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CARELESS USE OF FIRE ACT 1936

APPROVAL OF THE RURAL FIRE CONTROL MANUAL

NO. 153 OF 1992

Under section 5KA (7) of the *Careless Use Of Fire Act 1936*, I approve the Rural Fire Control Manual.

Date: 25 September 1992

Terry Connolly
Minister for Urban Services

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RURAL FIRE CONTROL MANUAL

for the

ACT RURAL FIREFIGHTING SERVICE

A.C.T. BUSH FIRE COUNCIL

JULY 1992

Australian Capital Territory

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1. PURPOSE AND SCOPE OF MANUAL

1.1 OVERVIEW

The ACT Bush Fire Council (Council) is responsible for fire control of extensive tracts of bush and grasslands within the ACT and Jervis Bay Territory, irrespective of land tenure and management responsibility.

The Council recognises that bushfires are an integral part of the Australian environment and that they can have both positive and negative benefits. On the one hand fire has a legitimate role to play in the management of bush and pastoral areas within the ACT. On the other hand wildfires burning under adverse weather conditions may result in the loss of life and/or substantial damage to developed areas, ACT water catchments, pine plantations and native flora and fauna.

As a fire control authority the Council seeks to ensure that it is in a position to:

* *optimise its ability to control fires;*
* *protect life and property;*
* *minimise adverse effects of fires which do occur;*
* *promote responsible land use management within the Jervis Bay Territory, ACT and surrounding regions;*
* *educate the public on the dangers of bushfires and the minimisation of fire risk.*

The legal requirements, the realities, and the feasible practices which characterise fire control for a public authority such as the Council are extremely complex and are not well understood by the public. This manual aims particularly to address that deficiency.

The Council notes the complexities of fire behaviour and effects of fire in the environment and the response required by the Rural Firefighting Service consistent with public expectations and current legislation.

1.2 PURPOSE OF MANUAL

The purpose of this manual is to define:

* the organisation and structure of the Rural Firefighting Service;
* the powers, duties, qualification and eligibility of people engaged to fight fires;
* policies and techniques for fire management, allowing for appropriate discretion of the Chief Fire Control Officer;
* the equipment and communication requirements for the Rural Firefighting Service.

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The Bush Fire Council wishes to make clear that nothing in this manual may be used as a legal basis upon which the wealth, assets, property or personal reputation of any member of the Rural Firefighting Service, or of any member of the community, acting in good faith to suppress or support in the suppression of a fire, may be put at risk in any legal proceedings. Consideration of good faith must include not only the actions of a reasonable person, but those of a person who may be acting under great pressure and in unusual and rapidly changing circumstances.

1.3 THE SCOPE OF FIRE MANAGEMENT

The management of fire by a fire control authority has two elements. On the one hand there is fire control which is least subject to predictable time scheduling and encompasses:-

* fire detection;
* control decision making;
* fire suppression activities and;
* co-ordination of fire suppression.

On the other hand there is fire protection which involves making preparations so as to be in the best possible position to control fires and to limit adverse effects. It encompasses:

* minimisation of risk of exposure to fire of people and property through appropriate land use planning;
* land management for reduction in serious fire risk;
* surveillance of fire danger conditions;
* management response at times of serious hazard;
* provision of equipment, personnel and training and;
* maintenance of control lines and access.

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2. BASIS FOR FIRE MANAGEMENT

2.1 THE AIM OF THE BUSH FIRE COUNCIL

The ACT Bush Fire Council (the Council) has the task of developing policies which are implemented by the Chief Fire Control Officer (CFCO). The aim of the Council is to minimise the impact of bushfires on the ACT. The broad objectives of the Council are to provide, through the CFCO:

* *an efficient Rural Firefighting Service*
* *a command structure for the Rural Firefighting Service in time of fire emergency*
* *an administrative and organisational framework for the Rural Firefighting Service*
* *advice and assistance to the ACT community on fire prevention and hazard reduction.*

2.2 THE ROLE OF THE BUSH FIRE COUNCIL

The ACT Bush Fire Council (the council) is a corporate body and has a statutory base under the provisions of the Careless Use Of Fire Act 1936 *and its Amendments. The general role and functions of Council can be recognised within Sections 5H, 5K, 5KA and 5M, namely:*

* *establish the Rural Firefighting Service (RFS);*
* *employ personnel to carry out the functions and administration of Council;*
* *establish bushfire brigades;*
* *appoint fire controllers and brigade officers of various ranks;*
* *control and carry out fire suppression throughout the ACT, except in the 'built up area';*
* *control and carry out fire suppression in the built-up area when the ACT Fire Brigade is not present, or when assistance is requested;*
* *acquire, hold and dispose of real and personal property;*
* *maintain and co-ordinate deployment of real, and personal property of the Council;*
* *set standards for fire management practices;*
* *identify fire hazardous areas throughout the ACT;*
* *provide advice during the preparation and implementation of fire management plans by land managers;*

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* *develop and maintain effective liaison and co-operation with other fire authorities and land managers in all functions appropriate to the Council operations;*

* *identify for Gazettal, the built up area;*

* *develop and implement a structured training program for personnel involved in bushfire control and protection;*

* *implement an on-going public education and publicity program;*

* *co-ordinate and where requested assist land managers with fire mitigation programs in identified fire hazardous areas;*

* *support and participate in appropriate fire research projects;*

* *develop and/or implement appropriate technology for fire management.*

The Bush Fire Council, as it is primarily a policy-making body, delegates these powers necessary to the effective implementation of the Council's role and functions to the appropriate officers of the Rural Firefighting Service and its administrative components.

2.3 RESPONSIBILITY AND THE STATUTORY CONTEXT

The Council's responsibility is to control and maintain an effective bush and grassland fire management capacity within the provisions of the *Careless Use Of Fire Act 1936* (the Act).

The significant parts of the Act that give the Council its charter and powers are:

* Section 5H of the Act imposes a duty on the Council to 'take such action as it deems necessary to prevent or control the outbreak or spread of fire and to protect there from life and property in any part of the Territory', and requires the Council to exercise its powers and perform its duties in accordance with the manual;

* Section 5K establishes the RFS which has its organisation and structure set out in this manual;

* Section 5KA requires the Council to prepare a Rural Fire Control manual containing particulars of all aspects of the operation and organisation of the Rural Firefighting Service;

* Section 5M allows the Council to appoint fire control officers of various ranks and establish bushfire brigades;

* Section 5N(1A) empowers the Council to appoint a Chief Fire Control Officer (CFCO);

* Section 5N(2) states that 'the Chief Fire Control Officer shall exercise his or her powers and shall perform his or her duties in accordance with the manual';

* Section 5S requires land owners, managers or occupiers outside a built up area to take such measures as are reasonable in the circumstances to prevent and inhibit the outbreak of and spread of fire on land under their control;

* Section 5AC allows an inspector, who believes on reasonable grounds that the owner, manager or occupier of land is in breach of Section 5S, to give that person

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written directions requiring the owner, manager or occupier to take such action as is reasonable to prevent and inhibit the outbreak and spread of fire on that land.

2.4 AREA OF OPERATION

The the Bushfire Council and its operational arm, the Rural Firefighter Service operates over a diverse range of land tenures, legal jurisdictions and political boundaries. Each of the major areas of operation are described below.

2.4.1 AUSTRALIAN CAPITAL TERRITORY

The Careless Use Of Fire Act 1936, *empowers the Council to prevent or control the outbreak of fire and to protect therefrom life and property in any part of the Territory. Except that part which is a building or the Gazetted 'built up area', at which a member of the ACT Fire Brigade is in attendance.*

2.4.2 BUILT UP AREA

Under Section 3 of the Careless Use Of Fire Act 1936, *requires an area referred to as the 'built up area' to be defined. This built up area refers to an area in the Territory declared by the Minister, by notice in the Gazette, to be the area of operations of the ACT Fire Brigade.*

The 'built up area' is determined and put forward for Gazettal from a co-operative working group between the two affected agencies. Generally the boundaries are visually recognisable features, such as back fences, perimeter roads, sports grounds, etc.

2.4.3 COMMONWEALTH LAND

With the introduction of self government, land within the Territory has been divided into Territorial and National lands. On 2 March 1989 those lands that were to remain National lands were Gazetted under Section 27 of the *Australian Capital Territory (Planning and Land Management) Act 1988.*

The provisions of the Careless Use Of Fire Act 1936, *applies to all land but does not bind the Commonwealth in relation to National lands.*

Therefore, the suppression of fire and declaring of fire bans on such lands comes within the management of those lands. However, the Act still governs the careless use of fire within the Territory generally.

Thus the CFCO has no power to enforce the provisions of the Act against the Commonwealth. In practical terms, this would mean that the CFCO may be refused entry to National Land by the Commonwealth to suppress or prevent fire, if the Commonwealth were so minded. The CFCO can enforce a fire ban against a third party on National Land, but not against the Commonwealth.

2.4.4 JERVIS BAY

The Jervis Bay Territory Acceptance Act 1915 *provides that the* Careless Use Of Fire Act 1936, *that is in force in the ACT is also deemed to be in force in the 9250 hectare Jervis Bay Territory on the New South Wales coast. As a consequence, all the existing powers, functions*

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and responsibilities of the Council that apply in the ACT also apply in the Jervis Bay Territory, with the exception of those lands declared under the Defence Force Act *where Commonwealth provisions apply.*

2.4.5 Lease Area

After the disastrous 1939 fire season, a special NSW Government lease was arranged for the Commonwealth to provide fire protection to the ACT from fire originating in the west. The current lease with the NSW Department of Lands is due to expire in the year 2008. The lease covers 16500 ha.

The lease is managed by the COUNCIL and covers the area between the western ACT border and the Goodradigbee River in NSW. The area is subject to frequent lightning strikes and is in difficult terrain for firefighting. Strategically the area is important for fire protection and management of the Cotter catchment and nearby commercial and native forests.

Some of the previous lease area has now been included in the NSW Bimberi Nature Reserve while the current lease area is proposed to be included in the future Brindabella National Park. Once this Park is established the existing lease arrangement will cease to exist.

2.5 FIRE MANAGEMENT AND THE COMMUNITY

Fire management is a part of land management that generally is poorly understood by the community. The reasons for this are many due to the complex issues inherent in fire management. In its simplest form fire management is recognised by the public as fire suppression.

Legislation in all States has been enacted to address this threat, all Acts requiring the effective care, control and management of fire prone lands. Common to all Acts (including the ACT *Careless Use of Fire Act 1936*) is the requirement for all land management agencies or individuals to take all possible steps to prevent the ignition of unplanned fires and to prevent the spread of an uncontrolled fire from land under their tenure and management to that of another tenure. This common legislative requirement places an obligation on everyone in the community, although the full implications are seldom fully understood.

The relatively recent rapid intrusion of the major urban areas into nearby natural bushland has resulted in many situations where life and property are regularly under threat from wildfires. A growing community environmental awareness has now enhanced the wider community appreciation of bushfire problems to the extent that the public now demands and has rightfully gained an input into fire management planning and policy. Fire management has evolved to a level where it is now very much guided and constrained by social, political and economic considerations even though the ecological bases for fire management are generally appreciated by fire management personnel for most environments.

With the community demanding an input to land management including fire management, considerable polarisation of views has occurred as to the most appropriate techniques to be adopted to address fire management requirements, particularly fire protection..

Fire protection encompasses all methods and programs to reduce the potential for unplanned fire ignition and the amelioration of wildfire intensities when a fire occurs. The most widely applied protection practice is that of prescribed burning (hazard reduction burning) developed in the 1950s for broad-area fuel reduction. The planned burning of extensive areas of natural bushland to 'protect' life and property was accepted as such by the community in the 1950s and 1960s but was questioned in terms of its widespread application in the 1970s and 1980s

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as community environmental awareness and concern increased. 'Burn' and 'no-burn' views now exist within the wider community which makes rational fire management even more difficult when expressed in open debate and imposed on fire management personnel.

Such socio-political involvement is not entirely detrimental to the fire management planning process as it has made land and fire management personnel more accountable and definitive in planning and implementing fire management programs. This accountability has extended to the development of ecologically based fire regimes; but unfortunately these defined fire regimes often conflict with other management objectives and are generally compromised in favour of life and property perceptions. Compromises between the multiple fire management objectives is the art of fire management but is very dependent on sound land use planning, particularly where urban areas extend into fire prone lands.

In the ACT urban land use planning has been a feature since Canberra's early establishment but this planning has not fully accounted for bushfire problems at the urban/bushland interface. The widely dispersed suburbs with extensive open space bushland adjoining and within the urban precincts now present special fire management problems for land managers obviously not foreseen in early urban planning. As a result, community concerns still exist or arise periodically with respect to fire control but unfortunately the fire control personnel are not the managers of the land. Town planners, land managers and fire control personnel obviously need to work even more closely together than they have in the past to identify and quantify the various fire hazards and risks existing in the urban bushland areas. The community at large must recognise its responsibilities in the careful use of fire and to the reduction of potential fire ignition sources around individual homes.

Fire management is thus an 'across the community' issue in the ACT and if addressed fully by town planners, land managers and fire suppression authorities, the social, political and economic issues of fire management can be effectively integrated with ecological fire management objectives; all of which are demanded by the community.

2.6 VEGETATION AND FUEL DYNAMICS IN THE ACT

The natural vegetation in the ACT ranges from open grasslands through savanna woodlands, wet and dry forests to alpine woodlands and alpine shrublands on the peaks of the Brindabellas. There are 14 major forests and woodland vegetation associations. All have been influenced by fire in the past and all have particular characteristics which now influence the spread and behaviour of bushfires burning through them. Most have been influenced to a greater or lesser degree by human activity. These may have changed the fuels that accumulate within the association and the way bushfires now burn.

Fuel is simply that material which burns during the bushfire. It includes the dry grass, dead leaf bark and twig material, dead and live shrub material, green leaves in the tree canopy, (which can burn as a crown fire under extreme conditions) and large log and branch material which has been cut or which has fallen. The amount of fuel in any vegetation association available to a bushfire depends on seasonal conditions, human activity, the time since the last fire and the vegetation type itself. In tall forests the total fuel load which burns under conditions of prolonged drought and extreme fire weather may be of the order of 200 or more tons per hectare and includes all the leaf twig and bark material on the forest floor, a proportion of large logs, shrub material in the understory canopy, the fine leaves and twigs of the tree crowns and even a proportion of the organic material partially incorporated into the soil. The fuels which primarily determine the speed and frontal flame characteristics of a bushfire with in a forest are the fine grasses, leaf bark and twig material which are less than 6mm in diameter. Fuels larger than this generally burn behind the main front of the fire and while they may not contribute indirectly to the fire behaviour they can have a serious effect on fire suppression difficulty. However, if the fine fuels are absent these larger fuels cannot

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ignite or if they do they present few problems. Fine fuels within a forest accumulate after a fire until they reach an equilibrium point where the amount of fuel accreting to the forest floor balances the amount of fuel which is removed by decay. The rates the fuels accumulate vary considerably in the different forest and woodland associations. Both the rate of accumulation and the equilibrium fuel load influences strategies for fuel management. As a general principle, forest fuel loads less than 10 tons per hectare allow direct fire suppression to be carried out over a wide range of fire weather conditions. Thus the time to accumulate this level is an important consideration for the fire suppression and fire mitigation planning.

A brief description of the fuel dynamics of the major fuel types may assist in understanding fire management in the ACT:

Suburban gardens

Suburban gardens in the ACT may be well manicured, green lawns with carefully tended exotic, deciduous hardwoods and low shrubs which cannot sustain a fire even under the worst fire weather conditions. At the other end of the spectrum there are native gardens dominated by native eucalyptus with dense plantings of native shrubs with a heavy layer of litter and sometimes added bark mulch: all of which can be particularly flammable and create severe suppression problems if a fire starts in them under extreme fire weather conditions. For most of Canberra, the type of suburban garden has little effect on the Councils activities; but where houses are located on the suburban perimeter or close to hill parks clothed with native vegetation, the type of garden can have a serious effect on the level of damage done to buildings and the threat to life and other property when a bushfire burns into them.

Open grasslands and open woodlands

Here the major fuel is grass. This grass is often modified by planting of introduced grasses in improved pastures or invasion of weeds species. In woodlands the contribution of leaf litter and large log and branch material has little effect on fire behaviour but can make suppression problems more difficult. Grasslands accumulate and become available as a fuel for bushfires in response to seasonal conditions. The most dangerous situation occurs when there is prolific growth after favourable spring conditions and grasses cure before being substantially grazed by stock or native animals. Maximum fuel loads occur in early summer and may exceed five tons per hectare in good pastures. As the summer progresses grasses are grazed or naturally break down and the fuel loads towards the end of the fire season are substantially reduced. Heavy rain in summer may induce fresh green grass growth which reduces the fire danger in the grasslands; the forest fuels may remain dry; however, and lead to a situation where high fire danger exists in forests while a low fire danger exists in the grasslands.

Dry forests

The dry forests occur on the hill parks, for example, Black Mountain and the lower mountains to the west of the Murrumbidgee. The dominant tree species are made up of gums, (Eucalyptus maculosa), stringybarks (e.g. E. macrorhyncha), peppermints (e.g. E. radiata) and White Box (E. polyanthemos). The dry forest reach equilibrium fuel loads of around 15 tons per hectare after 10 to 15 years following a fire. These forests may dry out rapidly during spring and become quite flammable and present serious fire problems even when the surrounding grasslands are green. Because they often contain rough bark species such as peppermints and stringybarks they have a high spotting potential and fires in these forests can present a serious threat to the adjoining properties and particularly houses in suburban Canberra adjacent to hill parks. Council recommends periodic fuel reduction by burning with low-intensity fires as a practical means of reducing the fire hazard in these forests; the aim is to maintain the fine fuel loads at less than 10 tons per hectare.

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Wet forests

The main species in the tall forests are Manna gum (E. viminalis) Alpine Ash (E. delegatensis) and Brown Barrell (E. fastigata) and these occur in the Cotter Valley and in Namadgi National Park. Even in an undisturbed state these forests may accumulate fine fuel loads in excess of twenty five to thirty tons per hectare some 15 to twenty years after burning.

Because of high winter rainfalls at higher elevations in the mountains these forests generally remain moist during spring and early summer and reach their maximum fire potential when the deep litter fuels dry out towards the end of summer or early autumn. Under moderately severe drought conditions bushfires in the tall forests can be very severe because of the heavy load of accumulated fine fuels. Fuel management may include the prescribed burning of strategic areas every seven to ten years to reduce the fine fuel loads and reduce the spotting potential of the rough bark trees.

Alpine woodlands

The Alpine woodlands are composed of Snowgums (E. pauciflora) and Mountain gums (E. dalrympleana) and occur at higher elevations along the Brindabella Ranges to the west of the ACT and in the mountains to the south of the Namadgi National Park. These woodlands accumulate fine fuel loads of around fifteen tons per hectare after five to ten years and often carry a discontinuous cover of snow grass. These woodlands often appear green in many summers but can carry quite severe fires when the forest fuels dry out or the snow grass becomes partially cured towards the end of summer. Fuels management of this alpine forest is not a high priority although careful fuel reduction by burning may be carried out to protect specific structures or for the management of native flora and fauna.

Pine plantations

Pine plantations maintained by ACT Forests are mostly comprised of radiata pine (P. radiata) although there are small stands of other exotic species which were originally planted on a trial basis. The fuel loads in the pine plantations are affected by management operations and the highest loads occur soon after pruning or thinning. Fuel loads in pine plantations may be reduced by a combination of mechanical crushing or slashing, low-intensity prescribed burning, or grazing. In strategic areas both within the forest and close to suburban areas considerable effort may be undertaken to reduce the density of the pine plantations, the height of the green crown above the ground and the amount of both fine and large material on the ground, to reduce the potential for crown fires.

General

The management of fuel levels within the ACT is an integral part of land management responsibilities. In forests and open woodlands this can be achieved by using planned fire (prescribed burning) and other fuel modification techniques. At the urban/grassland interface and in dry parks within the suburban area, mowing and slashing is a major undertaking by land managers during the late spring as grasses start to cure. While mowing reduces the height of the flames and makes suppression easier, surprisingly fast rates of spread may be maintained through mown grass, and many nuisance fires can occur in dry parkland areas during the summer months. Residents adjoining the parks within the suburban area and grasslands adjacent to urban development can assist both the land and fire management authorities by mowing and watering a few metres of grassland adjacent to their properties. The reduced fuel load and watering of these areas can assist fire suppression and greatly reduce the threat to adjacent houses.

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2.7 CHARACTERISTICS OF FIRE AND FIRE WEATHER IN THE A.C.T.

The fire season in the ACT when bushfires present a serious threat to the life of property normally runs over the summer months from the beginning of November to the end of February. In exceptional years the fire season may extend two months either side of the normal fire season, namely, start as early as September and finish as late as the end of April. Early in the fire season, and particularly during September and October, fires may occur in the dry forest while the surrounding grasslands are still green. These may present a localised threat to pine plantations or property adjoining the forests but bushfires normally don't present a major threat within the ACT until the grasslands become fully cured.

During November and early December the fire weather is often characterised by strong westerly winds which may prevail for up to four days at a time. Serious fires may occur in recently cured grasslands or dried forests but generally the mountain forests remain moist and have not reached their full potential for devastating fires. Between January and March the daily fire weather is determined by the passage of high and low pressure systems across southern Australia. The most serious weather occurs just after a high pressure system has moved out in the Tasman Sea and a cold front is approaching across Victoria and southern NSW. Strong north-westerly winds often precede the front and as they are generated from dry air from the interior of Australia they may be extremely dry and very hot. Most of the major fires in recent years have occurred in these months when strong north-westerly winds precede the southerly change. If the change occurs while the fire is still burning there is a sudden wind shift from the north-west to the south-west and large areas of country can be burnt. Under the worst recorded conditions grass fires can travel up to 18 to 20 km per hour and fires more than 60 km away may threaten the ACT. An area of more than 60000 hectares may be burnt in eight hours and if only two or three fires break out at the same time it is possible for them to burn most of the ACT. Also, it must be remembered that fires starting within the ACT under these conditions have the potential to burn through to the south coast.

It is important that we recognise that, under these extreme fire weather conditions, which may occur every five years or so, it is impossible for any fire suppression organisation to control the fire if it is burning in abundant fuels. While much can be done with early detection and rapid initial attack, if a fire burns from some distance away and enters the ACT in a broad front then fire suppression forces available in both rural and urban fire brigade services will be overwhelmed. Prevention of loss of life and damage to property can be undertaken only by individual home-owners. Thus, it is vitally important for the ACT Bush Fire Council to promote a sound understanding of fire spread and what can be done under severe conditions to protect life and property and extend this to individual home-owners through the volunteer bushfire brigade movement.

The suburban area of Canberra has never been directly hit by a large fire travelling in from the west. However, the potential weather to create widespread havoc within the suburban area has existed and there are adequate examples in history to indicate the potential for a bushfire disaster. In 1939 fires burning west of the Brindabella ranges in the Mountain Creek and Flea Creek catchments rained firebrands on Capital Hill, now the site of Parliament House. Due to the eaten out nature of the grasslands the firebrands did not start significant spot fires as there was little grass fuel available to burn. Further south a fire starting in Brindabella leapt across the ACT in a series of bursts from spotting and eventually burnt back into NSW east of Williamsdale.

On 6 March 1965, a fire originating near Taralga, north of Goulburn, burnt under extreme fire weather conditions and later that night cut the Princes Highway north of Ulladulla. There were no serious fires within the ACT on that day, all being contained by rapid initial attack. On 13 February 1979, a fire starting near Hall burnt 16000 hectares before being controlled

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and, on 5 March 1985, fires starting near Mugga Lane burnt across the Googong Dam and eventually cut the Captain's Flat Road near Foxlow.

