conductors, only high voltage conductors or only low voltage conductors shall comply with:

(i) the design requirements of paragraph 1.5.12.3 (b) of AS 1418.10 - 1987 'SAA Crane Code Part 10 - Elevating Work Platforms'; and
(ii) the electrical testing requirements of subclause 1.11.1.4 of AS 1418.10 - 1987 'SAA Crane Code Part 10 - Elevating Work Platforms'.

(b) For low voltage work only

EWPs that are to be used as insulated elevating work platforms for work near power lines comprising only low voltage conductors shall comply with paragraph (a) above or:

(i) the design requirements of paragraph 1.5.12.3 (d) of AS 1418.10- 1987 'SAA Crane Code Part 10 - Elevating Work Platforms' except that the following subparagraph shall apply instead of subparagraph (i) of that clause:

'(i) The insulation shall be effected by an insulating component or coating of metallic surfaces or a combination of coating and insulating component and the insulating properties of the platform (basket)'; and

(ii) the electrical testing requirements of clause 1.11.3.5 of AS 1418.10 - 1987 'SAA Crane Code Part 10 - Elevating Work Platforms.

6.2.6 Eye Protection

Eye protection shall comply with AS 1337 - 1992 'Eye Protectors for Industrial Applications'.

6.2.7 First Aid Kits

First aid kits must be adequately stocked with appropriate supplies.

6.2.8 Helmets

Safety helmets shall comply with the applicable provisions of AS 1801 - 1981 'Industrial Safety Helmets'.

6.2.9 Insulated Tools

Low voltage tools shall comply with:

(a) The electrical insulation requirements of AS 3527.2 - 1990 'Insulated Screwdrivers'; and

(b) The electrical testing requirements of AS 3527.2 - 1990 'Insulated Screwdrivers'.

6.2.10 Ladders

Ladders shall comply with, as applicable:

(a) Wooden ladders

AS 1892.2 - 1992 'Portable Ladders - Wooden'

(b) Fibreglass ladders

ANSI A14.5 - 1982.

6.2.11 Safety Belts and Harnesses

Safety belts and harnesses shall comply with 'AS 1891.1 - 1995 'Industrial Fall Arrest Systems and Devices' and have:

(a) Forged support rings; and

(b) No metal components other than support rings and clasps;

and may have

(c) The tool strop or 'D' ring on the belt or harness used for the attachment of tools sufficiently weak to snap under sudden pressure to prevent the climber being pulled to the ground if timber should fall onto their tools and drag them downwards.

7. General Electrical Safety Requirements

7.1 Instruction in the Requirements of Related Legislation

Only those workers who have completed a course of instruction provided by their employer in the requirements of applicable Federal, State and Local Government laws that apply to the work covered by this Code shall carry out vegetation control work.

Within the courses particular attention needs to be paid to the *Occupational Safety and Health Act 1984*, the *Occupational Safety and Health Regulations 1988* and the guidelines and safety documentation issued by WorkSafe Western Australia relating to safety in the workplace.

Other requirements of particular relevance are:

- Local authority requirements for the control of pedestrian and vehicular traffic. Further information is contained in the Main Roads Western Australia Code of Practice 'Traffic Management for Road Works'.
- Western Power document 'Code of Practice for Road Traffic Control and Safe Working on Roads and Highways'.
- Requirements for providing the necessary fire protection when carrying out work.

7.2 Personnel

7.2.1 Tree Workers

Only tree workers shall carry out vegetation control work that requires:

(a) Work to be carried out above ground level; or

(b) The use of tools to prune, trim or cut trees from ground level.

Trainees may assist a tree worker but only under the direct supervision of that tree worker.

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

7.2.2 Ground Workers

Ground workers may carry out all work at ground level except to prune, trim or cut trees.

7.2.3 Assistance

Tree workers shall be assisted by a ground worker or another tree worker. A trainee may assist a ground worker or a tree worker on the ground.

7.2.4 Number of Workers at a Work Site

A minimum of two workers shall be present at each work site, one of whom shall be a tree worker.

A trainee shall not be considered a worker for the purpose of this subclause.

7.3 Work Briefing

Before work commences, a tree worker must conduct a work 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.

The briefing shall 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 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.

7.4 Communications

Wherever possible, a reliable on-site communication link should be established with the operator.

7.5 Emergencies

Where an emergency develops, for example:

- vegetation making contact with a high voltage power line;
- conductors clashing and arcing;
- conductors falling to the ground,

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

Work shall not recommence until permitted by the operator.

7.6 Identification of Power Lines

All conductors and all underground cables shall be considered to be live unless confirmed otherwise by the owner of the line.

The voltage and type of power line shall be positively identified. Where this is not possible, further information shall be obtained from the owner of the line to enable a positive identification to be made and if it still cannot be determined whether:

(a) The conductors of a low voltage power line are insulated, the conductors shall be considered bare.

(b) A high voltage cable is insulated, the cable shall be considered a bare high voltage conductor.

7.7 Safety Observers

7.7.1 Where Safety Observers are to be Used

Safety observers shall be used where:

(a) An EWP is placed or operated in a position where any part of the vehicle could accidentally contact a power line;

(b) Work is being carried out by a climber and vegetation could contact a conductor; or

(c) Work is being carried out from the ground and vegetation could contact a conductor.

7.7.2 Safety Observer Duties

A safety observer must:

(a) At all times be in a position

(i) that gives an unobstructed view of the distances between any part of a person, tool or vehicle and the conductor of a power line; and
(ii) to be able to effectively communicate with the persons carrying out the work;

(b) Immediately inform tree workers that a dangerous condition is likely to occur; and

(c) Ensure all work is stopped should a dangerous condition occur.

Note: More than one safety observer may be required.

7.8 Control of Vegetation Near Power Lines

7.8.1 General

Wherever possible, vegetation must be cut, trimmed, felled or pruned using controlled movements such that any piece of vegetation can be controlled by hand.

Where control by hand is not possible, branches and limbs must be supported or controlled by ropes so that during any cutting or removal, the branch or limb will move away from the power line.

Branches or limbs extending above power lines must be controlled before being trimmed or cut to prevent damage to the conductors.

Where any part of the vegetation cannot be controlled so that it will move away from the power line, **work must immediately stop** and:

(a) work methods changed so that there is no possibility of the vegetation contacting the power line; or

(b) arrangements are made with the operator to have the power line isolated and (if applicable) earthed.

Where any vegetation falls towards a power line, no attempt shall be made to stop it by hand.

Where any part of the vegetation makes contact with or comes to rest on a high voltage power line, **work must immediately stop** and arrangements made with the operator to have the line isolated and earthed.

Ropes used to control branches and limbs must be directed away from the power line or controlled to prevent the tail end from swinging towards the line.

7.8.2 Vegetation Touching or Through Low Voltage Conductors

Care must be taken when removing vegetation that is touching or through low voltage conductors.

Removal techniques shall ensure that the low voltage conductors do not move towards each other.

Note: General safety guidelines for:

- Climbing;
- Working with tools in trees;
- Pruning and trimming;
- Lowering limbs, topping and blocking;
- Felling, limbing and sectioning; and
- Wood chipping and stump grinding,

are contained in Appendix A 'General Safety Guidelines for Vegetation Control Work'.

7.9 Telecommunication Lines

Where there are also telecommunication lines (telephone, cable TV, etc) at the work site, the requirements within this Code that relate to low voltage service lines or ABC shall apply to the telecommunication lines.

7.10 Restrictions on Working Above a Power Line

No work shall be carried out:

(a) above a power line; or

(b) on vegetation that is above a power line,

unless permitted under section 8, 9, or 11.

7.11 Limit of Approach and Vegetation Clearance Distances

Subclauses 7.11.1 and 7.11.2 must be read together.

7.11.1 Maintaining Limit of Approach and Vegetation Clearance Distances

The limit of approach and vegetation clearance distances in Table 7-1, Table 7-2 and Table 7-3 that relate to the voltage of the power line near which vegetation control work is being or is intended to be carried out, shall be maintained at all times.

The distances in Table 7-1, Table 7-2 and Table 7-3 are minimums and may need to be increased in certain circumstances (refer to subclause 7.11.2).

Table 7-1
High Voltage Conductors
Limit of Approach and Vegetation Clearance Distances (m)

Voltage and type of cable	Work from an insulated EWP[1]			Work from an uninsulated EWP or by a climber		
	Limit of approach		Vegetation clearance	Limit of approach		Vegetation clearance
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	EWP	Body, tool or extension		EWP or climber	Body, tool or extension	
1,000 up to 33,000 volts[2]	2.0	1.0	1.0	2.0	2.0	2.0
Over 33,000 up to 132,000 volts[2]	3.0	3.0	3.0	6.0	3.0	3.0
Over 132,000 volts[2]	Contact the owner of the line			Contact the owner of the line		
Insulated cables	0.6	0.6	No clearance required	0.6	0.6	Physical clearance[3]

1 EWPs that comply with the requirements of clause 6.2.5 paragraph (a).

2 Bare conductors.

3 'Physical clearance' means that no contact is made with the conductor.

Table 7-2 **Low Voltage Insulated Service Cable and Aerial Bundled Cable** **Limit of Approach and Vegetation Clearance Distances (m)**	
Limit of approach for work from an EWP, ladder, the ground or by a climber	**Vegetation clearance distances**
Physical clearance*	No clearance required

* 'Physical clearance' means that no contact is made with the conductor.

Table 7-3 **Bare or Covered Low Voltage Conductors** **Limit of Approach and Vegetation Clearance Distances (m)**								
	Work from an insulated EWP[1]				**Work by a climber or from an uninsulated EWP, ladder or the ground**			
	Limit of approach			**Vegetation clearance**	**Limit of approach**			**Vegetation clearance**
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
	EWP	Body	Tool or extension		EWP, climber or ladder	Body	Tool or extension	
Using uninsulated tools	0.3	0.3	Physical clearance[2]	No clearance	0.6	0.3	0.3[4]	Physical clearance[2]
Using insulated tools[3]	0.3	0.3	Physical clearance[2]	No clearance required	0.6	0.3	Physical clearance[2]	No clearance required

1 EWPs that comply with the requirements of subclause 6.2.5 paragraph (a) or (b).

2 'Physical clearance' means that no contact is made with the conductor.

