BULLETIN 58
Pamphlet No. 7
1973

N° 7

# FORESTERS' MANUAL

# FIRE CONTROL

FORESTS DEPARTMENT
PERTH
WESTERN AUSTRALIA

# CONTENTS

## INTRODUCTION

1. The problem of fire control is intimately connected with the questions of reforestation and afforestation and the ultimate success of the Department's efforts in these projects is largely dependent on a strong measure of public sympathy and co-operation in attacking the fire problem.

2. Of equal importance is the proper use of controlled fires to regenerate and protect the forest and its associated flora and fauna and to guard adjoining communities from wildfire.

3. The eucalypt forests of Western Australia have evolved in a fire environment. Both flora and fauna have adapted to hot, dry summers, the associated fires started by lightning and more recently by man. It is, therefore, natural and advisable to undertake hazard reduction by the intelligent use of fire of prescribed intensity and frequency.

## HISTORY

4. At the passing of the Forests Act, 1918, the northern half of the State Forests had been ravaged by unrestricted cutting and uncontrolled fires.

5. Since 1919 the forest has been progressively roaded and, until the early 1950s, the aim was to give complete protection. During this period, the extension of group settlement and other farming ventures resulted in heavy damage from indiscriminate firing of the southern forest area where forestry organisation was not yet established.

Protection problems

6. It was found that, after 15 or 20 years' protection, the accumulation of combustible material was such that even very heavy expenditure on men and equipment could not control a fire under the severe weather conditions that occur periodically in Western Australia. Other States have learned this lesson with equal force.

## POLICY

7. Present fire control policy results from five decades of experience and research and may be summarised as follows:

Fire policy

7.1 Prescribed burning and intelligent planning is used to reduce the danger of severe uncontrolled fires.

7.2 Use our well-developed fire-fighting organisation to quell outbreaks in the dangerous summer months, but fight fires with discretion and consider cost of operation.

7.3 Train officers and men to think in terms of cost and collateral values on every operation involving fire protection.

7.4 Train and trust the junior officer to use fire as a controlled weapon to accomplish silvicultural ends and to guard against calamities.

8. In the implementation of this policy it has been found necessary to divide the forest into three zones indicating the degree of fire protection.

A Zone

9. "A" Zone. This will comprise all country on which fires will be attacked immediately they become known. Included will be regenerated or planted forest as well as the greater part of the prime forest.

Within this zone there will be a proportion of sub-marginal forest, unforested country and private property where fires pose a direct threat to high-value areas.

B Zone

10. "B" Zone. This will include forest on which protection is provided by prescribed burning and where suppression of uncontrolled fires may be delayed when commitments in Zone "A" or "P" require the postponing of immediate attack. Certain areas of private property adjacent to State Forest will be included.

P Zone

11. "Plantation" Zone. This will comprise areas on which exotic or indigenous species have been established in plantation form, areas cleared or part cleared awaiting planting or regeneration and a protective buffer area surrounding these areas.

"Plantation" Zone is in "A" Zone and fires will be attacked immediately they become known. They will be given precedence within "A" Zone for fire attack and will be defined for planning and fire suppression action. Despatch action for each of these areas will be detailed in divisional standing orders under the title of Red Action Order.

12. The boundaries of these zones will be reconsidered annually by the D.F.O. and, where necessary, will be revised after discussion with the Fire Control Superintendent.

13. All fire reports dealing with damage to the forest will refer to the area in terms of these zones.

Detailed fire organisation responsibility of O.I.C.

Assistance from fire and administrative staff

Fire duties associated with position rather than rank

14. The Forests Department's organisation covers a large area and must train, organise and prepare for periods of extreme effort. The detailed organisation of fire control within divisions is the responsibility of the D.F.O. or other officer in charge. Officers of the Fire Control Section, Fire Research Officer and administrative Inspectors are available to help with the planning of pre-suppression measures and maintenance of standards in all fire control operations. Within all such organisations, stress is placed on the clear definition of duties and responsibilities. These definitions and responsibilities are laid down in this section of the manual and all officers must clearly understand that such duties are associated with the position rather than the actual rank of the officer.

15. For example, where the duties of a D.F.O. or District Officer are defined, it follows that in his absence, even temporarily, such duties pass to the officer acting in that position.

16. The work of fire control falls into three main branches:

16.1 Fire Prevention.

16.2 Fire Pre-suppression.

16.3 Fire Suppression.

Fire Control Working Plan

17. All Divisions must prepare Fire Control Working Plans. These Working Plans will give regular checks, locally, of the general organisation within other Divisions. They will also provide officers from other Divisions, relieving in an emergency, with a quick reference to available manpower and equipment and to the general situation concerning prevention and pre-suppression measures in the Division concerned.

The Fire Control Working Plan will consist of two parts under the broad headings set out below. The detail required in these parts is given in Appendix "A".

*Part A—Inventory*

17.1 Manpower and Equipment (Forests Department and outside sources).

17.2 Water Supplies.

17.3 Detection and Communications.

17.4 Access.

17.5 Location of Research Plots.

*Part B—Planning*

17.6 Prescribed Burning.

17.7 Suppression—Standing Orders and Organisation.

## DEFINITIONS

18. Controlled Burning.—

(a) Any deliberate use of fire whereby burning is restricted to a predetermined area and intensity; or

(b) Deliberate burning of a prescribed area at a predetermined time.

19. Drought Index—A measure of moisture content of heavy fuel such as logs, deep fuel beds and green vegetation. It indicates suppression difficulty and reflects the effect of long-term past weather.

20. Fire Danger.—

(a) A general term expressing the sum of the factors risk, hazard and flammability which determine whether fires will start, the damage they may cause and the extent to which they can be controlled.

(b) Is a measure of one or more fire behaviour characteristics once ignition has taken place and is based on the effect of weather and forest factors on these characteristics. Tables are available to predict the fire danger for Western Australian forests.

21. Fire Danger Index (W.A.).—The maximum predicted rate of headfire spread using weather conditions and standard measures of each forest variable.

22. Fire Danger (Local)—A particular estimate of headfire rate of spread for a limited area of forest based on known forest type, fuel types, past and present weather.

23. Fire Hazard.—A measure of that part of fire danger which is due to the fuels available for burning; that is, the relative amount, class, character, moisture content, condition and distribution of fuel. Hazard refers to fuels only.

24. Fire Risk.—The relative chance or probability of fire starting, and is dependent on the presence of causative agencies and the likelihood of effective ignition.

25. Fire, Crown—A fire burning through the crowns of the trees in advance of the following surface fire. This type of fire occurs only in heavy fuels under extreme weather conditions. A crown fire cannot continue to burn unless supported by an intense surface fire.

26. Fire, Ground.—A ground fire is one that burns below the surface of the forest litter in peat or very deep litter. This type of fire is rare in Western Australia but has been experienced in plantation duff, wide flats and deep dry river bottoms.

27. Fire, Surface.—The surface fire is one that burns through the scrub and litter on the forest floor. This is the usual type of fire in this State.

28. Forest Officers.—Any officers appointed under the Forests Act or the Public Service Act, irrespective of whether they are permanent or temporary officers, and includes professional officers and field staff, but does not include overseers or other wage employees.

29. Inflammability—The susceptibility of the fuel to ignition and is closely related to its moisture content.

30. Mopping Up.—The term used for the work done in rendering a fire safe after it has been brought under control.

31. Prescribed Burning.—The application of fire to land under such conditions of weather, soil moisture, time of day and other factors as will result in the controlled spread and intensity of heat required to accomplish specific silvicultural environmental or fire hazard reduction objectives.

32. Pre-Suppression.—Those activities carried out during the safe period and maintained throughout the season to ensure that when a fire starts the whole suppression organisation will act efficiently.

The activities are the organisation, instruction and management of the fire control force, and the inspection, maintenance and improvement of fire control equipment and supplies to ensure effective suppression.

33. Prevention.—Those fire control activities concerned with the attempt to reduce the number of fires through education, law enforcement and hazard reduction.

All those steps taken prior to and during the fire season to stop fires from starting.

## FIRE PREVENTION

34. Fire prevention, a most important branch of fire control, can be divided into the following:

34.1 Risk reduction—

(a) General provisions.

(b) Education.

(c) Law enforcement.

34.2 Hazard reduction.

D.F.O.s to examine fire causes

35. A study of fire causes is of value to indicate possible points of attack in the campaign against future outbreaks.

Divisional Forest Officers should examine local fire occurrence annually to determine where prevention emphasis is needed.

The percentage incidence of fires from various causes throughout State forest over the years 1965-1969 is as follows:

| | % |
|---|---|
| Escapes from private property | 23 |
| Deliberately lit | 17 |
| Escapes from control and prescribed burning | 14 |
| Unknown | 10 |
| Hunters and fishers | 7 |
| Children | 6 |
| Bush workers | 4 |
| Mill surroundings | 4 |
| Householders | 3 |
| W.A.G.R. locomotives | 2 |
| Travellers | 2 |
| Lightning | 2 |
| Other Government employees | 2 |
| Mine surroundings | 1 |
| Tractors | 1 |
| Other causes | 2 |

### RISK REDUCTION

**General Provisions**

36. A study of fire causes will give some indication of the risks to be reduced or eliminated, and risk reduction can be by education, law enforcement or mechanical adjustment.

Smoking in plantations

37. Smoking will be prohibited in all plantations except on fire lines, when butts and spent matches must be deposited on bare mineral soil and buried.

Lighting billy fires

38. When it is necessary to light a billy fire, it must be lit on an area cleared down to mineral soil and the remains of the fire doused with water and covered with soil.

Mechanical equipment in plantations

39. Whenever mechanical equipment is used in plantations, the following procedure must be followed during summer months:

39.1 Chainsaws must be fitted with an efficient spark arrester which will be inspected periodically.

39.2 Chainsaws must not be used for at least 60 minutes prior to the operator leaving the area.

39.3 Pack sprays must be within 50 metres of felling and loading operations, full of water, tested frequently and ready for instant use.

39.4 The area worked over each day must be closely inspected by the faller before leaving.

39.5 Vehicles must be in reasonable condition and particular attention given to exhaust systems and brakes.

40. All new employees must be instructed in precautions outlined in paragraphs 37 to 39.

## Education

Fire reduction

41. The most effective means of fire prevention is through education. The objective is to make everyone fire conscious, and to make the general public realise the value and necessity of fire control.

Taking the long view, special attention should be given to the training of the younger members of society. Children are more receptive than adults, the child in the classroom today is the responsible citizen of tomorrow. Moreover, the child will take the doctrine of fire prevention from the school room to the home. Every effort should be made by the forest officer to introduce the subject of fire prevention into the schools of his district.

Fire hazard signs

42. Posters advocating fire prevention should be displayed at bus shelters, railway sidings, crossroads, picnic grounds, tourist attractions, and other suitable places throughout the forest frequented by the public. Signboards showing the daily fire weather forecast are effective means of educating the travelling public. The information on the board must be kept up to date, particularly when the forecast is dangerous, because of the special significance this forecast has under the Bush Fires Act. Colours used on these signs must conform with the following standard:

| *Hazard* | *Colour* | *Code No.* |
|---|---|---|
| Nil and Low | Verdigris Green | 280 |
| Moderate | Arctic Blue | 112 |
| Average and High | Canary Yellow | 309 |
| Severe | Traffic Yellow | 368 |
| Dangerous | Rail Red | 593 |

The colour name and code number conform with British Standards.

Pamphlets

43. Small pamphlets giving information concerning the provisions of the Bush Fires Act, the fire provisions of the Forest Act, organisation of Bush Fire Brigades and fire suppression methods are prepared by Head Office and the Bush Fires Board from time to time and should be distributed among local residents and settlers by local forest officers.

Personal discussions at the time these pamphlets are distributed are of considerable value. Alternatively, pamphlets may be sent with notification of intention to burn, etc.

Recommendations for the printing of new pamphlets and requisitions for supplies of pamphlets and posters should be submitted in April each year.

44. Lectures and the showing of educational films can be arranged. Application for the services of a lecturer, if none is available locally, and for the Departmental projector should be made to Head Office as required.

## Law Enforcement

Bush Fires Act

45. Every forest officer must acquaint himself with the Bush Fires Act and Regulations and make sure that his copy of the Act is kept up to date by entering any amendments that are gazetted. A simple summary of the major sections of this Act are contained in the pamphlet Fire Law.

The following sections of the Bush Fires Act are of particular significance to forest officers:

Definitions—Part I, Section 7.
Board structure—Part II, Section 8 (3).
Board powers—Part II, Section 10.
Fire Warden duties—Part II, Section 13.
Powers of Board members—Part II, Section 14.
Prohibited burning times—Part III, Section 17.
Restricted burning times—Part III, Section 18.
Serving notice to burn—Part III, Section 19.
Bush fire emergency—Part III, Section 21.
Burning during prohibited and restricted times—Part III, Section 22-27, inclusive.

Suppression of bush fires—Part III, Section 28.
Disposal of cigarettes and matches—Part III, Section 30 (d).
Wilful lighting of fires—Part III, Section 32.
Shire authority to require fire breaks—Part III, Section 33.
Burning of Crown lands—Part III, Section 34 (1).
Conservator's authority to require fire breaks—Part III, Section 34 (2).
Appointment of Bush Fire Control Officers—Part III, Section 38 (1).
Duties of Bush Fire Control Officer—Part III, Section 38 (4).
Fire Weather Officer—Part III, Section 38 (6).
Special powers of Bush Fire Control Officers—Part III, Section 39 (1).
Conditions when Forest Officer exercises authority of B.F.C. Officer—Part III, Section 39 (2) 45.
Bush fire brigades—Part III, Sections 41-44, inclusive.
Power to stop fires being lit:
of Bush Fire Control Officers—Part III, Section 46 (1).
of Forest Officers—Part III, Section 46 (1) (b).
Requests for coroner's inquiry—Part III, Section 49.
Duties of persons discovering an offence—Part III, Section 56.
Obstruction of officers—Part III, Section 57.
Recovery of expenses—Part III, Section 58 (3).
Protection of officers—Part III, Section 63.
Advisory committees—Part III, Section 67.
Regulations—Part III, Sections 19A, 23, 28 to 31 inclusive, 33 (7) to (14) inclusive, 37, 38, 38A, 38B, 38C, 39, 39A, 39B, 39D.
Appendix—Form 3.

Forests Act

46. Besides the provisions of the Bush Fires Act, the attention of all forest officers is drawn to the following fire provisions of the Forests Act and Regulations:

Penalty for unlawfully lighting fires—Section 46.
Forest officers calling for suppression assistance—Section 47.
Setting fire to bush without notice to forest officers—Section 48.
Mill protection—Reg. 140.
Responsibilities of licensees and permit holders—Schedules.

Prohibited burning period

47. The Bush Fires Act provides that there shall be a prohibited period each year during which the lighting of fires, except for certain specific purposes, is prohibited. The dates for the prohibited periods for different zones are published in the *Government Gazette* from time to time and D.F.O.s should acquaint all officers with the dates of local zone restrictions.

48. Provision is also made for this Department to obtain a suspension of the prohibited period to enable us to carry out protective burning.

Suspension of prohibited burning period

49. Before the beginning of the prohibited period the officer in charge should apply to Head Office for any suspension required, setting out the reason for his request, the minimum period required, the shires concerned, area of each job, map references defining the particular areas to be burnt and the prohibited burning zones in which each area occurs. The acceptance of suspension proposals by local shires should be indicated. Applications must be endorsed by Inspectors.

Fire investigation

50. In every case of fire the local officer must take immediate steps to ascertain the cause. From his local knowledge the forester will generally have a good idea of the cause of most fires which occur. Where it is obvious that it is directly due to human agency, immediate steps should be taken to obtain more specific information concerning the identity of the culprit with a view to possible law enforcement. Some points on how to go about such an investigation are given in Appendix "C".

51. Frequent sources of uncontrolled fires are escapes from settlers' burning-off operations.

Most of these are due to ignorance and lack of experience, so that discussion with farmers and bush fire brigades should go far to minimise this trouble.

52. Some of these escapes are due to inadequate safeguards and, where settlers persist in ignoring the provisions of the Bush Fires Act, they must be prosecuted.

Prosecution by local authority

53. Where a breach of the Bush Fires Act occurs on private property outside the boundary of State Forest, the local authority, which is charged with the policing of the Act, should carry out the prosecution.