The ACT has a uniform rainfall distribution on average, which means that some of our summers are quite wet. Rain from anti-cyclones in the north forms a tropical rain depression and moves down through southern Queensland and central NSW and eventually brings rain to the ACT. Thus, on average, we have about one year in seven is an extreme fire year, one year in seven will be a very low fire danger year, with the pastures remaining green throughout summer, while five out of seven years will be more or less of normal severity.

During a severe summer the orientation of the pressure systems over southern Australia means that a cold change occurs roughly on a seven day interval. Therefore, during the week the fire danger conditions may be low to moderate immediately after a cool change and gradually build up to extreme just before the next cool change passes. The fire danger also fluctuates on a diurnal basis in response to changes in temperature, relative humidity and wind speed. Often the fire danger may be low in the early morning and rise to very high or extreme by early afternoon and then drop back down to low again sometime in the late evening. The ACT Rural Firefighting Service along with the Bureau of Meteorology, monitor the progressing curing state of the grasses, the dryness of the forest fuel and the daily weather at several locations throughout the ACT. The Bureau of Meteorology provides forecasts of fire weather and on days when very high or extreme fire danger weather will occur at sometime during the day, the Chief Fire Control Officer imposes a total ban on the lighting of all fires in the open. Total bans are normally based on the occurrence of extreme fire weather and there will commonly be total fire bans in adjacent districts in NSW. However, total bans may also be imposed for other reasons, (for example, the fire suppression forces are already totally committed on existing fires) and are not necessarily tied only to the prevailing weather conditions.

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3. ADMINISTRATION

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3. ADMINISTRATION

3.1 ADMINISTRATIVE RESPONSIBILITIES

The Rural Firefighting Service (RFS) is the operational arm of the ACT Bush Fire Council and is directed by policies of the Council. All administrative, financial management and personnel functions of the RFS are managed by the Director, Fire and Emergency Services, within the Department of Urban Services.

3.2 BUDGETING AND FINANCIAL MANAGEMENT

Budgeting and financial management will be co-ordinated and executed by the Chief Fire Control Officer (CFCO) as head of the RFS, which is responsible for its own structured financial management. The service will develop, operate and manage its own budgeting and financial allocations.

The RFS financial program is part of the Fire and Emergency Services Division of the Department of Urban Services. The CFCO, with respect to all financial and budgetary functions of the ACT Government, will respond directly through the Director of Fire and Emergency Services to the Secretary, Department of Urban Services, and hence the ACT Government.

The RFS will prepare an annual budget, under the guide-lines of the ACT Government financial management regulations and Audit Act, for endorsement by the Director of the Fire and Emergency Services Division.

Matters to be addressed in the course of financial control include the following:

* administration, management and operation of the RFS;

* administrative and financial support to the Council;

* salaries of the RFS;

* wages of temporary staff;

* all aspects of firefighting operations including standby, detection and all infrastructure and incident control activities, firefighting wages and allowances of approved personnel;

* contractual works as approved, including all types of research, surveys, consultants, maintenance, aircraft, fire appliance and equipment hire and all aspects appropriate to the successful operation of the RFS;

* purchase, maintenance and disposal of fire appliances, vehicles, plant and equipment and structures;

* evaluation, purchase and operation of new technology;

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* all training matters, including publicity and education for the public;

* participation in collaborative programs and research;

* pursue all opportunities of cost recovery from all public and private agencies in respect to fire appliances, equipment, salaries and wages, aircraft and fee for service.

3.3 INSURANCE AND COMPENSATION

All bushfire fighters, whether departmental employees, volunteers or emergency volunteers, are covered by the same insurance and compensation provisions that apply to any ACT government service employee.

3.4 PLANT AND EQUIPMENT USE

The Council can acquire (both through purchase and hire), hold, maintain and dispose of real and personal property, which includes all existing and future assets, under the provisions of the Careless Use of Fire Act. These actions are normally undertaken by the Rural Firefighting Service on behalf of the Bush Fire Council.

The RFS currently has under its control a fleet of fire appliances and plant. It also has other minor equipment and firefighting equipment distributed throughout the ACT, at locations dependant on operational necessity.

The RFS will continue to purchase fire appliances, plant and equipment and enter into contractual arrangements for hire, appropriate to its emergency service functions and operations.

The RFS will have under its control such appliances, vehicles, equipment and aircraft on a contractual basis. Tenders will be called, when appropriate, for hire of fixed winged and rotary powered aircraft and other necessary equipment, including plant, under ACT Government guide-lines and the RFS financial program, to ensure the optimum level of readiness in any fire season or situation.

The RFS will negotiate the use and engagement of personnel for this equipment with agencies of the ACT Government or other agencies in the fire season and the non-fire period.

Maintenance of fire appliances, plant and equipment will be arranged by the RFS, taking into consideration that the RFS is an emergency service, which requires 24 hour seven day per week service. Service will be arranged at sites the RFS deems appropriate to ensure safe, reliable, efficient and effective operation of equipment, including in a normal workshop, and on the fire ground in emergencies.

The RFS will negotiate, through developed internal and external agreements, the use of its fire appliances, plant and equipment, including contractual equipment such as aircraft, on a hire, recovery or fee for service basis, to ensure effective and efficient maintenance, operations and protection, throughout the year.

Disposal of fire appliances and equipment will be at the discretion of the CFCO, after discussion with the Bush Fire Council and subject to the financial and budgetary guide-lines of the RFS, the Fire and Emergency Services Division and ACT Government disposal will

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take into account the unique, purpose, built emergency services, fire appliances and equipments.

3.5 ASSET IDENTIFICATION SYSTEM

The CFCO will manage the plant and equipment assets under a control system authorised by the Director, Fire And Emergency Services.

All assets including fire appliances, equipment to build up fire appliances (pumps, hose reels, radio equipment, sirens etc.), major equipment (floater pumps, communications equipment etc.) and minor firefighting and minor safety equipment are to be etched, in a prominent place, with a unique bushfire equipment (BFQ) number. All equipment is to be maintained and recorded by the RFS, in an asset register (manual or computerised) with the unique BFQ number, date of acquisition, brand name, description of item, serial number, quantity, asset value (cost) and the location of the item.

When an asset item or other equipment is issued to a staff member of the RFS or other agency of the ACT Government, the item is to be recorded in a personal issue register and accounted for in the same manner as other assets and equipment and must contain a date of issue to the person. The personal issue register is to be maintained by the Administration Section of the RFS.

Major office equipment, such as computing equipment, is to be recorded in the asset register and managed in accordance with the standards and practices of other major equipment.

Brigades and firefighters requesting new, replacement or repairs to assets and equipment are to apply on the standard form, and such requests must be approved by the Chief Fire Control Officer, or his delegate, before issue is authorised.

3.6 VOLUNTEER BUSHFIRE BRIGADES

It is Bush Fire Council policy to encourage the formation of volunteer bushfire brigades drawn from the rural community and interested people from suburban Canberra. The Council recognises that there are difficulties with training volunteers in bushfire fighting and home protection. Also recognises that, under a conflagration disaster situation, protection of individual property and life cannot be assured by rural and urban fire authorities, and must be the responsibility of individuals within the community. The Council therefore feels that the extension of the volunteer bushfire brigades system to as many people as possible in the ACT is the most efficient way of communicating safe fire control and fire prevention practices

3.6.1 STANDARD CONSTITUTION FOR VOLUNTEER BRIGADES

A volunteer bushfire brigade will operate within the framework of a constitution of its choice, subject to approval by the Council. A copy of a model constitution which may be used for this purpose is attached as Appendix 1.

3.6.2 MEANING OF VOLUNTEER BUSHFIRE BRIGADE MEMBER

Any person who is accepted and is registered with a volunteer bushfire brigade formed under the provisions of this manual, is classified as a volunteer bushfire brigade member.

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3.6.3 VOLUNTEER BUSHFIRE BRIGADE FIREFIGHTER RECRUITMENT.

The final decision of acceptance or rejection of people applying to join a volunteer bushfire brigade as firefighters remains with the brigade. In reaching this decision the brigade will take into account the following:

* members under 16 years of age and over 65 years of age, should be aware that current compensation provisions do not include recovery of loss of wages, although all other provisions apply;

* each firefighter recruit, and each existing member of the brigade, should keep the Captain informed of any medical or physical condition, including aspects of physical fitness, which may affect the safety of that person or others during firefighting or other brigade activity;

* a recruit member must not participate in firefighting until that member has completed the ACT Bush Fire Council Basic Training Modules 1 to 4, and then only under supervision until that member has completed Modules 1 to 9;

* each firefighter recruit should be encouraged to undertake further training over and above the Basic Training Modules;

* the consent of the parent or guardian of all members under the age of 18 is necessary before such people may be considered as firefighter members.

3.6.4 MEMBERSHIP CLASSIFICATION

Members of volunteer brigades who intend to do a firefighting role must successfully complete the ACT Bush Fire Council's Basic Training Modules 1 to 4 to attend a fire under supervision and Modules 1 to 9 to attend a fire unsupervised. Additionally, a person who in the opinion of the Captain has appropriate actual firefighting experience, may be added to the brigade register as qualified to attend a fire unsupervised. Such members may not act as brigade officers or crew leaders until they have successfully completed the relevant training modules, and should be encouraged to complete Basic Training Modules 1 to 9 as a refresher.

Members of volunteer brigades who intend to perform only support functions and not work on the active fire ground should be encouraged to successfully complete the ACT Bush Fire Council's Basic Training Modules 1 and 3.

3.6.5 VOLUNTEER BUSHFIRE BRIGADE MEETINGS.

Volunteer bushfire brigades are run on democratic lines and regular opportunities should be afforded all members to discuss brigade management and fire protection matters affecting the brigade and its area of operations.

Brigades should have an annual general meeting and may have one or more general meetings if there is sufficient business throughout the year.

Normal procedure in conducting meetings should prevail, but generally, constitution alterations demand that members be advised by a notice of motion.

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3.6.6 VOLUNTEER BUSHFIRE BRIGADE ANNUAL GENERAL MEETING

Each brigade will usually hold an annual general meeting (AGM) at which officer bearers will be elected and field officers nominated for appointment by the Council. The annual General Meeting should be held in August or September. Brigades should consider inviting some or all members of the Council, and the CFCO to the AGM.

Brigade Secretaries should, immediately following the AGM, forward to the Council's Secretary the results of the election.

Deputy captains should be elected in order of ranking. The correct sequence of election of field officers is:

- Captain

- Deputy captain (1 and 2)

Field officer appointments must be approved by the Bush Fire Council before the officer assumes responsibilities.

Volunteer bushfire fighters who wish to seek appointment to the field officer positions of captain and deputy captain must have completed the Council's Basic Training Modules 1 to 9 and be prepared to successfully complete officer training Modules as they become available.

Volunteer bushfire brigade captains and deputy captains have wide powers when fighting fires. Consequently, they must be people who can exercise these powers in a reasonable and responsible manner and act with discretion at all times.

a) Captains

The captain must be the leader of the team, he/she should not do all the work but encourage the members to work as a coordinated and responsive team.

A captain should:

* be able to make speedy and accurate decisions;
* know the members of the brigade and their special abilities and so be able to give them various duties in line with their skills;
* be able to inspire confidence in the members of the brigade and be willing to help train the brigade members;
* have a good knowledge of the brigade area, fuel levels, fire trails, tracks, water supplies and the land owners/occupiers;
* know the captains of adjoining brigades with whom the brigade co-operates;
* be readily contactable for call out.

b) Deputy captains

In the selection of deputy captains, regard should be given to the qualifications desirable in a captain. Also, where more than one deputy captain is selected thought should be given to the location of residence. It may be preferable for the deputy captains to be located in different parts of the brigade area than to be congregated in one area.

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People nominated for field positions should:

- have had sufficient active fire fighting experience and be prepared to attend brigade meetings and training sessions on a regular basis.

- be in good health and able to participate in normal brigade activities.

- have field experience, training, local knowledge, and leadership ability.

3.6.7 ELECTION OF OFFICERS WITHIN VOLUNTEER BRIGADES

Volunteer bushfire brigade officers will be elected by a vote of the majority of financial brigade members present at the brigade's AGM. It is recognised that the term 'financial member' may apply to all adult members of one household, e.g. husband, wife, grown-up children, all covered by one subscription from that household. Subsequent casual vacancies can be filled at future ordinary general meetings, but only for the remaining term until the next AGM.

The people elected to the positions of captain and deputy captain will not hold such positions until their appointment is approved by the Council.

3.6.8 OFFICE BEARERS' DUTY WITHIN A VOLUNTEER BRIGADE

The Bush Fire Council recognises that volunteer bushfire brigades are democratic, community service organisations which perform a valuable function in the protection of life and property. The voluntary nature of these brigades means that specific officer bearers' duties may vary slightly depending upon personalities, available volunteers, and the wishes of the community. The following items are suggested as a guide to Office Bearer's duties, and may be used in default as brigade regulations if the community offer no amendments.

President:

The president's role is to preside over the brigade. This includes:

* preserving order and applying the rules of procedure at brigade meetings;

* overseeing administration of the brigade.

Secretary:

The secretary is responsible for keeping the records of the brigade and maintaining contact with other people and the RFS. Apart from recording the minutes of brigade meetings the secretary duties could include:

* preparing and forward all correspondence dealing with the brigade;

* keeping the brigade informed of procedures, newsletters, advice and other administrative matters that affect the brigade or its members;

* handling brigade publicity, unless otherwise delegated by the brigade;

* advising the president on the need for calling meetings of the brigade;

* maintaining a record of brigade membership.

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Treasurer:

The treasurer is responsible for maintaining the brigade's financial records, receiving and banking incoming brigade funds and paying brigade accounts authorised by a meeting. The main duties of a treasurer could include:

* banking the fund regularly;

* presenting a report to each meeting of the brigade showing:

  . the bank balance at the previous meeting

  . bank deposits and payments since the previous meeting

  . current bank balance;

* preparing and presenting annual financial statements;

* arranging an annual audit of financial records.

Brigade Training Officer:

The volunteer brigade's training officer is usually responsible for instructing brigade members in the Council's Basic Training Modules, and for coordinating brigade members attendance at Council run courses, or other authority courses, with liaison through the RFS.

The training officer is also usually responsible for maintaining an accurate record of brigade members attendance at and completion of training courses, and in addition, recommending courses considered desirable by the brigade.

Brigade Equipment Officer:

The brigade equipment officer is responsible for providing the RFS with reports and requests on maintenance requirements of the brigade equipment, and helping to ensure that all fire appliances and support equipment are kept in the best possible condition. . The RFS is responsible for the repair, maintenance and replacement of all equipment issued to the brigade.

Captain:

The role of the captain is to control the incident management operations of the brigade. To fulfil their role a captain should:

* maintain close liaison and co-operation with the CFCO and his deputies;

* be conversant with the Careless Use Of Fire Act 1936, and the provisions of this manual;

* command fire suppression activities of the brigade and report fire situations to the Control Centre or to an appointed field controller;

* be conversant with the location of access trails, water storage facilities, fire breaks, adjoining brigades and other relevant resources within and adjoining the brigade area of operations;

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Brigade Deputy Captains:

Deputy captains will assist the captain and act according to instructions and directions given by the captain. In the absence of the Captain the most senior deputy captain available shall assume the role and responsibilities of the captain.

3.6.9 HOLDING MORE THAN ONE POSITION WITHIN THE RURAL FIREFIGHTING SERVICE

No person will hold more than one field officer position within the Rural Firefighting Service.

A field officer may hold other positions within the brigade, provided they are not field positions.

3.6.10 COMMUNITY SERVICE ACTIVITIES AND VOLUNTEER BRIGADES

Community service activities relate to the use of Rural Firefighting Service resources by volunteer and departmental bushfire brigades on non-operational related activities. These activities include fund raising, assistance at community activities such as fun runs, Christmas functions, etc.

All volunteer and departmental brigade community service activities involving the use of government vehicles are to be authorised by the Chief Fire Control Officer to ensure the normal insurance and compensation provisions apply.

3.6.11 MEDICAL EXAMINATION FOR VOLUNTEERS

Subject to funding approval, the Rural Firefighting Service will pay for confidential medical examination, with a doctor of their own choice, for any volunteer who wishes to establish his or her fitness for firefighting.

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4. STAFFING AND ORGANISATIONAL STRUCTURE

4.1 RURAL FIREFIGHTING SERVICE ORGANISATIONAL STRUCTURE

Staffing for the Rural Firefighting Service (RFS) and its organisation builds from the top down with responsibility for performance placed with the Chief Fire Control Officer (CFCO).

The Organisational Structural Chart is shown on the next page.

4.2 POWERS, FUNCTIONS AND RESPONSIBILITIES OF RURAL FIREFIGHTING SERVICE MEMBERS

The powers, functions and responsibilities of the RFS and its incident control system (see Chapter 10) are designed to be able to cope with the small to very large and complex incidents and emergencies. The powers, functions and responsibilities of each of the office bearers of the Rural Firefighting Service and the Incident Control System are detailed below.

4.2.1 CHIEF FIRE CONTROL OFFICER (CFCO)

The CFCO has four primary functions:

* *provide executive assistance to the ACT Bush Fire Council (COUNCIL) and be responsible for the implementation of policy determined by Council;*
* *head the RFS and be responsible for coordination, control and direction of the overall management of the Service;*
* *manage the RFS financial component to ensure efficient and effective administration and budget management;*
* *under the provisions of the Careless Use Of Fire Act 1936, co-ordinate, control and direct the overall management of all fire control activities anywhere within the ACT, except the 'built up area', as defined in the ACT Government Gazette, or buildings, when the ACT Fire Brigade is in attendance. This function also includes the approval and issue of permits to burn under the Act, and as a delegate of the Air Pollution Act 1984, approve and issue permits regarding smoke management under conditions prescribed by the Pollution Control Authority.*

Under all incident control situations, unless otherwise delegated, the CFCO will occupy the position of Incident Controller under the Incident Control System, and will be responsible for overall safety, the development and implementation of strategy, and the ordering and release of resources.

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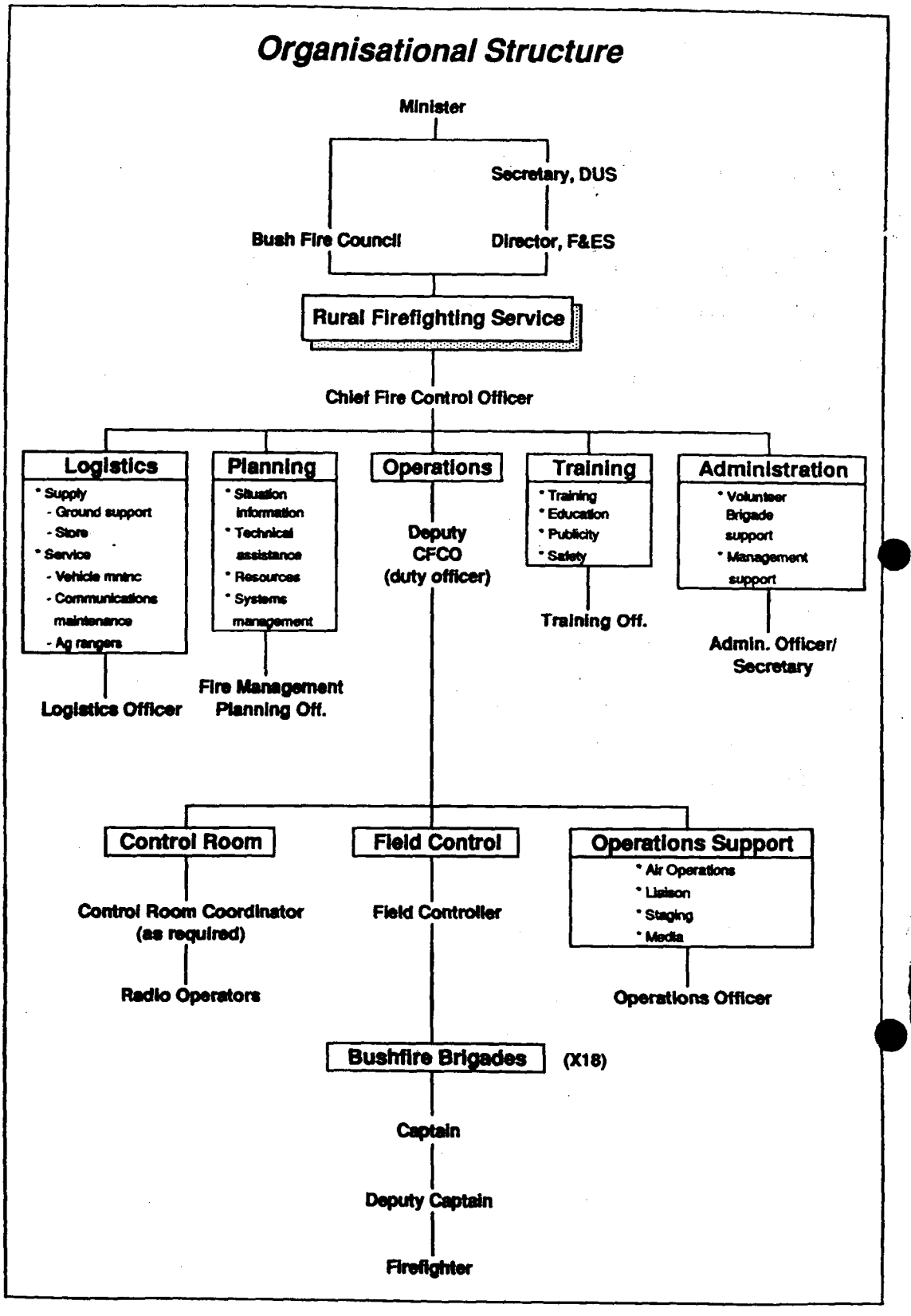

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The following are general duties applicable to the Incident Controller:

* assume control and co-ordinate incident management;
* assess incident situation;
* activate elements of the Incident Control System;
* brief control staff and senior officers;
* develop and approve implementation of the incident action plan (either oral or written);
* determine information needs and organise collation;
* co-ordinate staff and resource activity;
* manage incident operations;
* approve requests for additional resources and requests for release of resources;
* authorise release of information to news media;
* monitor safety considerations.

4.2.2 DEPUTY CHIEF FIRE CONTROL OFFICER

The Deputy CFCO has two primary responsibilities:

* *as a senior officer of the RFS assume, in the absences of the CFCO, the powers and responsibilities of the CFCO for incident control under the provisions of the Careless Use Of Fire Act 1936*
* *fill the position allocated within the Incident Control System. The positions normally allocated to a deputy chief fire control officer are: Incident controller, Field controller or Air Operations, but may include Logistics Officer, Assistant to the Incident controller or Liaison Officer.*

There are two Deputy CFCOs within the RFS. These officers perform the Duty Officer role and work a week on, week off roster as the first contact for out of work hours callout.

4.2.3 CAPTAIN

The captain is a bushfire brigade officer within the RFS. The role of the captain is to maintain a high operational efficiency level within the brigade, and command the incident control activities of the brigade. There are currently 18 brigades in the ACT and Jervis Bay made up of 10 departmental and eight volunteer brigades.

The captain's duties should include:

* maintain close liaison and co-operation with the Chief fire control officer and his deputies;
* when directed assume field controller or sector leader responsibilities;
* command incident control activities of the brigade;

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* report incident control information to the Incident controller or to an appointed Field controller;
* be conversant with the location of access trails, water storage facilities, firebreaks, adjoining brigades and other relevant resources within and adjoining the brigade area of operations;
* liaise with the CFCO on matters relating to hazard reduction, strategic firebreaks and trails, protection of major hazards, safety matters and other matters that affect the brigade;
* ensure that all equipment allocated to the brigade is kept the best possible order at all times.