3 Tools that comply with the requirements of subclause 6.2.9.

4 This distance does not apply to working from the ground as uninsulated tools cannot be used in these situations

7.11.2 Increasing Limit of Approach and Vegetation Clearance Distances

(a) The limit of approach and vegetation clearance distances set out in Table 7-1, Table 7-2 and Table 7-3 are minimum distances; increased distances need to be applied where unfavourable conditions occur. For example:

(i) Strong winds - which can make conductors and/or vegetation sway and reduce horizontal distances; or

(ii) High temperatures - which can increase the sag of the conductor and reduce the vertical clearance between the conductor and the vegetation.

(b) In practice, this means that where the power line conductor span exceeds 70 metres, the vegetation clearance and limit of approach distances Table 7-1, Table 7-2 and Table 7-3 in need to be increased by at least 50%.

Where the term 'physical clearance' or 'no clearance required' is used in Table 7-1, Table 7-2 and Table 7-3, the distance shall be the equivalent distance for a bare conductor of the same voltage increased by, at least, 50%

(c) For lines of voltages up to 33,000 volts (distribution lines) where a conductor span is less than 70 metres, the distances contained in Table 7-1, Table 7-2 and Table 7-3 should be adequate in most circumstances.

7.12 Power Lines with Conductors of Different Voltages

This clause explains the application of the limit of approach and vegetation clearance distances contained in Table 7-1, Table 7-2 and Table 7-3 where conductors are **directly above** other conductors that are of a lower voltage.

7.12.1 Work Permitted Beside and Below the Power Line

Where work is only permitted beside or below the power line, the lowest conductors will act as a 'physical barrier' to the conductors directly above. Therefore, in practice:

(a) **The vertical limit of approach distances for the top conductors** will be those that are applicable to the bottom conductors (given that work cannot be carried out in the area between the conductors). (refer to Figure 3 and Figure 4);

(b) **The vertical vegetation clearance distances for the top conductors** will be:

(i) where the bottom conductors are high voltage, the vegetation clearance distances in Table 7-1; or

(ii) where the bottom conductors are low voltage, the vegetation clearance distances will be:

- to the level of the low voltage conductors where the vertical distance between the circuits is less than the applicable vegetation clearance distance for the top conductors set out in Table 7-1; or
- those set out in Table 7-1 where the vertical distance between the circuits is more than the applicable vegetation clearance distance for the top conductors set out in Table 7-1.

Refer to Figure 3 and Figure 4.

(c) **The horizontal limit of approach and vegetation clearance distances for the top conductors** will be those set out in Table 7-1 (refer to Figure 3 and Figure 4).

Figure 3

High voltage conductors

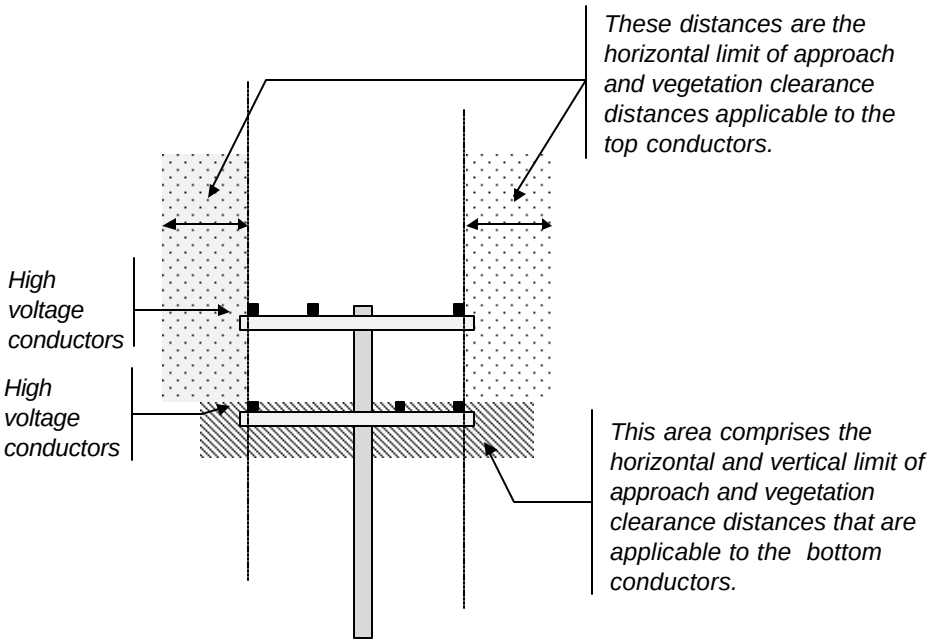
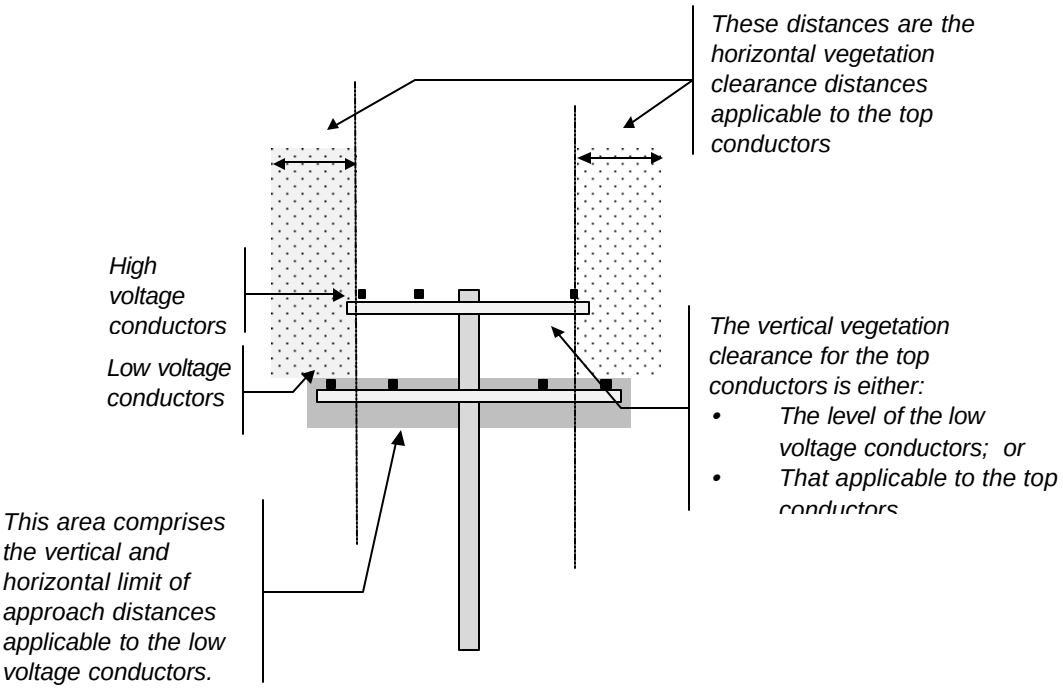


Figure 4

High voltage and low voltage conductors



7.12.2 Work Permitted Above, Beside and Below the Power Line

Where work is permitted above, beside and below the power line, the requirements of subclause 7.12.1 will apply and above the power line, the vertical vegetation clearance and limit of approach distances will be those applicable to the top conductors.

7.13 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) Working where:

(i) an electrical storm is observed in the vicinity of the work site;
(ii) it is raining or in mist or fog; or
(iii) there is excessive wind such that work cannot be carried out safely.

Note: This code of practice does not prevent a climber using any type of ladder to gain access to a tree.

8. Electrical Safety Requirements for Working from an Insulated Elevating Work Platform

Within this section, the limit of approach and vegetation clearance distances from Table 7-1, Table 7-2 and Table 7-3 are minimum distances only and the requirements of subclause 7.11.2 'Increasing Limit of Approach and Vegetation Clearance Distances' must also be taken into consideration.

8.1 High and Low Voltage Power Lines

8.1.1 Insulation of the Elevating Work Platform

The EWP used under this clause must comply with the requirements of paragraph 6.2.5(a) of this Code and be rated for the highest voltage conductor of the power line.

Note: Where, for example, a power line comprises 22,000 volt and 440 volt conductors and an EWP is rated only for the 440 volt conductors, then the electrical safety requirements:

(a) For the 22,000 volt conductors would be those in subclause 9.1.1 (for an uninsulated EWP); and

(b) For the 440 volt conductors, would be those in clause 8.3 (insulated EWPs near low voltage conductors) **but only for working beside and below** those conductors.

Refer to paragraph 13.5.1 (c) for further information.

8.1.2 Beside and Below Any High and Low Voltage Power Line

Where a power line comprises any type of:

- high voltage conductor (bare, insulated); and
- low voltage conductor (bare, covered, insulated, ABC),

vegetation control work from an insulated EWP can be carried out **beside and below** that power line if:

(a) The vegetation is:

(i) no closer to the conductors than the applicable distances in column 3 of Table 7-1; and
(ii) not above the power line;

(b) The applicable limit of approach and vegetation clearance distances in columns 1, 2 and 3 of Table 7-1, Table 7-2 and columns 1, 2 and 3 of Table 7-3 are maintained;

(c) The EWP is not operated above the power line or in the area between the high voltage and low voltage conductors; and

(d) No work is carried out above the power line or in the area between the high voltage and low voltage conductors.

8.1.3 Above, Beside and Below Power Lines with Insulated High Voltage Cables and Any Type of Low Voltage Conductor

Where a power line comprises:

- insulated high voltage cables; and
- any type of low voltage conductor (bare, covered, insulated, ABC),

vegetation control work from an insulated EWP can be carried out **above, beside and below** that power line if:

(a) There are no bare high voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The applicable limit of approach and vegetation clearance distances in columns 1, 2 and 3 of Table 7-1, Table 7-2 and columns 1, 2 and 3 of Table 7-3 are maintained;

(c) The EWP is not operated in the area between the high voltage and low voltage conductors; and

(d) No work is carried out in the area between the high voltage and low voltage conductors.