54. The forester may assist officers of the local authority to obtain evidence, but as far as possible should leave prosecutions to the local authority where the breach occurs on private property.

Failure by local authority to prosecute

55. Where a local authority fails to take legal action against flagrant breaches of the Bush Fires Act, particularly if there are several cases of such failure, immediate advice of the incidents, together with full details, should be sent to the Fire Control Superintendent so that the matter may be taken up with the Bush Fires Board without delay.

Fire notifications to local authorities

56. When any illegal burning ouside State Forest boundaries is located, the local authority should be notified immediately by telephone of the position of the fire and a record made in the office log book.

Form F.D. 573

57. Once a week written advice using form F.D. 573 should be sent to the Shire Clerk listing all the fires located in their area during the period including those already received by telephone. A copy should be sent to the Fire Control Superintendent.

Advice to H.O.

58. If the local authority is known to be taking disciplinary action in any case, advice of this should also be sent to Head Office without delay.

Departmental assistance for p.p. or vacant Crown land fires

59. When Departmental assistance is requested for suppression of fires which do not threaten State Forest, timber reserves or land vested in the Conservator, the following policy will apply:

59.1 Assistance can only be given when it will not prejudice other Departmental commitments.

59.2 Fires reported to or detected by the Forests Department will be advised to the shire or appropriate Fire Control Officer for initial action.

59.3 Assistance should only be given following a request through the Chief Fire Control Officer or, in the event of such officer not being available, through a responsible shire officer, Fire Control Officer or Bush Fire Brigade Officer. Requests from individuals will be discouraged in all cases except where there are break-downs in communication within the rural fire organisation.

59.4 Assistance as neighbour to neighbour should be the keynote of decisions to provide help. This assumes local fire brigades have been called upon for maximum effort. Circumstances will then decide where recoups are warranted. *Where recoup is proposed, provide early advice of the details to Head Office.*

Recoup of costs

60. Costs of action taken under Section 28 (3) of the Bush Fires Act are to be recouped under the authority of Section 28 (4) or Section 58 (3) of this Act.

61. In the case of costs recouped as a result of legal action, only direct charges, *i.e.,* wages and vehicle mileages or hours, are admissible. When recouping costs other than as a result of legal action, overheads will be charged in addition to wages and mileages.

62. Salaries and officer transport charges will not be recouped when expended on investigation of possible fires within 3.2 kilometres of State Forest.

Policy defined to Shires

63. This policy was clearly defined to shires in February, 1971, and they were asked to disseminate the information to their communities through their own officers, Advisory Councils, Fire Control Officers and Brigade Captains. Occasional follow-up should be undertaken by Divisional Officers and Inspectors to ensure continued community awareness.

64. Forest officers must be most punctilious in the observance of all provisions of these Acts.

W.A.G.R. locomotives

65. It is the policy and practice of the Railways Commission to fit all W.A.G.R. locomotives with spark arresters during the summer months. Forest officers have no authority to stop or inspect any W.A.G.R. locomotives suspected of being faulty.

66. Forest officers must maintain close liaison with local W.A.G.R. officers in all matters of fire prevention.

Liaison with W.A.G.R.

67. Immediately a forest officer is reasonably certain that a W.A.G.R. locomotive has started a fire he should advise, by telephone, either the District Locomotive Superintendent at Forrestfield, Bunbury or Narrogin, or the Locomotive Foreman at Collie, depending on the locality.

68. These telephoned reports must be confirmed in writing as soon as practicable and a copy forwarded to the Fire Control Superintendent in Perth.

69. The report of a fire having been lit by a W.A.G.R. locomotive should contain the following information:

69.1 Number of the locomotive.

69.2 Locality.

69.3 Date and time.

69.4 Direction of travel.

69.5 Any other relevant information.

## HAZARD REDUCTION

**Prescribed Burning**

70. All areas of hardwood forest which do not require complete protection will be burned systematically by fires of prescribed intensity.

Types

71. There are six types of prescribed burning for fuel reduction that are standard practice:

71.1 Burning of buffer areas or firebreaks around areas of high risk —that is, to contain fires in areas where they frequently start or occur more or less regularly, *e.g.*, external boundaries, railway lines, main roads and certain areas of private property.

71.2 Burning of buffer strips or firebreaks around areas of high value—that is, to keep fires out of places such as saw mills, schools, townsites, isolated settlements, plantations, research areas, regeneration, etc.
(The burning of the above two types will be carried out as frequently as possible, but not less frequently than every third year.)

71.3 Prescribed burning of large areas on a rotational system. The length of rotation will depend primarily on rate of fuel build-up together with seasonal weather, manpower available and other local circumstances.

71.4 Advance burning: prior to logging operations.

71.5 Top disposal burning, for regeneration and hazard reduction, following logging operations.

71.6 Subdivision of extensive plantation areas with prescription burnt buffers to minimise loss in the event of wildfires.

72. Except for those areas where specific approval for burning has been obtained from Head Office, complete protection will be afforded to: Areas to be protected

72.1 Plantations.

72.2 Karri tops or scrub-rolled areas being held for regeneration burning and severely fire-damaged areas programmed for cutting within five years.

72.3 Regenerated karri areas where crop saplings are less than 15 metres tall.

72.4 Regenerated jarrah areas where crop saplings are less than 6 metres tall.

72.5 Areas required for research and investigation.

**Planning for Prescribed Burning**

73. Officers in charge of Divisions must draw up prescribed burning master plans. These plans will show: Master plans

73.1 Hardwood areas which will be burnt on a three-year (or less) rotation—*i.e.*, areas covered by burning types defined in 71.1 and 71.2 above.

73.2 Hardwood areas for prescribed burning on a rotational basis for protection of timber, flora, fauna or recreational values. Rotation length should depend on the average rate of fine fuel accumulation for each forest type unless defined management objectives dictate otherwise for a particular area. As our suppression organisation can be expected to handle wildfires in fuels up to seven to ten tonnes/ha, this should generally be used as the criterion to decide rotation length.

The map attached to Management W.P. 85 shows the broad categories for management and, unless otherwise specifically stated in individual working plans, the standards for fire intensity and percentage area burnt are to conform with the limits set below:

(a) I.M.U.'s, potential I.M.U.'s and other areas of good forest.

Standard for Prescribed burning

Jarrah Forest:

Burning cover in the range 60 to 80 per cent without scorch to crop or potential crop trees.

Karri Forest:

Burning cover in the range 60 to 80 per cent. Up to 10 per cent scorch in small clumps or individual crop trees.

Flats:

Burning cover in pockets ranging between 40 to 60 per cent. under spring conditions only.

(b) Poor Quality Forest.

Burning cover in the range 40 to 60 per cent. Burning to be restricted to conditions of drought index less than 100 to minimise possibility of re-ignition and scorch.

Planning must aim to achieve annual programmes of continuous strips rather than a patchwork of scattered areas, and wherever possible be designed for aircraft ignition. Design for aircraft ignition

73.3 Softwood burning proposals for each plantation unit will be submitted to the Chief of Division, Plantations, for approval. They will be designed according to the guidelines set out in paragraph 84 of this pamphlet.

74. The master plans must be checked annually and adjusted, if necessary, in the light of previous burning. Changes to the softwood proposals must be approved by the Chief of Division, Plantations. Proposals for burning under pines

Annual burning plan

75. The Divisional Forest Officer shall draw up current burning plans each year setting out his proposed programme. This will be submitted, after vetting by the Fire Control Forester and Inspector, to the Fire Control Superintendent for approval or amendment by the following dates:

Hardwood—15th June.

Plantations—15th March.

Proposals forwarded to Fire Control Superintendent

The master plan and plans showing results of previous burning will be used to frame the annual programme for both pines and hardwood. Proposals for aerial prescribed burns, listing number of burns, approximate area, locations and number of lightings, are to be forwarded to the Fire Control Superintendent by the 30th April.

Local officer to inspect and prescribe

76. The Forester-in-Charge is responsible for burning in his own district. A local officer must inspect each area to be burnt to assess the fuel condition and vulnerability and decide the weather conditions under which it should be burnt. A member of the field staff must issue instructions for each piece of burning. This should not be left to an overseer or leading hand.

77. The description, prescription and fire behaviour data for each burn is to be recorded. Hardwood burning is to be planned for spring unless management objectives or special conditions of fuel flammability demand otherwise. Such exceptions are to be discussed with fire control staff. Plantation burning times are laid down in paragraphs 84 to 93.

Prescriptions completed by: 15th July hardwoods; 15th March pines

78. Prescriptions for hardwood burning are to be completed by the 15th July to ensure adequate time for checking, and full advantage is taken of suitable early weather, for edging, flat burning, etc. In plantations, they are to be completed by 15th March. Prescriptions are to be checked by the Forester-in-Charge before burning commences.

Prescription plans Flight plans

79. Prescriptions for hardwood burning will be based on 1:25000 scale A.P.I. plans and on 1:12500 plans for plantations. For aerial ignition, map copies suitably marked for flight plans will be prepared on request to Drafting Branch, Head Office.

Hardwood prescription

80. Compile each hardwood prescription as follows:

80.1 Use the A.P.I. plan for separating each job into similar forest types based on species, height, and density.

80.2 Examine cutting records to determine sapling age, likely height of regeneration and changes to canopy density since aerial photography. In karri forest, proposed cutting will be noted.

80.3 Records of past burning will be used to identify the numbers of leaf falls since the last burn and whether it was patchy or clean.

80.4 From the number of leaf falls and canopy density, fuel quantities are estimated from fuel accumulation tables.

80.5 Inspect *sufficient* check points to *confirm* the predictions of fuel type and weight, and height of potential crop tree regeneration. Record scrub type, density and height. Techniques for assessing fuel quantity are available from fire research. Note topography.

81. Prescribe suitable burning conditions for each forest and fuel type in terms of maximum fire danger, within the nearest half unit; wind direction; burning technique and lighting pattern; requirements for edge burning and number of ignitions required. Comment on adjacent fuels and items requiring prior attention, namely:

areas to be given protection (pine plots, etc.);

advice to property owners;

road grading or improvement;

persons and property in the area (see App. G.).

Pine prescriptions

82. Descriptions and prescriptions for plantation burning are to be prepared on form F.D. 574. All details of stand condition, fuel, slope, aspect or position which may affect fire behaviour must be described and an appropriate fire danger prescribed for burning. Each burning unit should be selected for its uniformity of fuel type, species, treatment, topography and aspect, and separate prescriptions recorded for each burning type.

83. Overseers or officers directly in charge of the burning operations must mark on the plan the area considered to have been burnt. This will not be finally washed in on the Divisional burning plan until it has been inspected and the area and quality of the burn verified. Post-burn inspection

Areas not burned to schedule will be marked on the plan and arrangements made for these portions to be burned later.

Every pine burn is to be supervised and controlled by an officer or overseer experienced and competent in procedures for pine burning.

**Particular Areas**

84. Pine Plantations. No prescribed burning under pine canopy is to be carried out except with the written authority of the Chief of Division, Plantations. The following guidelines explain the principles to be used for burning under pine canopy. C.O.D. authority for pine burning

84.1 Major zones to restrict the spread of wildfires will be selected only within part of a large continuous planted area. Planning burning in plantations

They will be positioned to isolate areas 300 to 400 hectares in *P. pinaster* and about 150 hectares in *P. radiata*. Lesser zones 20 to 60 metres deep depending on stand density, located adjacent to unplanted breaks will be selected to halve or quarter major groups or to improve boundary protection against high risks. However, where it is possible to prescribe burn adjacent hardwood forest, this will be preferred to boundary burning under pines.

84.2 Other types of burning under pines:
Rotational burning over a plantation unit will be considered for small plantations, high-risk areas or areas in which normal suppression arrangements cannot ensure a reasonable level of protection.

Advance and top disposal burning will only be acceptable on areas selected for regular burning as breaks; or where it has been demonstrated that for a particular plantation the break burning programme does not utilise the full capacity of officers and men trained in pine-burning techniques.

84.3 The minimum age at which burning can be undertaken in a pine stand will be determined by the time taken for trees to attain thick plated bark structure to 4 metres. Usually this is not before age 11 in either pinaster or radiata.

84.4 Where no burning has been initiated in a plantation and no local officer has been trained in the required techniques, the Fire Control Superintendent will direct programmes and training arrangements to be made after master plan proposals are received from Divisions.

84.5 As burning is completed, each area should be hatched and dated on Divisional records. At the end of each season a trace of this information is to be forwarded to the Fire Control Section, Como.

85. Procedure and controls to be exercised when prescription burning under pines is as follows:

85.1 No burning may be undertaken unless the fuel profile has first been completely saturated and is drying from the top. This requires a physical check before lighting commences at each burn. Burning will only be allowed when rainfall correction factors are effective (Jarrah Fire Danger Tables) during the winter season. Controls for pine burning

85.2 Burning must not be started or continued while the open wind velocity exceeds 40 kilometres per hour.

85.3 Burning must not be started or continued while the adjusted fire hazard exceeds 4.5 or the relative humidity is below 40 per cent.

85.4 The accepted upper limit of jarrah fire danger index for burning under pine canopy is 12 metres per hour for pinaster and 20 metres per hour for radiata. The upper end of the scale should only be used for burning areas of low flammability with poor fuel aeration or slow drying characteristics, *e.g.*, compact needle beds or fuels on southern aspects, lower slopes or under dense canopy. The lower end of the scale should be used for burning areas of high flammability with well aerated fuels and rapid drying characteristics, *e.g.*, tops, scrub and areas with northerly aspect, under slopes or on compartment edges.

85.5 The above specification relates to actual conditions at time of burning. Where they are likely to be exceeded during the daily peak, burning must not commence until suitable conditions are reached.

Fire danger

86. The factors to be used to derive fire danger are:

86.1 *Past weather:*

Daily rain to 0900 (24 hours' record).

Average daily temperature (Stevenson screen conditions).

Both of these measurements should be obtained from a station reasonably close to the plantation and be recorded together with fire danger calculations.

86.2 *Present weather:*

Temperature and relative humidity should be taken regularly before and during the burn. A whirling hygrometer is a suitable instrument. The readings should be taken on a break or similar open area adjacent to the burn.

Open wind velocity should be measured at a nearby tower or headquarters to determine the average wind speed over the tree tops.

Test fires

87. Test fires must be lit in each burning unit before overall lighting starts. They should be lit where fire intensity is expected to be greatest, *e.g.*, more exposed sites, northern aspects, upper topography, etc. Their performance will indicate whether fire intensity will be acceptable under the prevailing conditions. Head fire flame height above 0.7 to 1.0 metre is unacceptable except for occasional flare-ups.

Time for lighting

88. Burning should be completed on each unit within two hours of test fires being lit, to reduce the chance of variation from test fire indications due to either weather or fuel dryness changes. For similar reasons, burns should not be started before 1100 hours or when air mass changes are likely, *e.g.*, winds in the northerly quarter suggesting incoming lows or fronts.

Spacing of spot fires

89. Test fire performance will not illustrate the effect of multiple ignition points. Therefore, strip width and spotting distance should be calculated using double the rate of spread shown by the flank and head of the test fire for the first run and thereafter adjusted on actual fire performances.

Compartment edges

90. Compartment edges within 20 metres of breaks must be treated as separate fuel types and burned under minimum conditions where necessary, according to the prescribing officer.

Use of fusees

91. The lighting crew will be limited to four and fusee matches used when the ignition pattern exceeds a 10-metre grid.

D.F.O. responsible

92. Divisional Forest Officers will be responsible for the daily decision to burn, having taken into account past and present weather. They should keep their Inspector informed.

Approval by Fire Control Superintendent

Approval of the Fire Control Superintendent must be obtained each year:

(a) before burning commences in any plantation unit;

(b) for any burning after 15th September under pine canopy.

Recording for each burn

93. The following information will be recorded for each burn:

Date, time of commencement and duration.

Area burned and detailed costing.

Weather and fuel conditions.

Fire behaviour notes and results obtained.

94. Karri regeneration areas. The following principles must be followed: Karri regeneration

94.1 Exclude fire from areas to be cut over, for sufficient time to ensure a clean regeneration burn.

94.2 Cutting sections are to be surrounded by prescribed burns to protect the regeneration area and provide safe boundaries to the regeneration burn.

94.3 Regeneration must be protected until saplings can safely withstand prescribed burning, which is usually after crop trees reach 17 metres.