4.2.4 Deputy Captain

Deputy Captains are officers of bushfire brigades within the Rural Firefighting Service. The role of the Deputy Captain is to assist the Captain and act according to instructions and directions given by the Captain. In the absence of the Captain the most senior Deputy Captain available shall assume the role and responsibilities of the Captain.

4.2.5 Field controller

The Field controller is an officer of the Incident Control System, and is responsible to the Incident controller for safety, management and control of all operations at an incident, or specific number of incidents (i.e. a number of small fires close to each other). This responsibility includes allocating duties to all available resources at the incident and reporting on the progress of control operations.

Each incident is regarded as a separate entity (except for spot fires close to a major fire front where they may be managed as a sector of the main fire) with a Field controller appointed to each incident.

The Field controller's main responsibilities include:

* obtaining briefing from the Incident controller;
* identifying resources allocated to the incident;
* allocating tasks to available resources;
* supervising the overall control operations;
* where appropriate Sectorise the incident control management, appointing sector leaders and co-ordinate activities between sectors;
* consulting with and then directing Sector Leaders on specific tasks to be achieved;
* determining needs and request resources;
* reporting incident control progress at specified times or when requested by the Incident controller. Such reports should contain:
    - summary of resource use
    - work progress

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- . deviations from agreed attack plan
- . conditions affecting operations
- . hazardous conditions
- . size of incident

* ensuring that liaison with other attending agencies is maintained through efficient communication arrangements;

* undertaking the Safety Officer responsibilities provided that they have undertaken the appropriate accredited OH&S training, or during large or complex incidents allocate this task to an appropriate officer, liaising with this officer and ensuring that safety considerations are paramount in incident control operations;

* reporting special occurrences or events to the Incident controller.

4.2.6 SECTOR LEADER

The Sector Leader is an officer of the Incident Control System and is responsible to the Field controller for the implementation of their allocated portion of an incident control operation. The responsibilities include the assignment of resources allocated to the sector, reporting progress, ensuring safe working practices, establishing common communication within the sector, and providing direct supervision and command of crews allocated to the sector.

A general checklist for Sector Leaders is as follows:

* obtain briefing and instructions from the Field controller;

* review sector assignment and allocate tasks;

* monitor work progress and, when necessary, make changes;

* determine the need for assistance, and what type;

* co-ordinate activities with adjacent sectors and single resources;

* submit situation and resources status information to the Field controller;

* report special events, eg accidents, sickness, etc.;

* resolve logistics problems within the sector.

4.2.7 CREW LEADER

The Crew Leader is an officer of the Incident Control System and is responsible to the Field controller, or to the Sector Leader if the incident is sectionised. The Crew Leader is responsible for performing tactical assignments allocated to a crew. The Crew Leader reports progress, and other important information on incident behaviour.

A general checklist for Crew Leaders is as follows:

* obtain briefing from the Field controller or the Sector Leader, whichever applies to the incident;

* review incident assignment and allocate tasks;

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* determine the need for assistance;
* co-ordinate activities with adjacent crews;
* submit situation information as requested;
* ensure safe working practices within the crew.

4.2.8 Control Centre Co-ordinator

The Control Centre Co-ordinator is a member of the general staff assigned to the Control Centre and is responsible for providing facilities, services and material to support the Control Centre operations for small to medium incidents, when the Administrative Section or the Logistics Section have not been activated.

At times specified by the CFCO or the Duty Officer the Control Centre Co-ordinator will be required to report to the Control Centre and assist with the staffing of the Centre. During small to medium size incidents this officer will carry out the Logistics Officer functions unless otherwise directed.

In the event of a large incident this position will report to the Administrative Officer and be a part of the Management Support Unit.

The general responsibilities of the Control Centre Co-ordinator during small to medium incidents is to:

* obtain briefing from the Incident controller;
* activate logistics support and service requirements;
* procure, at the request of the Incident controller, personnel, equipment, material and services required for the incident;
* assist the Incident controller to co-ordinate the staging of resources;
* in the event of the incident requiring a change of shift, plan the change over requirements in consultation with the Incident controller;
* activate the Food Unit and assess requirements when requested.
* depending on the demands of the incident, assist the Incident controller as requested.

4.3 VOLUNTEER AND DEPARTMENTAL BUSHFIRE BRIGADES

There are 18 bushfire brigades in the Rural Firefighting Service with 16 in the ACT and two at Jervis Bay. The 16 brigades in the ACT are made up of nine departmental and seven volunteer brigades. The two brigades at Jervis Bay include one departmental and one volunteer brigade.

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4.3.1 BRIGADES IN THE ACT AND JERVIS BAY

* Departmental (ACT)
  - Athllon
  - Headquarters
  - Kowen
  - Namadgi
  - O'Connor
  - Pierces Creek
  - Stromlo
  - Tidbinbilla N. R.
  - Uriarra
* Volunteer brigades (ACT)
  - Guises Creek
  - Hall
  - Jerrabomberra
  - Majura
  - Tidbinbilla
  - Southern Districts
  - The Rivers
* Departmental (Jervis Bay)
  - Jervis Bay National Park.
* Volunteer (Jervis Bay)
  - Wreck Bay

4.3.2 FORMATION OF A BUSHFIRE BRIGADE

Volunteer bushfire brigades are formed by the desire of the community and by resolution of the Council. However, the total number of brigades within the ACT is determined by the Minister and notified in the ACT Government Gazette.

Departmental brigades are formed based on equipment deployment and availability of an appropriate human resource in a strategic area. A Council resolution is required and the formation of the brigade must be within the number determined by the Minister and notified in the Gazette.

4.3.3 MEMBERSHIP OF VOLUNTEER BRIGADES

Membership of a volunteer brigade shall comprise people who are accepted and registered with an approved volunteer bushfire brigade in a manner consistent with the administrative requirements for Volunteer Brigades as set down in sections 3.6 of this manual.

4.3.4 MEMBERSHIP OF DEPARTMENTAL BUSHFIRE BRIGADES

The ACT Government directly manages about 80% of the open space areas of the ACT which includes nature conservation areas, pine plantations and other open space areas adjacent to urban and rural development. The land management agencies of the ACT Government have a legal responsibility to take reasonable steps to prevent fire on land under their control. They also have their own land use management goals and objectives that provide for the protection of the resource under their management. As a consequence many of the land management

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agencies of the ACT Government are committed to bushfire management and control under the direction of the Rural Firefighting Service.

There are currently 10 departmental bushfire brigades in the ACT and Jervis Bay. These brigades are staffed by the relevant land management agency, or combination of agencies; however, the necessary fire control equipment is supplied and owned by the Rural Firefighting Service.

Brigade membership is a matter for the employer, having regard to the person's type of work, availability, industrial award and organisational commitment. In many cases it is part of the duty statement for a position. Individual departments are responsible for training to the standards set by this manual and for the appropriate level of fitness of their brigade members.

The brigade captain is normally the overseer or foreman of a particular work area, while the deputy captain is normally the person who acts in the absence of the overseer or foreman. Brigade functions are divided up depending on industrial award agreements, except during an emergency when no appropriate award person is available. All operational positions of the brigade are still subject to the approval of the Council.

4.4 EMERGENCY VOLUNTEERS

The Bush Fire Council recognises that there are many people including casual passers-by who may lend assistance to bushfire suppression particularly in its early stages. Where a casual passer-by sees a fire starting he or she should be encouraged to take whatever action within their capabilities to suppress that fire and they therefore should be covered for any injuries sustained by him/her including a loss of compensation, unless it can be shown that they did not act in good faith. Council also recognises that there are many people in rural areas who will act in support of volunteer firefighters and while they may not be directly involved in direct firefighting at the flame front they may also sustain injuries through their role in supporting other firefighters. They too are also entitled to compensation.

Council also recognises that when a fire has escaped from initial attack, (which may be defined by escape from the firefighting forces which are first sent to suppress it) then safe firefighting requires a degree of training and co-ordination that casual passers-by do not have and cannot have unless they are members of a bushfire brigade. Therefore, emergency volunteers will include all people including passers-by who assist with the initial firefighting of an incident up until the time that an organised brigade arrives. After a field controller arrives he/she may continue to use that person as an emergency volunteer or the controller may ask that person to leave the fire scene.

Emergency firefighters also include - any person who assists with the support of firefighting provided they are asked to by a field controller or their delegate, or any person who responds to an emergency at the request of the Chief fire control officer.

4.4.1 MEANING OF EMERGENCY VOLUNTEERS

Members of the public who are not members of a brigade, and who may not be qualified in firefighting or firefighting support, may act in these roles in an emergency, particularly in the early stages of a fire. The BFC recognises three categories of people who may be classified as emergency volunteers. They are:

Category 1. Any person, including nearby residents, local property owners and workers, and passers-by, who is in the vicinity of an outbreak of fire and who takes action to assist in the suppression of that fire, is deemed to be an emergency volunteer.

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Category 2. Any person who responds to the request of a field controller for assistance is deemed to be an emergency volunteer.

Category 3. During incidents which required the organised assistance of volunteers, such volunteers will be recruited by official announcement by the Chief Fire Control Officer. Those accepted are deemed to be emergency volunteer recruitment and will be subject to:

- registration of names and addresses at a specified registration point;
- being physically capable to perform the task required;
- preference being given to people who can prove previous training or experience.

4.4.2 CONDITIONS FOR EMERGENCY VOLUNTEERS

People in the above three categories are considered to be volunteer firefighters and are covered by workers' compensation and other provisions which cover volunteer bushfire brigade members.

Emergency volunteers in Category 1 should withdraw from the vicinity of the fire when replaced by brigade members, unless they are requested to remain by the field controller, or unless they have property in the vicinity. Brigade field officers in attendance at an incident must endeavour, either personally or through other firefighters, to make every effort appropriate in the circumstances to contact and register the names of those people attending as emergency volunteers.

The field controller at an incident who accepts emergency volunteers as firefighters under his/her control should allocate duties to each person for which that person is adequately clothed and is believed capable.

As a general rule, people who travel some distance to an obvious fire, who are unqualified, who are not associated with the vicinity of the fire in terms of residence, relationship to residents, employment or property ownership, and who are not responding to an organised call for volunteers by the CFCO or his delegate, are unlikely to be regarded as emergency volunteers.

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5. INFRASTRUCTURE AND EQUIPMENT

5.1	Fire towers	5.2	5.4.2	Light units	5.4
5.2	Communications equipment	5.2	5.5	Hand tools and knap sacks	5.5
5.3	Firefighting equipment	5.2	5.6	Protective clothing	5.5
5.4	Bushfire fighting appliances	5.3	5.7	Helmets	5.5
5.4.1	Tankers	5.4			

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5. INFRASTRUCTURE AND EQUIPMENT

5.1 FIRE TOWERS

The RFS has four main towers for general use and one minor tower used only during extreme fire danger. This fire tower network provides good fire observation over most of the ACT and adjoining NSW local government areas.

5.2 COMMUNICATION EQUIPMENT

The RFS has a radio system consisting of two very high frequency (VHF) operational channels and one ultra high frequency (UHF) command channel. The southern base at Mt Tennent is the site for the existing operational channel (VHF Channel 1) and the command frequency (UHF Channel 25), while the northern base site at Baldy Hill, near Hall, has the VHF operational channel (VHF Channel 8), and the same command frequency, however this site uses a different sub-audible control tone and is programmed in UHF radios as Channel 26. The VHF channel at Baldy Hill operates in the same way as the simplex channel at Mt Tennent, while the UHF command channel operates as a repeater from either base site.

All RFS channels are linked to the Control Centre. In addition, the following radio channels are also accessed : Forests, Conservation and Wildlife (C&W) channel at Mt Booth and Mt Pierce, the Yarrowlumla Shire Fire Control channel, the Ag and Landcare (Alpha) channel, the ACT Disaster Network (Whiskey) channel, and all the ACT Fire Brigade channels.

For radio coverage in areas remote from the existing base sites, temporary operational communications can be provided by the use of a portable cross-band link radio that cross links VHF frequency to UHF command. Any radio traffic on either channel is heard on the other whenever the cross-link is active, so that radio traffic should be minimised during this time. The portable cross-band link equipment would be temporarily installed to cover the required area for the duration of an incident, for example Mt Coree would provide coverage of the Brindabillas, etc.

Effective communication relies on messages being concise and clear. The procedures used by the Rural Firefighting Service are clearly laid out in the Bush Fire Council's Basic Training Module 3 (Basic Communications).

5.3 FIREFIGHTING EQUIPMENT

The success of any incident control method depends on a combination of people, equipment and training. Since people first attempted to exert their will over wildfire, they have needed equipment of some kind to help them. Whatever the equipment used, its purpose has been to reduce the effect of the incident in one of several different ways or to provide safety for the firefighters faced with the front line conditions.

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Because of the special demand placed on bushfire fighting equipment of all kinds, it is vital that it be of excellent quality, be well maintained and be effective in the hands of a broad spectrum of firefighters. To achieve this the ACT Bush Fire Council maintains a policy of standards regarding the equipment and its uses.

Wherever possilbe the equipment used by the Rural Firefighting Service must be:

* of a very high quality so when any piece of equipment is used during an emergency it performs satisfactorily;
* safe to use;
* designed so that wherever possible it is adaptable to allow exchange and sharing with other co-operating agencies at an incident;
* flexible in its design and performance so that it allows equipment use in varying conditions;
* able to be cost effectively maintained to a standard that allows maximum reliability.

The range and variety of equipment used to control incidents is extremely broad and is increasing almost daily as new technology is adapted to this task. There are three major types of equipment used by the RFS in general these are:

* hand tools
  - rake-hoes
  - axes
  - drip-touchs
  - chainsaws
  - knap sack sprays
* plant
  - bulldozers
  - graders
  - farm tractors
  - aircraft
* water-handling equipment
  - portable pumps
  - large tankers and hose
  - medium tankers
  - light units
  - portable water reservoirs
  - helicopter water buckets
  - slip-on units

5.4 BUSHFIRE FIGHTING APPLIANCES

In some parts of the ACT there are adequate sources of water such as lakes, rivers, streams and water hydrant outlets that allow the use of pump and hose systems in suppressing

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wildfire. In other areas water sources are few and far between and in some places there is no readily available water. Also, many grass and bush fires move very rapidly over the terrain and the water source must be able to move with the fire front.

To achieve this the RFS has a range of firefighting appliances that carry water and the pump and hose system with them. The bushfire tanker and the light unit are the two basic appliances used within the ACT and are described below.

5.4.1 TANKERS

Because they are able to carry a relatively large volume of water tankers are perhaps the most versatile of bush fire fighting appliances.

* Knock-down: The high pressure water delivery capacity of tankers enables them to achieve a relatively rapid flame knock-down, generally the flank fire and sometimes the 'head fire' under moderate to high intensity conditions.

* Hose-lays: Where terrain is inaccessible to vehicles, tankers can continue fighting fire with water by the use of canvas hose-lays. Hose-lays of up to 600 metres have been used on fires in the ACT.

* Water supply - Sometimes, because of easier terrain, light units remain able to reach the fire when tankers have been halted. The tankers then play an important role as a strategic water supply for the light units.

* Fire break preparation - On grasslands, effective fire breaks can be prepared in advance of a fire, more usually the flank, using a boom spray delivering chemical retardant. Water can also be used, however this usually needs to be in conjunction with immediate backburning as the affect of water alone is too short term.

  Normally the crew of a tanker includes the driver + two, sometimes driver + three as in the larger tankers. The driver is in charge of the tanker plus its associated equipment.

There is a variety of pumping units to be found on the tankers in the services. The driver should attempt to ensure that each crew member is familiar with the correct operation of the pump. However, the operation of the pump normally remains the responsibility of the driver.

5.4.2 LIGHT UNITS

The 1 tonne Toyota 4 x 4 utility is the most common base for a light unit, which has the following general role:

* initial attack: because they are faster and more manoeuvrable than tankers, light units are often despatched to a fire first with the expectation that the speed of attack will result in a successful suppression before the fire has had time to build up.

* tanker support: a tanker has a greater water delivery capacity and is used to rapidly 'knock down' the fire edge. The light unit then follows along behind the tanker extinguishing anything which has relit or which the tanker may have missed.

* mopping up: due to their easier terrain light units are often more efficient at mop-up than tankers.

* patrolling: light units are often used in this role in conjunction with other work. This serves to make the service more visible to the public and it also has an important deterrent effect on would-be fire lighters.

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Normally the crew of a light unit includes the Driver + one. Sometimes the Driver + two. Unless otherwise specified the driver is in charge of the unit.

5.5 HAND TOOLS AND KNAPSACKS

During bushfire fighting hand tools are used to construct a fireline or to separate burning fuel from unburnt material. The main tasks are to cut trees, logs and shrubs, to chip grass and other low vegetation, to dig out half-buried fuel, and to remove surface litter so that the ground can be cleared free of flammable fuel.

The hand tools most commonly used are axes, brush hooks, shovels and rake-hoes. Not any one of these tools completely satisfies the main functions of cutting, chipping, digging and raking, but the uses of several are sufficiently versatile for the requirements of firefighting.

Knapsack spray units carry about 20 litres of water and can be operated by a hand-operated force pump that will send a jet of water to a maximum distance of about six metres, or to a lesser distance as a spray.

The use, care and maintenance of hand tools and knap sacks is clearly described in the Council's Basic Training Module 5, (Hand Tools And Knap Sack Sprays).

5.6 PROTECTIVE CLOTHING

The rural firefighter requires clothing that provides protection from sparks and abrasions and occasional moderate radiant and convective heat loads but is light enough to allow air to circulate and sweat to evaporate freely.

The RFS has a minimum standard of protective clothing for firefighting. This standard requires all firefighters to have clothing that protects the body, arms and legs from burns (e.g. cotton overalls), heavy boots, thick woollen or cotton socks, and an approved protective helmet.

ACT Bush Fire Council Basic Training Module 1 (Basic Fireground Safety) and the section on safety within this manual includes additional detail about the need for a protective clothing standard and the implications of not being correctly clothed for firefighting.

5.7 HELMETS

Helmets are required to protect the head from falling objects and radiated heat. The danger is greatest in a forest fire situation as there is always the possibility of injury from objects striking your head. The helmet should be adjusted to suit the individual with the chin strap properly secured.

All RFS personnel at an incident or during training must wear an approved safety helmet. The approved minimum standard helmet is made of a polycarbonate material that meets the Australian Standard 1801-1981, Sections 2 and 3.

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6. SAFETY

6.1	Safety policy	6.2	6.4.5	Fatigue	6.6
6.2	Occupational health and safety agreement	6.2	6.5	Survival	6.7
6.3	Fire ground safety	6.3	6.5.1	Grasslands	6.7
6.4	Protection of firefighters from fire hazards	6.4	6.5.2	Forests	6.8
6.4.1	Heat	6.4	6.5.3	Avoiding critical situations	6.8
6.4.2	Falling objects	6.6	6.5.4	Heat exhaustion	6.9
6.4.3	Smoke	6.6	6.5.5	Heat stroke	6.10
6.4.4	Nervous tension	6.6	6.6	Fitness for duty	6.10

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6. SAFETY

6.1 SAFETY POLICY

Bushfire control is an inherently dangerous occupation involving strenuous labour in a high temperature environment and will always have more than its share of hazards. But constant attention to safe working practices can keep injury to an absolute minimum. Safety is a prime responsibility of every person at an incident, not just the Field Controller.

The ACT Bush Fire Council (Council) through the Rural Firefighting Service (RFS) is committed to the safety and welfare of its firefighters and operates with regard to the following policies:

* *recognition that its inherent responsibility is to prevent both loss of life and property;*
* *holding every firefighter responsible for performing in the safest manner possible in consideration of the unusual and hazardous working environment;*
* *acceptance of its obligation to provide the safest possible equipment, tools and apparatus with which to perform firefighting duties;*
* *acceptance of responsibility for properly training and educating each firefighter in all safety aspects of the total working environment;*
* *acknowledgement and acceptance of the ACT Government Occupational Health and Safety (OH&S) agreement as the means of identifying and controlling occupational risks;*
* *acceptance and compliance with the RFS obligations under the Department of Urban Services OH&S agreement and implementation arrangements.*

While stressing the importance of the safety policies, the Council recognises that fire is unpredictable, and that in this section and throughout this manual, firefighters in the field may be required to make crisis decisions very rapidly. In such a circumstance, a decision may be made which in hindsight appears incorrect and perhaps contradictory to the Council policy. An example could be in Section 6.5.1, Grasslands, the fourth point, which states: 'the Council Policy is that only the number of people who can fit in the cabin are permitted in the vehicle' As a policy, this is correct, and must apply to vehicles being driven to the firefront. However, should the person in charge of the vehicle be caught in a rapidly advancing firefront and decide to evacuate additional people to safety, then that, and similar crisis decisions, would be accepted and supported by the Council.

6.2 OCCUPATIONAL HEALTH AND SAFETY AGREEMENT

The ACT Government OH&S agreement outlines a structure for the management of OH&S in the ACT Government through the introduction of appropriate consultative mechanisms and

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by the definition of responsibilities of management, unions and employees (including volunteers).

The aim of the agreement is to provide safe and healthy workplaces for Government employees by:

* identifying and controlling occupational risks within the Government at the agency level;
* establishing methods for all firefighters to have access to prompt advice wherever occupational health and safety issues arise;
* establishing a network for communication of OH&S information throughout the organisation; and
* organising activities such as training, health promotion and the provision of expert assistance for personnel throughout the organisation.

6.3 FIRE GROUND SAFETY

The Field Controller bears the responsibility for the welfare and safety of each person assigned to his/her fire ground work force. This responsibility extends much further than establishing good field welfare conditions during firefighting operations and encompasses:

* developing a high level of safety consciousness in each firefighter;
* ensuring that performance of individuals engaged on continuous fireline suppression duties is monitored for effects of fatigue and nervous tension.

The key to fire ground safety is adequate pre-planning, training and fostering safety-consciousness, by ensuring all fireline equipment is safe, and ready for action.

Attention to detail should ensure that:

* tool cutting edges are sharp, and protected when not in use;
* all tool handles are free from splinters;
* pumps function to maximum performance;
* mechanical equipment is safe to use;
* starting ropes will not break;
* fuel containers are leakproof and suitably labelled;
* a functioning radio is available;
* escape routes have been pre-planned;
* every worker knows personal safety survival techniques.

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Observance of the full range of normal workday safety rules such as:

* not sitting or standing on moving vehicles, unless carrying out an approved practice;
* never travelling on a tractor, unless driving;
* proper carriage of tools;
* watching the working arc of others.

Proper first aid facilities must be available to personnel in the field. First aid training of individuals will be encouraged and first aid should be available on the fireline.

Each crew member should be trained and practised in the range of tasks suited to their temperament and ability. They should be encouraged to take personal care of the equipment they will operate on the fire ground. The confident team morale on which the Field Controller depends for effective firefighter performance for long periods, under trying conditions, will come from attention to such factors.

6.4 PROTECTION OF FIREFIGHTERS FROM FIRE HAZARDS

Hazards of the fire control situation which may be encountered in the daily work situation are:

* heat;
* falling objects;
* smoke;
* nervous tension; and
* fatigue.

6.4.1 HEAT

A firefighter is exposed to a number of heat loads, which affect his/her efficiency, the type of protective clothing required, and the type of precautions taken. These are:

* direct contact with flames or burning embers;
* radiant and convective heat from the fire;
* environmental heat of a hot, summer day, tanker motors etc; and
* metabolic heat from bodily exertion.

The type of protective clothing required will depend on the firefighting task, and the amount of metabolic heat generated to do that task.