8.2 High Voltage Power Lines

This clause applies to high voltage power lines where there are no low voltage conductors:

(a) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or

(b) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole.

8.2.1 Insulation of the Elevating Work Platform

The EWP used under this clause must comply with the requirements of paragraph 6.2.5(a) of this Code and be rated for the highest voltage conductor of the power line.

Note: Where, for example, a power line comprises 66,000 volt and 22,000 volt conductors and an EWP is rated only for the 22,000 volt conductors then the electrical safety requirements:

(a) For the 66,000 volt conductors would be those in subclause 9.2.1 (for an uninsulated EWP); and

(b) For the 22,000 volt conductors would be those in this clause but only for working beside and below those conductors.

Refer to paragraph 13.5.1 (c) for further information.

8.2.2 Beside and Below Any High Voltage Power Line

Where a power line comprises any types of high voltage conductor (bare, insulated), vegetation control work from an insulated EWP can be carried out **beside and below** that power line if:

(a) The vegetation is:

(i) no closer to the power line than the applicable distances in column 3 of Table 7-1; and
(ii) not above the power line;

(b) The applicable limit of approach and vegetation clearance distances in columns 1, 2 and 3 of Table 7-1 are maintained;

(c) The EWP is not operated above the power line nor in the area between the high voltage conductors; and

(d) No work is carried out above the power line nor in the area between the high voltage conductors.

8.2.3 Above, Beside and Below Insulated High Voltage Cables

Where a power line is comprised of insulated high voltage cables, vegetation control work from an insulated EWP can be carried out **above, beside and below** that power line if:

(a) There are no bare high voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or

(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The applicable limit of approach distances in columns 1 and 2 of Table 7-1 are maintained;

(c) The EWP is not operated in the area between the high voltage cables; and

(d) No work is carried out in the area between the high voltage cables.

8.3 Low Voltage Power Lines

8.3.1 Insulation of the Elevating Work Platform

The EWP used under this clause must comply with the requirements of paragraph 6.2.5 (a) or (b) of this Code.

8.3.2 Above, Beside and Below Any Low Voltage Power Line

Where a power line comprises any type of low voltage conductor (bare, covered, insulated, ABC), vegetation control work from an insulated EWP can be carried out **above, beside and below** that power line if:

(a) There are no high voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

and

(b) The applicable limit of approach distances in Table 7-2 or columns 1, 2 and 3 of Table 7-3 are maintained.

9. Electrical Safety Requirements for Working from an Uninsulated Elevating Work Platform

Within this section, the limit of approach and vegetation clearance distances from Table 7-1, Table 7-2 and Table 7-3 are minimum distances only and the requirements of subclause 7.11.2 'Increasing Limit of Approach and Vegetation Clearance Distances' must also be taken into consideration.

9.1 High and Low Voltage Power Lines

9.1.1 Beside and Below Any High and Low Voltage Power Line

Where a power line comprises any type of:

- high voltage conductor (bare, insulated); and
- low voltage conductor (bare, covered, insulated, ABC)

vegetation control work from an uninsulated EWP can be carried out **beside and below** that power line if:

(a) In dry conditions:

(i) the vegetation is:
- no closer to the conductors than the applicable distances in column 6 of Table 7-1 and column 8 of Table 7-3; and
- not above the power line;

(ii) the applicable limit of approach and vegetation clearance distances in columns 4, 5 and 6 of Table 7-1, and 5, 6, 7 and 8 of Table 7-3 are maintained;

(iii) the EWP is not operated above the power line nor in the area between the high voltage and low conductors; and

(iv) no work is carried out above the power line nor in the area between the high voltage and low conductors.

(b) In damp conditions where there are bare or covered low voltage conductors:

(i) the requirements of paragraph 9.1.1 (a) are complied with;

(ii) insulated tools are used; and

(iii) the applicable limit of approach and vegetation clearance distances in Table 7-3 relating to the use of insulated tools are complied with.

9.1.2 Above, Beside and Below Power Lines With Insulated High and Low Voltage Cables

Where a power line comprises

- Insulated high voltage cables; and
- Insulated or ABC low voltage cables

vegetation control work from an uninsulated EWP can be carried out **above, beside and below** that power line if:

(a) There are no bare high voltage conductors or bare or covered low voltage conductors:

  (i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
  (ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole

(b) The vegetation is no closer to the conductors than the applicable distances in column 6 of Table 7-1;

(c) The applicable limit of approach and vegetation clearance distances in columns 4, 5 and 6 of Table 7-1 and Table 7-2 are maintained;

(d) The EWP is not operated in the area between the high voltage cables and low voltage cables; and

(e) No work is carried out in the area between the high voltage cables and low voltage cables.

9.2 High Voltage Power Lines

This clause applies to high voltage power lines where there are no low voltage conductors:

(a) In or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or

(b) On or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole.

9.2.1 Beside and Below Any High Voltage Power Line

Where a power line comprises any type of high voltage conductor (bare, insulated), vegetation control work from an uninsulated EWP can be carried out **beside and below** that power line if:

(a) The vegetation is:

  (i) no closer to the power line than the applicable distances in column 6 of Table 7-1; and
  (ii) not above the power line;

(b) The applicable limit of approach and vegetation clearance distances in columns 4, 5 and 6 of Table 7-1 are maintained;

(c) The EWP is not operated above the power line nor in the area between the high voltage conductors; and

(d) No work is carried out above the power line nor in the area between the high voltage conductors.

9.2.2 Above, Beside and Below Insulated High Voltage Cables

Where a power line is comprised of insulated high voltage cables, vegetation control work from an uninsulated EWP can be carried out above, beside and below that power line if:

(a) There are no bare high voltage conductors:

  (i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
  (ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The vegetation is no closer to the power line than the distance in column 6 of Table 7-1;

(c) The applicable limit of approach and vegetation clearance distances in columns 4, 5 and 6 of Table 7-1 are maintained;

(d) The EWP is not operated in the area between the high voltage cables; and

(e) No work is carried out in the area between the high voltage cables.

9.3 Low Voltage Power Lines

This clause applies to low voltage power lines where there are no high voltage conductors:

(a) In or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or

(b) On or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole.

9.3.1 Beside and Below Any Low Voltage Power Line

Where a power line comprises any type of low voltage conductor (bare, covered, insulated, ABC), vegetation control work from an uninsulated EWP can be carried out **beside and below** that power line if:

(a) In dry conditions:

(i) there are no high voltage conductors:
- in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
- on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(ii) the vegetation is no closer to the power line than the applicable distance in column 8 of Table 7-3;

(iii) the applicable limit of approach and vegetation clearance distances in Table 7-2 or columns 5, 6, 7 and 8 of Table 7-3 are maintained;

(iv) the EWP is not operated above the power line; and

(v) no work is carried out above the power line.

(b) In damp conditions, where there are bare or covered low voltage conductors:

(i) the requirements of paragraph 9.3.1 (a) are complied with;

(ii) insulated tools are used; and

(iii) the applicable limit of approach and vegetation clearance distances in Table 7-3 relating to the use of insulated tools are complied with.

9.3.2 Above, Beside and Below Insulated or ABC Low Voltage Cables

Where a power line is comprised of insulated or ABC low voltage conductors, vegetation control work from an uninsulated EWP can be carried out **above, beside and below** that power line if:

(a) There are no high voltage conductors or bare or covered low voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole

and

(b) The applicable limit of approach and vegetation clearance distances in Table 7-2 are maintained.

10. Electrical Safety Requirements for Working from the Ground

Within this section, the limit of approach and vegetation clearance distances from Table 7-1, Table 7-2 and Table 7-3 are minimum distances only and the requirements of subclause 7.11.2 ' Increasing Limit of Approach and Vegetation Clearance Distances ' must also be taken into consideration.

10.1 High And Low Voltage Power Lines

Where a power line comprises any type of:

- high voltage conductor (bare, insulated); and
- low voltage conductor (bare, covered, insulated ABC)

vegetation control work from the ground can be carried out **beside and below the low voltage conductors** of that power line if:

(a) Insulated tools are used;

(b) The vegetation is:

  (i) no closer to the conductors than the applicable distances in column 6 of Table 7-1; and
  (ii) not above the power line;

(c) The applicable limit of approach and vegetation clearance distances in columns 5 and 6 of Table 7-1, Table 7-2 and column 7 of Table 7-3 are maintained; and

(d) The tools are not operated above or beside the high voltage conductors or in the area between the high voltage and low voltage conductors.

10.2 Low Voltage Power Lines

Where a power line comprises any type of low voltage conductor (bare, covered, insulated, ABC) vegetation control work from the ground can be carried out **beside and below** that power line if,

(a) Insulated tools are used; and

(b) The limit of approach distances in Table 7-2 or column 7 of Table 7-3 are maintained.

11. Electrical Safety Requirements for Working as a Climber

Within this section, the limit of approach and vegetation clearance distances from Table 7-1, Table 7-2 and Table 7-3 are minimum distances only and the requirements of subclause 7.11.2 'Increasing Limit of Approach and Vegetation Clearance Distances' must also be taken into consideration.

11.1 High and Low Voltage Power Lines

11.1.1 Beside and Below Any High and Low Voltage Power Line

Where a power line comprises any type of:

- high voltage conductor (bare, insulated); and
- low voltage conductor (bare, covered, insulated, ABC)

vegetation control work by a climber can be carried out **beside and below** that power line if:

(a) In dry conditions:

(i) the vegetation is:
- no closer to the conductors than the applicable distances in column 6 of Table 7-1 and column 8 of Table 7-3; and
- not above the power line;

(ii) the applicable limit of approach and vegetation clearance distances in columns 4, 5 (relating to 'tool or extension') and 6 of Table 7-1, Table 7-2 and columns 5, 7 and 8 of Table 7-3 are maintained;

(iii) the climber maintains such a position that they cannot fall onto or swing into the conductors; and

(iv) no work is carried out above the power line or in the area between the high voltage and low conductors.