95. Protective burning should be carried out around school buildings and quarters in the forest areas and nearby. Burning around schools, etc.

Details of any school or other Government buildings not adequately protected must be forwarded to the Divisional Officer for advice to Head Office so that the departments concerned can be advised of the position.

Where such burning is done at the request of a Government department or other organisation, the D.F.O. should obtain a local purchase order or its equivalent to cover costs of the burning. This charge may only be waived on recommendation of the administrative superintendent. Recoup of costs

96. **Mill Villages and Townships**

96.1 For the protection of mill villages and townships against the danger of loss of life or material damage from uncontrolled forest fires the Forester-in-Charge should prepare details of any precautionary measures considered necessary and discuss them with the respective mill managers or shire clerk, or local Bush Fire Control Officer in the case of townships. Burning around mill villages and towns

96.2 Around each mill, town or settlement in the forest it will be necessary to select or construct tracks to facilitate provision of a burnt break around the settlement at least 400 metres deep from the perimeter.

96.3 It is of great importance to the economy of the State that the risk of damage or destruction of sawmills by fire be reduced to the absolute minimum and the prescribed burning programme must ensure that mills are protected from bush fires. Occasional fires may arise in the grounds of mill towns and action should be taken in conjunction with the mill management to reduce the hazards responsible.

96.4 Every possible precaution must be taken to ensure that every forest settlement is safe from damage by forest fires. This is the direct obligation of the Forester-in-Charge of the settlement, who should draw the attention of his Divisional Officer to any cases of exceptional hazard or risk. Forest settlements

**Advance Burning**

97. In principle, advance burning aims to minimise the fuel hazard when fire risk is markedly increased by trade operations and to protect the operators and equipment. Advance burning

97.1 In jarrah forests where rotational prescribed burning is applied, the fuel quantity is not likely to exceed 7 tonnes per hectare at the time of cutting, and advance burning is only warranted when heavier fuels exist. The rotational burn may be advanced or postponed a year to minimise risk. Not usually necessary in jarrah

97.2 Karri forest. The advance burn, which is standard practice in jarrah forest, has been discontinued in karri forest where its advantages are outweighed by detrimental effects such as: Undesirable in karri

(a) the difficulty of securing a uniform burn without scorching of canopy and damage to buds and blossom or release of seed which should ideally remain on the tree until after logging;

(b) adverse effect on the regeneration burn which becomes discontinuous and may destroy seedlings developing from the advance burn;

(c) dense establishment of fire weeds which inhibit development of karri.

In the few cases where karri advance burning can be justified, *e.g.*, for reduction of extensive areas of dense acacia fire weeds, it is essential that such burning be confined to a karri seed year well in advance of logging.

97.3 Plantation. (Refer paragraph 84.2 above.)

**Top Disposal**

Top disposal

98. Serious damage can be done to the remaining tree crop by uncontrolled fires following in the wake of "felling" operations. Not only are saplings, poles and piles destroyed in this way, but where the butts of mature trees are surrounded by a litter of tops the resultant scorching reduces the value of the standing crop by the production of dry sides, hollow butts, or death and by allowing the ingress of termites and wood-destroying fungi.

Judicious expenditure on top disposal operations generally will be repaid many times over in the saving of valuable timber.

Workmen to follow fallers

99. Unless otherwise directed by the D.F.O., workmen will follow the fallers and clear away limbs and other debris for a distance of about 1 metre from around valuable trees and saplings.

Burning of jarrah tops

100. Burning of tops is carried out to reduce fine fuel hazard and to dispose of as much limb wood as possible. It may also be essential for regeneration.

100.1 Jarrah tops burning must reduce fine fuel and heavy wood effectively. Tops must be held unburnt for at least two summers after cutting so that large wood has dried. The burn should be undertaken in late spring or autumn after a dry spell and in weather conditions which prevent damage to retained trees. As the leaves will have fallen from the tops after two years, the burn may be combined with rotational hazard reduction work giving due consideration to heavy fuels present. The tops may be held an extra year or the rotation burn varied a year to achieve this combination and reduce costs.

Burning karri tops

100.2 Karri tops burning is tied completely to silvicultural requirements. Seed must be present in retained trees and weather conditions chosen to achieve a clean seed bed.

Burning pine tops

100.3 Plantations. (Refer paragraph 84 and 84.2 above.) Burning of pine tops from thinning requires the utmost caution and experience of fire behaviour in this fuel type to avoid damage to retained trees. Only the flash fuel should be removed and this usually must be done in two or three stages under minimum weather conditions in winter.

Each proposal for disposal of slash from thinning must be referred to the Chief of Division, Plantations.

**Method of Burning**

Method of burning

101. All recognised methods of burning large areas involve "stripping". (This refers to the lighting of roughly parallel lines of fire at set spacings between the lines.)

Lines of fire or spots

The lines will be lines of spot fires or lines of continuous fire, depending on conditions and the method of burning used.

Lighting by aircraft or men

101.1 Lighting may be done by aircraft or men on the ground. In each case the selection of strip width and spotting distance must be determined from the Prescribed Burning Guide on the day of the burn.

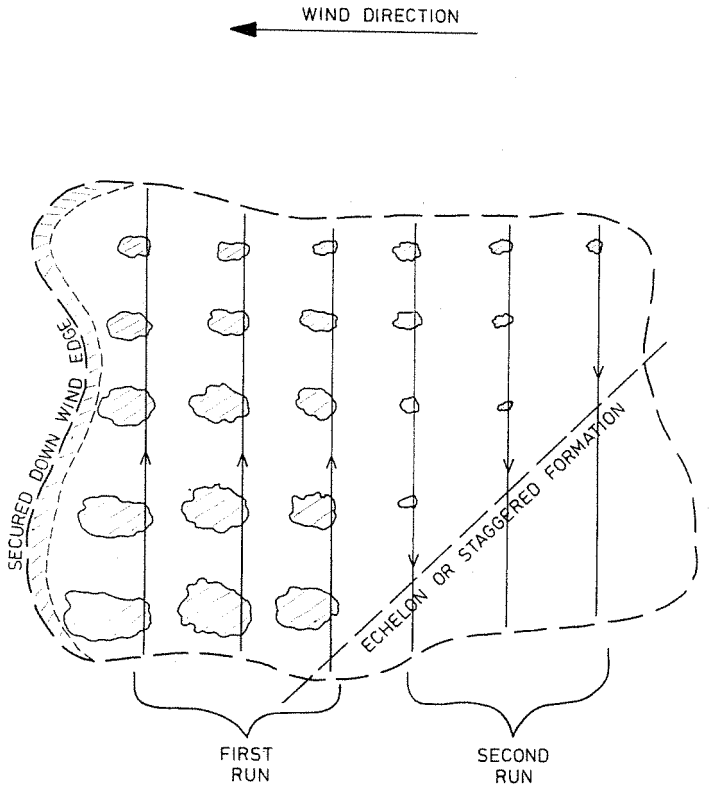
Safety of men

101.2 Safety of the men must be given detailed consideration. When ground crews are used and the men are in visual contact or have portable radio communication, immediate action can be taken to protect one who has an accident. In other circumstances where line length exceeds 3 kilometres or in scrub fuels and rough topography, fire presents a real threat of injury to individuals working alone and pairs of lighters will run each strip to avoid this risk.

101.3 It is essential that the direction of ignition strips be maintained as planned and that ground crew members hold their positions in the formation. When crew members are in contact the most capable and experienced person acts as marker on one end of the formation. He may use a compass, direction finder or natural skill as a bushman to maintain direction. When crew members are not in contact, each pair must be equipped with compasses or direction finders. When aerial ignition is used, the aircraft uses automatic direction finding radio beacons, flares, or marker fires. It is essential that marker crews are adequately trained each season. Gang organisation

**Burning Techniques**

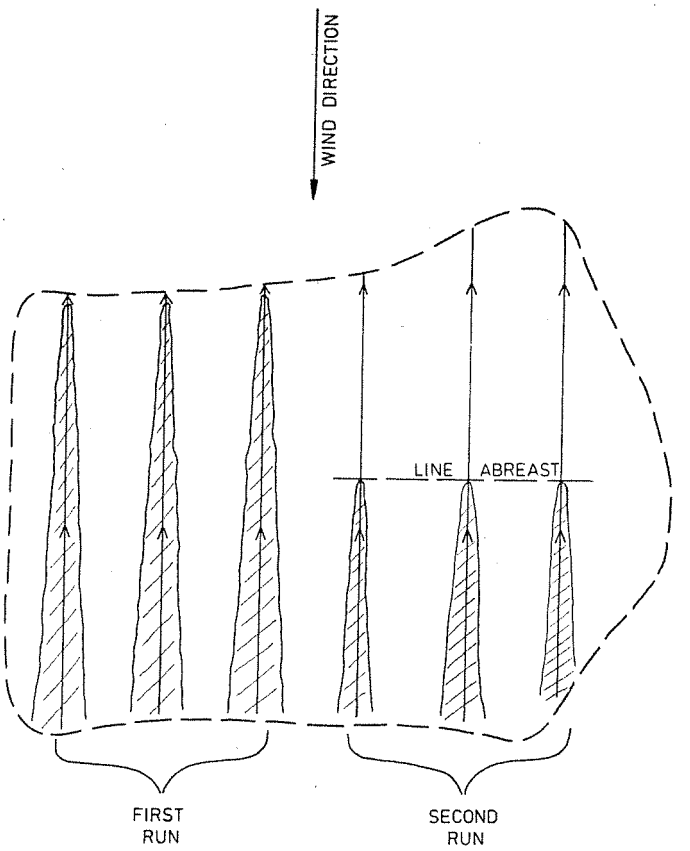
102. Burning with strips across the wind—this is the fundamental method used for prescribed burning. The direction of the strip lines is approximately at right angles to the wind direction. When using ground crews the lighters must move in "echelon" formation with the lighter on the leeward side leading the staggered group. This allows the fire from one strip to run for some (allowed for) distance with the wind until it runs into the burn of the previous line. Across-wind method




Strips are started on the downwind edge of the burn and move progressively up wind. Hatching illustrates area burnt.

103. Burning with strip straight into the wind—this is a secondary method, only to be used on small areas in light winds. Continuous lines of fire are lit STRAIGHT into the wind. All fires burn as flank fires. Lighters must move strictly in "line abreast" formation and must return to the same baseline to start each new strip unless there is a change in wind direction.

Into-the-wind method




Areas burnt by strips are shown hatched.

104. Other methods use variations or combinations of the two outlined above.

**General Provisions**

Burn boundaries

105. An area prescribed for burning in one day must be completely enclosed by lines within which the burn can be contained. Such lines will usually be roads, firelines or water reservoirs, but may be fuel moisture barriers in mixed forest types. In this latter case the burn must be completed at the earliest opportunity and should take precedence over any new job.

Area to be burnt out in one day

106. The area so enclosed must be completely burnt out before the following day except where multiple lightings have been prescribed. No fire should be running out of control on the second day even "inside" the burn.

Leeward edge safe

107. In all circumstances and by whatever method an area is burnt, the officer in charge must ensure that the leeward edge is safe before proceeding with the remainder of the burn. Expensive mop-up and control of "hop-overs" along this edge is to be avoided.

Conditions for edge burning

108. To strengthen roads and firelines acting as boundaries of a burn and so avoid time-consuming mop-up and patrol, edging is allowed in late autumn, winter and early spring when subsequent weather will not allow the edge burn to flare up and continue running. Re-ignition is unlikely and edging reasonably safe whilst drought index is under 100.

Local fire danger should not exceed 20.0, and unstable conditions ahead of lows and fronts associated with strong and gusty north-westerly winds should be avoided. Flame-throwers may be used but operators must be trained in the method of lighting, i.e., when to spot, when to use continuous lighting and when to stop lighting. The area within edging burns must be burnt out before the summer to prevent uncontrolled fire damage.

Control of scorch

109. The design of large-area burning should take into account all information and experience so that levels of scorch are maintained within prescribed limits. The prescribed limits will be decided from the condition and height of the youngest crop stems. These must not have their crowns fully scorched. The scorch height is correlated with the flame height and so to the rate of fire spread.

Index table

110. The officer in charge must select the day on which weather and fuel conditions will give a rate of spread, and so a flame height, which will keep scorch within the desired limits and yet will satisfactorily reduce the hazard over a high proportion of the area. To guide this selection, all prescriptions must be summarised in an Index Table. It should list each job number and the fire danger prescribed for burning it.

Job selection from 0745 hour forecast

110.1 Selection of daily jobs must be based on the 0745 hours fire weather forecast. Local values for rainfall, wind, temperature and relative humidity should be used for calculating local fire danger. Operational spot forecasts are available on request.

1000 hour check

The daily check of actual conditions at 1000 hours is to be the criterion for implementing aerial prescribed burns. This check is to be based on temperature and relative humidity at the site of the burn and wind strength and direction from adjacent towers. Any queries on the forecast should be referred to Fire Control, Como.

The "forecast" local fire danger, adjusted for fuel quantity, must match with that prescribed before a job is programmed for lighting.

Lighting technique to be employed

111. The officer or overseer directly in charge at the burn must then calculate the least amount of fire he is able to put into the area to ensure that it will burn out in the available time on the day.

112. Strip width and spotting distance must be calculated from the prescribed burning guide on the morning of the burn and for aerial ignition a flight plan will be prepared.

Flight plans

112.1 Copies of flight plans are to be distributed to aircrew, markers, suppression forces and controlling officers. Flight plans should show:

- the lighting pattern;
- distances to be moved by markers;
- forecast and provision for weather readings and fire danger calculations;
- names and call signs of officers and crews;
- location of suppression forces and equipment;
- navigation plan should show ground features obvious from the air.

The Controller's copy of the flight plan, showing weather data and fire behaviour, should be retained for record purposes.

Fire behaviour and weather to be recorded

113. The fire behaviour must be observed at each burn to see that prescriptions are followed. Lighting patterns must be varied or even stopped in the light of unexpected weather changes. Weather conditions, particularly wind, must be checked frequently.

Briefing the men

114. The overseer (or officer) directly in charge of the burn must ensure that the gang members are fully briefed on the job ahead. They must know:

(a) The whole area to be burned and its boundaries. The most satisfactory procedure to achieve this is to drive the gang around the boundary tracks dragging a marker behind the vehicle.

(b) The method of lighting. They must be told the formation to be used and their individual places in it.

(c) The direction and approximate distance of each strip line.

Controller to direct aerial burn

115. At each aircraft burn there will be a Controller and he will direct the aircrew, markers and suppression crews. A Fire Boss will assist the Controller.

115.1 The Controller will usually be the O.I.C. of the Division and his duties are as follows:

Maintain liaison with officers responsible for aircraft movements and daily jobs.
Provide warning notices to the public on each day of an aerial burn.
Ensure flight plans are prepared and that aircrew and markers are fully briefed.
Direct use of suppression forces through the Fire Boss.
Check the weather forecast.
Check fire danger regularly and assess fire behaviour by obtaining reports from aircraft navigator and ground crew.
Direct the aircrew.
Determine starting and stopping of lighting.

115.2 The aircrew will consist of a pilot, navigator and bombardier. The navigator directs movement of ground markers and reports on fire behaviour to the Controller.

Post-burn inspection

116. Forest officers and inspectors are to examine the results of burning and, if necessary, the aircraft may be used for this purpose. From such examinations follow-up action will be decided.

Bulletin 71

117. Officers must ensure that all members of the Department under their control have read and understood Bulletin 71, "Safety in Controlled Burning".

Verey pistol usage

118. Verey pistols are used by crews marking strip lines for aircraft. The following safety rules must be followed by those firing the pistols:

118.1 Pistols may only be handled by staff and employees who have been fully briefed and authorised to use them. Police authority is required for each person using the pistols. For this purpose Divisions must provide Head Office with the names of operators before burning starts each season.

118.2 Pistols must not be loaded until the operator is in a firing position. Loaded pistols must not be carried in vehicles.

118.3 The muzzle must be pointed down until ready to fire and must never be pointed at another man. Do not cock the pistol till ready to fire.

118.4 Pistols must only be fired from a standing position on the track and at an elevation and direction which projects the flare above the canopy into the area to be burnt. The elbow should be slightly bent to absorb recoil.

118.5 In the event of a misfire the pistol should be cocked and refired. If another misfire occurs it should not be broken for fifteen seconds to avoid the risk of a flash back.