Rural firefighters should never need to be exposed to direct contact with high flames, but will often be in contact with low flames, wind-blown burning embers and smouldering coals on the ground. For this reason all firefighters must have heavy boots, thick woollen socks, a protective helmet and clothing which protects the body, arms and legs from burns.

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The type of material will depend upon the firefighting tasks, and the amount of protection provided against radiant heat, depends entirely on the thickness of the material. Thus, a firefighter fighting a stationary fire, such as a burning structure , or a windrow of logs is not expending a great deal of energy in the task. They need thick heavy clothing such as an urban firefighters turnout coat, and heavy gloves so they can approach the fire as close as possible to effectively apply water to the base of the fire.

On the other hand rural firefighters will expend a considerable amount of energy during firefighting, particularly if they are working with hand tools.

An experimental study to determine the heat load on firefighters and the physical stress they were under, when using hand tools on forest fires up to 1000 kW/m intensity found that most the heat stress arose from metabolic heat developed when working on a hot day. Radiant and convective heat from the fire were usually less important, as firefighters placed themselves at a sensible distance from the fire where these heat loads were small. However, both radiant and convective heat were very important considerations when firefighters had to work close to the fire edge to contain a spot fire or break away.

During the study the firefighters during the study consistently worked at 75% of their maximum physical capacity; maintained mean heart rates of 152 beats/min and had deep body temperatures around 38.70(peaks 181 beats/min and 39.60C). Sweat rates when working were commonly one litre/hour or greater.

Thus, rural firefighters require clothing which provides protection from sparks and abrasions and occasional moderate radiant and convective heat loads but is light enough to allow air to circulate and sweat to evaporate freely. This study found no difference between different types of material commonly used by firefighters, e.g. cotton overalls, woollen overalls, or a combination of cotton drill trousers and shirts, or the colour of the material. However, material which does not burn or melt is preferred to prevent minor burn injuries.

The Council recommends that, as a general rule, firefighters wear combination drill overalls which:

* have been spark proofed (Proban);
* are loose fitting at the waist;
* are not tucked into socks, thus preventing ventilation beneath the garment;
* are preferably of a high-visibility colour, including yellow.

Convective heat makes up 75% of the heat released above a fire (radiation 25%). While this is mostly carried upwards by buoyant convection currents, it may occasionally affect firefighters near the line when a downdraft or strong wind gust brings it close to the ground. When firefighters have been working hard a sudden burst of convection or radiant heat can cause them to overheat rapidly and suffer heat exhaustion. They will usually recover rapidly if they take a short rest away from the fire edge.

Firefighters will evaporate a litre of water per hour by sweating when working hard on the fireline. During experiments, even though men drank frequently they still became dehydrated by over 1.5 litres during a four hour shift. This study indicated that it was difficult for firefighters to replace water when working on a fire edge. Thirst is not a good indicator of water needs. A person's thirst is quenched well before water needs are made up.

The Council recommends that firefighters working at a fire front under hot conditions take a drink of water every 10 minutes even if they don't feel like it.

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Plain water is best, but anything which encourages a person to drink (e.g. tea, fruit juice, weak cordial) should be used. Under most circumstances salt supplements are not required, and salt replacement is best done with extra salt at meals.

6.4.2 Falling Objects

Burning trees can drop limbs without any warning noise. In some mature, and long unburnt eucalypt forests, trees may start falling within 30 minutes of a fire and continue to drop for several days after the fire.

The type and condition of the trees should be examined before mopping up in treed areas. Look-outs must be posted when stags are to be felled, to warn of falling limbs. On steep slopes all firefighters are to avoid dislodging rocks and logs, and to watch for rocks rolling from above.

6.4.3 Smoke

Smoke is an irritating nuisance and may at times, become dense enough to be debilitating. Although susceptibility to smoke varies between people, protection from this hazard should be available to everyone.

The Council requires that each crew member be issued with goggles, and recommends that each firefighter should carry a cloth to use as a smoke mask or a filter mask.

These items must be light and convenient enough to be carried effortlessly. During emergencies the technique of using a wet rag or handkerchief over the face, and getting low to the ground breathing in between smoke clouds, should be used.

Carbon monoxide is produced by bushfires and slowly accumulate in the blood when it reacts with haemoglobin to form carboxyhaemoglobin (COHb). Studies have shown that firefighters working continuously in a smoky environment for an eight hour shift may accumulate COHb levels of 7% if they smoke cigarettes or 5% if they are non-smokers. Individual heavy smokers may accumulate COHb levels of less than 10% have negligible effects on psychomotor function and physical work capacity.

The Council recommends that the smokers limit the number of cigarettes they smoke during firefighting, and wherever possible take rest-breaks away from very smoky areas.

6.4.4 Nervous Tension

Nervous tension, resulting from excitement or fear, may cause considerable fatigue, especially in inexperienced firefighters.

The best counter is high morale and team spirit resulting from good training, and confidence in leadership.

6.4.5 Fatigue

The firefighters exposed to hard work and hazards on the fireline for long periods are very prone to accumulating fatigue which will greatly reduce their efficiency. Supervisory staff are similarly affected by fatigue.

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Field Controllers should:

* take into account fatigue when setting fire control target items;
* anticipate a requirement for replacement of tired firefighters;
* ensure that they themselves are also getting sufficient effective rest.

6.5 SURVIVAL

The pain threshold for prolonged exposure to heat radiation is reached at a radiation flux of 1.25 kW/m2). The maximum radiant heat flux in an intense forest fire is 100 kW/m2. It is not feasible to provide firefighters with protective equipment to withstand this maximum heat load which will persist for several minutes in a forest fire, particularly when combined with a convective heat load and very high winds associated with fire burning under extreme conditions.

The Bush Fire Council does not recommend the use of personal survival shelters or heat proof suits, nor does it equip its vehicles to survive envelopment by intense fire.

Such measures are considered to invite firefighters to take unnecessary risks, and would substantially reduce the efficiency of fire suppression. Most fatalities have occurred when fire crews have driven tankers in impossible situations with heavy forest fuels and extreme fire weather, or when firefighters have been caught in the open away from a vehicle.

The problem of surviving a high intensity fire is so difficult that novice firefighters must accompany an experienced crew leader and receive a basic apprenticeship in firefighting before they can be expected to recognise either unsafe situations or safe refuges.

The following are guidelines for survival but do not guarantee survival for a person exposed in a critical situation.

6.5.1 GRASSLANDS

A normal vehicle provides a safe refuge from a grass fire even under extreme conditions. People are killed because:

* they are caught in the open away from a vehicle or other refuge;
* cars are crashed, often into roadside vegetation where fuels are heavier, and destroy the protection of the vehicle; and
* people leave the vehicle.

The Council Policy is that only the number of people that can fit on the cabin are permitted in the vehicle as its crew.

When suppressing grassfires under dangerous conditions:

* never leave a person in the open or in an unprotected vehicle;
* ensure that crew members on foot always work in a systematic manner so they can fall back onto burnt ground;

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* ensure that the hose men can gain ready access to the cab or behind a heat shield; in the event of a sudden wind change.

In the event of a burn-over in an open grassland the flames will persist for about 10 seconds and smouldering heat for another minute. The vehicle will probably catch alight. Evacuate onto burnt ground as soon as possible and try to put out the vehicle.

6.5.2 Forests

Survival in intense forest fires is virtually impossible. Critical situations must be avoided by always working in a safe and systematic way and having an escape route either to burnt ground, or to an area which won't burn.

However, many fatalities occur when the fire danger is not extreme and when:

* you are building a line downhill towards a fire;
* you are fighting a fire on a slope, Rolling material can ignite fuel below you;
* the wind changes speed or direction;
* the weather gets hotter and drier;
* you are in heavy cover with unburnt fuel between you and the fire;
* you are in an area where terrain and/or vegetation impedes travel;
* you are in country you have not seen in daylight;
* you are unfamiliar with local factors influencing fire behaviour;
* you are using tankers on a frontal attack;
* you are getting frequent spot fires over your line, and heavy smoke directly above you;
* you cannot see the main fire or communicate with anyone who can;
* you have not been given clear instructions;
* you feel like taking a nap near the fireline.

6.5.3 Avoiding Critical Situations

Any situation on the fire edge is potentially dangerous if conditions change.

The field controller must constantly be aware of the potential for change; plan firefighting tactics with consideration of time and logistic requirements before an expected change and receive regular reports from the bureau of meteorology and observers outside the fire area for possible changes

The crew leader is responsible for the safety of his/her crew and must be continually alert for changes in fuel, slope, wind direction and strength which could increase fire behaviour and endanger his crew. The crew leader must never became involved in direct suppression, as this distracts him from observing the fire and planning tactics.

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Individual crew members have a responsibility to themselves, their leader, and other co-workers to restrain from any activity which will endanger their personal safety, and that of others.

These responsibilities will be catered for by a team approach to safety which involves:

* the crew leader adopting a sound tactical plan and sticking to it;
* every person knowing the plan;
* an escape route being planned and discussed;
* local knowledge of terrain or good mapcraft being the basis for judgments;
* using caution in an unfamiliar situation;
* suppressing panic by providing clear instructions and useful tasks.

If, and only if, firefighters have ignored all advice and training and become trapped by fire they may save themselves if:

* *they find an area clear of fuel (bare road or clearing, pond, creek, rocky scree etc.);*
* *they take every measure to protect themselves from radiation (clothes, rocks, solid shields of any sort);*
* *they protect their airways from hot combustion gases.*

To do this they will have to remain calm, think clearly (more clearly than the thinking which led them to this point) and consider their best options.

6.5.4 Heat Exhaustion

Every firefighter should be familiar with first aid treatment for heat exhaustion and heat stroke. Forms of heat exhaustion are relatively common and can be treated effectively on the fireline. On the other hand heat stroke is a medical emergency and demands immediate treatment and urgent evacuation to hospital.

When firefighters are working close to the fire line their deep body temperature is elevated above normal. They can maintain a safe temperature level provided their skin temperature remains below the deep body temperature and they can sweat freely. Sudden bursts of fire activity which provide an unexpected radiant or convective heat load on the firefighter may raise the skin temperature and the body can overheat very rapidly. A firefighter will suddenly feel dizzy or nauseous and want to sit down. The firefighter must be cooled promptly or the condition may lead to heat stroke. The following actions should be taken:

* immediately move to a cool shady place;
* loosen clothing;
* sluice with water while fanning vigorously to reduce body temperature;
* give the patient water.

Normally a firefighter will recover quite quickly from this type of heat exhaustion and be able to continue working. Ensure that the firefighter continues to drink often to avoid dehydration.

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If the firefighter loses consciousness or stops sweating (e.g. his face becomes hot, flushed and dry), he/she must then be immediately treated for heat stroke and evacuated.

6.5.5 HEAT STROKE

This is a true medical emergency. Brain damage and death can occur in a matter of minutes, as the body has lost its capacity to cool itself. Strenuous efforts must be made to reduce the body temperature and keep it cool. Actions required are:-

* move the patient to a cool place;
* remove clothes;
* immerse in cold water, splash with water or rub down with ice if available;
* wrap in a wet sheet, fan and make sure the sheet is kept damp;
* arrange for immediate emergency evacuation to hospital.

Fortunately, heat stroke is relatively rare but it can occur with firefighters who are fit and highly motivated but who have over-extended themselves, particularly if they become dehydrated. People who are suffering from a virus or any infection which raises the body temperature are also more prone to heat stroke and should not engage in heavy fireline duties until they are well.

Crew leaders and other crew members should be constantly vigilant for heat exhaustion and check on any crew member who becomes unusually tired and lags behind the rest of the crew or appears to be acting in an irrational manner.

6.6 FITNESS FOR DUTY

Firefighters need to be fit. Fitness aids firefighters to work safely and efficiently. The work is physically demanding, and important strategic decisions are required when conditions can be extremely hot.

A firefighter should be able to:

* travel on foot through rugged terrain;
* work within short distances from the heat of a fire;
* work with a hand tool or hose for long periods;
* to be able to use an axe or chainsaw when required.

A firefighter should be able to perform all of the tasks outlined above safely and efficiently day after day, during the fire season.

In Australia there are no formal test to assess fitness for firefighting. The step test used in the United States is essentially a test of aerobic leg fitness and does not necessarily reflect a measure of work capacity for fireline construction. People engaged in outdoor manual work such as forest labourers and farmers often possess a degree of fitness which enables them to work long hours on the fireline, yet they may fail a physical test such as a step test or running, which is a measure of aerobic leg fitness.

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The Council recommends that all firefighters undergo a regular medical examination to check for possible heart conditions and general fitness for heavy industrial work. Any person with a suspected heart condition or other health problem should advise their brigade captain or crew leader and be assigned light duties and not direct firefighting activities.

The Council recommends that departmental employees should be provided with 30 minutes of paid time, three times per week, to engage in a voluntary fitness program outside the normal fire season.

Volunteer firefighters and particularly those engaged in sedentary occupations should assess their degree of fitness and, if necessary, engage in an aerobic fitness program.

The following exercises are a guide to the minimum fitness for firefighting duties:

* walk five km in one hour (on flat ground);
* run two km in 11 min;
* walk up and down a hill 100 m in length continually 10 times;
* do 15 push-ups; and
* do 20 bent-knee sit-ups.

Any fitness program should be embarked on slowly, but regularly, and should be carried out at a sub-maximal rate. This means that you should be able to carry on a conversation while exercising.

There is a number of exercises which can be undertaken to increase your fitness, but the Council recommends that a brisk daily walk for 30 minutes or more.

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7. TRAINING

7.1	Training policy	7.2	7.3	Training material	7.4
7.2	Training plan	7.2	7.4	Cross organisational accreditation	7.4
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7.2.2	Lesson format	7.4			

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7. TRAINING

Training in bushfire fighting can only be properly achieved by an apprenticeship type program where inexperienced people gain experience in fires under the supervision of experienced firefighters. Council recognises that simply undertaking the training courses provided by Council will not necessarily provide for an efficient and experienced firefighter. Council also recognises that there are many people within the volunteer movement and within the rural public who have considerable experience in fighting fires but who may not have undertaken the official training courses. It is up to the judgment of the Chief Fire Control Officer or his/her field controllers or their delegates to recognise experienced firefighting people within their community and accept them as emergency volunteers if required.

7.1 TRAINING POLICY

On 28 April 1988 the Bush Fire Council adopted a number of policies regarding training and minimum standards. These policies formed the basis for developing the training program currently being implemented, in stages by the Rural Firefighting Service.

The policies adopted were:

* that training be given the highest priority after those taking into account items required to achieve fire suppression.
* that minimum standards are essential for all personnel, tasks and functions.
* that minimum standards be applied across the board to all personnel, functions and tasks defined as necessary for fire control.

7.2 TRAINING PLAN

The aim of the training program is to provide all firefighting and support personnel with a cost effective structured training program, comprising all necessary training materials; which can be presented by Brigade Training Officers with minimal preparation and instructional skills.

The Council's training program is structured on five separate levels, known as categories. Each one is designed to achieve a particular objective and is a prerequisite for the next. They are as follows:

Categories	Objective
Recruit Firefighter	What a recruit firefighter must know before he/she are allowed on the fire ground.
Firefighter	Has completed the Recruit Firefighter category as a rerequisite.

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	Has a clear understanding and practical knowledge of fire ground operations.
Brigade Officer	Has completed the firefighter category as a prerequisite. To acquire knowledge and skills to undertake a brigade management function.
Field Controller	Has completed the Brigade Officer category as a prerequisite. To acquire knowledge and skills to accept a field Controller role.
Skills training courses	These courses are conducted as additional training and are applicable from the firefighter to the field controller, depending on the particular skill required. These courses are co-ordinated by the RFS Training Officer.

Within each category there are a number of modules that make up the category training level. These modules for each level are:

Recruit firefighter

* basic fireground safety (Module 1)
* bushfire behaviour (Module 2)
* basic communications (Module 3)
* bushfire suppression (Module 4)

Firefighter

* hand tools and knap sack sprays (Module 5)
* fighting fire with water (Module 6)
* hazard reduction
* basic first aid (Module 8)
* basic structure protection (Module 9)

Brigade officer

* safety on the fireground
* pumps and pumping
* fire behaviour
* fire weather
* map reading
* fire suppression
* management of fire operations
* structure protection

Field controller

* incident control system
* aircraft usage
* leadership

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Skill training courses

* fire extinguishers
* chainsaw operations
* advanced chainsaw operations
* handling of dangerous goods incidents
* four wheel drive vehicle operations (Module 10)
* electrical hazards
* fire tower operations
* liaison officer training
* fire investigation
* leadership
* first aid (St Johns Level)

7.2.1 Module Development

Each module will be developed as a separate training package and will be published in a distinctive training cover with relevant module numbering.

7.2.2 Lesson Format

Every module is a standard format and design so that the instructor has readily available all the resource material necessary to conduct the lesson. For preparation the instructor need only review the lesson, check the training aids and have sufficient modules to hand out

The training lesson must be approached remembering that most participants are adult. They will have much to offer by way of experience and the training should be an exhilarating experience for them. Initial training should provide only the basic modules to build confidence to make a start and continue to study.

7.3 TRAINING MATERIAL

At the time of writing this section of the manual only nine of the modules listed above are available. As modules become available the support material needed to conduct the lessons will be included in the instruction material, but will generally include: overhead plates, videos, and practical exercises.

7.4 CROSS ORGANISATIONAL ACCREDITATION

The RFS will recognise accreditation given by other fire control authorities for courses undertaken by people who can produce proof of completion for such courses, and where it can be demonstrated that the course was of an equivalent standard.

7.5 FIREFIGHTER RECORD BOOK

Each ACT bushfire fighter is issued with a training record book in which the lesson undertaken, the date and the signature of the Training Officer is recorded at the completion of

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each module. This record book can be used as identification and as a statement of training completed by the trainee.

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8.FIRE PROTECTION

8.1	Publicity and public awareness	8.2	8.8	Fuel management	8.5
8.2	Roadside fire danger meters	8.2	8.8.1	Prescribed burning	8.6
8.3	Printed material	8.3	8.8.2	Hazardous fuel removal	8.7
8.4	Media relations	8.3	8.8.3	Prescription fire plan	8.7
8.5	Displays and promotional opportunities	8.3	8.8.4	Notification to remove hazardous fuels	8.10
8.6	Total fire bans	8.4	8.9	Smoke management	8.10
8.7	Inspectors - power and appointments	8.5	8.9.1	Steps to take to minimise smoke effect	8.11

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8. FIRE PROTECTION

8.1 PUBLICITY AND PUBLIC AWARENESS

The Rural Firefighting Service (RFS) has, and needs to maintain, direct contact with the general community. The service has developed communication and education programs which target specific current needs, and simultaneously build knowledge for future generations. To be most effective these programs have been designed for use in ACT region and reflect the fire safety and fire prevention subjects specific to the ACT laws and policies.

The publicity and public awareness function of the RFS includes the following:

* *publicising the services provided by the service, including prevention efforts and other programmes designed to help people protect their lives and property from fire, or recover after a fire has occurred. Publicity efforts can include brochures, posters, advertisements in local papers, radio and television spots or announcements;*

* *developing a relationship with the media, providing information to reporters, and responding to their enquiries;*

* *providing public information during an incident or emergency to explain what has occurred, what is being done about it, and if applicable, what measures have been taken to protect the community affected by the incident;*

* *explaining managerial and technological innovations that will improve the services provided. Such innovations might include current programs and activities and acquisition of new apparatus or equipment;*

* *serving as a liaison with the land managers, private sector, school system, and other people involved in the total fire protection system to help educate them about the role of the service and secure their cooperation in prevention and other programs.*

8.2 ROADSIDE FIRE DANGER METERS

The RFS maintains a number of roadside fire danger meters as a means of informing the public about the level of fire danger on any one day during the bushfire danger period. These signs have been erected in locations that provide maximum viewing access.

The roadside fire danger meters are kept up to date by the departmental brigade staff, following the fire weather forecast for the day.

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8.3 PRINTED MATERIAL

The service produces a variety of printed material such as leaflets and brochures These are free and are designed to be informative and not specific to any particular fire season or location.

8.4 MEDIA RELATIONS

The press plays an important role in the RFS's relationship with the community. It relays information from the Service to the public and relays public opinion to the service.

The following guidelines are to be used for establishing and maintaining good working relationships with the media - newspapers, radio and television:

* media statements are to made by one person only. This will be the Incident Controller or a nominated officer;
* work with the media and set ground rules for restricted news coverage and be certain you both have the same understanding of such terms as 'off the record' and 'just background information';
* take time to orient reporters to the incident and supply them with background material on complex issues;
* be sure information given to reporters is accurate and complete. If you do not know the answer to a question, do not bluff or refuse to answer, but offer to find out;
* practice a genuine open-door policy with reporters. Incident Controllers should try to be available for interviews at times that will help reporters meet their deadlines;
* be sure you provide the same information to each reporter;
* if a news story is inaccurate, do not hesitate to tell the reporter. But respect his or her news judgment and ignore minor inaccuracies.

8.5 DISPLAYS AND PROMOTIONAL OPPORTUNITIES

The RFS participates in a number of display opportunities within the ACT such as the Canberra Show, Canberra Festival and volunteer field days. In preparing a display it is important that a goal is selected or a decision is made as to what is to be accomplished by the display.

Any display or promotional opportunity entered into by the Service will have the following objectives:

* *the viewer should have a better understanding of the consequences of inadequate fire safety precautions;*
* *the viewer should better understand the immense need for fire prevention;*

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* *the viewer should better understand what constitutes a fire hazard; and*

* *the viewer should learn what her/his action would be in the event of fire.*

8.6 TOTAL FIRE BANS

Total fire bans are declared under Section 7A of the Careless Use Of Fire Act 1936. This section provides that; '... a person shall not light, use or maintain a fire in the open air on a day or during a period in respect of which the Minister has caused -

a) to be published in a newspaper circulating in the Territory;

b) to be broadcast from a broadcasting station in the Territory; or

c) to be televised from a television station in the Territory,

a warning of the likelihood of the occurrence of weather conditions conducive to the spread of fire'.

The Minister's authority is delegated to the Chief Fire Control Officer (CFCO).

Total fire bans are declared whenever the CFCO considers that it is necessary to do so to prevent the outbreak or spread of fires. The following are the normal procedures adopted in the process of declaring a total fire ban, however the procedures may be varied at any time at the discretion of the CFCO, based on the circumstances at the time:

i) the forecast for the following day is received at about 1530 hours;

ii) if the CFCO considers the forecast warrants, or is nearing, a total fire ban situation, contact will be made with the NSW Department of Bush Fire Services to determine what, if any, actions will be undertaken within the adjoining weather district;

iii) based on the weather information and/or the decision for the adjoining weather district, a warning of the possibility, or the declaration of a ban, will be transmitted to the media and other organisations by fascimile machine or telephone at about 1600 hours;

iv) the morning weather forecast for the day in question is received at about 0630 hours, at that time a review of the fire weather forecast will be made by the Chief Fire Control Officer and the total fire ban confirmed, revoked or not imposed. The media and affected organisations will be informed by 0700 as to the decision for the day.

The period of total fire ban will normally be 0700 to 2100 hours on the day in question, however, this may be altered by the Chief Fire Control Officer to suit the circumstances of the weather conditions.

Under the current provisions of section 7A there are no exemptions.

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8.7 INSPECTORS - POWERS AND APPOINTMENTS

Inspectors are appointed by the Minister under the provisions of Section 5 of the *Careless Use Of Fire Act 1936.*

The Minister's authority to appoint inspectors is currently delegated to the Director, Environment and Conservation Bureau, and the CFCO of the RFS.