(b) In damp conditions where there are bare or covered low voltage conductors:

(i) the requirements of paragraph 11.1.1(a) are complied with;

(ii) insulated tools are used; and

(iii) the applicable limit of approach and vegetation clearance distances in Table 7-3 relating to the use of insulated tools are complied with.

11.1.2 Above, Beside and Below Power Lines With Insulated High and Low Voltage Cables

Where a power line comprises:

- insulated high voltage cables; and
- insulated or ABC low voltage cables

vegetation control work by a climber can be carried out **above, beside and below** that power line if:

(a) There are no bare high voltage conductors or bare or covered low voltage conductors:

  (i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
  (ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The vegetation is no closer to the conductors than the applicable distances in column 6 of Table 7-1;

(c) The applicable limit of approach and vegetation clearance distances in columns 4, 5 (relating to 'tool or extension') and 6 of Table 7-1 and Table 7-2 are maintained;

(d) The climber maintains a position such that they

  (i) are at no time suspended above the conductors; or
  (ii) cannot fall onto or swing into the conductors; and

(e) No work is carried out in the area between the high voltage cables and low voltage cables.

11.2 High Voltage Power Lines

This clause applies to high voltage power lines where there are no low voltage conductors -

(a) In or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or

(b) On or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole.

11.2.2 Beside and Below Any High Voltage Power Line

Where a power line comprises any types of high voltage conductor (bare, insulated), vegetation control work by a climber can be carried out **beside and below** that power line if:

(a) The vegetation is:

  (i) no closer to the power line than the applicable distances in column 6 of Table 7-1; and
  (ii) not above the power line;

(b) The applicable limit of approach and vegetation clearance distances in columns 4, 5 (relating to 'tool or extension') and 6 of Table 7-1 are maintained;

(c) The climber maintains such a position that they cannot fall onto or swing into the high voltage conductors; and

(d) No work is carried out above the power line nor in the area between the high voltage conductors.

11.2.3 Above, Beside and Below Insulated High Voltage Cables

Where a power line is comprised of insulated high voltage cables, vegetation control work by a climber can be carried out **above, beside and below** that power line if:

(a) There are no bare high voltage conductors:

  (i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
  (ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The vegetation is no closer to the power line than the distance in column 6 of Table 7-1;

(c) The applicable limit of approach and vegetation clearance distances in columns 4, 5 (relating to 'tool or extension') and 6 of Table 7-1 are maintained;

(d) The climber maintains such a position that they:

(i) are at no time suspended above the conductors; or
(ii) cannot fall onto or swing into the conductors; and

(e) No work is carried out in the area between the high voltage cables.

11.3 Low Voltage Power Lines

Where a power line comprises any type of low voltage conductor (bare, covered, insulated, ABC), vegetation control work by a climber can be carried out **above, beside and below** that power line if:

11.3.1 In Dry Conditions

(a) There are no high voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The vegetation is no closer to the power line than the applicable distance in column 8 of Table 7-3;

(c) The applicable limit of approach and vegetation clearance distances in Table 7-2 or columns 5, 7 and 8 of Table 7-3 are maintained;

(d) The climber maintains a position such that they:

(i) are at no time suspended above the conductors; or
(ii) cannot fall onto or swing into the low voltage conductors.

11.3.2 In Damp Conditions, Where There Are Bare or Covered Conductors

(a) The requirements of subclause 11.3.1 are complied with;

(b) Insulated tools are used; and

(c) The applicable limit of approach and vegetation clearance distances in Table 7-3 relating to the use of insulated tools are complied with.

12. Electrical Safety Requirements for Working from a Wooden or Fibreglass Ladder

12.1 Work Permitted from a Wooden or Fibreglass Ladder

(a) Wherever possible, working directly from a wood or fibreglass ladder should be avoided and one of the other methods set out in section 8, 9, 10 or 11 should be used.

Ladders when used for vegetation control work do not provide a sufficiently stable work platform particularly when handling or controlling branches.

(b) Vegetation control work from a wood or fibreglass ladder is permitted to be carried out only beside and below a low voltage power line.

(c) The limit of approach and vegetation clearance distances from Table 7-2 or Table 7-3 are minimum distances only and the requirements of subclause 7.11.2 ' Increasing Limit of Approach and Vegetation Clearance Distances ' must also be taken into consideration.

12.2 Low Voltage Power Lines

Where a power line comprises any type of low voltage conductor (bare, covered, insulated, ABC), vegetation control work from a wooden or fibreglass ladder can be carried out **beside and below** that power line if:

12.2.1 In Dry Conditions

(a) There are no high voltage conductors:

(i) in or crossing the conductor span near where the work is to be carried out or on or crossing the poles supporting that conductor span; or
(ii) on or crossing the pole near where the work is to be carried out or in or crossing the conductor spans supported by that pole;

(b) The vegetation is:

(i) no closer to the power line than the applicable distances in column 8 of Table 7-3; and
(ii) not above the power line.

(c) The applicable limit of approach distances in Table 7-2 or columns 5, 6 and 7 of Table 7-3 are maintained; and

(d) No work is carried out above the power line.

12.2.2 In Damp Conditions Where There Are Bare or Covered Conductors

(a) The requirements of subclause 11.3.1 In Dry Conditions are complied with;

(b) Insulated tools are used; and

(c) The applicable limit of approach distances in Table 7-3 relating to the use of insulated tools are complied with.

13. Electrical Safety Requirements for the Use of Safety and Personnel Safety Equipment, Tools and Vehicles

13.1 General

Workers shall:

(a) Only use safety equipment that their employer has:

  (i) confirmed as complying with section 6; and
  (ii) inspected and/or tested at regular intervals and that inspection and/or test has deemed the equipment safe to use;

(b) Ensure that any safety equipment is in sound condition before being used;

(c) Ensure that sufficient safety equipment is available to enable work to be carried out in a manner that is safe for themselves, other workers and the public; and

(d) Use all safety equipment in the manner and the purpose for which it is issued and in accordance with the requirements of this Code.

13.2 Use of Personnel Safety Equipment

13.2.1 Vegetation in Contact or Above a Low Voltage Power Line

Where vegetation is in contact with or above a low voltage power line, the following shall be worn by all workers:

(a) Eye protection

(b) Safety footwear

(c) Safety helmets

(d) Gloves

(e) Protective clothing – including full body flame retardant overalls or cotton or natural fibre long sleeve shirt and trousers that cover the arms and legs.

13.2.2 Vegetation not in Contact with Conductors

Where vegetation is not in contact with a power line, the following shall be worn by all workers:

(a) Eye protection

(b) Safety footwear

(c) Safety helmets

(d) Protective clothing - clothing appropriate to the work location and conditions. Chainsaw operators should wear cotton or natural fibre clothing in preference to synthetics.

13.3 Hearing Protection

Hearing protection should be worn where appropriate.

13.4 Insulated Tools

Insulated tools shall be wiped clean before being used and inspected to ensure that all fittings are securely attached and the tool operates correctly.

Insulated tools shall not be laid on bare ground when not in use.

Insulating tools should be used without the use of additional precautions such as insulating gloves.

13.5 Elevating Work Platforms

13.5.1 Insulated Elevating Work Platforms

(a) Inspection Before Work

Prior to being used, an insulated elevating work platform shall be inspected to establish whether the insulating surfaces and components are in sound condition. If necessary, all insulating surfaces and components shall be wiped clean with a silicon impregnated cloth.

(b) Insulation

An insulated EWP shall only be considered insulated where it complies with the electrical test requirements (refer to subclause 6.2.5) relating to the voltage of the power line near which it is to be used.

For example:

- An insulated EWP that complies with the electrical test requirements for low voltage is an uninsulated EWP for working near high voltage power lines; or
- An insulated EWP that complies with the electrical test requirements for 33,000 volts is an insulated EWP for working near low voltage power lines and power lines up to 33,000 volts but an uninsulated EWP for working near power lines over 33,000 volts.

(c) Working near power lines with conductors of different voltages

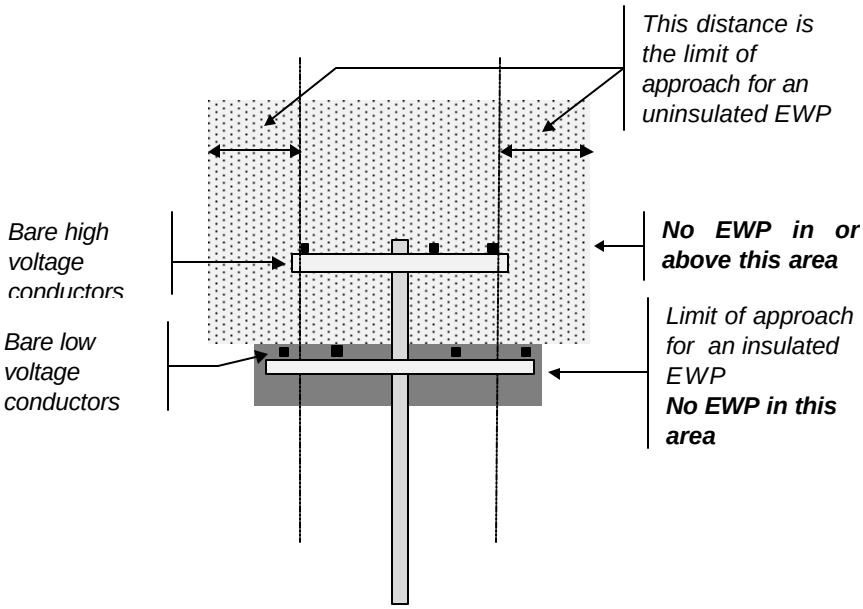
Where an insulated EWP is not insulated for the range of voltages at a work site, the EWP shall only be operated at the limit of approach distances for insulated EWP's in the area level with or below the conductors for which it is rated.

In all other cases, it shall be operated at the limit of approach for uninsulated EWP's.

For example:

Where an EWP rated for low voltage is being used near power lines having bare low voltage and 22,000 volt conductors, the EWP is operated at the limit of approach distances for uninsulated EWP's above the level of the low voltage conductors. (refer to Figure 5).