118.6 Pistols are to be cleaned and oiled after each burn.

118.7 Flares are to be kept in the box provided and not loose in the vehicle. They must not be jarred or bumped, especially near the detonator cap.

Prescription to ensure protection from damage

119. When the inspection and prescription are being prepared for each prescribed burn, every object, operation or establishment within the area which may suffer damage must be identified and action taken to ensure protection. The position of anything liable to be damaged must be recorded on the inspection form so that protection is not overlooked.

119.1 Bush Operations. Identify the precise location of sawlog, pole and firewood operations and relate them to prescribed burning plans. Advise the operators of burning to be carried out near the site of their operations or on their access routes. Plan and take precautions to avoid damage from the prescribed burn or from "hopovers".

Notification to S.E.C., P.M.G. Apiary site permit holders

119.2 P.M.G. and S.E.C. Lines. The locality of all lines in State Forest and other areas in which this Department is carrying out prescribed burning must be recorded on plan for easy reference when programming burns. Where lines are not adequately protected, the department concerned must be given ample notice of proposed burns. They must also be kept advised of the intended dates of burns. The Forests Department may be held responsible for damage caused by prescribed burning if adequate advice is not given.

119.3 Apiary Establishments. All apiary site permit holders in an area proposed for burning should be advised by letter so that they can protect or remove hives. Permit holders should be invited to maintain frequent communication if they are likely to be utilising affected sites.

Public warnings

119.4.1 Public Notice. The need to publicise the locality of extensive aerial burns for the sake of travellers, surveyors, fishermen, etc., cannot be over-emphasised. Prior to these operations each spring, advertisements should be placed in local papers identifying the areas and explaining that warnings will be repeated over the local radio stations on the morning of each burn. Lands Department will be provided with prescribed burning proposals through Head Office.

Signs

119.4.2 Road Signs. Road signs warning the public shall be erected on roads around or within areas to be burned as follows:

(1) "Burning Imminent" signs placed three or four days before an aerial burn.

(2) "Prescribed Burning" signs placed from the start of all prescribed burns until patrol work is complete.

119.5 Specialist officers in research, working plans and soil surveying should ensure that Divisional Officers are informed of their movements and areas of operation.

Burning in March

120. No burning shall be carried out in March without the authority of a D.F.O. or above.

Restrictions for burning

121. No fires shall be lit on days above average summer hazard or local fire danger of 40.0 without the authority of a D.F.O. or above.

Tower coverage during burning

122. Sufficient towers to give adequate coverage and weather data must be manned while prescribed burning is being carried out, except that during the months of May to September inclusive the manning of towers may be dispensed with at the discretion of the officer in charge of the Divisions.

Heavy duty at burns

123. A heavy-duty outfit must be taken to every burn except where otherwise directed by the officer in charge of the Divisions.

Patrol of burn edges

124. Patrol must be regarded as a very important duty. The officer responsible for the burn should also be responsible for the final patrol of the edge.

The frequency of patrol and length of time for which it is continued should be decided after assessing the risk of breakaway, i.e., by considering adjacent fuel, conditions of the fire edge, width of break and weather conditions.

Daily burning properly recorded

125. Officers in charge of Divisions must see that the day-to-day work of prescribed burning is properly reported and recorded.

Assistance to adjoining landholders

126. There is no objection to assisting adjoining landholders in burning breaks either on their property or on adjoining state forest, timber reserves or land vested in the Conservator. In many cases, this assistance is most desirable and it may be necessary for the Forester-in-Charge to roster settlers' burning to ensure that there is not an excessive number of fires burning simultaneously.

Landholders' responsibilities

127. The settler's responsibilities must be clearly understood and impressed upon him. Burning must only be done on private property following receipt of a written request. The landholder must be in attendance and should at least commence the lighting. He must understand that future patrol is entirely his responsibility.

F.C.O. to attend burning in Crown land

128. Similarly, a Fire Control Officer or a Bush Fire Brigade Officer must at least commence the lighting where Departmental personnel are assisting Shire Councils by burning Crown lands (other than forest land) at the Shire's request. It is to be remembered that a forest officer has no legal protection when burning on other than forest land, unless written authorisation is obtained from the occupier and permits have been obtained.

Notification to landholders

129. When a break is being burned in State forest, timber reserves or land vested in the Conservator, adjoining private property, at the request of the landholder, he must be notified of the time of the burn, irrespective of the time of the year. Burning will not be done unless he agrees to attend the burn and assist with the fire, at least to the extent of patrolling his holding and accepting responsibility for future patrol on his land.

130. When a request is received from a settler for assistance in carrying out any burning whatever this should be acknowledged in writing stating the settler's obligations.

131. When any burning is to be carried out by the Department within two miles of private property during the "restricted period" (see Bush Fires Act), notice of our intention to do such burning must be given on form F.D. 243 or 282 to all adjoining landholders as required by the Bush Fires Act.

132. The Department of Civil Aviation requires that approval be obtained from private property holders where aircraft operate above their holding at heights below 600 metres. The form F.D. 562 should be used for this purpose where private properties are close to aerial burning operations.

133. We are looked upon as the main exponents of fire control and it is essential that all forest officers be most careful to comply with the provisions of the Bush Fires Act.

# FIRE PRE-SUPPRESSION

134. Pre-suppression may be divided into the following headings:

134.1 Manpower.
- (a) Training.
- (b) Departmental Gangs.
- (c) Auxiliary Manpower.

134.2 Equipment.

134.3 Transport.
- (a) Regular.
- (b) Auxiliary.

134.4 Detection.

134.5 Communication.

134.6 Water Supplies.

134.7 Roads, Tracks and Firelines.

135. Inventories and plans contained in Part "A" of the Fire Control Working Plan cover the subsections listed above. The *pro forma* of this Working Plan is set out in Appendix A.

## MANPOWER

### Training

Training of manpower

136. The Forester-in-Charge shall see that his gangs get regular training in handling equipment, fire suppression methods and organisation of fire-fighting gangs. Each member of a regular fire gang should be trained so that as far as possible he is capable of taking charge of a gang, and should be fully instructed in the policy of the Department in fire control.

Training may be possible during the winter, but the early spring burning season should be a time of intensive training in preparation for the dangerous period.

The Forester-in-Charge, assisted by the Fire Control Forester, must see that his gangs get ample opportunity for training. The overseer in charge of the gang can carry out the training as a routine part of his work, but the forester should exercise an overall supervision of this training.

### Departmental Gangs

Disposition of gangs

137. The Forester-in-Charge must so arrange the work of his gangs in the fire season that on days of high fire danger they are in continuous communication and working in strategically selected areas as specified in the Working Plan. The location and communication means for all gangs and officers must be shown on the Staff Movement Board or in the office log book.

### Auxiliary Manpower

Bush Fire Brigades

138. Farmers outside the boundary of the forest should be helped and encouraged to form Bush Fire Brigades to combat fires likely to sweep in on the forest and to assist in prescribed burning around the boundaries.

Isolated farmers living within the forest could almost be incorporated in regular Departmental gangs. Such association and training is of greater assistance to the farmer himself than a policy of isolationism, and at the same time helps to augment our gangs.

139. It is important that there be close liaison with the Bush Fires Organisation, and at a local level meetings should be attended and every assistance given to the Shire Advisory Councils. Information concerning our past and programmed burning should be disseminated to them and arrangements made for mutual assistance and training when applicable. Good personal relations with Fire Control Officers and Brigades is essential.

Sawmill employees

140. Sawmill employees, both bush workers and those working in the mill, form a very considerable body of men who should be available for fire control.

The local forester should make it his business to encourage interest in the protection of the forest.

Large towns in the forest are a potential source of auxiliary manpower but these men are usually much more apathetic than timber workers.

Listing of manpower in Working Plan

All sources of auxiliary manpower and equipment must be listed in the Working Plans.

## EQUIPMENT

O.I.C. responsible for equipment

141. The Forester-in-Charge will list and order the equipment he considers necessary for his district and will be responsible for seeing that it is obtained and efficiently maintained.

This equipment will be sufficient for his gangs together with replacements and additional equipment for the auxiliary gangs he is likely to pick up under normal conditions.

Standard equipment to be carried on each fire-fighting unit is listed in Appendix G.

Reserves of fire equipment will be held at centres determined by the Divisional Forest Officer.

Equipment for aerial burns

142. Equipment issued for use by marker crews during aerial prescribed burning will be handled as follows:

142.1 Marker vehicles will be fully equipped and checked before each season by the senior Fire Control Forester, who will issue a list of equipment with the vehicle.

142.2 D.F.O.s will be responsible for marker vehicles whilst operating in their division. They will ensure vehicles and equipment are checked and signed for on receipt and despatch. Deficiencies are to be noted.

142.3 At the completion of the burning season vehicles and equipment with signed lists are to be returned through the Senior Fire Control Forester for checking.

Maintenance

142.4 The D.F.O. must ensure that the operators assigned to the vehicles are adequately trained and instructed to operate, service and maintain the equipment as follows:

Regularly service and recharge batteries.

Record specific gravity of batteries before and after each job.

Frequently adjust or tighten holding-down bolts, brackets and fittings.

Regularly inspect and check distance measuring meter and speedo cable. Know prescribed travelling speeds and not exceed them when this meter is engaged.

Tune and operate the H.F. radio and aerial system. Do not travel while the aerial is vertical. Fire the Verey pistol and know associated safety precautions and maintenance procedure.

Locate by map reading the location of flight lines.

Adjust flight line plans in the field as directed.

Division's colours

143. Equipment should be clearly distinguished by some painted mark to indicate the gang or district to which it belongs. This facilitates collection after a fire.

143.1 The following colours have been allocated:

Wanneroo, including Somerville-Collier—Orange.
Mundaring—Red.
Kelmscott—Light Green.
Dwellingup—Yellow.
Harvey—Pink.
Collie—Light Blue.
Kirup—Brown.
Nannup—Purple.
Busselton—Dark Blue.
Manjimup—Black.

Pemberton—White.
Walpole—Dark Green.
Forest Cadets—Grey.

The colour allocated to a Division should be applied as a patch which serves as a background for codes adopted locally to identify gang or outstation equipment. When the colour coincides with that already on equipment, e.g., red on tankers, the patch should be outlined with a narrow border of white or black.

Equipment to be checked after fires

143.2 After every fire all equipment must be checked to determine and replace losses and effect repairs to damaged items.

Insurance claims for lost or damaged equipment

144. In the case of equipment burnt or damaged in or at a fire, a claim for insurance must be submitted immediately. Any undue delay may result in the claim being disallowed. S.G.I.O. form number 220 should be completed for each claim. This is supplied following the initial damage report. This Department accepts no responsibility for any loss of non-essential personal items carried on Departmental vehicles, and employees should be advised accordingly.

End of season maintenance

145. At the end of the fire season all equipment shall be checked, overhauled and stored away ready for the next season.

Power pumpers must be thoroughly overhauled and put in good working condition at the end of the fire season, then checked over and run for short intervals at least once a fortnight during the winter to obviate any deterioration during storage.

Pre-season maintenance

146. Before the commencement of the spring burning season, equipment must be checked over again to make sure it is all there and in good order, particular attention being given to pack sprays to ensure that the leather pump buckets and rubber hose have not perished and that the tank is not leaking. Any replacement required should be requisitioned early.

Plastic containers not to be used for flammable liquids

147. Officers are to ensure that plastic containers are not being used to carry flammable liquids and regular checks are made to see this practice is avoided. However, they may be used by men on prescribed burning, but must be emptied and placed in closed boxes when on trucks.

Carrying petrol

148.1 Large supplies of petrol must only be carried on tender vehicles. Spare supplies of petrol and other flammable liquids are to be carried only on gang trucks or tender vehicles. Containers used and their identification must be as follows:

Marking of containers

Petrol: Jerry-can containers or permanently mounted tank painted silver with the word "PETROL" in red above a central red band.

Repeater Avgas: 18-litre drum, green with the words "REPEATER AVGAS" in yellow on two sides.

Chain Saw Fuel: Jerry-can container painted red with a central green band and the words "CHAIN SAW FUEL" in white above the band.

Kerosene: Jerry-can container or permanently mounted tank painted silver with a central yellow band and the word "KEROSENE" in yellow above the band.

Distillate: Jerry-can container painted orange with central white band and the word "DISTILLATE" in black above the band.

Oil: 18-litre drum painted yellow with a central black band and the word "OIL" in black above the band.

Water containers are to be identified with the word "WATER" in large white letters on a black background, and jerry-cans must not be used for drinking water. If the water is unsuitable for drinking the container must be labelled accordingly.

No unlabelled containers are to be carried.

Ethyl glycol and permanganate

Ethyl glycol and permanganate crystals must not be carried on the same vehicle.

All containers must be securely fastened during transit.

D.F.O.s must ensure that all staff, overseers and truck drivers are thoroughly aware of and understand these instructions.

T.I.R. Act regulations

148.2 The T.I.R. Act requires that except as provided in subclauses (a) and (b) a truck shall not carry liquid fuel on the back while workmen are also being conveyed there.

(a) A truck carrying a fire-fighting unit may carry petrol in the normal supply tank of the pumper engine.

(b) For chain saw or fire pumper operation a truck carrying men on the back may carry there a maximum of two leak-proof metal cans of petrol each not above 23 litres capacity.

## DETECTION

Tower coverage to be maintained when L.F.D. is greater than 20

149. Early detection and accurate location of fires is of paramount importance in fire control. A fire is located by plotting the bearings on it from two or more towers. Adequate tower or aircraft coverage is to be maintained on all days when the local fire danger exceeds 20.0.

Tower maintenance

150. Prior to the manning of the towers the forester in charge shall arrange the inspection of all towers to ascertain what repairs are necessary, and to see that the area around the tower is clear of debris. See Appendix E.

He shall see that all the equipment for the tower is installed and working or, in the case of small articles, available in the district office.

Towers to be inspected

He should arrange for towers to be visited at regular intervals, and any officer carrying out an inspection should satisfy himself that all equipment is being correctly handled and cared for and the tower log book properly maintained.

Inspecting officers should initial the log book on the day of their visit.

Tower equipment

151. The equipment required in the tower is shown in Appendix E.

Selection of towermen

152. Prior to the need for the manning of towers the forester shall make sure that a towerman is available. If a local man is employed, arrangements must be made for him to be available when required.

If no local man is available, a request must be sent to Head Office in ample time to have the man on the job when required.

153. The forester must make sure that he has an efficient towerman and should take some trouble in teaching him the requirements of the job and the layout of the country he is to guard.

154. The towerman is the watchman of the forest and as such must be willing to render continuous service from dawn till after dark if required in an emergency.

He should possess the qualifications set out in Appendix E and should be tested for them.

Detection by aircraft

155. Light aircraft are available on hire for fire spotting and location. Officers in charge of divisions should contact Head Office with any request for aircraft to be used on this work. Aircraft spotting can be of considerable value in the early morning following lightning storms and on days when smoke haze cuts down visibility from lookout towers. Where aircraft are employed for fire spotting work, the Forester-in-Charge must provide adequate training for pilots and check accounts submitted by the aircraft company hired.

## COMMUNICATIONS

156. Effective means of communication are vital, not merely in fire control but in the successful administration of the Department.

157. There are four "legs" to the communication system for fire control:

(1) Lookout to Headquarters.

(2) Headquarters to fire gang.

(3) Fire back to Headquarters.

(4) Point to point around the fire.

158. Tower communication to Headquarters will be by telephone line or radio-telephone. V.H.F. radio should only be used when there is no alternative. The second, third and fourth legs will normally be by V.H.F. radio. However, when a major fire organisation is instituted, either telephone, H.F. radio or an alternative V.H.F. channel must be established for the third leg to spread the communication load. Communication systems

159. In all cases where radio is used, messages must be kept concise and traffic kept to an essential minimum. Radio messages

160. Where the use of radio from point to point around the fire proves to be difficult, communication must be maintained by runners. The men selected as runners or messengers must be reliable and intelligent.

161. Full details of radio procedure are laid down in Radio Communication Orders and every officer must be conversant with the subject matter of the orders.

162. It is the forester's duty to see that his lines of communication are functioning efficiently. Every failure must be investigated as soon as possible and the fault rectified.

Before the spring burning season commences the forester must arrange a thorough maintenance of all communication systems.