Each inspector must carry an identity card that specifies the name and appointment of the inspector and on which appears a recent photograph of the inspector. An inspector must display his or her identity card whenever carrying out functions authorised by the Act. This identity card must be returned to the Minister's delegate upon the cessation of the inspector's employment.

The Careless Use Of Fire Act 1936 *provides standard inspection procedures to protect the public interests including:*

* *where an inspector believes, on reasonable grounds, that it is necessary to do so to ensure compliance with Section 5S or to issue a notice under Section 5AC of the Act, he or she may enter land outside the built up area;*

* *before an inspector can enter land they must give written notice to the owner of the land at least 24 hours before entering;*

* *an inspector may issue directions to the land owner to take action that is reasonable in the circumstances to comply with subsection 5S(1). Before such directions are given by the inspector the following procedures must be followed:*

  . *the CFCO must be informed and his/her approval given;*

  . *the inspector must justify the reasons for the direction, either on the RFS's hazard assessment process, or a clearly defined site specific risk assessment;*

  . *the inspector and the CFCO before issuing, or approving, a direction must consider:*

  a) the amount and type of litter, timber or vegetation whether alive or dead on the land;

  b) the amount and type of other inflammable material on the land;

  c) climatic conditions affecting the land;

  d) the location and use of the land and any nearby land; and

  e) the possible effects of a fire on the land and nearby land.

* *an inspector may require any person committing or reasonably suspected of having committed or about to commit an offence against the Careless Use Of Fire Act to give his or her name in full and place of abode.*

8.8 FUEL MANAGEMENT

Bushfires are inevitable due to climate, vegetation types and the existence of many uncontrolled agencies which start fires such as lightning. The bushfire problem essentially is

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the destruction of assets on which individuals or the community place value and the community's ability to protect these assets, or minimise the potential for damage in the event of a fire burning through their area.

Fuel management practices to maintain low fuel levels are essential for effective fire management in areas of potential high fire hazard. These fuel management practices include prescribed burning or hazard removal, such as mowing, slashing or spraying.

Prescribed burning is the responsibility of the land manager and under Section 5S1 of the Act: 'the owner of land outside the built up area should take such measures as are reasonable in the circumstances to prevent and inhibit the outbreak and spread of fire on that land, and to protect property from fire on that land or from spreading from that land.' This Section of the Act places a responsibility on the land manager to remove hazards, that is, to reduce fuels. This policy is actively supported by Council and in many cases it recommends that prescribed burning is the most efficient way of doing it. Under the Act land owners require a permit to burn if that burn is to be carried out during the proclaimed fire season. It is sufficient to say in this manual that the Bushfire Council will assist land holders in the undertaking of burning operations and preparing prescriptions if required.

8.8.1 PRESCRIBED BURNING

Prescribed burning is also variously known as 'hazard reduction', 'controlled burning', 'hazard reduction burning' and 'burning off. It is the practice whereby combustible fuel is burnt under mild weather conditions to reduce the fuel available to subsequent wildfires.

Prescribed burning has a number of advantages: it modifies the only factor in wildfire behaviour that can be manipulated by management practices. The practice can also have a significant ameliorating effect on wildfire intensity in areas treated before severe fire weather. Also it can retard the rate of spread of wildfire in suitably treated areas (however, this potential is significantly reduced the more extreme the fire weather conditions).

The decision to burn, once an area has been identified (either by the manager or the Service) as a high fire hazard, is the responsibility of the land manager. Where required the land owner must obtain a Permit To Burn, and this will require a prescription under which the burn will take place. The prescription must also take heed of the need to prevent the effect of smoke. The manager must decide the most appropriate way to reduce the potential effect of an identified hazard.

For example, if other land use management objectives conflict with the option to burn, then the onus is on the manager to reduce the potential effect of that hazard by some other means or by a documented management approach that supports the 'do nothing' management strategy.

Policies:

* *prescribed burning is regarded by the Council as a legitimate and practical management tool to alleviate the hazards of intense wildfire;*
* *the Council regards the responsibility for planning and carrying out prescribed burning as resting solely with the land owner, occupier and/or manager;*
* *land owners, occupiers and managers will be encouraged to undertake prescribed burning programs in those areas identified as potential hazardous areas and are also suitable for this management strategy;*
* *the Council will assist and advise all land owners, occupiers and managers to achieve their prescribed burning programs.*

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8.8.2 HAZARDOUS FUEL REMOVAL:

Hazard removal is the process of modifying the fuel complex by mechanical means; e.g. mowing, slashing, rolling or by chemical spraying.

Each year the RFS enters into agreements with land management sections of the Environment and Conservation Bureau to modify fuels adjacent to roadsides and established fire breaks on a program basis. This is funded by the service, and is normally restricted to those areas outside the normal management operations of the participating land management sections.

The funds allocated to the service for this function are generally small, but are sufficient to allow it to determine the priority areas and the number of mowing rotations for any growing season; thereby ensuring that the areas that require priority treatment in some way to modify the fuels are rated high in the Bureau's general mowing program.

Policies:

* *a hazard removal program will be implemented based on availability of funds, and will be restricted to those areas outside normal management control of the Environment and Conservation Bureau and ACT Forests;*

* *RFS will liaise with the relevant sections of the Environment and Conservation Bureau to maintain an effective and efficient fire hazard removal program for the ACT;*

* *RFS will assess, review and determine the areas and timing of the fire hazard removal program.*

8.8.3 PRESCRIPTION FIRE PLAN

Combinations of the following fire prescription elements are necessary to adequately plan and implement hazard reduction burning. The same elements are necessary for the evaluation and maintenance of air quality. The following check-list is to be used as a memory jogger for those items which will need to be considered. Wherever possible, details are to be shown on a map.

PART A THE PLAN

* Objective
  - reason for burn
  - expected achievements
  - consistent with land management objectives
* Description of proposed ignition area
  - aspect (e.g. 260 to 360 degrees = 52%)
  - slope (e.g. 0 to 10 = 42%, 10 to 20 = 58%)
  - elevation range
  - catchment area
  - size (gross and/or area to be treated)
  - location of fire control lines (map)
* Fuel
  - fuel type, by area as % of total
    grass
    native forest litter
    pine

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heath
other
- fuel quantity in t/ha (state whether measured, estimated or modelled)
- burning history
- fuel arrangement (e.g. suspended, ground litter, pruned, windrowed etc.)
- moisture content (current, preferred for burning)

* Identification of potential effects

List any identified potential effects and/or constraints and what measures will be needed to deal with these problems. For example, consider:

- air quality (smoke management)
- buildings
- fences
- recreation settings
- historic sites
- archaeological sites
- animal habitat
- weed infestation
- rare and endangered species
- soil stability
- landscape character
- research plots
- reference areas
- areas to be left unburnt
- adjoining property effects
- vegetation response

* Timetable

Timetable the action required to burn. Nominate who shall be responsible for each action. For example, consider:

- public notice requirements
- carry out preliminary check of area
- establish control lines and/or access
- rake around trees on the edge of the proposed burn
- ensure all equipment is functioning
- erect warning signs
- test burns
- evaluation (how long after the burn and by whom)

* Final check

Burning plans must be in accordance with:

- *Careless Use Of Fire Act 1936*
- *Air Pollution Act 1984*
- permit conditions
- approved plans of management (if any exist)
- government environment policy
- other relevant legislation (e.g. Nature Conservation Act)
- Where appropriate, with the consent of the adjoining property owner and/or after public notification.

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PART B THE BURNING PRESCRIPTION

* Objectives
  - restate objectives
* Area
  - identify proposed area
  - identify areas to be left unburnt
* Fire behaviour

Describe the conditions under which the burn would be conducted to achieve the desired objectives.

- maximum acceptable scorch height
- desirable fire intensity
- desirable wind direction to achieve burning objective and minimise smoke effect
- desirable air stability class
- desirable wind speed
- desirable relative humidity
- desirable temperature
- desirable fire danger index
- desirable drought index

* Control

Describe the control method that will be used.

- existing control lines
- adjacent old burns
- control lines to be prepared on the day
- areas requiring special attention
- availability of back up suppression forces
- mop up requirements

* Ignition method

Describe exactly how the burn will be carried out.

- desired commencement date
- time needed to complete the burn
- time of day to commence
- method
  ground - along roads and tracks, grid pattern, strip lighting, ignition pattern direction of lighting and spacing between ignition points or lines
  aerial - helicopter or fixed wing, direction of flight lines and spacing of ignition points and lines
- need for test burn
- stages of burn
- areas to be left unburnt

* Resource deployment

Describe how resources (personnel and equipment) will be deployed on the day of the burn.

- fire tanker crews

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- dozer operators
- chainsaw operators
- weather monitoring
- hand tool crews
- command location
- communications
- contact for public enquiries
- patrol method and duration

* Estimated costs

Describe completely, and as accurately as possible, all costs likely to be incurred.

- overtime
- wages
- aircraft hire
- burning fuel (i.e. drip torch fuel)
- incendiaries
- equipment hire or recovery costs
- rehabilitation (e.g. tracks, control lines, fences)
- site preparation
- publicity

8.8.4 NOTIFICATION TO REMOVE HAZARDOUS FUELS

Section 5AC of the *Careless Use Of Fire Act* allows inspectors appointed under the Act to give directions requiring the landowners to take such action as is reasonable in the circumstances to prevent and inhibit the outbreak and spread of fire on that land. the powers and procedures it be adopted by an inspector are described in section 8.7 of this manual.

8.9 SMOKE MANAGEMENT

On the 21 February 1990 delegation was given to the CFCO and the two Deputy CFCOs to issue permits under Section 27A of the Air Pollution Act 1984 for approval to burn plant matter. This delegation eliminates the need to obtain two permits before carrying out hazard reduction burns during the prescribed period. Outside the prescribed period the delegated officers will still issue Pollution Control Authority permits for hazard reduction burning.

The delegation places the accountability with these officers of ensuring the avoidance of unwanted smoke pollution effects from hazard reduction burning on the community. As a result, the way in which approvals are prepared and burning carried out, must be formalised.

A burning plan in writing, will be prepared in advance for each area or material to be burnt. Permits to burn will not be given without a written plan similar to that described in section 8.8.3 of this manual.

The following information is provided to assist managers in preparing such prescription burning plans, and to assist the delegated officers in evaluating whether the burning proposal will achieve the desired management objectives with the minimum impact on air quality.

Apart from the obvious fire management planning related issues of (why you are burning, what you are burning, how you are going to burn it, and when it is to be burnt, it is necessary to also predict and evaluate the potential air quality effects of the proposed burn. This involves exercising some smoke management practices as well as identifying potential air quality effects.

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Smoke management is now, more than ever, critical to maintaining community acceptance of hazard reduction burning. The more smoke put into smoke sensitive areas of the ACT, and the surrounding environs, the greater the community pressure that will be focused on the RFS and land managers to use less effective alternative methods. There can be no doubt that the community also must be prepared to accept that, in order to reduce the risk of wildfire damage, smoke from hazard reduction burning is inevitable from time to time. That does not, nor should it, lessen managers; responsibility to demonstrate good management.

The number of days during the burning season with conditions fitting both resource management objectives and air quality objectives is limited. As a consequence, it is likely that a number of burns may be programmed on those few days when both sets of constraints are met. Smoke from several sources could easily tax the air quality thresholds acceptable to the community within the ACT on these days. Therefore, a need for systematic and careful scheduling of burns may be called for. The judgment used to approve, and if necessary schedule, such burns will depend upon the quality of the burning plan and the ability to meet the desired objectives under the weather conditions at the proposed time of burning.

The need for such planning detail is that smoke plumes from burning plant matter contain a bewildering array of solid, liquid, and gaseous intermediate hydrocarbons and inorganic residues. As the surface of the solid fuel chars and erodes, particles of carbon and ash are carried through the flame zone to the convection column above. It is these small particles of condensed hydrocarbons, charcoal and ash that are the primary adverse ingredients in bushfire smoke.

Investigations in widely separated parts of Australia and the United States show that particular matter emissions are largely independent of the type of fuel burned. As particular matter, except the inorganic ash, is the product of incomplete combustion, it is not surprising that the emission yield of particulars from fires will vary markedly with fire intensity and other burning characteristics.

Hence, emission of particular matter in smoke is influenced by many variables. In an effort to minimise the particular matter, and therefore reduce the effect of smoke, some general practices are listed below and recommended, and should be considered when planning and preparing an area for burning.

8.9.1 Steps To Take To Minimise Smoke Effect

General practices to reduce the effect of smoke are:

* heading fires are not preferred as they produce about three times more particular matter than backing fires;
* consideration should be given both to the total fuel consumption and the moisture content of the fuel;
* burn scattered logging debris rather than piled debris;
* windrow burning is a most polluting reduction practices, and is to be avoided;
* consider smoke sensitive areas; look several kilometres downwind and along possible smoke drainage paths for potential effect areas;
* preferred atmospheric stability classes are (moderately unstable), (slightly unstable) or (neutral);
* do not burn when air stability is reported to be in one of the 'stable' classes;

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* do not burn under temperature inversions; for the ACT this usually will occur around sunset, so don't light up after 3 pm;

* if smoke drift is likely to affect the Canberra Airport in any way, burning should be avoided;

* avoid smoke drift over roads that may reduce visibility or create traffic hazards;

* where it is possible and reasonable, when preparing an area for burning, cut stumps low and fell dead stags where they can't be prevented from igniting;

* plan to mop up promptly to minimise smoke hazards, even if this means that additional resources are required than that normally used for hazard reduction burning;

* always bear in mind that smoke that goes somewhere safe today could end up somewhere sensitive tomorrow as the winds change; be aware of wind forecasts for at least 3 days after the proposed ignition day;

* if there is any doubt about what action to take, ask the RFS office.

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9. FIRE CONTROL

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9. FIRE CONTROL

9.1 READINESS AND RESPONSE

During the bushfire danger period firefighting units and crews are put on stand-by during a part of the day according to the weather forecast. A standard Readiness Chart issued before each fire season is used as a general guide to what, when and where the various units will stand-by. However, it is varied as required by the Chief Fire Control Officer (CFCO) and will normally only apply to departmental brigades.

The level of readiness is forecast in the afternoon for the next day. This is then confirmed or changed on the morning of the day in question. The afternoon readiness forecast is included with a general weather forecast at 1535 hours. The morning confirmation is broadcast at 0740 hours on normal work days or ten minutes after stand-by commences on weekends and public holidays.

Generally, crews on stand-by are expected to be able to respond to incident calls within thirty (30) seconds, however, at the lower end of the readiness chart during normal working hours response times may be as much as two minutes.

Outside the stand-by times the call out procedures described in 11.2 of this manual will apply. The following response readiness is the maximum delay generally acceptable to the RFS:

State of readiness	Response	time
Red	stand-by at designated location	20 second
Orange	stand-by at designated location,	20 second
Yellow	stand-by at designated location,	30 second
Blue	stand-by on *normal duties within easy reach of access systems,	1 minute
Green	stand-by on normal duties within easy reach of access systems,	1.5 minutes
Grey	stand-by on normal duties within easy reach of access systems,	2 minutes
Nil	normal duties	Quickest response possible in the circumstances.

(* The work allocated during normal duties should not be heavy manual duties that may reduce their effectiveness for incident control.)

The number of units to be called to an initial attack will depend on the Fire Danger Index, level of readiness and the information available about the incident.

As a general guide the following should apply:

State of readiness	Number of units
Red	3 tankers 3 light units
Orange	3 tankers

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Orange	3 tankers 2 light units
Yellow	2 tankers 2 light units
Blue	2 tankers 1 light unit
Green	2 tankers
Grey	1 tanker.

9.2 DETECTION FROM FIRE TOWERS

In the control of bushfire, a relatively ancient truism is that the best way of reducing fire losses is to detect them early and attack them quickly and thoroughly.

Detection is the work or act of discovering and reporting fires. Discovering a fire or smoke and reporting it accurately is necessary before suppression work can begin.

The Rural Firefighting Service (RFS) has four main fire towers for general use and one minor tower used only during extreme fire danger. This fire tower network provides good fire observation over most of the ACT and adjoining local government areas. The Gungahlin area of the ACT is the only area with unsatisfactory coverage.

The Fire Tower Operator's job in detecting and reporting are the first two links in a chain of events leading to the extinguishing of a fire. To perform this function adequately, continued alertness is required at all times, and the operator should glance around the whole of the area frequently, and at least every two minutes.

Fire Tower Operators must endeavour to provide the following information then report a fire or smoke sighting:

* bearing in degrees from tower
* estimated distance
* approximate location, if possible,
* smoke colour and volume
* if the smoke is building slowly or rapidly.

Fire Tower Operators are also required to report weather conditions at the tower every hour giving average wind speed, wind direction, temperature, relative humidity, storm activity and visibility.

The Stand-by Readiness Chart referred to in 9.1 specifies the towers to be operated and the times of operation, unless varied by the CFCO.

9.3 BACK UP AND STAGING ARRANGEMENTS

Once the initial attack is deployed to the best advantage, the Field Controller must decide whether there is a need for additional resources, to ensure the initial attack is of adequate strength.

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This follow up action involves the Incident Controller in:

* *moving additional resources to the incident, if required at once*
* *moving resources near to the incident, to reduce travelling time*
* *putting additional resources on stand-by.*

In order to properly maintain incident control and provide adequate cover for the remaining ACT area, it is essential to manage uncommitted resources. Staging provides an orderly link between response, initial incident control, follow up and continued fire cover; and is the basis for resource deployment.

Staging in the RFS is undertaken at two levels:

* *Level 1 - at the incident site, where resources are despatched to a central location near the incident for deployment by the Field Controller; and*
* *Level 2 - at the Incident Controller level where resources are deployed to cover gaps in the incident control organisation to compensate for resources used during incident control operations.*

9.4 COMMUNICATIONS

The communication system of the RFS is described in section 5.2 of this manual.

9.5 UNREGISTERED VEHICLE USE AT AN INCIDENT

Under the provisions of Section 211(3) of the *ACT Motor Traffic Act 1936*, unregistered vehicles engaged in an approved purpose of responding to, or engaged in a fire or another emergency are covered by third party insurance. This provision only applies to emergency situations and does not apply to general volunteer firefighter or volunteer bushfire brigade activities. If a vehicle owner wishes to use a vehicle for volunteer firefighting purposes but does not wish to register the vehicle (e.g. farm vehicle) for general use, a concessional registration is available which provides a token registration fee and a reduced third party insurance premium.

Vehicles registered with the concessional registration are approved for use for volunteer firefighter activities, such as; training, promotional activities, maintenance and other approved bushfire brigade activities.

9.6 REVOLVING LIGHTS AND AUDIBLE WARNING SYSTEMS

All RFS tankers, light units and command units are to be fitted with an audible warning system and red revolving light(s).

Whenever a fire control unit is directed, or operates in accordance with the provisions of this manual, to respond to an incident, revolving lights and sirens must be used when traffic regulations could be disregarded.

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When using these warning devices speed limits set for the public may be exceeded within the limits of not endangering life and property. A driver may also disregard motor traffic regulations that apply to the public concerning the direction of travel, direction of turns and parking of fire units. However, the driver must be in full control of the unit and will be responsible for avoiding other vehicles and pedestrians when disregarding traffic regulations. The driver is permitted to drive through traffic lights and stop signs but again, it must be stressed that the responsibility for defensive driving lies with the unit driver.

Council recognises that in any emergency, a driver may disregard motor traffic regulations, however, Council does not condone such actions in anything other than an emergency.

9.7 PERMITS TO BURN

During the declared bushfire danger period and outside the 'built up area' a written permit from the CFCO must be obtained before lighting any fire unless it is in an approved fire place. Specific conditions applying to each situation are written on the permit and must be met.

Outside the bushfire danger period and outside the 'built up area', permits are required for camping and cooking fires on unleased land, except in an approved fire place. Landholders on leased land may light fires to burn off without a permit, but only after ensuring that an adequate clearing or fire break of not less than 20 metres has been made, and adjoining landholders and the CFCO, or his delegate, have been informed.

By issuing a Permit to Burn, the Permit Issuing Officer accepts responsibility for the fire's behaviour and effects, provided that the person to whom the permit has been issued adheres to the written prescription in every detail.

Apart from the permit issued under the provisions of the Careless Use Of Fire Act 1936, as described above, conditions also apply under the Air Pollution Act 1984. These conditions relate to the burning of plant matter within the ACT that generates smoke. The CFCO has been delegated the authority to issue permits under the provisions of the Air Pollution Act.

Therefore, any burning of plant matter, outside the 'built up area' and other than a camp or cooking fire, or by a primary producer, must first have approval under the Air Pollution Act 1984 by the CFCO.

9.8 CONTROL CENTRE PROCEDURES

The RFS Control Centre co-ordinates a wide variety of information and activities. Procedures have been established to deal with this information flow and are fully described and kept up to date in the Control Centre Operational Procedures Manual.

9.9 DEPARTMENTAL CO-OPERATIVE ARRANGEMENTS

The RFS through the CFCO is responsible for bushfire protection and control throughout the ACT and Jervis Bay. To implement measures to fulfil this responsibility the Service owns and maintains numerous items of firefighting equipment, but relies on human resources from

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a number of ACT government departments, Commonwealth agencies and volunteers from within the ACT and Jervis Bay.

The Service has had considerable success in maintaining an effective and efficient incident control organisation. To maintain this level of effectiveness it must be clearly established beforehand what resources will be available at any one time and under what arrangements and conditions.

Departmental co-operative arrangements have been established to formalise a commitment to an agreed level of incident control stand-by, detection and firefighting for the protection of the ACT and Jervis Bay. Current co-operative arrangements can be seen on office file 8/01102.

9.10 OTHER AGENCY CO-OPERATIVE ARRANGEMENTS

Since the scope of any particular incident is impossible to accurately predict in advance, the service can not be sure which ACT agencies or cross border agencies will be involved in the control of any one incident.

Therefore, a commitment from as many of the potentially involved agencies as possible to work together is desirable. This commitment should take the form of a written co-operative arrangement.

Co-operative arrangements entered into with the Rural Firefighting Service will include, as a minimum, the following:

* parties involved (who they are);
* purpose of agreement;
* area involved;
* fire prevention
  - fuel management
  - public safety
  - closures during total fire ban periods;
* communications
  - radio use and control
  - contact arrangements
  - fire detection and reporting system;
* resources
  - availability (human and equipment)
  - cost recovery e.g. fee for service
  - conditions of commitment;
* operations
  - unified control / command structure
  - access arrangements
  - operational constraints e.g. backburning, heavy plant, etc
  - safety considerations;
* training;

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* liaison officer arrangement;

* approval requirements.

The agencies with which co-operative arrangements have been established, or are being established, include;-

. ACT Fire Brigade;
. Australian Federal Police;
. ACT Emergency Service;
. relevant commonwealth agencies;
. Yarrowlumla Shire Council;
. CSIRO;
. Australian National University (Mt Stromlo Observatory);
. NSW National Parks and Wildlife Service;
. Shoalhaven City Council;
. Yass Shire Council;
. Cooma/Monaro Shire Council.
. Australian National Parks and Wildlife Service
. Fire and Emergency Services Group

9.11 FIRE RELATED DAMAGE TO FENCES AND THEIR REPAIR

The Careless Use Of Fire Act 1936, provides legal direction with regard to damage to fences during the fire control activity and as a result of the fire itself. Section 5N(1)(c) requires the CFCO, as soon as practicable after any fence which has been pulled down, severed or removed on any land in the course of fire control operations, to cause it to be temporarily repaired in an appropriate manner and the land owner notified accordingly.

Section 11 says that where one land owner has cleared all flammable material for six metres from the fence where the adjacent landowner has not done so, and that fence is damaged by fire then the costs of repair will be borne by his/her neighbour.