Figure 5



13.5.2 Earthing

The chassis of an EWP must be connected to earth by means of a lead and metal earthing spike driven into the ground when vegtation control work is carried out within the danger zone of a high voltage power line.

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.

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 should be obtained (from the local shire, Water Authority, AlintaGas, Western Power, Telstra etc.) before work commences.

13.5.3 Electrical Leads and Conductive Hoses

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

14. Electrical Safety Requirements for High Voltage Vegetation Work from an Insulated Elevating Work Platform

14.1 Introduction

'High voltage vegetation work' is a type of vegetation control work that is carried out from an insulated EWP within the distances set out in Table 7-1, Table 7-2 and Table 7-3.

This type of vegetation control work is based on the principles used in live line hot-stick work (a specialised work technique used by trained linespersons for working on live bare high voltage conductors).

14.2 Scope and Application

This section of the Code applies to high voltage vegetation work as defined in Clause 14.3.1.

(a) High voltage vegetation work:

(i) must be carried out in accordance with the requirements of this section and the applicable requirements of sections 1 to 13;
(ii) can only be carried out by EWP tree workers; and
(iii) must be carried out from insulated elevating work platforms.

(b) Where low voltage conductors are in the vicinity of or form part of a power line near where high voltage vegetation work is to be carried out, vegetation control work near those low voltage conductors is to be carried out in accordance with the requirements of this section.

(c) If any requirement in this section differs from any requirement in sections 1 to 13, the requirement in this section must be followed.

This section does not apply to **any type** of vegetation control work within the danger zone of power lines of voltages over 33,000 volts. This work must be done in accordance with the requirements of sections 1 to 13.

14.3 Definitions and Interpretations

14.3.1 Definitions

Within this section, the following definitions apply in addition to the relevant definitions in clause 3.1:

'assistant' means a person who carries 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, feeding vegetation into a chipper, etc.

'EWP' means an insulated elevating work platform.

'EWP tree worker' means a person who is competent in the skills listed in clause 14.10.1 of the Code.

'high voltage insulated cable' means any high voltage ABC cable or IUC cable.

'high voltage insulated tool' means a tool that has the handle section made of insulating material which prevents danger of electric shock should the end of the tool, opposite to that which is held, contact a live exposed conductor or part.

'high voltage vegetation work' or **'work'** means any vegetation control work carried out **above, beside or below** live overhead power lines of voltages up to and including 33,000 volts where:

(a) Vegetation is closer than the distances in column 3 of Table 7-1; or

(b) The insulated EWP is operated closer than the distances in column 1 of Table 7-1 or column 1 of Table 7-3; or

(c) Work is carried out, or a tool is used, closer than the distances in column 2 of Table 7-1 or column 2 of Table 7-3.

'hot-stick work' means work performed on the components of a high voltage overhead power line that is energised or is capable of being energised where the full protective practice of isolating, proving de-energised and earthing has not been fully implemented.

'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.

'IUC' means high voltage Insulated Unscreened Conductors. Each conductor is separately insulated, to prevent arcing, but not to the extent where it can be touched without risk of electric shock.

'linesperson' means a person who has been trained in electrical linework to the satisfaction of the Director of Energy Safety.

'live line stick' means a stick of insulating material specifically designed and tested for use for safely bridging the distance between a live line worker and live high voltage conductors or parts.

'live line worker' means a linesperson who has been trained in accordance with a system that is consistent with the requirements of the 'Guidelines For Live Line Stick Work - ND/NL - 01 - December 1993' (issued by the Electricity Supply Association of Australia Limited) to carry out live line hot-stick work on live high voltage overhead power lines.

'low voltage insulated cable' means an insulated service cable, neutral screened cable or low voltage ABC cable.

'recipient in charge' means an EWP tree worker who has been authorised in writing by their employer to receive and be in charge of a vicinity authority and a work site.

'safety observer' means a person who:

(a) has the skills listed in clause 5.1 or has been trained in rescue techniques appropriate to high voltage vegetation work; and

(b) has received instruction in the limit of approach and vegetation clearance distances specified in Table 14-1 and Table 14-2.

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

'vicinity authority' means a [pre-printed] form that, when completed, authorises work in the vicinity of high voltage electrical apparatus.

14.3.2 Interpretations

The interpretations detailed in clause 3.2 apply to this section.

14.4 Basic Requirements for Carrying Out High Voltage Vegetation Work

High voltage vegetation work shall only be carried out if:

(a) A vicinity authority is issued that permits the work to be carried out;

(b) The auto-reclose facilities are disabled on the power line near which the work is to be carried out;

(c) Work is carried out from insulated elevating work platforms;

(d) Work is carried out by at least two EWP workers. Usually this will mean that both workers will work from the same EWP basket. However if conditions are such that two (or more) EWPs are used, this requirement can be met by having an EWP tree worker in each EWP basket;

(e) A safety observer (or observers) is appointed;

(f) All vehicles, tools and equipment comply with the requirements of this section and all other applicable sections of the Code; and

(g) All work is carried out in accordance with the requirements of this section and all other applicable sections of the Code.

14.5 Vicinity Authority and Disabling of Auto-Reclose Facilities

Before work commences, a vicinity authority must be compiled and issued and auto-reclose facilities disabled in accordance with the following requirements.

14.5.1 Compiling the Vicinity Authority

(a) A vicinity authority shall contain the information detailed in clause 14.9.

(b) A vicinity authority shall be compiled after a visit has been made to the work site by the issuer, preferably with the recipient in charge.

(c) An issuer shall not compile a vicinity authority solely from drawings or switching programs.

14.5.2 Disabling of Auto-Reclose Facilities

The operator of the high voltage line near where the high voltage vegetation work is to be carried out shall, in accordance with the vicinity authority,:

(a) Disable the auto-reclose facility controlling the high voltage power line.

The disabling of the auto-reclose facility shall have the effect that in the event of a fault occurring on the power line, protective equipment will automatically disconnect the power supply, but will not be capable of automatically restoring the electricity supply; and

(b) Attach a notice that advises of the high voltage vegetation work in progress and the location of that work, to the controlling mechanism of the disabled auto-reclose facility.

14.5.3 Issuing the Vicinity Authority

The vicinity authority shall be issued by or under the control of the operator of the power line near which the high voltage vegetation work is to be carried out.

The responsibility of the issuer is to:

(a) Issue the vicinity authority only to a recipient in charge; and

(b) Certify on the vicinity authority that:
  (i) the location of the high voltage vegetation work is accurately described;
  (ii) appropriate safety precautions are detailed on the vicinity authority; and
  (iii) the voltages of all of the conductors at the work site are accurately detailed on the vicinity authority.

The responsibility of the recipient in charge is to:

(a) receive the vicinity authority only from an issuer; and

(b) certify on the vicinity authority that:
  (i) the location of the high voltage vegetation work is accurately described;
  (ii) appropriate safety precautions have been taken;
  (iii) the voltages of all of the conductors at the work site are accurately detailed; and
  (iv) all members of the work party have read and understood the conditions of the vicinity authority.

14.6 Requirements Before Work Commences

The recipient in charge shall, where required, carry out the following before work commences and ensure all other requirements are met.

14.6.1 Work Party

The recipient in charge shall ensure that all members of the work party are trained and fully capable of safely performing their role in the work and also ensure that:

(a) There are at least two EWP tree workers available to carry out high voltage vegetation work;

(b) EWP tree workers who are required to operate an EWP, hold a certificate of competency issued under Part 6 of the *Occupational Safety and Health Regulations 1996* to operate elevating work platforms; and

(c) There is another person on the ground who can operate an EWP in an emergency. This person must also hold a certificate of competency issued under Part 6 of the *Occupational Safety and Health Regulations 1996* to operate elevating work platforms.

14.6.2 Personal Protective Safety Equipment

The recipient in charge shall ensure that members of the work party wear the following personal protective safety equipment:

(a) EWP Tree Workers And Safety Observers:

(i) eye protection;
(ii) safety footwear;
(iii) safety helmets; and
(iv) full body flame retardant overalls or cotton or natural fibre long sleeve shirt and trousers that cover the arms and legs.

(b) Assistants:

(i) eye protection;
(ii) safety footwear;
(iii) safety helmets; and
(iv) clothing appropriate to the work location and conditions.

(c) Hearing protection must also be used where appropriate.

14.6.3 Appointment of Safety Observers

The recipient in charge shall appoint safety observers where:

(a) An EWP is to be placed or operated in a position where any part of the vehicle could accidentally contact a live conductor or part; or

(b) Any part of a persons body or any tool could accidentally contact a conductor or part.

Due to the position or complexity of the work, more than one safety observer may be required. For example, the position of an EWP above a power line could be such that the distance between the basket and the conductors below needs to be monitored. This would mean that two observers are required with one on the ground observing the distances from that angle and the other in the EWP basket observing the distances from that angle.

If one of the EWP tree workers is a safety observer observing the distances from the basket, the other EWP tree worker must be able to safely carry out the work unaided. A safety observer can have no other duties (refer to the definition 'safety observer').

14.6.4 Limit of Approach and Vegetation Clearance Distances

An EWP tree worker shall ensure:

(a) The vegetation to be worked on is no closer to the conductors than the applicable distance in column 3 of Table 14-1; and

(b) The applicable limit of approach and vegetation clearance distances in Table 14-1 and Table 14-2 can be maintained during the work.

Table 14-1
High Voltage Conductors
Limit of Approach and Vegetation Clearance Distances (m)

Voltage and Type of Conductor	Limit of approach			Vegetation clearance
	Column 1	Column 2	Column 3	Column 4
	EWP[1]	**Body**	**Tool[2] or stick[2]**	
1,001 up to 22,000 volts[3]	1.0	0.75	0.38	above - 0.38 beside - 0.38 below - No clearance required
Over 22,000 up to 33,000 volts[3]	1.5	1.0	0.6	0.6
High Voltage Insulated Cables	0.38	0.38	0.38	No clearance required

1 EWPs that comply with clause 14.11.2.
2 Tools and sticks that comply with the requirements of clause 14.11.3.
3 Bare conductors.