## FIRE WEATHER

163. Weather forecasts are broadcast over the departmental radio network daily at 0745 hours, 1000 hours and 1615 hours during the fire season. In early spring a 1615 forecast will be issued on week days before conditions are suitable for general control burning. An 0745 hours forecast will only be issued automatically on Mondays. Otherwise it will be by request from Divisions. A confirmation or correction of the 0745 hours forecast will be issued at 1000. These forecasts give brief information on expected cloud, wind strength and direction, maximum temperature, minimum relative humidity and fire hazard. Weather forecasts

163.1 Where necessary, forecasts will be provided for five locations representing regions as follows:

West Coastal Plains (North)—Perth.
West Coastal Plains (South)—Bunbury.
West Coastal Plateau (Northern Jarrah)—Dwellingup.
South Coastal (Inland) (Southern Jarrah)—Bridgetown.
South Coastal (Karri)—Pemberton.

The approximate boundaries of these regions may be obtained from the Fire Control Section.

163.2 In addition to the regional forecasts issued at 0745, 1000 and 1615 hours, local operational forecasts will be available for major control burns or running fires. They will be provided at any time on request from divisions. The location for which they are requested must be defined by grid reference.

163.3 The 0745 hours forecasts will be issued through Como. The 1000 hours, 1615 hours and operational forecasts will be issued through Como on week days and Dwellingup on weekends.

164. To assist in the preparation and checking of forecasts, wind direction and strength will be required at 0930 and 1430 hours from the following towers: Weather readings required by Fire Control

West Coastal Plains—Gnangara and Hampton.
West Coastal Plateau—Dale, Wells and Mungalup.
South Coastal (Karri)—Collins, Gloucester and Frankland.
South Coastal (Inland)—Munro, Alco and Kepal.

Manjimup will collate readings from the South Coastal regions. Dwellingup will collate readings from the West Coastal regions. From Monday to Friday these two stations will transmit the readings to Como. At weekends Dwellingup will telephone all readings to the Bureau of Meteorology.

165. Fire hazard is expressed on two scales: an empirical scale from 0-10 and a general scale using descriptive names. Fire hazard

The measurement of the moisture content of wood cylinders is used as an aid to forecasting fire hazard. The relationship between the two hazard scales and the wood cylinders' moisture content is set out below:

| | Empirical Scale. | Moisture Content of 12 mm Pine Cylinders. Per cent. |
|---|---|---|
| Nil | Less than 1 | 19.4-17.0 |
| Low | 1-4 | 16.9-11.0 |
| Moderate | 4.1-6 | 10.9-7.9 |
| Average | 6.1-7 | 7.8-6.5 |
| High | 7.1-8 | 6.4-5.3 |
| Severe | 8.1-9 | 5.2-4.1 |
| Dangerous | 9.1-10 | 4.0-3.2 |

F.D.I. and L.F.D. to be calculated

166.1 The Fire Danger Index should be calculated, for each major forest type in a Division, from the morning forecast. This will provide the basis for all fire control planning and should be displayed prominently at Headquarters.

The local fire danger must be calculated for each fire at the time it is reported.

D.I. to be recorded

166.2 Drought Index should be recorded at all Divisional Headquarters and reported weekly to Fire Control, Como.

0745 hours forecast to be recorded

167. The 0745 hours forecast must be obtained by all Divisions each morning and passed on to Districts under their charge. (Should Divisions not be able to receive the forecast by radio, they must obtain it by P.M.G. or Departmental telephone).

Use of forecasts

168. Officers in Charge of Divisions and Districts must use these forecasts in deciding daily operations and disposition of gangs.

Part B of the Fire Control Working Plan sets out disposition of gangs and equipment against the Fire Danger Scale for normal working days and weekend and holiday "standby" periods.

169. If full and effective use is to be made of all time suitable for prescribed burning and if fires are to be suppressed efficiently at minimum cost, officers must be able to interpret the effect of weather on fire behaviour.

## WATER SUPPLIES

170. It is important that adequate static water points are available for fire control.

Distance between water points

170.1 In hardwood areas the objective should be to provide major water points on an 8 kilometre grid pattern.
In plantations they should be sufficiently close to allow a 20-minute turn-around of tankers.

Capacity

170.2 Each water point should be capable of yielding a minimum of 50 000 litres of water at any time during the summer.

Location

170.3 They should be placed as close to major access roads as possible. Access to water supply must be positive, and sufficient area to allow the turn-around of pumpers and parking of control point traffic should be cleared and surfaced.

H.O. advised of new points

170.4 As each new water point is established, its exact location should be indicated on office plans and Head Office advised so that master plans may be kept up to date for future inclusion in Departmental lithos.

Signposting water points

170.5 The roads into water points should be well signposted. It is not sufficient to place one notice on the turn-off from a main track.

Local records

170.6 Notes should be kept in the local office of capacity, supply and permanence of water points with a view to incorporating this information on Departmental lithos at some future date and to improving the supply where necessary.

Water points to be inspected

170.7 As soon as possible after the beginning of the spring burning season all wells and water holes should be inspected and put in good condition for the fire season.

# FIRE SUPPRESSION

171. Refer to definitions of the three types of forest fires:

Crown fires,
Ground fires,
Surface fires.

## FIRE BEHAVIOUR

Factors affecting fire behaviour

172. Fire behaviour characteristics, including intensity and rate of spread, are controlled by weather, fuel and forest conditions.

Past weather—Rain and drying conditions.
Present weather—Temperature, relative humidity, wind.
Fuel—Quantity, moisture content, distribution, type.
Forest—
Density, height, species, understorey, scrub.
Topography: slope and aspect.

Forest Fire Danger Tables

173. The "Forest Fire Danger Tables" are provided as a basis for prediction of fire behaviour. Predictions from Table C assume level topography, 60 per cent crown cover and standard fuel quantities for each forest type, e.g., jarrah 7 to 9 tonnes per hectare. They also assume lateritic soil type and 10-20 per cent low scrub. Variations from these standard conditions must be given due allowance when predicting local fire behaviour.

Fire parts

174. A fire burning up a slope or with a wind blowing, rapidly assumes a long oval shape and has three distinct parts:

The head fire.
The flank or side fire.
The tail fire.

175. The head fire is the most forward portion of the fire, usually narrow, travelling fastest and very hot. It is causing the greatest damage and if possible must be controlled first.

176. The flank fires, on either side of the head fire, spread more slowly but have greater length and can rapidly develop into head fires with change of wind or topography. One side is usually more dangerous than the other due to weather trends or topography and this dangerous flank must be controlled simultaneously with the head fire or very soon after it.

177. The tail fire is burning slowly and quietly against the wind, is doing least damage and should be controlled last, but must on no account be entirely neglected.

## FIRE ATTACK

178. No two bush fires can be fought in exactly the same manner; each one calls for a different approach depending on weather conditions, men and equipment available, fuel bed and topography.

Early attack and aggressiveness essential

179. The two essentials for all fires are early attack and aggressiveness. The earlier the fire is attacked the sooner it is brought under control. Once a fire is allowed to develop a long perimeter, the task of controlling it is increased tremendously.

180. The man in charge of the fire gang must take the offensive from the outset; he must realise he has the strength and training to stop any fire with which he is sent to deal. Officers can do much to foster this idea in the minds of their gangs.

If a defensive attitude is adopted the fire is master of the situation, the gangs have a feeling of frustration, hesitate to attack the fire face directly, tend to fall back on fire lines or tracks and wait for better conditions. By this time the fire has increased in size and needs many more men and equipment to bring it under control. The safety of men and equipment must, however, be carefully

planned together with the attack method, and all those involved in fire fighting must be taught the principles of self-protection and given detailed briefing at each fire in the light of local circumstances and suppression plans.

Action related to fire danger

181. Speed of attack is essential and will depend to a considerable extent on the despatcher, who will usually be the officer responsible for co-ordination of fires.

Part B of the Divisional Fire Control Working Plan sets out the action required against fires according to the fire danger of the day.

Sequence of action

182. The following sequence of actions will be taken in the event of a fire endangering State Forest:

182.1 Request towerman to check bearings and distances or check aircraft report.

182.2 Locate the smoke on a grid reference and record.

182.3 The most senior officer present will take charge and despatch forces laid down in the operation orders or despatcher tables.

182.4 Record the time and despatch action taken. If aircraft is available, request a report on fire behaviour, fuels and access.

182.5 Recalculate the local fire danger for the area of the fire and amend forces despatched if necessary.

182.6 If rate of spread exceeds 140 metres per hour or if three or more gangs are required, set up a Large Fire Organisation.

182.7 Advise the officer in charge as soon as possible.

Action by overseer

183. Each gang overseer must advise the despatcher of departure time and proceed directly by the quickest route to the nearest location of the head fire at a safe speed.

184. If first to arrive at the fire the overseer will:

184.1 On arrival make a quick reconnaissance of the fire while the gang—

reports arrival,

unloads equipment and arranges for its protection (see paragraphs 196-203 inclusive),

proceeds to forward section of the fire and commences suppression under control of No. 1 packspray man.

184.2 After reconnaissance, report to despatcher:

Position of fire.
Area and details of fire size.
Fuel type in and around fire.
Time estimated to gain control of the fire.
Additional assistance required.
Cause.
Communication arrangements.

184.3 Until an officer arrives, assume control of suppression action by his own and subsequent gangs arriving.

184.4 Report to despatcher at half-hourly or pre-arranged intervals and without fail if the fire is proving difficult to control.

184.5 Report when the fire is under control and estimated time of mopping up.

184.6 Report when the fire is safe and gang leaving.

184.7 Advise despatcher what further patrol action is necessary.

185. If other than first to arrive at the fire, the overseer will:

185.1 On arrival report to the fire boss or overseer directing suppression, for briefing and instructions concerning attack priorities.

185.2 In the absence of a control point, arrange advice to Headquarters of arrival at the fire.

185.3 Proceed with suppression.

Action by O.I.C.

186. The Officer-in-Charge will:

186.1 Inspect the fire during or as soon as possible after suppression.

186.2 Check efficiency of gang's work.

186.3 Enquire into cause (see Appendix C).

186.4 Complete Fire Report Form F.D. 304 1972 and forward copies to the Divisional Officer.

Fire in Crown land

187. When a fire is detected on Crown land or alienated land within 3.2 kilometres of State forest, timber reserves or land vested in the Conservator, action should be as follows:

187.1 Advise the appropriate Fire Control Officer and Shire (paragraphs 56 and 57).

187.2 Check whether the Forests Department has been notified of intended "controlled" burning.

187.3 Investigate or despatch suppression forces as the situation requires.

187.4 Where assistance is requested, refer to paragraph 59.

188. Basically there are only two methods of fire suppression: direct attack and counter or back firing.

Direct attack

189. The advancing edge of the fire is attacked directly and stopped either by the use of water, mineral soil, beating or raking the burning fuel back on the burnt ground, or by raking a narrow strip clear of fuel one or two metres ahead of the fire and letting the main fire burn up to the raked strip.

This raked strip should be constructed as near to the fire face as the heat of the fire will permit.

If the area of unburned fuel is more than one or two metres wide it should be lit up and burned out immediately but care must be taken not to prepare the strip too far back from the advancing fire.

The method of direct attack should be used whenever possible.

Counter-firing

190. In counter-firing the fire fighters fall back some considerable distance from the advancing fire, usually to a prepared fire line or track, and there set "back-fires" which are allowed to run back towards the main fire with the object of burning out a wide strip of country ahead of the main fire.

This method should never be used if any of the direct attack methods are likely to succeed.

Back-firing is always risky since if the main fire is too hot to handle directly the back-fire will also be very hot.

If the fire fighters fall back to an area that can be burned easily, then the main fire could be handled easily in this fuel type.

One of the main dangers in back-firing is the tremendous up-draft that frequently occurs when the two fires meet, leading to showers of burning debris being carried over ahead of the main fire beyond the line where the back-fire started. The greatest care must be taken in setting back-fires. As little face as possible should be lit at a time. Never back-fire from anything but a good break line which is long enough to ensure that the back-fire does not escape round the ends of the fire line.

Always light close to the fire line so that the back-fire has no opportunity to gain any forward momentum and only burns back slowly towards the main fire.

Precautions for back-firing

191. General rules for back-firing:

191.1 Assess the back-firing possibilities and proposed base line carefully before spending much time clearing the break.

191.2 Rake around dangerous trees well back from the edge. It is often advisable to burn heaps of debris separately before the back-fire reaches them.

191.3 Never light a longer line than can be held; special care is necessary if choppy winds are likely.

191.4 Always burn clear to the line and well in towards the main fire.

191.5 If burning on a slope, start at the top and burn down.

191.6 If the main fire is coming up a slope, back-fire from the lee of the ridge top, that is, just over the top from the direction of the main fire.

191.7 Patrol continuously.

191.8 Keep as close to the main fire as is commensurate with safety.

191.9 Back-fire against the head fire and attack the flanks and tail directly.

## MOPPING UP AND PATROL

192. Mopping up is the term used for the work done in rendering a fire safe after it has been brought under control.

193. Mopping up means completely extinguishing every piece of burning material that might permit the fire to escape.

Standard of mopping up

193.1 A strip at least one metre wide must be cleared around every fire, strictly following its edge.

193.2 Within 20 metres of unburnt fuel around the edge all low stumps or logs must be extinguished with water or mineral soil, or both. Heaps of smouldering debris must be broken up and dispersed to prevent too great a flame close to the edge.

Heaps of debris around the butts of trees close to the edge must be cleared away.

193.3 Within 100 metres of unburnt fuel around the edge all burning spars must be extinguished, felled or burnt around to provide adequate safety margin. Green crowns of trees felled near the fire edge must be either isolated or burnt to avoid unexpected ignition once the leaves dry.

Piles of logs or tops must be separated and dampened down and if necessary covered with earth.

193.4 In mopping up, power pumpers should be brought right in to the fire face so that water can be applied to burning trees and stumps.

If mopping up is done during the heat of the day the pumpers should go around fairly rapidly damping down the more dangerous areas and then return to consolidate the position.

193.5 Spot fires should be clearly marked to ensure they are not missed by replacement crews.

Patrol

194. Patrolling of all stopped fires is essential and should follow the instructions laid down under prescribed burning.

Dieback spread to be considered

195. Officers directing the movement of equipment to and from fires must be aware of the potential dieback spread which could occur and apply hygiene measures to minimise the risk, consistent with the urgency of suppression requirements.

## PROTECTION OF EQUIPMENT AT FIRES

196. All equipment taken to the vicinity of a fire is in danger of being burnt and whenever any such equipment is left unattended every precaution must be taken to see that it is adequately protected.

Officers must ensure that overseers and gang members are conversant with the following instructions.

Overseer's responsibility

197. The overseer's first duty on arriving at a fire is to detail a man to prepare a cleared area to accommodate spare equipment with a minimum of one metre clearance around the apparatus.

198. In the case of motor vehicles, greater care must be taken than for hand equipment in view of their greater value and the more flammable nature of the unit.

Vehicle precautions

199. The safest place to park a vehicle is on cold burnt ground or bare mineral soil, such as gravel pits, away from overhanging trees. If the ashes are still hot a strip must be raked down to mineral soil for each wheel and all smoking embers raked from under and around the truck. Care must be taken to see that the truck is sufficiently removed from burning trees to preclude the possibility of sparks or burning debris dropping on the vehicle. All flammable articles, such as clothing, etc., should be placed in the cab of the vehicle, the windows of which must be wound up to prevent the entry of sparks or burning embers.

200. If the vehicle must be left on unburnt ground it should be placed on an area clear of scrub and trees. All litter must be raked from under it and for a space of two metres all round it, and any trees that might possibly drop debris on the truck must be raked to ensure that they do not become alight from any fire. Raked litter must be well scattered and not left in heaps.

Do not park near felling tops or near large accumulations of fuel.

201. When a vehicle is left on a road, all litter must be raked away from the sides of the vehicle and dangerous trees raked.

Do not leave a vehicle on a road unless there is ample clearance to permit the passage of other vehicles.

202. A vehicle should always be left facing an escape route so that it is possible to drive straight away without the need for time-wasting manoeuvring. Ignition keys should be left in the vehicle.

203. Movement of vehicles and use of equipment must be conducted in conformity with Departmental safety rules.

## STAFF AND HEADQUARTERS ORGANIZATION—LARGE FIRES

204. Once three gangs are committed on one or more fires in a division or the rate of spread prediction for any fire exceeds 140 metres per hour, the Large Fire Organization will be implemented. The Duty Officer will promptly advise—

Calling a L.F.O.