9.12 INCIDENT REPORTING SYSTEM

The incident reporting system used by the RFS is a way of collecting comparable data on fires and other incidents for use at service, departmental and government levels. The basic idea in the system is to collect a core of reliable data on a large enough sample of incidents so that the problem can be adequately assessed and appropriate planning action identified.

The Control Centre co-ordinates the completing of the Incident Report form based on the procedures described in the 'Fire Report Forms - Explanatory Notes' document maintained by the Fire Management Planning Officer.

9.13 DE-BRIEFING

Enquiries, in the form of a de-brief, will be made into all incidents as soon as possible after they have been controlled. Depending on the incident type, value at risk and/or complexity, the de-brief can be formal or informal.

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The de-brief is not a means of trying to highlight individuals mistakes but a means of discusing operational problems and finding methods of overcoming such problems in the future.

Only positive operational aspects will be discussed during any incident de-brief. The following de-brief check-list is to be used as a memory jogger only and is by no means the only matters that should be discussed.

9.13.1 DE-BRIEF CHECK-LIST

* detection
  - . location determined
  - . tower/public involvement
  - . fire description or behaviour reported
  - . initial decision for action;
* despatch to fire
  - . initial units despatched
  - . assistance called for
  - . fire brigade advised
  - . analysis of despatch procedure;
* service organisation and support;
* initial fire suppression
  - . how was initial fire appreciation made
  - . how was that appreciation conveyed to Control;
* Analysis of fire -versus- forces committed
  - . what forces did the actual fire behaviour demand
  - . what forces were committed
  - . what forces were available
  - . what did Control decide about forces, i.e. staging
  - . at what time were these decisions made;
* strategy
  - . what strategy was adopted
  - . what advice was received from field;
* fire suppression action
  - . fire control structure at fire
  - . sectorisation
  - . actual fire attack adopted
  - . any safety hazards
  - . any near misses to personnel/equipment
  - . did the methods used suppress the fire without undue delay
  - . identify delays and explain;
* mop-up and patrol
  - . when was fire run stopped
  - . any potential break out points identified;
* shift changes and support;
* Fire Brigade and other organisation involvement

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- . Fire Brigade commitment
- . Police involvement
- . Ag. rangers involvement
- . catering
- . ACT Emergency Service involvement;

* firefighters welfare;

* demobilisation and wind-down
  - . when and who declared fire safe;

* fire preconditions
  - . weather
    - forecast and outlook
    - weather conditions at time of outbreak
  - . readiness level correct yes/no
  - . any other factors;

* communication
  - . did our communication network cope with the amount of traffic
  - . were messages concise but sufficiently informative
  - . did the various levels of control react effectively according to the context of the messages
  - . are control room communications adequate;

* follow up action.

9.14 WEATHER REPORTS

Weather is one of the most important factors governing the start and spread of bushfires. Weather forecasting, although part of the science of meteorology, requires experience in interpreting synoptic charts as well as understanding the likely local influences on the weather.

The RFS Control Centre receives and distributes fire weather information during the fire season. The Control Centre receives the fire weather forecast twice daily at 0700 and 1530 hours from the Bureau of Meteorology office in Canberra. This weather information is then transferred on to the service's weather broadcast sheet with the readiness and Fire Danger Index for the day, and then relayed by radio to the listeners of the service's radio frequency.

The service has also established a close working relationship with the Bureau of Meteorology and, through the Fire Management Planning Officer, often seeks specific weather information to assist with incident management.

Figure 1, on the next page, provides a flow chart of weather operations procedures, while Figure 2 describes the weather analysis procedures by the Rural Firefighting Service.

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FIGURE 1

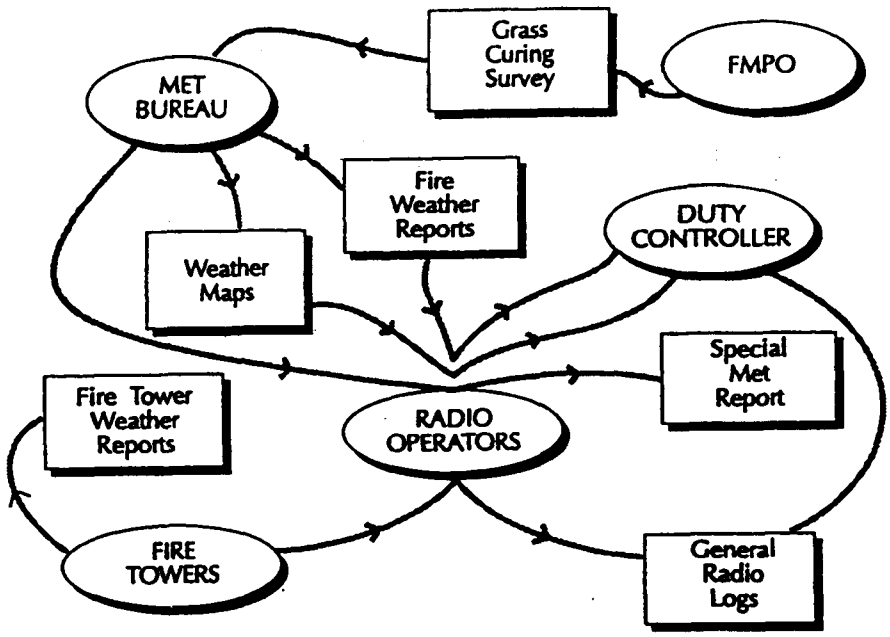
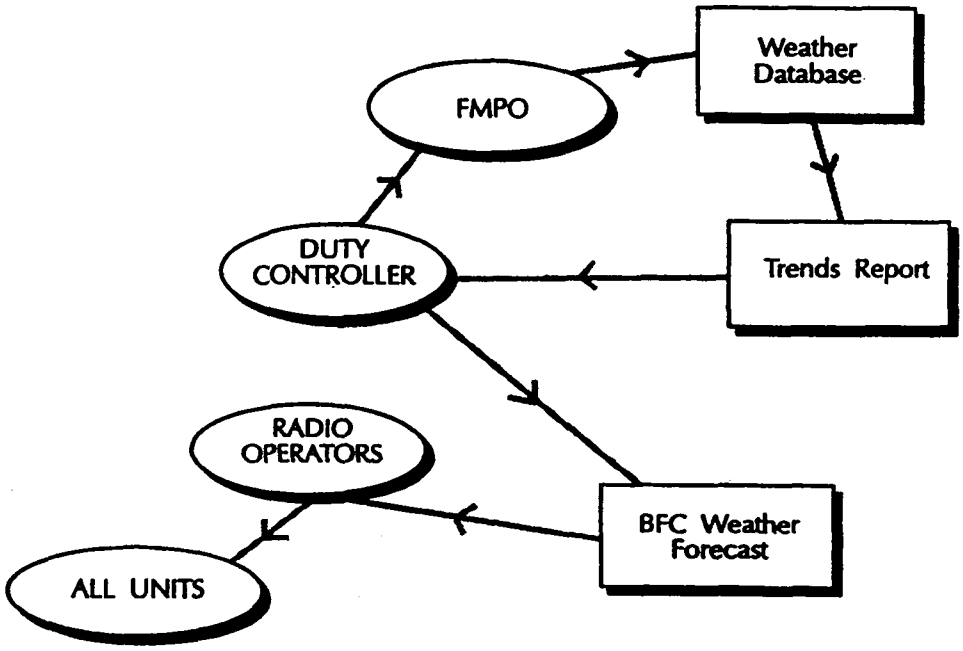


FIGURE 2



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9.15 RESEARCH AND DEVELOPMENT

To assure a healthy future, the RFS needs to seek a happy medium between an adoption that is too late and an experiment that is too early. One way to do this is to continually pursue a research and development function as part of managing the service.

The research and development efforts of the service will be orientated towards field operations and hazard assessment that may include:

* *collaboration with research organisations in undertaking research work;*
* *sponsoring and funding research and development where appropriate;*
* *undertaking management oriented research and investigation;*
* *contracting management oriented research.*

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10. INCIDENT CONTROL SYSTEM

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10.2.1	Functional areas of ICS	10.3	10.3	Inter-agency co-operation and unified control	10.10
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10. INCIDENT CONTROL SYSTEM

10.1 THE INCIDENT CONTROL SYSTEM

Throughout Australia a number of statutory authorities and government departments are responsible for the management and control of wildfire and other emergency incidents. In the early 1980s the Australian Association of Rural Fire Authorities (AARFA) was formed. The charter of the Association includes the promotion of effective rural fire management throughout Australia; to establish national policies on all matters concerning rural fire management; and encourage co-ordination of fire research, fire education and fire training.

AARFA has developed the Australian Inter-service Incident Management System (AIIMS) from the National Interagency Incident Management System currently operating in North America. AIIMS is intended to be used as a national system.

AIIMS consists of five sub-systems which collectively provide a total systems approach to incident management. The sub-systems are:

* Incident Control System (ICS)

  The combination of personnel, facilities, equipment and communication operating within a common organisational structure, with responsibility for the management of allocated resources to effectively accomplish stated objectives relating to an incident. All other sub-systems of AIIMS are in support of the Incident Control System;

* training

  AIIMS contains a standardised training sub-system, which supports ICS. The AIIMS training sub-system is provided to support incident management with standardised training;

* qualifications and accreditation

  AIIMS is capable of providing for the qualification and accreditation (i.e. recognition) of personnel who complete the Incident Control System training program;

* publications management

  the publications management sub-system includes development, publication and distribution of AIIMS material;

* supporting technology

  software packages, communication systems, fire danger rating systems, infra-red photography and other orthophoto mapping will become more accessible and economical with multiple sharing of these resources;

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10.2 THE INCIDENT CONTROL SYSTEM IN THE ACT

The Rural Firefighting Service uses a slightly modified version of the ICS to suit the particular needs of the ACT. The system used is a structure of delegation to ensure that all vital management and information functions are adequately provided.

10.2.1 FUNCTIONAL AREAS OF ICS

The structure is divided into five functional areas. These are:

* incident control;
* field operations;
* planning;
* logistics;
* administration.

The Incident Controller and the Officer-in-Charge of each functional area are referred to as the Incident Management Team.

During the initial response to an incident, the Incident Controller may perform all of these functions. As the incident grows, and the management functions become more demanding, the functions of field control, planning, logistics and administration will be delegated. The Field Controller will normally be the first position appointed.

Two of the principles on which the Incident Control System is based are:

* management by objectives - a process of consultative management where the management team determine the desired outcomes of the incident. These outcomes or objectives are then communicated to those involved, so they know and understand the direction being taken during the operation;
* span of control - a concept which relates to the number of groups or individuals controlled by one person.

An understanding of the terms, co-ordination, control and command is essential to appreciate the roles and functions of the ICS.

These terms are as follows:-

CO-ORDINATION - to bring together agencies and resources to ensure effective emergency management;

CONTROL - the overall direction of response activities in an emergency;

COMMAND - the direction of an agency's own personnel and resources at an incident.

At incidents, the nature of the environment in which supervision is undertaken can be rapidly changing and dangerous. For this reason, a maximum of five reporting groups or individuals is considered to be optimum, as this maintains the Incident Controller's ability to effectively task, monitor and evaluate performance.

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The functions and responsibilities of the Incident Management Team are:

* Incident Controller

. the Chief Fire Control Officer or the Deputy Chief Fire Control Officer will almost always be the Incident Controller and will have overall management of the incident

. the Incident Controller prepares objectives that in turn will be the foundation upon which subsequent action planning will be based. He/she will approve the incident action plan, and approve all requests for the ordering and releasing of resources;

* Field Controller

. the Field Controller will be appointed by, and be responsible to, the Incident Controller and will take over the responsibility for control of operations in accordance with the incident action plan;

* Planning Officer

. the Planning Officer is responsible to the Incident Controller

. the Planning Section is established in support of the incident and is responsible for:

- collection and analysis of incident information
- prediction of incident behaviour
- maintaining a register to record the location and tasking of resources
- preparation of alternative strategies to control the incident;

* Logistics Officer

. the Logistics Officer, is responsible to the Incident Controller

. the Logistics Section is established in support of the incident, and is responsible for providing:

- facilities
- services
- materials

* Administrative Officer

. the Administrative Officer reports to the Incident Controller and is responsible for all financial and management support aspects required for the incident management.

10.2.2 INCIDENT ACTION PLAN

An Incident Action Plan may be oral or written and reflects the overall strategy developed by the IMT. It contains objectives and strategies within specific time frames which will be reviewed continually at subsequent planning meetings or discussions. When adopted the incident action plan will be, conveyed to the required level of the Incident Control System and to support agencies. For large or complex incidents, discussion and consideration of all factors affecting the incident will be developed into a written Incident Action Plan.

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The plan is designed to:

* describe the overall operational objectives and strategy;
* ensure continuity of control operations;
* provide effective use of resources;
* identify total expected resources.

10.2.3 Multiple Agency Incidents

The ICS is suitable at all incidents involving the RFS within its jurisdiction, however, some modification for multiple agency incidents due to factors such as legislation, or agency policies and procedures, may be required. In these situations local agreements and systems will operate. However, the system principles and terminology for multiple agency incidents is regarded as advantageous, as any potential confusion is reduced when these processes are used within all attending agencies.

Some of the additional advantages and reasons why the ICS is used by the RFS are:

* the system strengthens and formalises inter-service control while at the same time ensures that individual agency responsibility or command is not compromised;
* increased understanding and communication should result within agencies and between agencies through the acceptance and use of uniform terminology, procedures and incident organisational structures;
* the system is designed to accommodate a variety of incident types, sizes and operational environments. Particular functions and operational elements are activated only at the time and to the extent dictated by the operational requirements of each specific incident. The system applies from the small to the very large incidents and provides for a logical and smooth expansion of structures and functions as the incident grows;
* the system can effectively be applied to all emergency services;
* through the system a mutual benefit to all agencies at an incident results from sharing resources, communication and working together on a local, Territory and regional basis.

10.2.4 ICS Structure Charts

The key to operational success of an incident revolves around an ability to effectively implement clear lines of communication through an established command structure. The following examples show the incident control system structure chart with the appropriate management structures for different incident requirements:

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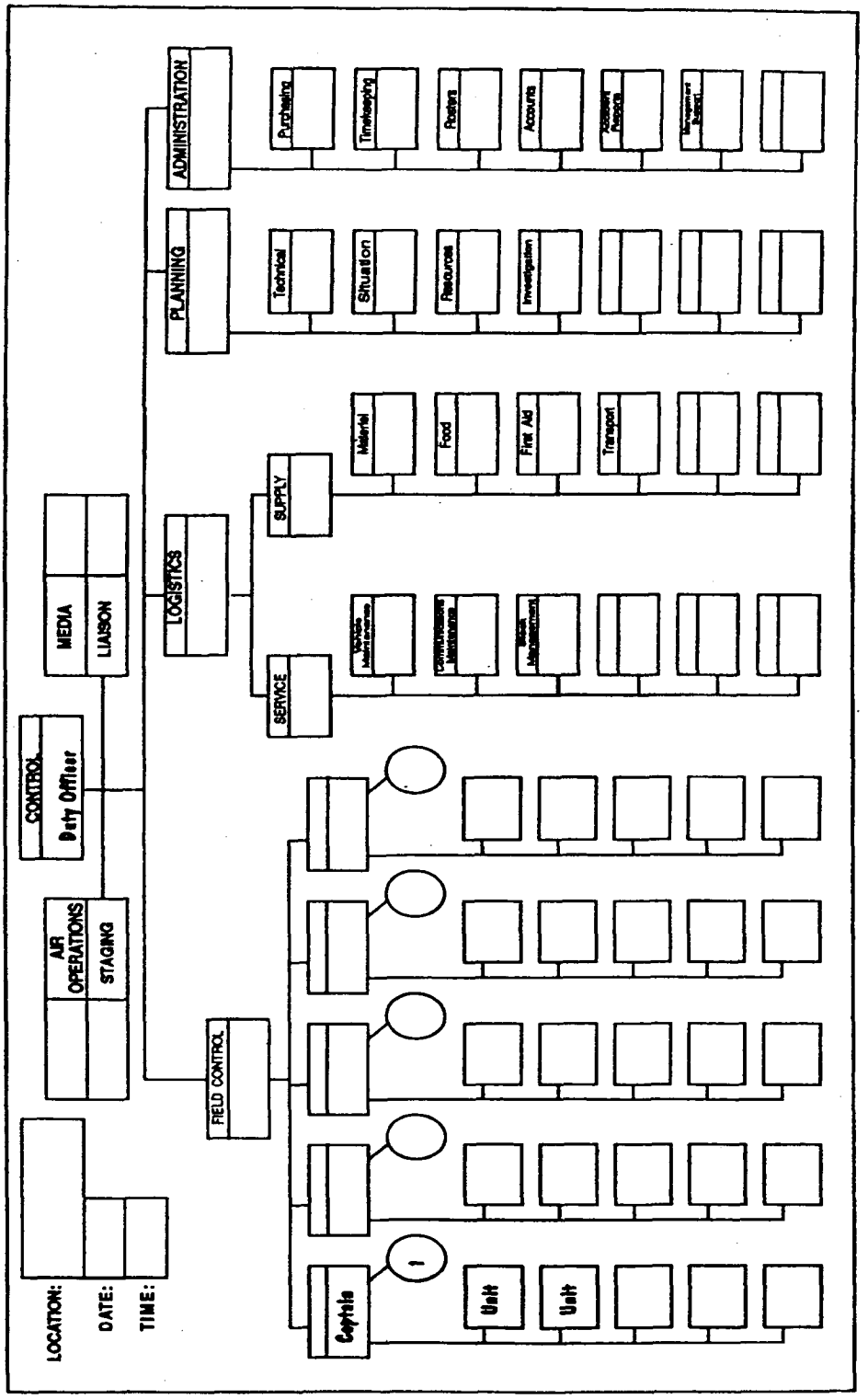
SMALL INCIDENT



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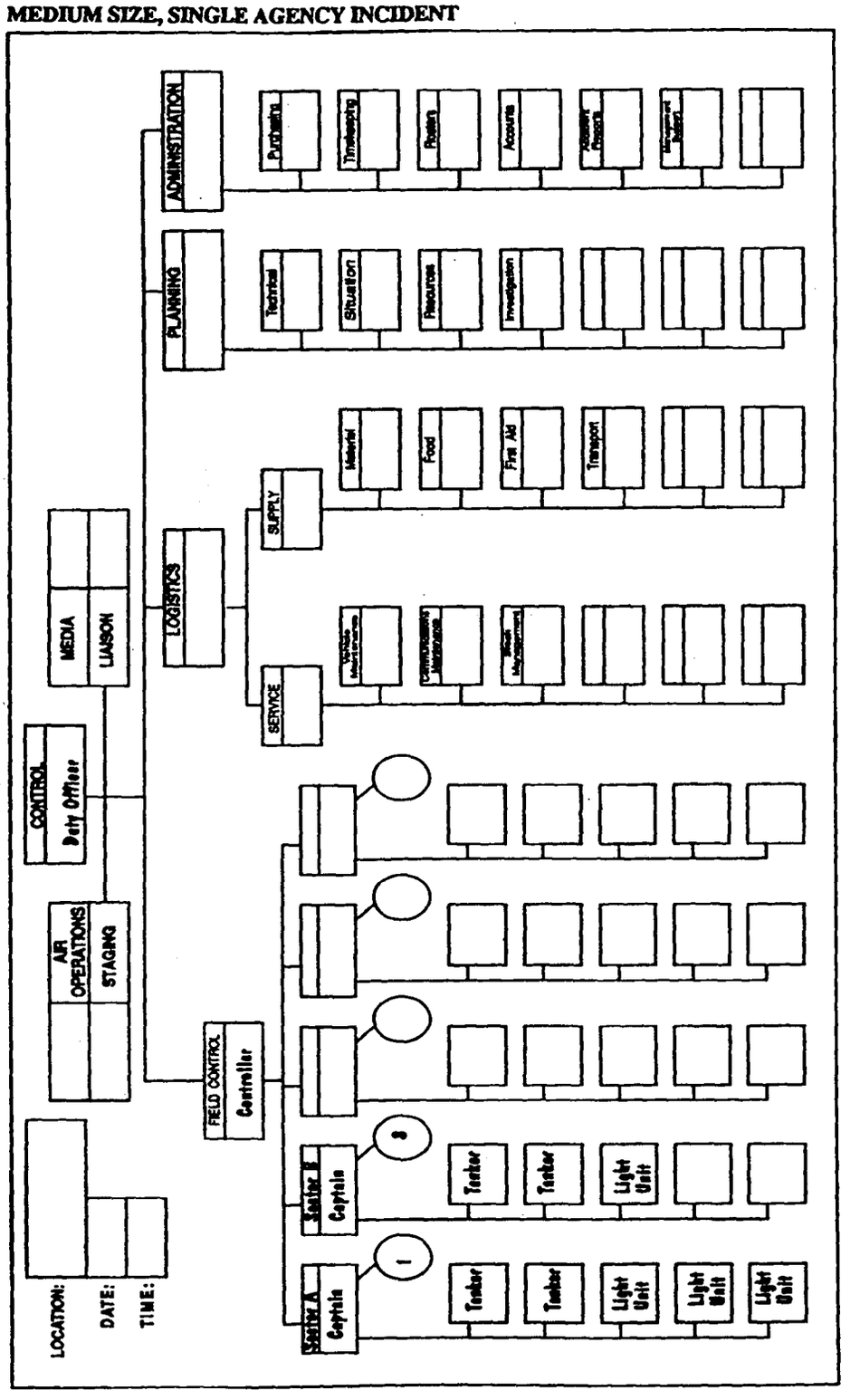
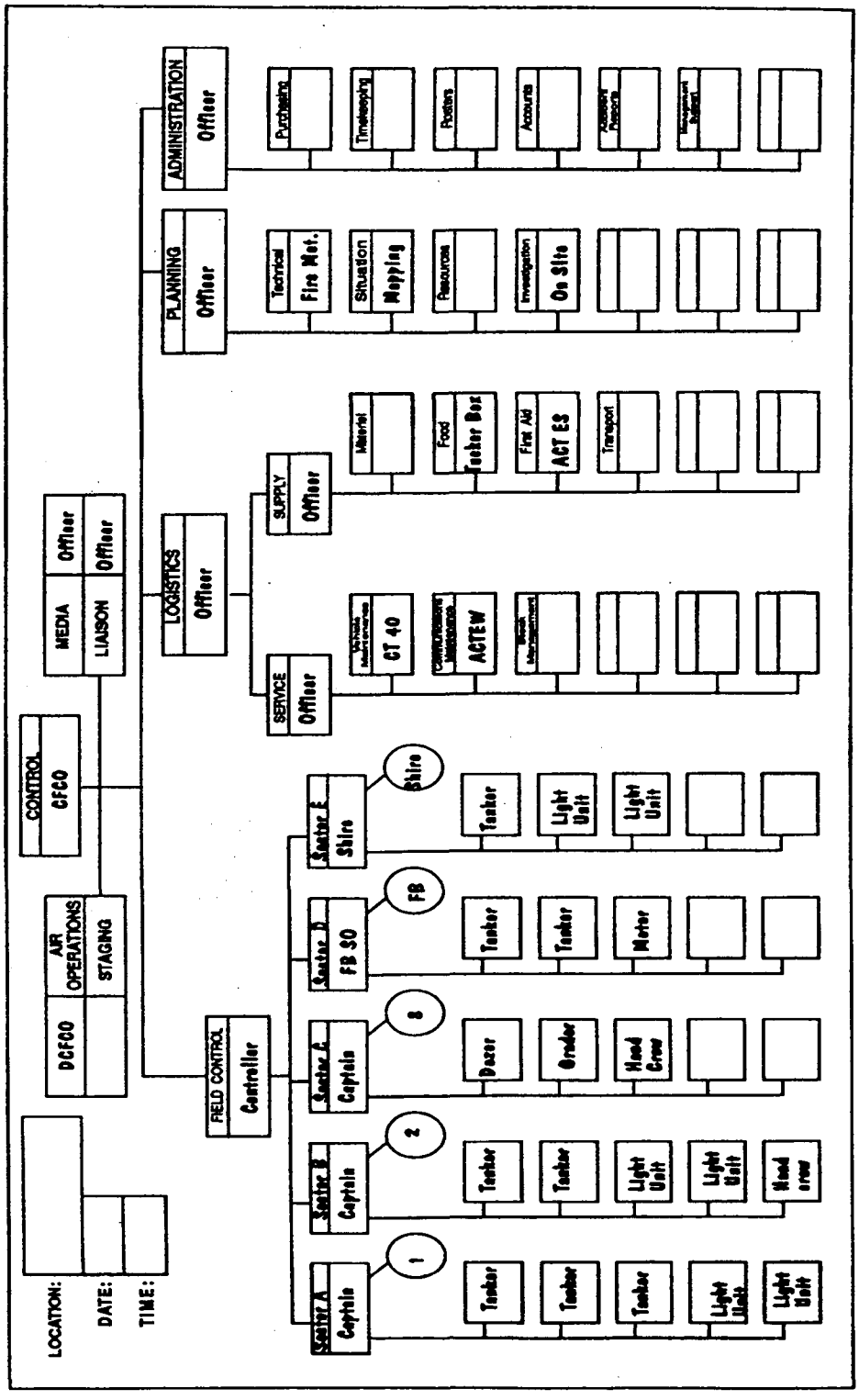
MEDIUM SIZE, SINGLE AGENCY INCIDENT