Table 14-2 Low Voltage Conductors Limit of Approach and Vegetation Clearance Distances		
Voltage and type of conductor	**EWP[1], Body, Tool[2] or Stick[2]**	**Vegetation**
Low Voltage Insulated Cables	Physical clearance[3]	No clearance required
Covered or Bare Conductors	Physical clearance[3]	No clearance required

[1] EWPs that comply with clause 14.11.2.
[2] Tools and sticks that comply with the requirements of clause 14.11.3.
[3] 'Physical clearance' means that no contact is made with the conductor.

14.6.5 Insulated Elevating Work Platforms

Insulated elevating work platforms shall comply with the following requirements before being used.

(a) Electrical test certificate

Each EWP has an electrical test certificate that has been issued within the previous six months and that states the platform complies with the testing requirements.

(b) Rating

Each EWP has a rating for the conductor of the highest voltage at the work site.

(c) 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.

(d) Inspection

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

14.6.6 High Voltage Insulated Tools and Live Line Sticks

High voltage insulated tools and live line sticks shall comply with the following requirements before being used:

(a) Proof of testing

Each tool and stick has been tested within the previous six months. Verification can be by the markings on the tool or stick or sighting a test certificate or a register.

(b) Rating

Each tool or stick must have a rating for the conductor of the highest voltage at the work site. A combination of tool and stick or sticks may be used to achieve the rating.

(c) Cleaning

Each tool and stick must be wiped thoroughly with a clean, dry cloth then wiped thoroughly with a silicone impregnated cloth.

(d) Inspection

Each tool and stick must be inspected to ensure:

(i) the insulation is not cracked or the surface damaged, all fittings are securely attached and there are no other defects apparent; and
(ii) it operates correctly.

14.6.7 Work Briefing by the Recipient in Charge

The recipient in charge shall conduct a work briefing session:

(a) At which an explanation of the following shall be included:

(i) WHY the high voltage vegetation work is to be done;
(ii) WHAT is to be accomplished; and
(iii) HOW the high voltage vegetation work is to be carried out.

(b) To ensure that all members of the work party understand the conditions of the vicinity authority.

(c) To address specific factors which affect safety such as:

(i) The voltage (or voltages) of the power line conductors near which the high voltage vegetation work is to be carried out:

- the limit of approach distances for each conductor; and
- the vegetation clearance distances for each conductor.

(ii) Hazards that exist and how those hazards are to be handled to ensure the safety of all persons at the work site, other workers and the public.

(d) To ensure all members of the working party:

(i) know who has been appointed as a safety observer; and
(ii) understand that they must immediately comply with any instruction or direction given by a safety observer.

14.7 Requirements During the Work

14.7.1 Recipient in Charge

The recipient in charge shall ensure that:

(a) Work is carried out in accordance with the conditions of the vicinity authority and the Code;

(b) All members of the work party are informed of any change in the conditions under which the party is working;

(c) Any person who joins the work party after work has commenced is made fully aware of the current work conditions (including those matters discussed at the work briefing); and

(d) Any member of the work party who leaves the work site and returns is made aware of the current work conditions before recommencing work.

14.7.2 Power Lines Becoming De-energised During Work

If the power line becomes de-energised during the work, the operator shall not liven that power line without the express permission of the recipient in charge.

14.7.3 Positioning Insulated Elevating Work Platforms

These requirements must be followed when positioning an insulated elevating work platform at a work site:

(a) The EWP shall be placed to enable the work to be carried out from the safest work position available;

(b) The chassis of the EWP must be connected to earth by means of a lead and metal earthing spike driven into the ground.

Care must be taken to avoid driving the spike into underground services. Information on the location of underground services in the area where high voltage vegetation work is to be carried out should be obtained (from the local shire, Water Authority, AlintaGas, Western Power, Telstra etc) before work commences; and

(c) Stabilisers shall be in place and locked in position (where this facility is available) before the boom is raised.

14.7.4 Maintaining Limit of Approach and Vegetation Clearance Distances

The applicable limit of approach and vegetation clearance distances in Table 14-1 and Table 14-2 must be maintained during the work.

14.7.5 Increasing Limit of Approach and Vegetation Clearance Distances

Where a conductor span is less than 70 metres, the distances contained in Table 14-1 and Table 14-2 will be adequate in most circumstances.

However, under unfavourable conditions and particularly where a conductor span is over 70 metres, increased distances need to be applied. For example:

- Wind - which can make conductors and/or vegetation sway and reduce horizontal distances; or
- High temperatures - which can increase the sag of a conductor and reduce the vertical clearance between the conductor and the vegetation or the conductor and the ground.

In practice, this means that under unfavourable conditions, the vegetation clearance and limit of approach distances in Table 14-1 and Table 14-2 need to be increased by at least 50%.

Note: 1 Where the term 'no clearance required' is used in Table 14-1, the distance used shall be the equivalent distance for a bare conductor of the same voltage increased by at least 50%.

2 Where the term 'physical clearance' or 'no clearance required' is used in Table 14-2, the distance shall be at least 0.45 metres.

14.7.6 Safety Observer Position and Duties

A safety observer must:

(a) Be in position before EWP tree workers commence work.

An observer does not need to be on the ground. For example, the best position for an observer could be in the basket of an EWP (a safe distance from the conductors must be maintained at all times).

(b) While work is in progress, at all times be in a position:

(i) that gives an unobstructed view of the distances between any part of a person, tool or vehicle and the conductor of a power line; and
(ii) to be able to effectively communicate with the personnel in the EWP baskets.

(c) Immediately inform the work party if a dangerous condition is likely to occur.

(d) Ensure all high voltage vegetation work is stopped if a dangerous condition occurs.

14.7.7 Low Voltage Conductors at the Work Site

Where low voltage conductors are also at the work site, work must be completed in the area around those conductors first.

14.7.8 Work Requirements for EWP Tree Workers

EWP tree workers shall comply with the following requirements when working:

(a) A safety harness must be worn. The harness must be attached to the anchor point before the basket is moved.

(b) All work must be carried out from inside the EWP basket, with at least one foot on the basket floor at all times except when exiting the basket in emergencies.

(c) No worker shall place themselves:

(i) in the area between the conductors of a power line that operate at the same voltage;

(ii) in the area between the conductors of a power line that operate at different voltages; or

(iii) where one power line crosses another power line, in the area between the conductors of those power lines,

except that a linesperson, who is also an EWP tree worker, may work in the area between low voltage conductors provided the limit of approach and vegetation clearance distances in Table 14-1 are maintained at all times.

(d) Objects such as electric leads (for portable electrical appliances), hoses, pipes or ropes must not be run from the vehicle or the ground to the EWP basket. This does not include hydraulic and pneumatic hoses which form an integral part of, and are electrically tested along with, an EWP.

Ropes can be used from the basket of the EWP for the raising or lowering of tools and equipment or lowering vegetation that has been cut, provided that:

- The basket is first moved to a position outside the danger zone of the power line before the rope is run out; and
- The rope is left on the ground or stowed in the basket before the basket is moved back into the danger zone.

(e) Operating Insulating Elevating Work Platforms

(i) The EWP shall be operated by the basket controls unless procedures are in place that permit control from the ground controls.

(ii) The EWP shall be placed in the safest work position available. This means the furthest distance from a live conductor where work is still able to be safely carried out.

(iii) Before moving the EWP basket to another position, an inspection must be carried out to ensure it is safe to do so.

(iv) Care must be taken to ensure that the safe working load of the EWP is not exceeded, particularly when carrying cut or pruned vegetation in the basket.

(v) EWPs shall not be operated:

- in the area between the conductors of a power line that operate at the same voltage;
- in the area between the conductors of a power line that operate at different voltages; or

- where one power line crosses another power line, in the area between the conductors of those power lines.

(f) Tools and equipment must not be used:

(i) in the area between the high voltage conductors of a power line that operate at the same voltage;
(ii) in the area between the high voltage conductors of a power line that operate at different voltages; or
(iii) where one high voltage power line crosses another high voltage power line, in the area between the conductors of those power lines.

(g) High voltage insulated tools or live line sticks:

(i) must be used where:
- the vegetation is closer to a high voltage conductor than the distances in column 3 of Table 7-1; or
- it is intended to work or use a tool or stick closer than the distances in column 2 of Table 7-1;

(ii) must be handled carefully to avoid damage to the moisture-resistant hard gloss surface finish; and
(iii) shall not be laid directly on the ground;

(h) Care must be taken to ensure that the safe working load of a high voltage insulated tool or live line stick is not exceeded.

(i) Control of Vegetation Near Bare High Voltage Conductors

(i) care must be taken to ensure that insulators or conductors are not 'shorted out' by vegetation.
(ii) vegetation near bare high voltage conductors must be cut, trimmed, felled or pruned:
- in sections small enough to be supported and/or controlled by hand or by tools held in the hand; and
- so that it cannot encroach the vegetation clearance distance of any conductor.

(iii) where any part of the vegetation cannot be supported and controlled so that it does not encroach the vegetation clearance distances of a bare high voltage conductor, **work must immediately stop** and:
- work methods changed so that there is no possibility of the vegetation encroaching the vegetation clearance distances; or
- arrangements are made with the operator to have the power line isolated and earthed;

(iv) where any vegetation falls towards a bare high voltage conductor, no attempt shall be made to stop it.
(v) where any vegetation makes contact with a bare high voltage conductor, **work must immediately stop.** Work shall not recommence until permission has been given by the issuer.
(vi) where any vegetation comes to rest on a bare high voltage conductor, **work must immediately stop,** and arrangements made with the issuer to have the line isolated and earthed.

(j) Control of Vegetation Near High Voltage Insulated Cables and Low Voltage Conductors

(i) vegetation near high voltage insulated cables and low voltage conductors must be cut, trimmed, felled or pruned in sections small enough to be supported and/or controlled by hand or by tools held in the hand:
- so the high voltage insulated cable or low voltage conductor are not damaged; and
- the clearances between the low voltage conductors of a power line can be maintained.