Officer-in-Charge of the Division.
Relief Controller.
Fire Control Superintendent.
Administrative Inspector.

Controller duties

205. The Officer-in-Charge of the Division will assume the position of Controller until relieved. Following on initial check of action taken, his primary function will be in the role of Intelligence Officer to determine the probable rate of spread, and from this revise the despatch requirements and arrange necessary supplies.

206. The Officer-in-Charge will make immediate arrangements for the despatch of

Supply Officer
Plans Officer
Field Control Point Staff
Fire Boss
Plant Officer

as set out in the Fire Control Working Plan, until relieved. On arrival at the divisional centre the Relief Controller will assume the role of Controller and ensure that all headquarters positions are functional.

207. The statement of duties for each position in the organisation is detailed in Appendix "B".

Relief of L.F.O. personnel

208. The relieving of all personnel including officers at the fire and at headquarters must be planned and enforced according to plan. Nobody should exceed 20 hours to their first relief or 12 hours to subsequent reliefs. Crew and staff changeovers should be completed between 0500 and 0700 or 1700 and 1900 hours. Staff should hand over and carry out briefing before crews change.

Naming L.F.O. personnel

209. Although general titles are used in the organisation set out in Appendix "B", each Division must name the actual officers and their reliefs under these titles at the beginning of each season.

Helmet markings

210. The rank of officers at the fire face may be recognised by distinguishing colour stripes on their protective helmets. The colours to be used are:

Professional Officers—Black stripe on white helmet.
Fire Control Foresters—Red stripe on white helmet.
Assistant Foresters and above—Red stripe on yellow helmet.
Forest Guards and Rangers—Green stripe on yellow helmet.
Overseers—Black stripe on yellow helmet.



2—24068

H.Q. yard

211. Even though few Divisional Offices and no two Divisional headquarter yards are the same in layout, attention should be given to organising them, as far as possible, along standard lines for use as fire suppression centres. (See also 222.)

Office facilities

212. For day-to-day use each control headquarters must have—

A wall plan (with plotting facilities) situated close to the tower communications terminals.

An "Office Daily Log" (F.D. 596) kept near the wall plan and communications mentioned above.

A staff movements board which will consist essentially of blackboard prominently displayed in the office and carrying information under the following headings:

Date, weather forecast, officers' duties, location, means of communication and estimated time of return to headquarters.

It shoud be extended to include this information for gangs as well as individual officers.

Forest Assistant duties

213. The Forest Assistant, who is vital to the fire organisation, will handle, direct, or supervise, the correct entering of details on the above board.

214. He will also, in some cases, be expected to act initially as Despatcher and must therefore be fully conversant with standing and operation orders.

215. He will be responsible for relaying the 0745 hours forecast within his division and will also supervise communications.

Staff movements board

216. The Staff Movement Board must be brought up to date each morning, and as changes occur, otherwise it becomes misleading, useless, and therefore dangerous.

Messages to be recorded

217. All messages dealing with fires must be recorded either in the office log or on message pads. When message pads are used they will be treated as permanent records and are to show the action taken by the person to whom they are directed.

If it is an instruction, it should be written out in duplicate and the original handed to the person concerned, or sent on to him with an appropriate endorsement, should it be relayed by telephone or radio. This lessens the possibility of error.

218. Duplicate messages are of considerable value to a relieving officer, enabling him to follow the progress of the organisation at the fire.

219. Messages should be written out before transmission by radio or telephone. This is particularly important for radio transmission to prevent unnecessary traffic.

Control centre facilities

220. When a large fire organisation is put into effect it is necessary to set up a separate room or part of a room as a control centre.

This space need not be permanently allocated for this purpose alone, but should be able to be swung into such use quickly.

It should be cut off from the noise of radio and telephones where possible and should provide the following facilities:

220.1 Wall space on which plans covering the fire area can be fastened and covered with clear plastic (a progressive record of fire spread will be kept in this way, where it is available for study at any time by the headquarters officers).

220.2 A fuel age plan showing at least the previous four years burning. This must also be prominently displayed.

220.3 A tactical dispositions board which will show the current distribution of all men and heavy equipment concerned in the suppression of the fire. Dispositions information will include those men and equipment items—

Resting, stand-by (on wall), on duty at headquarters, at Sectors 1, 11, 111, etc., and miscellaneous.

The board should be a large section of peg board and the men and equipment designated by standard plastic tags as follows:

Individual officers—orange diamond.

Overseers with gangs—orange rectangle.

Heavy duty outfits—yellow rectangle.

Bulldozers—grey rectangle.

Miscellaneous—green rectangle.

220.4 A plan table for the spreading of loose plans and the marking up of field copies.

220.5 A large desk for use by the Recorder and, if necessary, the Despatcher.

Fire record to be maintained

221. A complete record of events, instructions, reports and messages must be maintained. Depending on fire size and type, this may be in the form of a diary or appropriate recording forms and message sheets filed together in chronological order once they have received attention.

Every item recorded must be dated and the time of initiation and receipt entered, using the 24-hour system. Later, this provides a basis on which to conduct a fire study from which much vital information may be obtained.

A fire plan kept in conjunction with the written records completes the picture of the situation.

Layout of H.Q yard

222. The yard layout of a headquarters will vary from place to place, but the following broad features must be ensured:

222.1 Straight-through or circular access should avoid bottlenecks caused by having incoming and outgoing traffic using the same road or gateway.

222.2 Assembly points, for vehicles and manpower, should be within relatively easy reach of the Despatcher, but not close enough to allow unnecessary cluttering of the control room approaches or interference to the radio.

222.3 Assembly points should not block the through or circular roads, but should be big enough to hold approximately six normal gangs with vehicles.

222.4 Fuel bowsers, drum dumps, water points, loading ramps and gantries should be well removed from the office and assembly points but should also be easily accessible.

222.5 A roped-off space should be allowed near the assembly points for the dumping, sorting and issue of hand equipment.

222.6 A parking area should be set aside for the private vehicles of men going to the fire in departmental trucks.

222.7 Sign posts should be prepared prior to the season to allow strangers to find their way through the yard and to various points within it.

## FIRE REPORTS

Fire report form F.D. 304/72

223. At the first opportunity after a fire the officer-in-charge of a gang shall fill in the preliminary fire report on Form F.D. 304 1972. Reports should be submitted while details are fresh in mind, because it is from these reports that wages sheets are checked and the annual fire report prepared.

The form should be completed immediately by the office staff and submitted to the senior officer for his information and comments. A copy of the completed form must be forwarded to the Fire Control Superintendent.

Fire requiring immediate report

224. All fires in protected forest that are likely to attain an area of 40 hectares and all fires in plantations must be reported immediately by radio or telephone to the Fire Control Office at Como during week days and to the Fire Control Superintendent at other times.

When claim for damages is likely

225. In all cases where a claim for damages is likely to arise out of a fire, the details must be reported immediately to the Fire Control Superintendent by telephone, and this must be confirmed in writing giving a detailed report of the circumstances. When a claim against the Department is likely, do not admit liability or commit the Conservator in any way as this could nullify insurance cover.

Daily fire reports

226. All centres will submit to Como Fire Control Section, at 0815 hours, a report covering any uncontrolled fires of the previous day stating:

Location.
Cause.
Size.
Date and time of starting.
Date and time of suppression.
Serial No.

Annual fire report

227. Immediately on the close of the fire season but not later than the end of the June quarter, the annual fire report, with the fire plan, must be forwarded to the Fire Control Superintendent.

The annual fire report shall be in the form set out in Appendix "F".

# Appendix A

## FIRE CONTROL WORKING PLAN

**Part A: Inventory**

To be set out in standardised form in a loose-leaf register, reviewed in July-August and regularly updated during the fire season. Copies or corrections of this section and "Suppression Measures" are to be forwarded to the appropriate administrative inspector and Fire Control Superintendent by 15th November each year.

1. Fire Fighting Manpower and Equipment.
   - 1.1 Forests Department.
   - 1.1.1 Officers:
     Name, rank, normal duties and headquarter station.
   - 1.1.2 Summary of gangs and equipment:
     Established gangs—

| Name of Gang | Over-seer | Normal No. of Men | Make, Type and No. of Gang, Truck and Pump | Radio Call Sign | HD Outfit: Make type and No. pump |
|---|---|---|---|---|---|
| | | | | | |

Total number of men and equipment in the Division:
Officers.
Overseers.
Employees.
Utilities.
Jeeps and Landrovers.
Gang trucks (equipped for fire gang).
Gang trucks (not equipped for fire gang).
Heavy trucks—carrying heavy duty outfits.
Heavy trucks—other.
Bulldozers—light.
Bulldozers—heavy.
Wheeled tractors with blades.

1.1.3 Detailed Manpower Lists.

| Name | |
|---|---|
| USUAL STATION | |
| Light truck driver | |
| Heavy truck driver | |
| Low loader driver | |
| HD pump operator | |
| Light dozer driver | |
| Heavy dozer driver | |
| Chain saw operator | |
| Storeman | |
| Handyman | |
| Carpenter | |
| Mechanic | |

1.1.4 Detailed List—Vehicles and Chain Saws.

| Reg. No. | Usual Station or Driver | Make | Capacity | 4 x 2, 4 x 4 or 6 x 6 etc. | Pump if any | Remarks |
|---|---|---|---|---|---|---|
| 1. Cars and utilities. | | | | | | |
| 2. Jeeps and Landrovers. | | | | | | |
| 3. Medium transport (equipped and used for fire gangs). | | | | | | |
| 4. Medium transport (other than used for fire gangs). | | | | | | |
| 5. Heavy transport (normally carrying H.D.). | | | | | | |
| 6. Heavy transport (other—not normally carrying H.D.). | | | | | | |
| 7. Bulldozer—light. | | | | | | |
| 8. Bulldozer—heavy. | | | | | | |
| 9. Wheeled tractors with blades. | | | | | | |
| 10. Chain saws. | | | | | | |

1.2 Outside Sources.

1.2.1 (i) Established Gangs. (Defined crews with training or experience and with a nominated officer or foreman). Immediately available. (Those such as sawmill and shire council gangs immediately available for fire fighting in forest areas.)

Personnel
and Vehicle
and Equipment

(ii) With other commitments. (Such as bush fire brigades of farming areas bordering forests.)

Personnel
and Vehicle
and Equipment

1.2.2 Supplementary Fire Fighting Personnel. (Other sources of manpower and equipment which may be called upon. List names, telephone numbers or other means of contact.)

Bulldozing contractors and machines.
Hauling and carting contractors and low loaders.
Tractors and trucks.
Fallers and power saws.
Unorganised manpower (not already mentioned—P.W.D., M.R.D., sawmills, etc.)—vehicle and equipment.
Oil company depots—fuel supply and water tankers.

1.2.3 Auxiliary Services. (List names and telephone numbers).

Local Authority—Secretary, Chief F.C.O., Traffic Inspector.
Police—names.
P.M.G.—services and names.
Medical—doctors, ambulance, hospital, Red Cross.
Food Supply—caterers, butcher, baker, grocer.
Accommodation—halls, bedding, etc.

2. Water Supplies.
   - 2.1 Town, village and mill supplies.
   - 2.2 Static water in the forest (show on plan).
   - 2.3 Ferry tankers (Forests Department, oil companies, M.R.D. and bulk milk companies).

3. Detection and Communications.
   - 3.1 Lookout towers.
   - 3.2 Other departmental and private information services.
   - 3.3 Telephones—Departmental and P.M.G.

3.4 Radio—Departmental, Bush Fire Brigades, etc.
3.5 Aircraft—Head Office liaison with contractors.
3.6 Landing strips—Approved and emergency.

4. Access (up-to-date master plan showing road quality).
4.1 Arterial.
4.2 Sub-arterial.
4.3 Forest track—good surface.
4.4 Forest Track—poor surface.

5. Research Plots—record location.

**Part B: Planning**

1. Pre-suppression burning. (This section mostly illustrated on plans—little descriptive writing necessary.)

1.1 Master Plan. Proposals for rotational prescribed burning shown on 1:50 000 or 1:63 360 scale plans.
Amendment of these plans should be considered each July and adjustments made where necessary.
(Copies to be held by local office and Como fire control.)

1.2 Plan for the Current Year (season). This plan is to be taken each year from the master plan mentioned above—with any necessary adjustments. It should be made out each winter to show the complete prescribed burning proposals for the ensuing season—the late winter, spring, summer and autumn following. On plan, details will be shown using the legend below:

1.2.1 Numbers—each burning job will be numbered (1), (2), (3), etc.

1.2.2 Areas edged with broken green line—proposed burning not yet carried out.

1.2.3 Area covered by green dashes—burning carried out but not yet inspected.

1.2.4 Areas washed in green—areas burnt, inspected and found satisfactory.

1.2.5 Areas unsatisfactorily burnt will be left with green dashes.

1.2.6 Weaknesses or danger points will be noted on the plan in writing. Copies of this plan should be held by the local office and the Regional Fire Control Forester.

1.3 Previous Burning.
A 1:50 000 or 1:63 360 scale plan showing areas burnt season by season for the previous four (4) seasons, together with the current season's proposals. Such plans will be prepared during winter (July) of each year and will use a standard colour legend—

Current year—green, as in section 1.2 above.
Previous year—brown.
Two years old—grey (neutral).
Three years old—blue.
Four years old—yellow.

Copies should be: One on the burning plan folder (W.P.) at D. Hq., another as wall plan at D. Hq. and another held by the Fire Control Forester.

2. Suppression Measures.
2.1 Standing Orders. In tabular form showing disposition of man-power and equipment against recognised fire danger scale.
2.1.1 Deployment of gangs and equipment on normal working days.
2.1.2 Action in the event of a fire.
2.1.3 Week-end and holiday "stand-by".
2.1.4 Allocation of assistance to other divisions.

2.2 Staff Organisation (large fires). List with any relevant remarks the officers or employees and their reliefs, in order of priority, who will fulfil the functions set out below and described in Appendix "B" of this pamphlet.

Controller.
Intelligence Officer.
Plans Officer.
Supply Officer.
Headquarters Timekeeper.
Plant Officer.
Storekeeper.
Caterer.
Headquarters Despatcher.
Message centre.
Fire Boss.
Control Point Officer.
Control Point Personnel.
Sector Boss.
Crew Leader.
Runners.

# Appendix B

## LARGE FIRE STAFF ORGANISATION—STATEMENT OF DUTIES

**Headquarters Staff**

1. *The Controller*

Solely responsible for the overall organisation and direction of the fire suppression operation. Decides the initial attack force and nominates a person to direct its despatch.

Supervises performance, welfare and safety of all personnel at the fire.

Prepares a plan of action to achieve control of the fire.

Designates sectors.

Inspects critical sectors of the fire personally, when possible.

Calls and conducts briefing sessions for senior staff on the fire.

Designates and briefs the relieving controller.

Decides and organises the time and level of scaling down the organisation.

Organises resources and anticipates the need for additional resources for each section of the organisation.

Liaises with other personnel regarding property affected or likely to be affected by the fire.

Handles public contacts.

2. *Intelligence Officer*

Directly responsible to the Controller.

Determines and continually up-dates probable rate of spread of the fire by time periods (using fuel plans, forest type plans, rate of spread tables, cutting plans, road classification plans, tower reports, and any reconnaissance data available).

Interprets and makes appropriate adjustments to weather forecasts according to local conditions.

Appraises the reliability of his predictions and the need for revision as a result of personal field inspection once in each shift.

Assesses the likely manpower and equipment required to achieve earliest control of the fire.

3. *Plans Officer*

Responsible to the Intelligence Officer.

In conjunction with the Intelligence Officer and the Controller prepares maps illustrating the plan of action.

Maintains operations map of the fire perimeter showing times, sectors, control status, location of control points, access routes, and means of communication.

Maintains a record of information pertinent to each stage or change in suppression of the fire.

Maintains the movements board in conjunction with the Supply Officer.

Supplies all maps, plans and photocopies as required.

Ensures adequate supply of all maps is continually available.

Arranges special ground and air reconnaissance.

4. *Supply Officer*

Responsible to the Controller for organisation of the supply section.

Procures and despatches men, machines, stores, fuel and catering.

Anticipates the likely demands and advises the Controller of the requirements.