MEDIUM TO LARGE AND/OR MULTI-AGENCY INCIDENT



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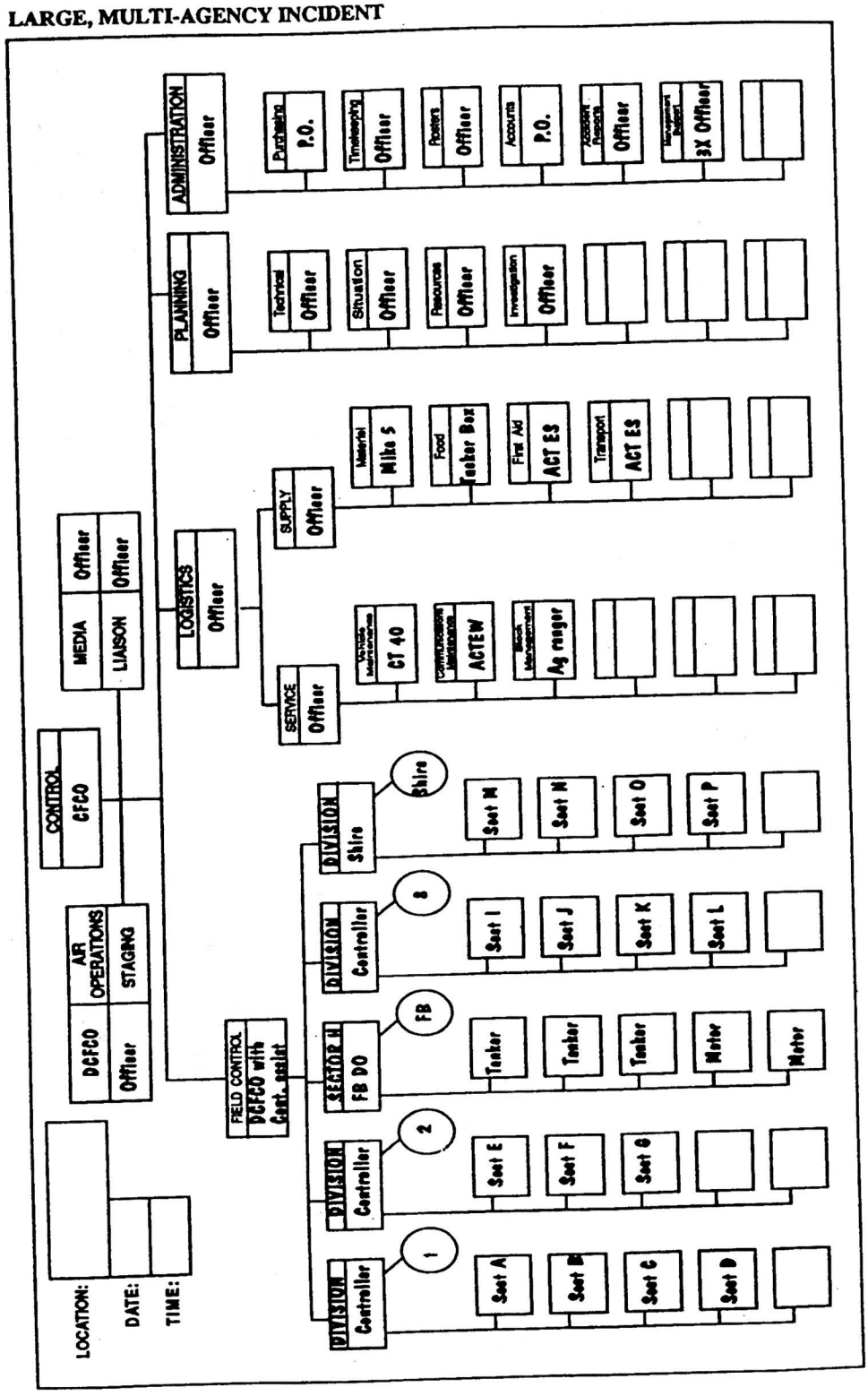
LARGE, MULTI-AGENCY INCIDENT



10.3 INTER-AGENCY CO-OPERATION AND UNIFIED CONTROL

The need for unified control is brought about because:

* incidents have no regard for jurisdictional boundaries;
* individual agency responsibility and authority normally is legally confined to a single jurisdiction.

The concept of unified control simply means that all agencies who have a jurisdictional responsibility at a multi-jurisdictional incident contribute to the process of:

* determining the overall incident objective;
* selection of strategies;
* ensuring that joint planning for tactical activities will be accomplished;
* ensuring that integrated tactical operations are conducted;
* making maximum use of all allocated resources

The RFS will co-operate with the concepts of the unified control approach wherever such situations arise. Also, where appropriate, the RFS will enter into formal co-operative arrangements that clarify the unified control concept.

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11. INCIDENT MANAGEMENT

11.1 OPERATIONS

Operations are the functions and procedures carried out by the Rural Firefighting Service (RFS) to establish an operating framework for strategic and tactical action.

The basic systems approach used in maintaining the RFS's operational requirements are:

* *the RFS's operational approach must be able to adapt to any incident to which the RFS is expected to respond;*

* *the operations of the RFS must be applicable and acceptable to users throughout the RFS;*

* *operational procedures should be readily adaptable to new technology;*

* *operations within the RFS must have basic common elements in organisation, terminology and procedures;*

* *the operating requirements of the RFS must provide for the following kinds of operations:*

  . single jurisdiction with a single agency involvement
  . single jurisdiction with multi-agency involvement
  . multi jurisdiction with multi-agency involvement.

11.2 CALL OUT PROCEDURES.

Call out of RFS resources is activated in a number of ways depending on the time of day, time of year and level of danger.

The procedures used are flexible and are mainly at the discretion of the Duty Officer (i.e. CFCO or DCFCO or the volunteer brigade captain in the absence of a duty officer). However, as general principles with regard to response:

* *the most appropriate unit close to and/or able to respond the quickest will be the first unit called;*

* *departmental units should respond as directed;*

* *in the absence of a Duty Officer (i.e. the CFCO, DCFCO or incident controller), volunteer units can respond, without direction, to incidents in their area of responsibility;*

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* *when the Duty Officer assumes control, volunteer units will only respond as requested.*

The broad guidelines to assist the Duty Officer can be divided into those applying during the bushfire danger period and those applying outside the bushfire danger period.

The guidelines applicable during the bushfire danger period are as follows:

Within normal stand-by time:

* *Control will activate the appropriate unit(s);*
* *the closest unit should be called first;*
* *tankers should be the first responding unit where possible;*
* *a light unit(s) should also be called to support the tanker(s);*
* *no unit should respond unless directed by the Duty Officer.*

Outside normal stand-by time:

* *all reports of incidents must be conveyed to the Duty Officer;*
* *volunteer units may respond in their area of operations without direction;*
* *when the Duty Officer assumes control, further volunteer units can only respond as requested;*
* *the Duty Officer should give preference to the despatch of departmental units relative to the fire location and land management responsibility.*

The guidelines applicable outside the bushfire danger period are:

During normal working time:

* *Duty Officer will call the most appropriate unit(s).*

Outside normal working time:

* *Duty Officer will decide the most appropriate response.*

11.3 INCIDENT ASSESSMENT - FACTOR CHECK LIST

Every wildfire control situation is different from the previous incident, however, there are a number of assessment factors that are constant. Incident assessment factors must be evaluated by the person, or team, managing the incident. The most important of these factors are:

* description and extent of the incident;
* equipment and human resources required;
* weather
  - . humidity
  - . temperature
  - . wind, direction and speed
  - . time since rain and amount;

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* drought index;

* state of fuel (curing and amount of fuel);

* lives and property in danger;

* time and space

. time to brief and position crews
. time fire will take to reach key areas
. time before weather changes;

* topography;

* logistics / resources

. communications
. roads (access)
. water availability
. assembly points
. feeding
. relief crews;

* safety

. particular dangers
. identified refuges
. continuing review of incident ground safety.

Each factor must automatically produce a deduction. It may be a simple deduction but it is vital that it be registered, even if only in the mental process.

11.4 SPAN OF CONTROL

Span of control is a concept which relates to the number of groups or individuals controlled by one person.

At incidents, the nature of the environment in which supervision is undertaken can be rapidly changing and dangerous. For this reason, five reporting units or individuals is optimum, as this maintains the Field Controller's ability to effectively allocate, monitor and evaluate performance.

The Field Controller needs to be able to quickly receive reports, evaluate information, communicate orders, and deploy units at the same time as catering for their safety and welfare. Responsibility for more than five sectors, units or individuals begins to jeopardise the safety of personnel and the effectiveness of the operation.

11.5 STRATEGY AND TACTICS

In making an appreciation of an incident with the view to control, the Incident Controller is seeking to establish a strategy, or broad plan, from which he or she will then develop techniques for implementing the plan or tactics.

For example, when an incident is reported or detected, the decision making starts with a statement of the objective, i.e. to control a fire in a certain place by a certain time. The task is

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then to call an initial attack force, commence assessment of the fire location, terrain, knowledge of fire history in the area, weather, other available resources and then define a course of action (strategy). Implementation at the incident site (tactics) is then largely a matter of logistics, requiring the tactical allocation of resources by the Field Controller.

Under extreme fire weather an approaching low change will cause the wind direction to shift in an anti-clockwise direction. This often occurs suddenly usually from a NW to SW direction. A basic strategy under these conditions is to control the north-eastern flank of a fast moving grassfire so that large areas will not be burnt after the wind change.

11.6 FIRELINES, FIRE BREAKS AND FIRE TRAILS

A fireline is any part or action taken to control the burning edge of a fire. Firelines may be of various widths depending on the method of construction. For example, a fireline in grassland may be constructed directly by extinguishing the fire edge with water. In forest fuels a fireline may be constructed by a bulldozer and should be several metres in width.

A fire break is a fuel-free area which is constructed before a fire occurs and is designed to prevent fires crossing them, often in the absence of suppression crews. Fire breaks may be constructed during a firefighting operation by widening a fireline so that burning embers do not blow across.

A fire trail is a track constructed to permit vehicular access for the purpose of fire fighting.

In grassland, firelines are usually constructed by direct suppression by water. A fireline constructed in this way is usually strengthened by grading a bare earth trail around the perimeter of the fire. Firelines may also be constructed by a grader or bulldozer or existing roads and tracks may be used as firelines to control the fire.

In forest country, firelines may be constructed by hand tools or bulldozers. There are two recognised methods of group working when constructing a narrow trail with hand tools:

- the step-up method

- the one-lick method.

Both these methods are described in detail in the ACT Bush Fire Council Basic Training Module 5 (Hand Tools and Knap Sack Sprays). The construction of lengthy firelines in forest fuels is most efficiently carried out using tractors. Such firelines will normally require rehabilitation when no longer required, therefore care in locating firelines will make rehabilitation easier and reduce the environmental effects.

Fire breaks can be effective in stopping moderate to high-intensity grass fires provided there are no trees near the break. For example, a 10m wide fire break has a 99% chance of stopping a 10 MW fire, however, if there is one tree within 20m of the break the chances of the fire break stopping the same fire is reduced to less than 50%.

Fire breaks are not considered useful in native forest country because firebrands from even moderate-intensity fires will carry the fire across even quite wide fire breaks.

Fire breaks may be constructed around the perimeter of pine plantations in the plantations themselves, or where they adjoin grasslands. Fire breaks within pine plantations are generally ineffective against high-intensity fires, but they can be useful when the plantation is young and they can provide firefighters a higher degree of security in plantation areas under moderate conditions.

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Under extreme fire danger conditions, fire breaks should not be relied upon or expected to stop either forest or grass fires.

11.7 EVACUATION OF CIVILIANS

The ACT Bush Fire Council has considered and adopted a policy on the evacuation of private homes during a bushfire.

The Council does not favour the evacuation of local residents from their homes during a bushfire threat, because most homes burnt during rural fires ignite because of blown sparks and embers, which occur during the fire and may continue for several hours after the fire front. Able-bodied persons are encouraged to remain within their homes to perform the necessary protection functions before and immediately after a bushfire spreads through the area.

People who are not confident to remain, ill or unable to physically protect their home should inform either the police or the Rural Firefighting Service and evacuate early, so as not to be trapped in the open by the fire. It should be noted that the Australian Federal Police have the responsibility for the protection of life within the ACT and the final decision to evacuate home owner, or not, will be made by them.

11.8 LIVESTOCK RESCUE

In the event that livestock are threatened by wildfire, the owner of the property and/or the stock, will be responsible for the protection of the stock.

Where the Field Controller, or the Control Centre, believe that stock are under threat, the Agricultural Rangers of Agricultural and Landcare Section will be advised and requested to liaise with the stock owner and assist with stock protection. The management of the stock will then be left to the owner. However, for the protection of stock, owners should remain in contact with the Field Controller or a person nominated by the Field Controller.

11.9 FIRE INJURED LIVESTOCK

Livestock injured during a wildfire will become the responsibility of the Veterinary Services Unit of Agricultural and Landcare Section. The destruction of such livestock injured during a wildfire will be left to the Veterinary Services Unit in consultation with the livestock owner where necessary. The Veterinary Services Unit can be activated either by the Control Centre or by the Agricultural Rangers.

The disposal or burial of carcasses will be regarded as part of the fire control operation and appropriate resources made available through the Incident Controller to achieve the task.

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11.10 HYDRANT OPERATIONS

A stand-pipe for taking water from water mains is a standard item on all RFS tankers and light units (also known as stand-pipes).

The procedure and safe working practices for using hydrants is defined in the ACT Bush Fire Council Basic Training Module 6 (Fighting Fire With Water) and is endorsed as the standard practice used by the Council.

11.11 ELECTRICITY TRANSMISSION LINES

The ACT Electricity and Water Authority (ACTEW) is responsible for all transmission lines within the ACT. All fires caused by transmission lines and all situations where lines are likely to be affected by fire, must therefore be reported to the ACTEW as soon as possible.

Where fires are burning in close proximity to transmission lines, the Field Controller and/or the Control Centre must be advised so that immediate action can be taken to advise ACTEW and obtain information on current power status of the affected line.

No firefighter shall approach any fallen power lines without the consent and assurance of ACTEW that it is safe to do so.

Where transmissions lines have fallen and the status of the lines is unknown, the Field Controller must place a responsible person or persons nearby to warn unsuspecting firefighters or sightseers of the danger.

11.12 FIRES ON RAILWAY PROPERTY

Firefighting on or near railway property must be reported to the Control Centre. The Control Centre staff will then advise the nearest railway station of the fire and obtain from them the status of rail traffic on the affected railway line. Field Controllers must take all care to ensure the safety of firefighters.

Where a threat exists to the safety of trains and passengers, the Field Controller, through the Control Centre, should request that all trains be stopped pending advice from an appropriate railway officer.

Where a threat exists to the safety of firefighters, the Field Controller should request, through the Control Centre, that all trains be stopped pending further advice from the Field Controller.

Railway lines should only be crossed with all due care, preferably at a designated crossing point approved by the Field Controller.

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11.13 TRAFFIC CONTROL AND ROAD CLOSURE

Where fire or smoke presents a hazard to fire fighters working on roadways, or to passing motorists, the Field Controller, through the Control Centre, will request police assistance for traffic control or road closure. The actual roads closed, or traffic control assistance given, is a matter for the police, but advice should be given by the Field Controller of the incident requirements.

If the police are not in attendance and there is immediate need for traffic control, the Field Controller should deploy firefighting resources to ensure public safety. Once the police arrive and assume traffic control the firefighting resources should be returned to fire control duties.

In the event that major traffic problems are evident the Field Controller should establish fire ground liaison with the police, and maintain that liaison until the situation improves.

11.14 ACTION AT THE INCIDENT SITE

On arriving at the incident site all units must report to the Field Controller, or the nominated Officer advised by the Control Centre at the time of despatch.

All units at the incident site will be under the control of the Field Controller. In the event that the incident is sectorised, all units will be allocated an appropriate sector and will be directly under the command of the nominated Sector Leader.

The Field Controller directs the incident control operations. Only one person can be in charge. Field control may change, however, and a person who starts out in charge of a small incident may be replaced by another if the incident develops to large proportions. As standard practice, higher ranking officers will assume increasing operational responsibility as the incident increases in complexity.

Safety at the incident site is paramount. There are many potentially dangerous situations faced during fire control operations and as such a firefighter's life, as well as that of other firefighters, may well depend upon an ability to react in a safe, calm manner. As a consequence, all firefighters must have completed the ACT Bush Fire Council Basic Training Module 1 (Basic Fire Ground Safety) before they are permitted to attend a fire as part of a brigade.

11.15 AERIAL OPERATIONS

The RFS uses helicopters, and sometimes fixed wing aircraft, for a variety of reasons. These include observation platforms for command, detection of fires, reconnaissance, water bombing, retardant bombing, aerial ignition, supply, transport and mapping.

When a helicopter is used as an observation platform for command, a Deputy Chief Fire Control Officer will normally occupy the command position and will relay tactical directions to the Field Controller.

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During detection and reconnaissance flights, the pilot is normally accompanied by a Deputy Chief Fire Control Officer and one other whose job it is to accurately plot the location and extent of a fire.

Water and retardant bombing of the fire front is done by the use of underslung buckets attached to a helicopter. For this operation to be successful there must be a suitable source of water available for water bombing, and a retardant mixing base in the case of retardant bombing, within an acceptable turn around time to the fire front.

When helicopters are used for supply or transport they are required to ferry crews and supplies into remote areas where land transport would be difficult or very time consuming.

To ensure the most effective deployment of resources and to ensure that valued assets are protected, accurate location of the fire front and rate of spread is vital information. Such information, easily and quickly obtained from aerial observation.

11.16 CHANGEOVER OF PERSONNEL

The changeover of personnel at an incident (i.e. shift arrangements) is a major factor in incident control efficiency and effectiveness. Poor changeover can threaten the safety of personnel and affect the continuity of the control operations and objectives.

The implications of poor changeover are:

* control over the direction of the incident is lost;
* poor morale;
* safety is compromised;
* loss of performance;
* loss of unity of purpose.

The organisation of better changeovers starts at the top. Recognition of the need for formal preparation for the shift change is the first step.

Some general guidelines to achieve better changeover are:

* *changeover in daylight where possible;*
* *prepare for the changeover;*
* *brief incoming leaders (Field Controller, Sector Leaders and Crew Leaders);*
* *changeover at a suitable location close to the control line if possible;*
* *feed ongoing shift before changeover, feed offgoing shift after changeover.*

Changeover can be achieved more effectively by proper planning. Incoming personnel need to be briefed on their role by existing personnel who should depart as soon as the replacement assumes the role. A successful changeover of personnel means that the momentum of the control operation is not affected.

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11.17 LOGISTICS

Logistics means supplying the facilities, services and materials necessary for the achievement of the incident control objective. A simple example is the provision of a continuously available water supply for a firefighter. Logistics is also concerned with supplying the equipment to enable water to be obtained e.g. pumps and hose, fuel to operate pump motors, lighting for safe operation at night, feeding all personnel and provision of communications on the fire ground.

The logistics role within the Rural Firefighting Service has three major functions. These functions and/or their components are fulfilled as required, to satisfy the needs of the incident. The functions are:

* supply
  - . water
  - . diesel / petrol
  - . equipment;
* ground support
  - . catering
  - . first aid;
* maintenance at the incident site
  - . fire vehicles and equipment
  - . communication equipment.

11.17.1 SUPPLY

Supply is a logistics function and has a vital role where personnel, equipment and supplies are not readily available. A supply unit would normally be established and would need to know how to obtain the necessary resources. The supply unit must be able to store supplies and throughout the incident maintain items of equipment that may be required throughout the incident. The ACT Emergency Service will often be called upon to provide this service for large or complex fire situations, but it is the only source used to provide supply facilities.

As a general guide the supply unit is responsible for:

* water
  - . organisation of general bulk water carriers
  - . setting up of portable reservoirs
  - . location and operation of water supply facilities at dams, creeks, hydrant and/or other water collection points relative to the incident
  - . quick fill pumping facilities;
* Diesel / petrol
  - . resupply of fuel types used at the incident
  - . mixing of drip torch fuel
  - . maintain records of fuel purchased and supplied;
* Equipment
  - . emergency purchases of essential equipment
  - . supply of store items to the incident site
  - . replacement of damaged or unserviceable equipment as requested
  - . record of equipment items allocated and returns verified.

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11.17.2 GROUND SUPPORT

At any protracted incident, personnel, equipment, supplies and food are usually needed. Ground support is concerned with providing the means of ensuring the relative comfort and well being of all those involved with the incident.

Catering involves the provision of food and drink to the combating personnel. The role becomes more complex the larger the incident as generally more personnel are in attendance, more locations for feeding are required and differing meal times are necessary for on and off-going shifts. The ACT Emergency Service and the Salvation Army are set up to undertake this task on behalf of the Bush Fire Council. There is always a delay in setting up effective catering so Incident and Field Controllers should be aware of this and plan accordingly.

First Aid is the provision of a First Aid service for the personnel combating the incident. At most incidents requiring the Rural Firefighting Service, the personnel involved in the incident are themselves at some risk from burns, toxic poisoning, cuts, abrasions or heat stroke. The First Aid Unit of the Logistics Section services this need.

11.17.3 MAINTENANCE ON THE FIRE GROUND

Maintenance on the fire ground involves a number of different requirements but can be generally divided into two main areas: repairs to fire control appliances and communications.

Fire Control Appliances:

Repair requirements for fire control appliances fall into the three principal categories of mechanical, electrical and hydraulics. Arrangements for each category are as follows:

* mechanical

. the Rural Firefighting Service contracts mechanical repairs to private enterprise. Companies contracted to supply this service must be able to provide a 24 hour a day, seven days a week service, and must also be able to carry out field service and repairs;

* electrical

. auto electrical repairs are a common problem with rough terrain fire fighting vehicles. The RFS will establish contracts on the same basis as those used for mechanical servicing, but not necessarily with the same contractor;

* hydraulics

. water supply and pumping requirements on existing fire appliances have service and repair needs that differ from those covered by the mechanical and electrical contracts. The Rural Firefighting Service will establish contracts on the same basis as those used for mechanical and electrical servicing and repair.