(ii) where any part of the vegetation cannot be supported and controlled so that damage will not occur to the high voltage insulated cable or low voltage conductor **work must immediately stop** and:
- work methods changed so that there is no possibility of damage; or
- arrangements are made with the issuer to have the power line isolated and (if applicable) earthed.

14.7.9 Position of Members of the Working Party on the Ground

Members of the work party on the ground shall avoid positioning themselves under the place where the high voltage vegetation work is being carried out.

14.8 Requirements at the Completion of the Work

At the completion of the work, the recipient in charge must:

(a) Ensure that all members of the work party, tools and vehicles are outside the danger zone of the power line;

(b) Instruct all members of the work party that the vicinity authority is now relinquished and no further high voltage vegetation work is to be carried out within the danger zone of a power line at the work site;

(c) Notify the issuer that the vicinity authority is now relinquished and no further high voltage vegetation work will be carried out within the danger zone of a power line at the work site; and

(d) Ensure high voltage insulated tools and live line sticks are transported and stored in accordance with paragraphs 14.11.3 (e) and (f).

14.9 Vicinity Authority Forms

Vicinity authority forms shall include the following information:

(a) The name of the recipient in charge and the issuer;

(b) The name of the company carrying out the high voltage vegetation work;

(c) The date and time the vicinity authority is issued;

(d) A description of the high voltage vegetation work to be carried out;

(e) The location where that work is to be carried out;

(f) A description of the precautions taken including the place where notices have been attached to the control mechanisms of the disabled auto-reclose facility;

(g) Instructions to be observed by the work party;

(h) A description of the live apparatus at the work site;

(i) The voltage of the live apparatus and the limit of approach and vegetation clearance distances to be maintained;

(j) Safety observer names; and

(k) The date and time the vicinity authority was cancelled.

14.10 Training and Skills

14.10.1 EWP Tree Worker Skills

EWP tree workers shall have the following skills:

(a) The skills detailed in clauses 5.1 and 5.2.1;

(b) Understanding and using a vicinity authority;

(c) The care and maintenance of an insulated EWP;

(d) The care, maintenance, storage and transportation of high voltage insulated tools and live line sticks;

(e) Safely carrying out high voltage vegetation work including:

(i) control of branches and limbs;
(ii) positioning an insulated EWP near bare live high voltage conductors including:
- earthing of the chassis of an EWP;
- positioning of an EWP to permit safe operation;

(iii) operating an insulated EWP near bare live high voltage conductors including:
- placing the basket in the safest possible position;
- maintaining the limit of approach distances and vegetation clearance distances;

(f) The rescue of an EWP tree worker from an EWP; and

(g) Working with high voltage insulated tools and live line sticks.

14.10.2 Training Authorities and Trainers

(a) Training given to tree workers to enable them to carry out work as EWP tree workers shall cover those skills listed in paragraphs 14.10.1 (b), (c), (d), (e), (f) and (g).

(b) Training authorities are required to be approved by the Director of Energy Safety; and

(c) Training for high voltage vegetation work shall be conducted by and under the supervision of a live line hot-stick work instructor.

14.11 Requirements for Safety Equipment, Personal Protective Safety Equipment, Tools and Vehicles

14.11.1 General

The requirements of clauses 6.1, 6.2.1, 6.2.2, 6.2.6, 6.2.7, 6.2.8, 6.2.11 and 13.1 also apply to this section.

14.11.2 Insulated Elevating Work Platforms

(a) Design and Testing Requirements

An insulating elevating work platform must:

(i) comply with the design requirements of paragraph 1.5.12.3 (b) of AS 1418.10 - 1987 'SAA Crane Code Part 10 - Elevating Work Platforms';
(ii) have only non-conductive oil in the hydraulic lines;
(iii) be tested in accordance with the requirements of subclause 1.11.3.4 of AS 1418.10 - 1987 at intervals not exceeding 6 months; and
(iv) be used as an insulated EWP only if it complies with the test requirements.

AS 1418.10:1996 can be used as an alternative to AS 1418.10 - 1987.

(b) Cleaning Insulating Components

As vegetation control work results in by-products (wood chips, dust or sap) which can easily contaminate the insulating components of an EWP and reduce the effectiveness of the insulation, the insulating components of each EWP shall be cleaned (at least) on a weekly basis, as follows:

(i) Cleaning must be carried out with a soft cloth or sponge. Wire brushes, steel wool, or abrasive materials or substances **shall not be used**.
(ii) The outer surfaces of the insulating boom, the inside of the basket and the basket insulation shall be cleaned with plain water (water with a mild non-acid detergent may be used, provided it complies with the manufacturers instructions).
(iii) After the insulating surfaces have dried out, all surfaces shall be treated with a silicone impregnated cloth.
(iv) If accessible, the inside of the boom insulating component shall be flushed out with plain water.

14.11.3 High Voltage Insulated Tools and Live Line Sticks

(a) Design and Testing

High voltage insulated tools and live line sticks shall:

(i) comply with the requirements of ASTM:F711 'Specification for Fibreglass - Reinforced Plastic (FRP) Rod and Tube used in Live Line Tools';
(ii) be tested in accordance with the requirements of ASTM:F711 at intervals not exceeding 6 months; and
(iii) be issued for use only if they comply with the test requirements.

(b) Recording of the Testing

The testing of tools and sticks shall be recorded in one of the following manners:

(i) by marking the date the next test is due on the tools or sticks;
(ii) by issuing a test certificate that states the details of the test; or
(iii) by recording the details of the testing in a register.

(c) Cleaning

The insulating surfaces of the tools and sticks should first be cleaned using clean non-silicon cleaning cloths. The tool or stick is then thoroughly wiped with a silicone impregnated cloth.

(d) Repairs

Repairs to the surface coating of a tool or stick may be made by light sanding and re-coating with an epoxy varnish or coating recommended by the manufacturer.

Before being used, the repaired tool or stick must be tested in accordance with the requirements of ASTM:F711 to ensure compliance with the test requirements of that standard.

(e) Transport

Tools and sticks must be carried in suitable carrying rolls or containers, or on racks or supports designed for the purpose. They must not be carried loose.

(f) Storage

Tools and live line sticks must be kept in a dry clean place, preferably on supports and away from items that could damage their surface coating.

14.12 Work Conditions Prohibited

The following work conditions are prohibited when carrying out high voltage vegetation work:

(a) Working while standing on a ladder;

(b) Working as a climber;

(c) Working while standing on the ground;

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

(e) Working where:

(i) an electrical storm is taking place in the vicinity of the work site;
(ii) it is raining or in mist or fog; or
(iii) there is excessive wind such that work cannot be carried out safely (it is recommended that work not be carried out where constant winds exceed 40 km/hr);

(f) Working before dawn or after dusk;

(g) Using any type of rope to control vegetation;

(h) 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

(i) 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.

15. Electrical Safety Requirements for Live Line Workers Carrying Out Vegetation Control Work

15.1 Introduction

Live line hot-stick work is a specialised work technique used by trained linespersons for working on live bare high voltage conductors.

Live line workers carrying out vegetation control work using live line hot-stick work procedures are able to work with limit of approach and vegetation clearance distances that are less than those detailed in sections 1 to 14 and use work techniques not available to tree workers or EWP tree workers (such as moving live high voltage conductors to obtain the necessary vegetation clearance distances).

15.2 Scope and Application

This section of the Code applies only to live line workers as defined in clause 15.3.1.

Live line workers may carry out:

(a) Vegetation control work within the danger zone of any live overhead power line in accordance with the requirements of sections 1 to 13 and in doing so can undertake any of the duties and responsibilities of a tree worker; or

(b) High voltage vegetation work within the danger zone of any live overhead power line of a voltage up to and including 33,000 volts in accordance with the requirements of section 14 and in doing so can undertake any of the duties and responsibilities of an EWP tree worker; or

(c) Vegetation control work within the danger zone of any live overhead power line in accordance with the requirements of this section.

15.3 Definitions and Interpretations

15.3.1 Definitions

Within this section, the following definitions apply in addition to the relevant definitions in clause 3.1:

'EWP tree worker' means as defined in clause 14.3.1 of the Code.

'high voltage vegetation work' means as defined in clause 14.3.1 of the Code.

'live line hot-stick work' means work performed on the components of a high voltage overhead power line that is energised or is capable of being energised where the full protective practice of isolating, proving de-energised and earthing has not been fully implemented.

'live line stick' means a stick of insulating material specifically designed and tested for use for safely bridging the distance between a live line worker and live high voltage conductors or parts.

'live line worker' means a linesperson who has been trained in electrical linework to the satisfaction of the Director of Energy Safety and who has received additional training in accordance with a system that is consistent with the requirements of the 'Guidelines For Live Line Stick Work - ND/NL - 01 - December 1993' (issued by the Electricity Supply Association of Australia Limited) to carry out live line hot-stick work on live high voltage overhead power lines.

'safety observer' means a person who is competent in working with live line hot-stick crews and familiar with the live line hot-stick work procedure being used.

'vicinity authority' means a [pre-printed] form that, when completed, authorises work in the vicinity of high voltage electrical apparatus and that contains the details specified in clause 14.9.

15.3.2 Interpretations

The interpretations detailed in clause 3.2 apply to this section.

15.4 Working in Accordance with Live Line Hot-Stick Work Techniques

Live line workers may carry out vegetation control work within the danger zone of any live overhead power line using live line hot-stick work techniques, provided work is carried out in accordance with a live line hot-stick manual and associated live line hot-stick work procedures.

15.5 Live Line Hot-Stick Manual

A live line hot-stick manual must:

(a) Be consistent with the requirements of the 'Guidelines For Live Line Stick Work - ND/NL - 01 - December 1993' (issued by the Electricity Supply Association of Australia Limited); and

(b) Specifically include requirements for carrying out vegetation control work using live line hot-stick work procedures.