Advises the Intelligence Officer of movements of men and materials.

Procures adequate radio and telephone communications and supervises the headquarters message centre.

With the assistance of the time keeper, provides the Controller with estimates of wages and plant costs associated with alternative strategies.

Investigates reported accidents.

Responsible for gang control to minimise costs.

5. *Time Keeper*

Responsible to the Supply Officer.

Records movements and location of all personnel.

Collects, checks and records time worked by all personnel and contract machinery.

Collects, checks and records documents relating to purchases, hirings and reimbursements.

Ensures proper documentation of reported accidents.

This function may be filled at divisional headquarters, the fire face or both, but a full record must be kept.

6. *Plant Officer*

Directly responsible to Supply Officer.

Advises Supply Officer on the staffing needs of the plant sub-section.

Carries out or arranges for the servicing and repair of all departmental plant and mechanical equipment.

Arranges recovery of broken-down vehicles from the fire.

Advises the Supply Officer on units which have become unserviceable and those becoming available after repair.

7. *Storeman*

Responsible to the Supply Officer.

Anticipates the likely requirements of stores and equipment and orders them through the Supply Officer in accordance with established procedure.

Checks items received and ensures adequate documentation of all stores supplied, transactions (*i.e.*, In/Out Book).

Remains at headquarters and uses runners for pick-up or delivery.

8. *Caterers*

Responsible to the Supply Officer.

Organises the feeding of personnel to meet the time schedule set by the Controller and procures the requisite food supplies.

Ensures proper first aid supplies are available and arranges medical attention where required.

Procures accommodation for relief crews and directs crews to their accommodation.

Ensures proper documentation of supplies and services purchased.

9. *Despatcher*

Responsible to the Supply Officer.

Sets up a centre to which personnel report when arriving at or departing from headquarters.

Directs the movements of men, equipment and other items of supply into and out of headquarters.

Ensures that such movements are properly recorded by the timekeeper.

Passes movement orders to all personnel and equipment leaving for the fire.

Ensures that records of all movements of men and equipment are passed to the Plans Officer for maintenance of the movement board.

Controls and directs runners.

This function may be filled at divisional headquarters, the fire face or both.

10. *Message Centre*

Records and passes to appropriate addressee incoming and outgoing messages to or from headquarters.

11. *Fire Boss*

Solely responsible to the Controller for directing and supervising all work on the fire face.

Selects and applies the most suitable tactics to achieve the strategic plan of control laid down by the Controller.

Obtains the strategic plan and alternate courses of action from the Controller.

Keeps himself informed of conditions and progress on the fire face.

Maintains contact with his sector bosses and informs them of his movements and of any changes in the plan of action.

Informs the Controller of the conditions and progress of the fire.

Anticipates problems and the requirements for additional or surplus resources, briefs sector bosses on the fire situation and behaviour, sector boundaries, work required, tactics to be employed.

Allots crews to sectors and co-ordinates work between sectors.

Regularly inspects trouble sectors of the fire line.

Briefs the incoming fire boss on the situation and personally reports to the Controller on completion of a shift (the new fire boss will carry out all shift changes).

Sets up and operates from a control point headquarters.

12. **Control Point Personnel**

12.1 *Control Point Officer*

Directly responsible to the Fire Boss.

Sets up a control point at a designated locality and directs control point staff in the absence of the Fire Boss.

Maintains a map and movements board showing fire situation and disposition of forces.

Arranges adequate communications and supervises recording.

In the absence of the Fire Boss—

receives messages concerning the fire situation;
briefs field staff and crew leaders;
makes tactical decisions as Deputy Fire Boss.

12.2 *Field Supply Officer*

Responsible to the Fire Boss or his deputy.

Requests, receives and despatches, as directed by the Fire Boss—

Stores,
Men,
Equipment,
Fuel,
Food and supplies.

Organises catering.

Advises movements of men and materials to control point officer.

When necessary arranges marshalling of stores, men and equipment at the control point.

Arranges transport of equipment and repairs to vehicles around the fire.

Directs runners and mechanics.

12.3 *Runners*

Assist the Field Supply Officer as—

Guides—when moving men and equipment;
Marshals—during shift changes;
Storemen—delivering food, fuel, equipment and supplies.

12.4 *Reconnaissance Officer*

Directly responsible to the Fire Boss and reports to him on—

location of fire edge;
work progress;
track conditions;
water supplies;
signposting;
any allied intelligence required by Fire Boss.

12.5 *Recorder*

Responsible to the control point officer.

Maintains a diary of events by time periods as follows:

Records and passes to appropriate addressee incoming and outgoing messages to or from the control point.

Summarises important verbal communications concerning the fire situation.

Records men and equipment received or despatched.

Operates communications (V.H.F., H.F., telephone) with assistance as necessary.

12.6 *Water Supply Officer*

Responsible to Fire Boss for—

(1) co-ordinating water use;
(2) supervision of water pick-up to minimise turn-around time;
(3) anticipating and planning adequate water supply;
(4) supervision of hose lines if required.

13. *Sector Boss*

Solely responsible to the Fire Boss for directing and supervising all work in his sector.

Duties:

(1) Obtain definition of his sector; instructions on work to be done; tactics decided by the Fire Boss.
(2) Brief crew leaders; allot, control, supervise and co-ordinate the work of crews and plant assigned to him.
(3) Be responsible for the performance, safety and welfare of personnel in his sector.
(4) Regularly travel his sector and—
inspect work progress and quality;
note the fire situation and behaviour;
maintain contact with crew leaders.
(5) Report to the Fire Boss—
information gathered on work progress;
fire situation and behaviour;
anticipated problems;
possible courses of action;
additional resources needed or surplus resources.
(6) Inform crew leaders of his movements.
(7) Decide the location of communication facilities allotted to his sector.
(8) Ensure meal breaks and rest periods are taken in accordance with A.W.U. requirements, allowing for the fire situation.
(9) Remain on his sector unless otherwise directed.

14. *Crew Leader*

Responsible to the Sector Boss for—

*The Job*:

Obtain instructions and brief crew;
Reconnoitre the job and allot work;
Apply information to achieve maximum efficiency;
Report work progress:
Changes in fire situation;
Deviation from pre-arranged plans.

*The Crew*:

Direct—

work done by his men;
suitable meal and rest breaks;
his men on and off shift.

Check—

physical conditions and clothing daily;
feeding and sleeping arrangements through headquarters caterer and advise crew.

Report—

crew catering requirements and any failure of same to Sector Boss;
daily time records of men in his charge to the timekeeper;
any accident to the control point.

Ensure—

the safety and welfare of his men;
normal crew needs are met;
water, emergency rations and first-aid is available.

*The Machinery and Equipment*:

Check—

equipment before leaving headquarters, control point or fire;
that vehicles are regularly serviced.

Report—

vehicle repairs required;
fuels needed;
daily time records of hired plant.

*Gang Unit Card*

The "gang unit" card illustrated on the next page must be used whenever crews are directed from one Division to another. The despatching centre must initiate this record and the crew leader is responsible for showing it to the Fire Boss or control point officer, or other recording personnel. On return from the fire, it must be handed to the Forest Assistant of the home station.

DAY

GANG UNIT CARD—

DIVISION .....

DISTRICT .....

OVERSEER .....

| Name | Capabilities | | | | |
|---|---|---|---|---|---|
| | H/D | Ch/S | L/BD | H/BD | L/H |
| ..... | | | | | |
| ..... | | | | | |
| ..... | | | | | |
| ..... | | | | | |
| ..... | | | | | |

VEHICLE (Make, Call Sign, etc.)

| Make | Type | Drive | Call Sign |
|---|---|---|---|
| | | | |

This card to be held only by FIRE BOSS while on shift.

DAY

TIME CARD

| TIME | | | |
|---|---|---|---|
| Place | Dep. | Arrive | Function |
| | | | |

## Appendix C

## POINTS IN INVESTIGATING OUTBREAK OF FIRE

Speed in reaching the source of the fire is important; it may be possible to intercept the persons lighting the fire, either on the spot or going away from it.

Further, an officer should get there early to pick up any tracks that may be in the vicinity before they are obliterated by fire fighters, and to ascertain as nearly as possible the exact point of origin of the fire.

Any tracks found should be protected as far as possible by covering with bushes or bark or by placing a small log over them.

The following are a few of the possible clues that should be looked for:

(1) Remains of a camp fire.

(2) Cartridge cases.

(3) The spot where someone stopped to light a cigarette. This might be indicated by the tracks of two vehicles pulling up together, footprints by the side of the vehicle tracks, or by spent matches.

(4) Cattle tracks overmarked by horse or dog tracks indicating travelling stock.

(5) Pieces of smouldering bag or other lighting material.

(6) Ash from old blackboy cores or rotten branches in a cleared patch indicating a delayed action fuse.

Careful note must be made of any tracks in the vicinity. Their direction, size, whether boots or shoes or in the case of horse tracks whether shod or unshod and any peculiarities such as hob-nails and patched shoes. The width and tread marks of tyres, the width between wheels and whether dual or single rear wheels, should be looked for.

It is usual and advisable to call in the services of the local police constable to accompany the forest officer. The moral effect of police attendance and questioning of suspected persons and possible informants is quite considerable.

Every person in the locality who is likely to have useful information must be interviewed.

A full report must be submitted to the Fire Control Office immediately after the investigation is completed. The following details should be included:

(1) Full name and address of the person lighting or suspected of having lit the fire.

(2) Signed statements from this person, if possible.

(3) The section of the Act infringed.

(4) Exact location of the start of the fire, with an attached plan.

(5) Tenure of land where fire started, e.g., State forest or private property.

(6) Time fire started as nearly as possible.

(7) Method of lighting.

(8) Reason, e.g., carelessness, match, cigarette butt or, if deliberate incendiarism, the suggested motive.

(9) Name and address of witnesses, with signed statements.

A detailed report must be compiled for any fire likely to involve the Department in legal action to recover costs (refer circular letter H/O 140/73 on 23/10/73.)

# Appendix D

## STANDARDISED EQUIPMENT ON FIRE TRUCKS

The movement of men and equipment between karri, jarrah and plantation areas for fire suppression has made it necessary to specify the type and minimum quantity of equipment which shall be available on pumpers and personnel carriers.

Equipment on all such trucks should be as listed below and checked regularly by overseers and officers. The relevant list should be carried in each truck. For the present these lists are to be kept in imperial measure.

### TYPE AND MINIMUM QUANTITY OF EQUIPMENT FOR H.D. TRUCKS

1 tank—600 gallons.
1 pump unit.
120 ft. x 1 in. rubber hose/100 ft. or 150 ft. x ¾ in. nylex high pressure hose on live reel.
24 ft. x 2 in. armoured suction hose strainer and foot valve.
10 x 100 ft. (1000 ft.) x 1½ in. canvas hose (500 ft. only where vehicle is certain to be confined to hardwood areas).
1½ in. short canvas hoses (numbers as required locally).
1 set hose keys.
2 x 1½ in. directors with tips.
1 "Y" coupling, 1½ in. (2 in plantation areas).
2 hose clamps.
1 shut-off nozzle (Fyrex or similar).
2 packsprays.
2 axes.
1 shovel.
1 drum drinking water (CLEARLY MARKED).
2 drip torches with quantity of kerosene.
1 spotlight.
1 helmet torch (hoseman).
1 first-aid kit.
2 waterbags.
4 rake hoes or rakes.
1 crowbar.
1 Divisional plan (1 : 50 000 or 1 : 63 360 scale).
Detergent and measuring cup.
Emergency rations (one meal for each man).
1 set (3) vehicle roadside warning signs A.S.S. E38—1962.
1 plastic folder with gang/unit cards (Large Fire Organisation).
Quantity of hose washers.

### OPTIONAL EQUIPMENT

Kangaroo jack and handle.
Plantation plans (where applicable).
60 ft. x ½ in. nylex hose.
1 x 1½ in. director with tips (extra).
Hose winder and board.
1 hand electric torch.
Tow rope.
Snig chain.
1 crosscut saw, hammer and wedges.

### TYPE AND MINIMUM QUANTITY OF EQUIPMENT FOR COMBINATION H.D./GANG TRUCK

600-gallon tank.
Pumper unit.
Gang seating accommodation and cover.
30 ft. x 3 in. armoured hose with strainer and foot valve.
300 ft. x ¾ in. nylex high pressure hose on live reel.
10 x 100 ft. (1000 ft.) 1½ in. canvas hose (500 ft. only where vehicle is certain to be confined to hardwood areas).
1½ in. short canvas hoses (numbers as required locally).
2 x 1½ in. directors with tips (shut-off fog nozzle, Fyrex or similar).

1 "Y" coupling (2 in plantation areas).
2 hose clamps.
1 set hose keys.
3 packsprays.
2 x 4 gallons water-carrying drums.
1 drum drinking water (CLEARLY MARKED).
Quantity kerosene (CLEARLY MARKED).
6 drip torches.
6 x 2-pint kerosene-carrying containers.
2 shovels.
2 axes.
4 rake hoes or standard rakes (at least 2 rake hoes).
1 crowbar.
1 snig chain.
1 chain saw, plus filing equipment, oils and fuel (fuel to be CLEARLY MARKED).
Hammer and wedges.
4 waterbags.
1 spotlight.
1 radio, plus a list of callsigns.
1 first-aid kit.
1 Divisional plan (1 : 50 000 or 1 : 63 360 scale).
1 pair pliers, footprints or similar.
1 axe stone.
6 sundial direction finders.
1 helmet torch (hoseman).
1 set (2) control burning/wildfire warning signs.
1 set (3) vehicle roadside warning signs A.S.S. E38—1962.
Emergency rations (one meal per man).
Detergent and measuring cup.
1 plastic envelope with gang/unit cards (Large Fire Organisation).
Quantity of torch wick, fuses, hose washers.
Burning prescriptions and report forms.
P.A.F.T.A.C.C. report forms.

## OPTIONAL EQUIPMENT

Kangaroo jack and handle.
1 vice.
1 packspray (extra).
Plantation plans (where applicable).
2 rake hoes (extra).
1 cant hook.
2 slashers or fern hooks.
Extra shovels (Southern Divisions).
1 x 1½ in. director with tips (extra).
Field phone (where applicable).
1 hand electric torch.
3 helmet torches.
2 water-carrying cans (extra).

## TYPE AND MINIMUM QUANTITY OF EQUIPMENT FOR L.D. GANG TRUCKS

1 water tank—180 gallons.
1 light pumper unit.
80 ft. x 1 in. rubber hose/100 ft. or 150 ft. x ¾ in. nylex high pressure hose on live reel.
20 ft. x 2 in. armoured suction hose, strainer and foot valve.
25 ft. x 1½ in. canvas hose, director and tips.
1 shut-off nozzle (Fyrex or similar) fitted to hose on live reel.
1 set of hose keys.
3 packsprays.
1 drum drinking water (CLEARLY MARKED).
1 x 4 gallons kerosene (CLEARLY MARKED) plus pump.
6 drip torches.
6 x 2-pint kerosene-carrying containers.
2 shovels.
2 axes.



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4 rake hoes or standard rakes (at least 2 rake hoes).
1 crowbar.
1 snig chain.
1 chain saw, plus filing equipment, oils and fuel (fuel cans to be CLEARLY MARKED).
Hammer and wedges.
4 waterbags.
1 spotlight.
1 radio, plus list of callsigns.
1 first-aid kit.
1 Divisional plan (1 : 50 000 or 1 : 63 360 scale).
1 axe stone.
1 pair pliers, footprints or similar.
4 sundial direction finders or compasses.
2 prescribed burning/wildfire warning signs.
1 set (3) vehicle roadside warning signs, A.S.S. E38—1962.
Emergency rations (one meal for each man).
1 plastic folder with gang unit cards (Large Fire Organisation).
Burning prescription and report forms.
P.A.F.T.A.C.C. report forms.
Quantity of torch wick, fuses, hose washers, etc.

# Appendix E

## TOWERS AND TOWERMEN

The Towerman must possess the following qualifications:

(1) Must have good eyesight.

(2) Must have reasonably good enunciation and good hearing for the use of the telephone.

(3) Must be capable of reading a map and learning the country visible from the tower.

(4) Must become proficient in using the instruments and in furnishing reliable information.

(5) Must be able to endure the necessary isolation and take care of himself and must be sober.