Communications:

The RFS operates a simplex VHF midband radio network using bases located at Mt Tennent and at Baldy Hill. The midband channels at each site are controlled from the Tuggeranong Control Centre using UHF link control channels. The RFS also has a UHF command channel that operates out of Mt Tennent and Baldy Hill.

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There are approximately 200 mobile and 55 portable VHF radios and 15 UHF mobile radios. In addition, there are potentially another 300 radios belonging to other agencies that can access the RFS VHF channels.

The maintenance of this communication resource is contracted to the ACT Electricity and Water's radio workshop, and in some minor cases, the supplier of specific base station radio equipment. The maintenance agreement is on a 24 hour a day call out basis with priority given during operations.

11.18 PLANNING

Planning in relation to incident management refers to functions carried out by a Planning Officer, or Section, who which is responsible to the Incident Controller for providing support to the incident in the form of:

* collection and analysis of incident information;
* prediction of incident behaviour;
* preparation of, and/or assistance with the development of, strategies to control the incident.

11.19 RESOURCES

Resources means all personnel and equipment available, or potentially available, for incident tasks.

The Incident Controller is the only person authorised to assign resources to an incident. As an incident develops, the management of resources assigned can become complex and time consuming. For small to medium size incidents the Incident Controller is responsible for maintaining resource allocation and movement records. During large, complex or protracted incidents, the function of knowing where resources are and what they are doing is delegated to a Resources Officer who is responsible to the Planning Officer.

The Resources Officer is responsible for maintaining a system that shows the type of resource and whether that resource is assigned (working), available (within a short time), allocated (en route) or out of service.

11.20 SITUATION INFORMATION

The situation function is responsible for:

* collecting, processing and organising situation information;
* summarising this information; and
* developing projections and forecasts of future events related to the incident.

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During small to medium size incidents, the Rural Firefighting Service's Fire Management Planning Officer is responsible for this task and reports directly to the Incident Controller. During large or protracted events a Situation Officer, or Unit, is established and reports to the Planning Officer.

The components of the Situation Unit (Officer) functions are:

* weather service

. arranging special forecasts for the incident area, co-ordinating incident weather observations;

* collecting, processing and organising situation information

. establishing field observers, aerial reconnaissance and personal contact, processing this information onto maps and situation summaries and then organising this for use by the Planning Officer or Incident Controller;

* mapping

. during medium to large incidents, maps with additional notes are important for summarising and describing the incident situation;

* incident prediction

. using knowledge of the current situation, and existing models to predict the incident behaviour.

11.21 TECHNICAL SPECIALISTS

Any technical specialists required to help manage an incident will be assigned to the Planning Officer and may be required to operate within an existing unit.

For example, a fire behaviour specialist and meteorologist could be made a part of situation unit, or may form a separate unit within the Planning Section depending upon the requirements of the incident and the needs of the Planning Officer and/or Incident Controller.

Generally, if the expertise is needed for only a short time (and normally only one person) that person should be assigned to the situation unit. If the expertise is required for a long term and may require several people, a separate unit in the Planning Section is established.

The character of the particular incident is the primary determinant of the need for technical specialists. Listed below are technical areas for which specialists may be required:

* fire behaviour;

* meteorology;

* management constraints;

* environment effects;

* resource use and cost;

* toxic substances;

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* chemicals;

* structural engineering;

* water use.

11.22 MANAGEMENT SUPPORT

The management support function is responsible for the provision of personnel to operate communications equipment such as facsimile machines, telephones and radios. This function also provides administrative services such as:

* time recording for personnel (wages, overtime, etc.);

* accounts for purchases of supplies and hire of equipment;

* compensation and insurance for personnel, property and vehicles;

* collection of cost data, performing cost effective analyses and providing cost estimates for the incident.

Most of the management support and the administrative functions listed above are catered for on a day-to-day basis within the Rural Firefighting Service, but large or complex incidents may require the establishment of a specific administration section. The administrative officer heading the administration section would report to the Incident Controller.

11.23 FIREFIGHTING PRACTICES

Firefighting practices include all the work of extinguishing or confining a fire, beginning with its discovery. These practices usually involve difficult work with inherent dangers. However, knowing and applying safety principles and firefighting tactics does much to ensure safe and effective work.

The fire suppression policy of the RFS is to have very rapid initial attack to contain all fires to as small as possible an area. If the initial attack fails and the fire defeats the first crews sent to suppress it, the RFS policy is then to attack the fire to keep its area to the minimum practical size with the resources available to it. This requires an assessment of the potential damage from the fire in relation to the current and expected weather conditions; the management objectives of the land manager and the time available when effective suppression can be carried out. In general the RFS policy changes from a minimum area suppression to a minimum time suppression. Some areas need to be sacrificed in order to contain the fire at defensible firelines within the available time-frame. Success in fire control is usually the result of prior planning. This planning should be designed to combine a capacity for prompt first attack with flexibility essential for dealing with fire under widely varying conditions. The firefighting practices on the fire ground start when suppression crews arrive at a fire and adapt their method of attack to the behaviour of the fire.

The firefighting practices detailed below form the principles on which safe, efficient and effective fire control operations are based.

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11.23.1 Standard Firefighting Orders

Every firefighter who will have firefighting duties should aim to be familiar with the standard firefighting orders and must follow each order when it applies.

a) Keep informed on fire weather conditions and forecasts.

b) Know what your fire is doing at all times.

c) Base all actions on current and expected behaviour of fire.

d) Have escape routes for everyone and make them known.

e) Post lookouts when there is possible danger.

f) Be alert, keep calm, think clearly, act decisively.

g) Maintain prompt communication with your crew, your boss and adjoining forces.

h) Give clear instructions and make sure they are understood.

i) Maintain control of your personnel at all times.

j) Fight fire effectively, but provide for safety first.

11.23.2 Fireline Construction

Firelines can be constructed by hand, machine or aircraft, but existing roads, trails, tracks, rivers or other suitable natural barriers may be used where appropriate.

The first principle of fireline construction for initial attack is to establish an anchor point. This is a point which can beheld at all times and is usually located towards the rear of the fire. This principle applies whether fireline construction is by tankers using water on grass fires or by hand or machine construction in forest fuels. Construction of the fireline moves progressively around the fire edge so that at any time there is a safe route out towards the anchor point, usually onto burnt ground behind a controlled section of the fireline if weather conditions change.

When firelines are constructed without a secure anchor point, for example backburning on the head of a fast moving fire, there is a strong possibility that the fire will breach the line and fragment the firefighting effort and crew structure and endanger the safety of the crew. When indirect attacks on large fires are used, careful decisions need to be made on the location, standard and method of fireline construction. Careful consideration is required of the logistics of time and space to construct a fireline of required standard within the time available. Here consideration must be given to the rate of fireline construction, the equipment and resources available and eventually the cost of the fireline in relation to the values threatened if the fireline is not completed satisfactorily. Considerable experience is required for efficient firefighting under these circumstances. On large fires, hand line construction may be employed over considerable distances where topography is too steep or too rocky for efficient machine operation.

One or more six person rake-hoe crews used for hand construction of a fireline is a flexible and effective means of suppressing forest fires of low intensity. A rakehoe crew on-site at a lightning strike in remote country can quickly build a fireline that will hold under moderate fire danger conditions.

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Generally, wheeled vehicles for machine fireline construction are only useful on flat ground or established roads and tracks. Tracked tractors are needed to move most forest fuels.

The type of vehicle needed to meet the fire suppression objective will be determined by:

* the type of fuel to be moved;
* the size and density of standing trees;
* the slope of the terrain, particularly the side slope;
* the soil type and wetness;
* the occurrence of rocks;
* the method of attack;
* whether machines are working singularly or in tandem;
* the experience of the operator.

Ample personnel should be made available to supervise and operate any machinery used for fire control purposes. A machine unit typically includes a driver, an offsider who may act as a relief driver, and a line locator. Crews may follow the dozer to clean up the line.

Machine operations should include the following practices:

* attack at right angles to the fire edge;
* push fuel into the fire with much dirt;
* dozer should work close to the fire edge;
* keep the line narrow;
* mop up and patrol;
* location of the fireline is crucial. Consider fuel type and quantity, fire weather, topography, time of day, changing Fire Danger Index (FDI);
* push debris away from fire to reduce fuel on the fire edge;
* as far as possible avoid bends in the line that curve back beneath the established line or across the prevailing wind direction as this makes burning out more hazardous and more difficult;
* use a small clean up crew behind machines. Fall snags and clear around trees with hand tools;
* keep line to the minimum width which permits patrol by men and tankers during backburn and/or mop up. The line should never exceed two or three blade widths;
* steep side slopes should be avoided. Where slopes are greater than 30 degrees, bulldozer operations can be very slow and fireline construction with hand tools may be a more efficient method;
* location of line should use existing breaks such as roads, rivers and other suitable areas.

The use of a normally green creek line or narrow river bed is a hazardous practice when drought conditions are high. These firelines are difficult if not impossible to patrol and consideration should always be given to subsequent mop-up and patrol should weather conditions deteriorate.

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Aircraft are also used to construct firelines by dropping fire retardant. Aircraft are expensive to operate, but in some situations they may allow a more rapid response than men or machines. In rocky and inaccessible terrain, fireline construction with aerial delivered retardant is the most efficient method. To avoid wasting expensive retardant all air operations should have a supervisor determine the location of each drop to ensure that the fundamental principles of fireline construction are met.

Firelines built by aircraft are reinforced by hand crews or machines; a bare earth fireline is constructed around the fire and standard mopping-up operations carried out.

11.23.3 Foam and Retardants

The Rural Firefighting Service uses low expansion forest firefighting foam and Fire-Trol liquid concentrate retardant. Both the products used by the Service have been tested and are considered to be within reasonable environmentally safe parameters owing to their biodegradability and their chemical composition, which has been formulated to minimise environmental effects.

Both the foam and the retardant used by the RFS have a wide range of applications. They can expand a tanker load of water to about five times its original volume, causing the water mix to act as a blanket, thereby smothering the fire and removing the oxygen. Foam and retardants used contain suffocants or wetting agents that reduce the surface tension of the water and allow for deeper penetration into hard woody fuels and deep forest fuels.

Each tanker and most light units carry foam and are fitted out with the appropriate nozzles. Only one tanker is equipped to use the Fire-Trol retardant.

11.23.4 Fire Attack Methods

There are three main methods used by the RFS in dealing with fire control. These are known as direct attack, the parallel method and the indirect method. Each of these methods is described in the ACT Bush Fire Council Basic Training Module 4 (Bushfire Suppression). The choice of the method used depends on the nature of the fuel or the type of equipment available. Mostly the decision is influenced by tactical considerations and safety requirements.

Direct method:

In this method, work is applied directly to the fire edge which then becomes the established control line. This can be achieved by applying water, pushing burning fuel into the fire, smothering with earth and throwing into the fire any logs or sticks that lie across its edge.

Parallel method:

In this method a fire line is constructed parallel to, and just far enough from, the fire edge, to allow firefighters and equipment to work effectively away from the heat and smoke. The strip of fuel between the fire and the control line is normally burnt out as soon as possible after the fire line is constructed.

Indirect method:

The indirect method involves constructing firelines at some distance from the fire edge at the most appropriate location, to rapidly encircle the fire. Most often roads, fire trails, fire breaks or natural barriers are used to make up the fireline around the final area which will be burnt out. As the name suggests, the form of the fire is not tackled directly but a careful decision is made to commit a considerably larger area where fireline can be constructed as quickly as

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possible. This method is often employed when it is unsafe to light fires directly along the edge of the fireline. Burning-out is usually delayed until the weather conditions have moderated and burning can be conducted safely and efficiently. It is essential that all the areas between the fireline and the main fire are burnt out while moderate weather conditions persist and before dangerous weather conditions arise. Depending on the weather forecast, this may require burning-out to be carried out overnight or there may be several days available before very high fire danger returns. Aerial incendiaries may be used to ensure that very large areas are burnt out quickly and safely while the moderate conditions persist.

As burning-out may be an arduous and hazardous undertaking, the following points require special attention:

* burning-out operations should always be led by an officer who understands fire behaviour and knows how to take advantage of favourable topography, fuel and weather conditions. The officer in charge of the burn-out must know exactly where the main fire is and watch for the safety of the crew while carrying out burning-out tasks;

* when fire danger is very high to extreme, burning-out operations are extremely hazardous and may escape, thereby enlarging the fire area. Direct suppression action on the flanks is preferable until conditions improve;

* a burning-out should be placed as close as possible to the main fire, balancing the time needed to create an effective fireline against the rate of spread of the wildfire. Flexibility is essential;

* once the burning-out has started it is essential that all the fuel between the fireline and the main fire is burnt out as soon as possible;

* sufficient firefighters and equipment should be progressively placed along the fireline to watch for spot fires and prevent trees close to the fire edge catching alight;

* if possible, lighting should be delayed until late afternoon or evening when weather conditions are settled and fire danger moderating, but not delayed to such a time when fires will not spread effectively;

* inspection on the ground or by air is essential during and after a burning-out operation. Subsequent action may be necessary to burn-out unburnt patches to strengthen the fireline.

11.23.5 Backburning

Backburning is a technique of setting fire from a fireline or fire break in front of a fast moving head fire in order to contain the fire. It is an extremely hazardous operation and should only be carried out under the direction of an experienced rural firefighting officer. In popular jargon, backburning is often confused with burning-out described above. However, it is a very specific operation used to directly contain a running fire and its use should be confined to widening a fire break to stop fast moving fires. If it is successful backburning can result in a large saving of area burnt. However, if it is unsuccessful the backburn becomes a second wildfire, which may often burn out a larger area than if the original fire had been allowed to run freely. The technique requires experience and judgment to locate the backburn at a sufficient distance ahead of the main fire to ensure that a barrier of a sufficient width is created before the main fire arrives. A large number of crews required to prevent firebrands from the backburn crossing the established fire break; very often these crews would be better deployed by flanking the fire to ensure that the eastern flank is contained in the event of a major wind change.

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In forest country, backburning should never be attempted to stop a fast moving forest fire unless the head of the fire is of an intensity that it could be fought directly. If the main fire is spotting at all then it will be virtually impossible to control spot fires produced from the backburn and escape will be inevitable. Contrary to popular opinion, backburns are not sucked back into the main fire. If there is a fire interaction it will only serve to accelerate the main fire towards the back fire; with a consequence of increased intensity and increased spotting potential. Backfires are sometimes employed in hilly topography using a lee slope eddy to suck the backfire up the slope towards the crest of the ridge where the main fire is coming across. In this circumstance it would be better to

allow the fire to crest the ridge and throw spot fires beyond the ridge which will then burn slowly down toward the control line. In almost every situation in forest country, backfires are unsuccessful and only serve to increase the difficulty of suppression and the final area burnt.

11.23.6 Mopping Up

When the spread of a fire has been stopped, the perimeter must be secured. The width of the strip in which total extinction is required varies according to local conditions. However, as a general rule all smouldering or burning material within 10 metres of the fireline is to be totally extinguished, and the more dangerous hazards within 100 metres, or possibly more on sloping ground.

Generally, forest fires require more attention than grass fires. However, smouldering material close to the perimeter of any fire must be thoroughly mopped up. Attention to the following points is to be observed:

* commencement of mop up is to closely follow fireline construction or containment of the fire;
* water and/or foam additive is to be used to cool down the material sufficiently to permit handling;
* piles of fuel are to be separated to help reduce heat;
* some fuel may be allowed to burn out if it can be done quickly and safely;
* small branches and logs are to be dragged well back inside the fireline;
* where possible long pieces of fuel too heavy to carry are to be rolled around so that they lie up and down the slope, not across it;
* if burning or smouldering material is still likely to role down the slope , trenches are to be dug;
* snags, rotten logs and stumps require special treatment especially when close to the fireline. Felling trees is often necessary;
* roots burning underground are dangerous and require digging out or other suitable treatment;
* a cool fire edge is essential. The only sure test for signs of heat at possible danger points is by carefully checking with bare hands.

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11.23.7 PATROL

When the perimeter has been mopped up, patrols are to be made to make sure the fireline remains secure. Patrol and mop up are linked together. Patrol commences during the mop up stage, but once mop up is complete, a smaller patrol crew takes over and deals with any problem that arises. The frequency of patrols can be gradually reduced if weather conditions are favourable or the fire is considered safe.

The work of mop up and patrol is mechanical, dirty and monotonous, but its importance cannot be stressed too strongly. Until there is no possibility whatever that a fire can escape, the job of suppression cannot be regarded as ended.

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12. APPENDIX

12.1 ACT volunteer Bushfire Brigades - Constitution 12.2

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12.1. ACT VOLUNTEER BUSHFIRE BRIGADES - CONSTITUTION

NAME

The name of the organisation shall be ..... Volunteer Bushfire Brigade, hereinafter referred to as the Brigade.

OBJECTIVE

The objective of the Brigade shall be: to come together and maintain an efficient bushfire fighting unit that will be ready and equipped to -

* organise preventive measures;
* check and extinguish bushfires;
* prevent loss of human life;
* minimise loss of livestock and property;
* advise the Rural Firefighting Service (hereinafter referred to as the Service) on matters relating to the causes, detection, suppression and prevention of bushfires in the brigade area.

AREA

The area of the Brigade shall be the land within the boundaries as determined by the ACT Bush Fire Council.

MEMBERSHIP

Membership is open to anyone accepted by the brigade. A register of members shall be kept showing in respect of each member, name, address and date of commencement of membership.

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FEES

Membership fees for the ensuing twelve months shall be determined at the Annual General Meeting.

FUNDS

The funds of the Brigade shall be used solely for the purpose of promoting the objects for which the Brigade has been formed.

FINANCIAL YEAR

The financial year of the Brigade shall commence on 1 July and end on the following 30 June.

BANKING

The funds of the Brigade shall be placed in a bank selected by the Executive Committee, and such funds shall be drawn only by cheques signed by the honorary secretary and honorary treasurer.

ANNUAL GENERAL MEETING

The annual meeting shall be held in the month of ..... at ..... (place) when the activities of the Brigade shall be reviewed and such office bearers elected as provided by the Rural Fire Control Manual (the Manual). At least seven days written notice of this meeting shall be given by the Secretary to members, and notice of intention to elect the captain, deputy captains and other officers shall be included in the call for the meeting.

QUORUM

Seven financial members shall form a quorum for the transaction of business at any general meeting, and five committee members at any executive committee meeting.

OFFICE BEARERS

The Executive Committee of the Brigade shall consist of the President, Vice President, Captain, Honorary Secretary, Honorary Treasurer and five financial members of the Brigade.

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These office bearers shall be elected annually at the annual meeting of the Brigade, and shall hold office until the next Annual General Meeting, and shall be eligible for re-election at such meeting, but any office bearer may be removed from office by a resolution of three-fifths of the members present at a special meeting called for such purpose.

Any office bearer who is absent without leave from three consecutive meetings of the Executive Committee shall forfeit the office if so determined by the Executive Committee.

The Executive Committee shall have power to appoint a member to fill the vacancy in any position created by this constitution, except the position of captain and deputy captain.

Any member so appointed shall retire at the next Annual General Meeting, but shall be eligible for election to any office at such meeting.

MANAGEMENT

The management of the brigade shall be deputed to the Executive Committee which shall meet for the despatch of business, adjourn and otherwise regulate its meetings as it thinks fit. The Executive Committee shall meet at any time when duly summoned by the President.

FIELD OFFICERS

At the Annual General Meeting the Brigade shall elect by voting a captain, and such complement of deputy captains (in order of seniority) as may be determined. The meeting may also elect the equipment, training, first-aid and other officers. These officers should hold office until the next Annual General Meeting at which they shall be eligible for re-election, or until a successor has been appointed, but any field officer may be removed from office by a resolution of three-fifths of the members present at a special meeting called for such purpose. Should any of these offices become vacant before the expiration of the financial year, the vacancy shall be filled at a special general meeting of members called for the purpose and the officer elected to fill the vacancy shall hold office for the unexpired portion of the term for which the officer whom he succeeds was appointed.

AUDIT

At every Annual General Meeting some competent person (or persons) not being a member of the Executive Committee shall be elected to serve as honorary auditor (or auditors) for the ensuing year. The auditors shall audit the accounts of the Brigade not less than seven days before the Annual General Meeting and shall certify to their correctness or otherwise and present a report at each annual meeting.

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DUTIES OF OFFICERS:

PRESIDENT

* Shall preside at all meetings and perform all acts and duties usually required of an executive and presiding officer. In the absence of the president, the vice president shall preside and perform the duties of the president. In the absence of both,the meeting may elect its own chairman.

SECRETARY

* Shall be in attendance at all meetings and keep a correct minute and account of the proceedings of the Brigade in a book which shall be open for inspection by members at any reasonable time; a copy of the minutes will be sent to the Service within one month of the Brigade meeting.

  The Secretary shall answer all correspondence and keep a record of same, and shall send out all necessary notices of meetings. The secretary may receive subscriptions, donations and other moneys on behalf of the Brigade, and shall remit same to the honorary treasurer. The Secretary shall assist the honorary treasurer in the preparation of the annual balance sheet, and attend auditors' meetings to explain accounts; and keep a record of all fires attended, showing the numbers present, description of the damage and estimated cost of damage.

  As soon as possible after the annual general meeting the secretary shall forward a list of all financial brigade members to the Service.

TREASURER

* Shall receive donations and deposit same forthwith to the credit of the Brigade's bank account; pay accounts when authorised so to do by the Executive Committee of the Brigade, keep a correct record of all moneys received and payments made, prepare a balance sheet with the assistance of the honorary secretary, be the custodian of all moneys of the Brigade and regularly supply the honorary secretary with the names of those members who have paid their membership fees.

CAPTAIN

* In the absence of the Chief Fire Control Officer or the Deputy Chief Fire Control Officer or another officer which the Chief Fire Control Officer has nominated in a particular instance, the Captain of the Brigade shall have full control over members while engaged in firefighting, and shall issue instructions as to the methods to be adopted. The Deputy Captain next in seniority shall, in the absence of the Captain, perform the duties and exercise the powers and authorities of the Captain.

EQUIPMENT OFFICER

* Shall control the storage, issue and return of equipment and shall be responsible for its maintenance, but not liable for any loss or damage thereto. The equipment officer shall send all requests for repair, replacement or new equipment to the Service issue or appropriate service order.

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MEMBER

* All members are under the direction of the Captain while attending any incident. All members, upon ascertaining the definite location of any outbreak of fire, shall inform the Service's Control Centre or Duty Officer.

  Members to whom equipment is issued are expected to keep it in good order. In case of their absence from home they are to arrange with suitable neighbours to take apparatus to outbreaks, and if such arrangement is not made, either the Captain, President, Equipment Officer or Secretary should be advised accordingly.

The constitution may be added to, repealed, or amended by resolution at any annual or special general meeting provided that no such resolution shall have been deemed to be passed unless it is carried by a majority of at least two-thirds of the members voting thereon. The Bush Fire Council must approve variations to the constitution and may, in writing, request variation be made that are consistent with the Manual or Council policy.

AUTHORISATION

Any appointment or re-appointment of a Captain or Deputy Captain must be reported immediately to the Service for its authorisation of the appointment by the Bush Fire Council.

The Service supplies, authority cards to brigades, for issue to the Captain and Deputy Captains.

The authorities, duties and functions of Captains and Deputy Captains are detailed in the Manual.

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