15.6 Live Line Hot-Stick Work Procedures for Vegetation Control Work

Live line hot-stick work procedures used for vegetation control work must:

(a) Be specifically compiled or adapted for the purpose of carrying out vegetation control work;

(b) Be compiled, trialed, authorised and introduced in accordance with the procedures in the live line manual; and

(c) Include the following provisions:

(i) the issuing of a vicinity authority to permit the work to be carried out;
(ii) auto-reclose facilities are disabled on the power line on/near where the work is to be carried out;
(iii) work is carried out by, at least, two live line workers; and
(iv) a safety observer (or observers) is appointed.

15.7 Live Line Worker Training for Vegetation Control Work

Before undertaking any vegetation control work using live line hot-stick work techniques, live line workers must have received instruction and training in those aspects of the live line hot-stick manual and live line hot-stick work procedures that relate to vegetation control work.

APPENDIX A

GENERAL SAFETY GUIDELINES FOR

VEGETATION CONTROL WORK

Taken from the
'Standard for Safe Work Practices 1993'
issued by The Tree Guild of WA Inc.

General Safety Guidelines for Vegetation Control Work

1. Definitions

Within this Appendix, unless the context implies otherwise:

'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 as a fulcrum point for their climbing rope.

'backcut' means the final release cut made on the opposite side of the trunk to the scarf in a felling operation.

'blocking' means the dismantling of a trunk of a tree by the gradual removal of manageable sections, subsequent to the removal of the canopy.

'branch rope' means a rope used by a climber for lowering heavy branches or other parts of a tree. May also be used as a tool rope.

'climber' means a tree worker who works on vegetation while supported by that vegetation.

'climbing rope' means a rope that is used solely for attaching a climber to a tree.

'craning fork' means any fork formed by the junction of two branches or a branch and a trunk which can be used safely as a load bearing fulcrum point for a branch rope.

'felling' means the falling of an entire tree, in one operation, performed from ground level.

'hanger' means a severed branch that remains lodged in the canopy.

'holding wood' or **'hinge'** means a section of timber left uncut between the scarf and the backcut. Ideally, it should be one tenth of the trunk diameter.

'kickback zone' means the upper quadrant of the guide nose bar.

'limbing' means the removal of limbs from a fallen tree.

'prusik loop' means a climbing aid made of rope and used to attach a climber from a harness to a climbing rope.

'sectioning' means the sawing of a felled tree or limbs into smaller sections.

'scarf' means two cuts made to form a notch that determines the direction of fall when felling or topping, or the direction of break when removing a branch. When felling or topping, these two cuts should form an angle of 45° between the cuts.

'tool rope' means a separate rope used by the climber to raise or lower equipment. May also be used as a branch rope.

'tool strop' means a rope or webbing tape that attaches a climbers tools to their harness.

'topping' means the removal of the upper canopy of a tree performed in one operation whilst aloft in the tree, before performing a blocking operation.

2. Chainsaws

Chainsaws must be used in accordance with the applicable provisions of AS 2727 - 1984 'Chainsaws - Guide to Safe Working Practices'.

3. Climbing

3.1 Climbing Ropes

Climbing ropes must:

(a) Be of a sufficient length to reach the ground when both eyes in the tails of the rope are attached to the climber;

(b) Not be used to lower limbs or other part of trees or vegetation or to raise or lower equipment;

(c) Not be repaired by splicing; and

(d) Not be left in a tree overnight;

3.2 Ascending a Tree

(a) A climber should climb on the side of a tree that is away from the power lines, while always maintaining the appropriate limit of approach;

(b) A climber must be attached to a tree at all times with a climbing rope or pole belt and safety harness when working at any point in a tree 4 metres or more above ground level;

(c) The climbing rope should only be passed around healthy, sound, suitably strong anchor points and the final anchor point should be as high above the ground as possible.

The anchor point must have a wide angle to prevent any binding of the climbing rope. Exceptions are palms and other trees with similar growth characteristics that will not allow a climbing rope to move freely;

(d) The final anchor point selected for tying into and working from should be directly above the work area, or as near to that position as possible, but located in such a way that a slip or a fall would swing the worker away from the conductor of any power line or other potential hazard.

The climbing rope should also be passed around the main leader or upright branch using the limb as a stop. Feet, hands and ropes should be kept out of tight V-shaped forks;

(e) A figure of eight knot or eye splice must be tied in the end of the climbing rope. This will prevent the rope accidentally running through the Prusik loop and causing possible serious injury from a fall; and

(f) Wherever possible, the use of epicormic growth as anchor points should be avoided.

3.3 Working with Tools in the Tree

(a) General

Equipment must be transferred to the climber by use of a separate tool line. Equipment should be attached so as not to cause damage to the rope.

(b) Using Chainsaws

(i) Chainsaws must be of the appropriate size and correct guide bar length and must be checked, started and warmed up on the ground before being passed to the climber.

(ii) The chainsaw should be attached to the climbing harness by means of a tool strop which is of a sufficient length to ensure that the chainsaw is suspended below the climbers feet.

However, where there is a risk of the climber being dragged out of the tree by the chainsaw being trapped and taken by a falling limb, the chainsaw should be attached to an appropriate point in the tree.

(iii) Care must be taken to avoid contacting the 'Kick Back' zone against any object and to make appropriate and accurate cuts.

(iv) The chainsaw must be switched off or the chainbrake applied after each cutting operation or when the chainsaw is allowed to hang from the tool strop.

(v) A chainsaw which malfunctions whilst in the tree must be passed to the ground for repairs, adjustment or replacement.

(c) Other Power Tools

(i) Reference must be made to the manufacturer's recommendations when using electric, hydraulic or pneumatic equipment.
(ii) Equipment that malfunctions whilst in the tree must be passed to the ground for repairs, adjustment or replacement.

4. Pruning and Trimming

(a) A separate branch rope must be attached to limbs that cannot be dropped safely or which are too heavy to be controlled by hand. The tail of the branch rope may be controlled by workers on the ground. A craning fork and if necessary other anchor points, separate to the climber's anchor point, must be used for lowering limbs; and

(b) Cut branches shall not be left in trees.

5. Lowering Limbs, Topping, Blocking

(a) Tree workers lowering limbs, topping or blocking must ensure that the tree in question is able to withstand the strain of such a procedure. If not, some other method must be implemented; and

(b) If substantial limbs are lowered in sections, any climber should, where possible, be above the limb being lowered.

6. Felling

(a) Before beginning any felling operation, the following must be carefully considered:

(i) soundness of the tree;
(ii) surrounding objects that could interfere with the safe undertaking of the operation;
(iii) shape and weight distribution of the canopy;
(iv) lean of the tree;
(v) wind force, direction and consistency;
(vi) proximity to power lines;
(vii) proximity to other services (telephone etc.);
(viii) nature of terrain;
(ix) location of other persons;
(x) presence of 'hangers' in the canopy; and
(xi) chainsaw is sharp, correctly tuned and contains adequate fuel and bar oil;

(b) The work area must be cleared to permit safe working conditions and an escape route planned before any cutting is started;

(c) Suitable wedges must be available for use to prevent the tree from falling in a direction other than that intended and/or where necessary to break the holding wood;

(d) Each worker must be instructed as to exactly what they are to do. All workers not directly involved in the operation must be kept clear of the work area to a distance of at least 1.5 times the height of the tree;

(e) A scarf and backcut must be used in felling trees over 200 mm in diameter, measured at breast height. Trees of this diameter or larger must not be felled by 'ripping' or 'slicing' cuts;

(f) Sufficient 'holding wood' must be preserved;

(g) Special precautions in cabling or roping a rotten, leaning or split tree must be considered if it is likely that it may fall in a direction other than the intended direction of fall. Special precautions must be taken not to over-tension such cables or ropes to the extent that excessive and potentially reactive pressures are built up in the tree; and

(h) The operator must move away from the tree, along the pre-prepared escape route, as the tree begins to fall.

7. Limbing and Sectioning

(a) Wherever possible, work must be carried out on the side of the trunk opposite to that on which the limb is being cut;

(b) Workers should stand on the uphill side of the work wherever possible;

(c) Timber under tension must be considered hazardous; and

(d) When necessary, logs must be chocked to prevent rolling.

8. Wood Chipping and Stump Grinding

8.1 Wood Chippers

(a) Wood chippers should be fed from the side of centre line and the operator must immediately turn away from the feed table when the vegetation is taken into the rotor or feed rollers. Chippers must be fed from the curbside wherever practical;

(b) The chipper chute must not be raised or removed while the rotor or disc is turning. The chipper must not be used unless a discharge chute, which is of sufficient length or design to prevent contact with the blade, is in place;

(c) Material other than timber, such as stones, nails and sweepings must not be fed into the chipper;

(d) Loose clothing, gauntlet type gloves, rings, watches and other jewellery must not be worn by workers feeding the chipper; and

(e) The feed chute or feed table of a chipper must have sufficient height on its side members to prevent operator contact with the blades or the knives during any operation.

8.2 Stump Grinders

Respiratory protection must be used where there is a risk that chemicals have been used to poison the stumps being ground.

APPENDIX B

REGULATION 316A OF THE *ELECTRICITY REGULATIONS 1947*

Extract from the *Electricity Amendment Regulations 1996*

Regulation 316a of The *Electricity Regulations 1947*

This Appendix contains an extract from the *Electricity Amendment Regulations 1996*, made under the *Electricity Act 1945*, that inserts regulation 316A in the *Electricity Regulations 1947*.

Regulation 316A of *Electricity Regulations 1947* inserted

3. After regulation 316 of the *Electricity Regulations 1947** the following regulation is inserted -

316A. Vegetation control work near overhead power lines

(1) A person performing vegetation control work for reward shall not do so within the danger zone of an overhead power lines unless exempted by subregulation (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 subregulation (1) if -

(a) the person -

(i) has been trained in 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 Powerlines* 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) **'overhead power lines'** means overhead lines for the transmission of electrical energy;

'conductors' includes active or neutral conductors (whether bare, insulated or double insulated) catenary supported conductors, neutral screened conductors, and aerial bundled cable;

(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;

(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.

[* *Reprinted as authorised 21 August 1968.*
For amendments to 29 May 1996 see 1995 Index to Legislation of Western Australia, Table 4, pp. 67-9.]