*Instructions for use of Forest Service Eye Test for Fire Lookouts.*

The lookout eye test is designed to measure the relative ability of Towermen to see *small smokes*. The eye test target, which may be obtained from Head Office if testing of Towermen is to be done in the field, consists of a 178 mm square white board with a large black spot in the centre, black diagonal bars on the corners and a small (1.59 mm) black spot midway between the centre and one diagonal bar. The maximum distance that a man can see this *small* spot is a measure of his power to see small columns of smoke at long distances. The eye test is given as follows:

Select a suitable place out-of-doors. Either a sunny or cloudy day will do. A dark foreground, such as green grass or earth is necessary. Avoid bright foregrounds, such as dusty or gravelled roads.

Insert the round peg in the block on the back of the board to form a handle, hold eye test board in full light of open sky but shaded from direct rays of sun. Avoid getting under eaves of buildings or tree crowns.

Hold eye test board upright so that one pair of diagonal black bars is vertical, the other horizontal (the *small* spot will be up, down, to right, or to left), with white side of eye test board facing towards the person being tested.

Have man being tested back away from eye test board until *small* black spot almost disappears (usually 12 to 14 metres).

Whirl eye test board several times so the *small* black spot may assume a new position, up, down, right or left. Have observer signal or state new position of the *small* spot. If correct, have him step back half a metre or more. Repeat procedure until the observer indicates position of *small* black spot incorrectly. Have him guess when he is no longer certain. He may rest his eyes if he wishes.

Record the observer's rating as the distance in metres from eye test board to the last point from which he can indicate position of the *small* black spot correctly. The distance at which this small spot can be seen is definitely related to the distance at which *small* smoke columns can be easily detected. The following tabulation indicates quality of eyesight in relation to eye test rating in feet:

| Maximum distance at which *small* black spot can be seen (metres). | Quality of eyesight. |
|---|---|
| $> 19$ | Exceptional |
| 18-19 | Good |
| 15-18 | Average |
| 13-15 | Fair |
| $< 13$ | Poor |

The Towerman shall be required to:

(1) Make such early and late observations as the D.F.O. shall require.

(2) At first observation ensure that the orientation of the plan and finder is correct. This may be done by checking the bearings on one or two known points.

(3) At 8 a.m. he will obtain the early morning fire weather forecast and pass it on to neighbouring towers or Divisions. This information should be written on the top of the page of the day's observations.

(4) Report the wind direction and strength and visibility in each of the four quarters of the compass to District Headquarters. This information must be supplied as conditions change, hourly or more frequently as required.

(5) Remain on continuous watch during such hours of the day as the D.F.O. shall determine, with stipulated times off for meals or short breaks as advised.

(6) Maintain a careful watch at all times for smoke.

(7) All smokes will be identified by number, Division and date. Immediately on locating a smoke the lookout man should take a bearing and estimate the position of the fire. He should communicate this bearing and approximate location, together with a description of volume and character of the smoke, to central Towerman or District Headquarters, as previously instructed by the D.F.O.

(8) When the position of a fire has been definitely determined, the Towerman will be supplied with the location and the serial number of the fire to be entered in the log book and in the margin of the plan at a point which is a continuation of the bearing. This serial number will be used in all further reports concerning such fire.

(9) All messages to and from the tower must be entered in the tower log book against the time of the transmission.

In transmitting information from the tower the following codes will be used:

Visability—

(1) Clear vision up to 24 kilometres.
(2) Clear vision up to 16 kilometres.
(3) Clear vision up to 11 kilometres.
(4) Clear vision up to 8 kilometres.
(5) Clear vision less than 8 kilometres.

Wind strength will be recorded in kilometres per hour if the tower is equipped with anemometer or wind speed indicator. Otherwise Beaufort Scale descriptions will be applied. The minimum period over which reliable wind speed estimates can be made with an anemometer is 12 minutes. Read the meter, wait 12 minutes, read it again. Subtract the first from the second reading and convert to kilometres per hour with the table provided.

Description of smokes:

A—Direct view.

B—Not direct view.

| *Volume.* | | *Character.* | | *Colour.* | |
|---|---|---|---|---|---|
| Fine | 1 | Columnar | 1 | Blue | 1 |
| Medium | 2 | Spiral | 2 | White | 2 |
| Heavy | 3 | Billowy | 3 | Brown | 3 |
| Dense | 4 | Blankety | 4 | Black | 4 |
| | | Drift | 5 | Copper | 5 |

The Towerman should receive some instructions on the use and care of instruments along the following lines.

*Direction Finder.* Care should be taken in removing and replacing the steel arm of the direction finder to see that the sighting vane and arm are not damaged. Any damage should be reported immediately.

*Plan Board.* The plan board should be protected as much as possible from any damage by rubbing and scraping and should be covered in the event of rain.

On vacating the tower each evening the cover should be placed on the plan.

*Binoculars.* The binoculars now being issued to towers, besides being a precise optical instrument are also a very costly item of equipment and must receive every care in use.

The binoculars should be worn with a short strap and should not be left lying on the table or box to be picked up when required.

When not in use they should be kept out of the sun, either by keeping them in the cupboard or, if they are hung in their case, the lid of the case must be kept closed to protect the lenses.

Prolonged exposure to direct sunlight causes crystallisation of the cement used in the assembly of the large objective lens, causing a blurring of the image and necessitating complete dismantling and cleaning of the lens at considerable expense for rectification. In no circumstances should binoculars be left on unattended towers; if the towerman is not at the tower the binoculars must be locked up either in the tower hut or taken into headquarters.

*Sunglasses.* Sunglasses assist in the detection of fires in hazy conditions and to relieve unnecessary eye strain resulting from continuous observation under conditions of heavy haze, sun glare and high winds. They should be kept clean and placed in the case when not in use. The best type of sunglasses are of the "polaroid" type.

*Panorams.* Panorams should be kept as clean as possible. Covers should be placed over the boards each evening and sometimes during the day to give protection from sun, wind and rain.

The towerman should be encouraged to make additions to the panorams as points are identified from time to time.

**Care of Fire Towers and Lookout Trees**

At the end of the fire season the tower plan, sighting vane, log book, panorams, anemometer, binoculars and sunglasses should be removed from the tower and the last two locked up.

At the same time the tower or tree hut should be inspected and a full report with suggested renovations or repairs (if any) should be submitted to the divisional office. The tower should be inspected with a view to determining—

(1) The need for iron bands round uprights to control splitting.

(2) The need for treating exposed ends of timber with hot creosote, petrolatum or some similar compound.

(3) The need for painting or otherwise treating any exposed wood or ironwork.

(4) The need for renovations or improvements to the tower cabin and hut.

Trees should be inspected for the following:

(5) Dying back of the limbs or trunk.

(6) Patches of rot in dead areas.

(7) Rot or borer attack in tree pegs.

With the exception of towers which have been erected on a concrete base, each tower should be regularly examined to check conditions of piles where they enter the ground.

At each inspection the ground around the piles should be opened to a depth of 0.5 metres and any weathered or decayed wood should be scraped off and the exposed section should be painted thoroughly with hot creosote. If there are any indications of termites or decay, deeper holes should be opened and the affected wood cleaned away. The creosote, before application, should be heated to simmering point, but not allowed to boil violently. The piles should be allowed to dry before treatment.

The tightening of bolts used in the construction of fire towers should only be necessary at the beginning of each fire season for the first two or three years, after which further tightening should not be necessary.

Excessive tightening of bolts is to be avoided.

In the course of this work any patches of decay noted in the structural timber should be cleaned and a dressing of hot creosote applied to the affected areas.

It is estimated that for the treatment of the supporting piles in each tower 36 litres of creosote may be required. Any excess creosote left after painting the legs and other affected parts can be used for puddling the earth round the legs, particularly in the vicinity of any patches showing rot or termite attack. Supplies of creosote as required should be requisitioned.

In addition to the above periodic inspections, all towers and trees should be inspected before each fire season and officers-in-charge of districts where towers or trees are located should submit a report to the Fire Control Superintendent not later than the 30th September in each year setting out the general condition of the lookout and the towerman's hut.

At the beginning of the fire season steps must be taken to clear all undergrowth for a radius of 100 metres round each tower or tree so that there is no possibility of its carrying fire on the hottest day.

During the fire season at least two packsprays or 18 litre drums filled with water must be kept on the tower in case of emergency.

## Appendix F

## ANNUAL FIRE REPORT

A separate Annual Fire Report is required for the natural forest and for the plantation zone where a plantation has been established in a district that also fire protects the natural forest.

### AREAS OF NATURAL FOREST

The Annual Fire Report for *areas of natural forest* will be in the following form and this schedule must not be departed from without Head Office approval.

*ANNUAL FIRE REPORT*

..... Division No..... Season.....

1. Introduction.
   Areas protected—Zones A and B.
   Treated for regeneration.
   Period considered as fire season and covered by the report.
2. Prevention.
   (a) Prescribed burning.
   (b) Top disposal.
   (c) Roads and tracks.
   (d) Fire lines and firebreaks.
   (e) Publicity and propaganda.
   (f) Co-operation with local settlers.
   (g) Notes on notable "saves" of property.
3. Organisation of Fire Season.
   (a) Fire hazard—notes on fire season.
   (b) Detection—dates of manning and vacating towers.
   (c) Communication.
   (d) Suppression. Efficiency of employees; fire training schools.
   (e) Water supply.
4. Fires During Season.
   Date of first fire.
   Date of last fire.

Table 1.—Details of Fires Attended.
(This table will be Form F.D. 434.)

Table 2.—Causes of All Fires Attended.

| *Cause.* | *No.* | *Area.* |
|---|---|---|
| W.A.G.R. Locos | | |
| Escape from private property | | |
| Escapes from F.D. burning | | |
| Bush workers | | |
| Hunters and fishers | | |
| Householders | | |
| Firewood cutters | | |
| Travellers | | |
| Lightning | | |
| Deliberately lit | | |
| Children | | |
| Mill surroundings | | |
| Mine surroundings | | |

Other Government employees
Stockmen
Unknown
Totals

Table 3.—Prescribed Burning Carried Out.

| Season | No. of Days when Burning Took Place | Areas (hectares) | | |
|---|---|---|---|---|
| | | Prescribed Burning | Advance Burning | Top Disposal Burning |
| Spring | | | | |
| Autumn | | | | |
| Totals | | | | |

Table 4.—Rainfall Figures for the Season (in millimetres).

| *Month.* | *Wet Days.* | *Amount.* |
|---|---|---|
| June to May. | | |

5. Recommendations for Next Season.

6. Fire Plan. A paper litho to be forwarded with Fire Report showing:
   (1) A and B Zone boundaries—BLUE.
   (2) Prescribed burning—
       Spring—YELLOW.
       Autumn—BROWN.
       Top disposal—YELLOW with RED hatch.
   (3) Uncontrolled fires—RED and numbered with Serial No.
   (4) Private property fires during prohibited period—GREEN, cross-hatched RED.
   (5) Private property fires during open season—GREEN.

(The plan should not be folded but rolled on stick for placing in folder).

## PLANTATION ZONE

The Annual Fire Report for a plantation zone will be in the following form and this schedule must not be departed from without Head Office approval.

### *ANNUAL FIRE REPORT*

.....Plantation Season.....

1. Areas within Plantation Zone.
   (a) Plantation area.
   (b) Area of natural forest (S.F. and T.R.) within zone.
   (c) Areas of private property and other Crown lands within zone.

2. Prevention.
   (a) Prescribed burning, i.e., any burning within the Plantation Zone including boundary burning within buffer area, protective burning around settlements and burning under pine canopy.
   (b) Clearing burn for planting or sowing.
   (c) Roads, tracks and fire lines:
       (i) Construction—details, with distances in metres of new work within the plantation. Progressive total distances of roads, tracks and fire lines.
       (ii) Maintenance—details, with distances of grading, hand-work, etc.

(d) Firebreaks:

(i) Construction—details of new work.

(ii) Maintenance—details of old breaks cultivated or scraped.

(e) Publicity and propaganda.

(f) Co-operation with local settlers.

(Note: (e) and (f) not required if ordinary fire report is also forwarded, unless there are some special features.)

3. Organisation for Fire Season. As for natural forest report and not required if ordinary report forwarded, unless there are some special features.

4. Fires During the Season.

Date of first fire.

Date of last fire.

Table 1.—Details of Fires Attended.
(Form F.D. 434).

Table 2.—Points of Origin and Total Number of Fires Attended within Plantation Zone.

| Point of Origin | Number of Fires | Number and Area where Forest Land Burnt | |
|---|---|---|---|
| | | Number | Area |
| Planted Area | | | |
| Natural Forest within Zone | | | |
| P.P. and other Crown Land within Zone | | | |
| *Outside Zone | | | |

* Where not reported in other report.



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## Appendix G

# PROTECTION OF PERSONS AND PROPERTY FROM DAMAGE DURING PRESCRIBED BURNING

It is important that planning of burns be sufficiently detailed to prevent injury to personnel and damage to property. When the prescription is being prepared for each burn, every object, operation or establishment within the area which may suffer damage must be identified and, when necessary, action taken to ensure protection. The position of anything liable to be damaged should be recorded on this form so that protection is not overlooked.

P.A.F.S.O.U.

| Division .....<br>Job No..... | Items for checking during preparation of prescription. Officer prescribing to initial each item checked | Items for checking just prior to the burn. Officer to initial each item checked | Items for checking on day of aerial burn. O.I.C. of burn must initial each item after ensuring that action has been taken |
|---|---|---|---|
| Property on S.F.— | | | |
| Buildings .... .... | X | | |
| Plots .... .... .... | X | | |
| Bridges .... .... | X | | |
| M.R.D. Camps .... | X | X | |
| Miners Camps .... | X | X | |
| Advice to Neighbours— | | | |
| Burning notices .... | | X | |
| Low flying .... .... | X | | |
| Public warning .... | | X | X |
| F.D. Operations— | | | |
| Research .... .... | | X | X |
| W.P.O. .... .... | | X | X |
| Soil Surveyors .... | | X | X |
| Services— | | | |
| P.M.G. .... .... | X | | |
| S.E.C. .... .... | X | | |
| Shire Council .... | | X | |
| W.A.G.R. .... .... | | X | |
| Other Inhabitants— | | | |
| Fishermen .... .... | | | X |
| Hunters .... .... | | | X |
| Travellers .... .... | | | X |
| Dept. of Army .... | | | X |
| Surveyor (Local) .... | | | X |
| Ag. Protection Board | | | X |
| Gravel Licensees .... | | | X |
| Utilisation— | | | |
| Sawmilling .... .... | | X | X |
| Pole and Pile .... | | X | X |
| Firewood Cutter .... | | X | X |
| Apiarists .... .... | X | X | X |

OFFICER PRESCRIBING

## Appendix H

## LIST OF FIRE CONTROL FORMS

FORM No. F.D. 243.

This form is used to advise a private property owner of proposed prescribed burning by the Forests Department adjoining his land and to seek his co-operation and presence at the burn. It is a reminder that the Bush Fires Act provides for him to burn breaks on his property in co-operation with the Department. Refer paragraphs 126 to 129 and 131.

FORM No. F.D. 282.

This form is used to advise those property owners who adjoin State Forest and will be within 3.2 kilometres of prescribed burning proposed by the Forests Department. It is the appropriate form with which to advise our neighbours of prescribed burning proposed during the "restricted period". Refer paragraph 131.

FORM No. F.D. 304—1971.

This is a detailed report form to be completed fully for every fire on land controlled by the Forests Department. It should be used to record only the Forests Department commitment on other fires attended. Refer paragraphs 186.4 and 223.

FORM No. F.D. 434—1971.

A summary of all fires attended will be submitted on this form at the end of each season. Refer Table 1, Annual Fire Report.

FORM No. F.D. 562.

The Department of Civil Aviation requires that permission is obtained from private property owners to operate aircraft below 600 metres over their land. This form is used to obtain such permission in areas where aerial ignition is proposed. Refer paragraph 132.

FORM No. F.D. 573.

This form is used to confirm previous telephonic advice to Shires of illegal burning detected outside State Forest boundaries. Refer paragraph 57.

FORM No. F.D. 574.

Descriptions, prescriptions and associated fire behaviour and effects data, for prescribed burns carried out under pine canopy, are to be recorded on this form. Refer paragraph 82.

WILLIAM C. BROWN, Government Printer, Western Australia

24068/11/73—500