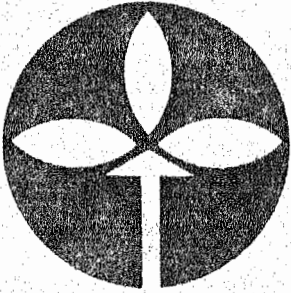


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DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

## Agronomy Branch Report

### MONARTO BUSHFIRE CONTROL PLAN

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Report No. 65

**MONARTO DEVELOPMENT COMMISSION**

***BUSHFIRE CONTROL PLAN***

**A report on the nature of the risks, hazards and desirable control measures of bushfires and other fires within and adjacent to the area of land under the control of the Monarto Development Commission at Monarto, South Australia.**

Compiled for the  
Bushfire Research Committee by  
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**May, 1975**

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## INTRODUCTION

The climate and vegetation of the land acquired by the Monarto Development Commission is similar to many other areas of southern Australia having a Mediterranean type climate, mostly loamy mallee soils and a rainfall of about 350 to 400 mm. Normally, opening rains in April-May germinate annual vegetation which grows during a relatively short winter, and matures in September-October leaving a residue over hot dry summers. The volume of this dry residue varies from year to year, but it is only following an exceptionally dry growing season that there is insufficient fuel to promote the spread of damaging bushfires. Therefore bushfires have been an ever present threat during the great majority of Monarto summers. With the pending change in land use and population density, this threat will be magnified and the potential for damage and destruction will become even greater than it has been in the past.

Uncontrolled bushfires damage and destroy not only man made structures and means of production, but also natural flora and fauna, the conservation of which has assumed a new dimension since the advent of Monarto as a future city. Though many species of native vegetation may regenerate following a bushfire – depending on its intensity – uncontrolled burning inevitably changes the ecosystem, usually to the detriment of the whole environment. The Monarto Development Commission recognised this fact together with the threat which bushfires present to man made structures within and adjacent to the area acquired for the development of the city of Monarto. Accordingly the Commission requested the Bushfire Research Committee to prepare a fire protection and prevention plan giving high priority to the formulation and implementation of such a plan to:—

- "Prevent, as far as possible, the occurrence of fires on Commission land.
- Reduce the spread of these fires which do occur and the damage which they cause.
- Take special measures to protect areas in which development is taking place."

During 1974, preliminary surveys of the area were made in company with the M.D.C. Estate Manager (Mr. G.K. Woodroffe). An interim fire protection programme was formulated to mitigate the potentially extremely high fire hazard conditions which existed at Monarto at the time. This programme was subsequently put into effect by M.D.C. prior to December 1974.

This PLAN is more comprehensive and has been developed with a longer term in view. It is based on the assumption that designated land use areas will remain much the same and for a similar period which current advice from M.D.C. indicates. Even if development schedules are varied or changed by M.D.C. it is believed that these recommendations are sufficiently flexible to be adapted to possible changes which may occur within the next few years. In any event, a fire protection plan covering more than one summer period should be reassessed each year prior to the onset of summer. Details of recommendations can then be altered if necessary to suit varying seasonal conditions and, in the case of Monarto,

progressive stages of development.

In addition to considering the possible needs of flexibility in planning, consideration also has been given to the practical problems of those whose duties include the implementation of a fire protection programme. It is believed that all of the recommendations made in this PLAN can be carried out without conflicting with other aspects involved in the development of Monarto and well within the resources of M.D.C. and the competency and capability of M.D.C. staff.

Nevertheless B.R.C. officers are and will continue for the foreseeable future, to be available to M.D.C. to advise and assist M.D.C. staff in any matter pertaining to the overall safety of Monarto from bushfires.

The recommendations contained in this PLAN are based on similar recommendations made, and subsequently put into practice by many rural landholders throughout S.A.. But much of the Monarto area will not be subject to the same normal fuel reduction processes which occur on farms throughout summer months as a result of routine farming enterprises and operations. Moreover the increasing population of Monarto (M.D.C. staff excepted) will not, in most cases, have had the same opportunity or need, as long standing rural dwellers to appreciate the real danger of bushfires which exists when living in rural surroundings.

Therefore, the bushfire risk and hazard on M.D.C. land at Monarto is likely to be greater than a rural area where land use is more typical to that usually associated with similar rainfall, soils and topography. There is a great responsibility on the part of the Commission to ensure that the fire control measures put into effect at Monarto are not less than those contained in this PLAN.

## **FIRE CONSCIOUSNESS**

To be acutely aware of how easily fires can start and spread is often termed "fire consciousness".

Fire consciousness on the part of all who live, work, or visit Monarto is the pivot around which all other fire protection precautions revolve.

Fire consciousness, in the first instance, must be developed by example on the part of the M.D.C. by indicating that fire control has a high priority in the aims and activities of the planners. A specific officer should be delegated to encourage and advise other personnel in all aspects of fire prevention and control and be given the powers required to enforce the carrying out of fire protection measures, if and when necessary, to ensure the overall effectiveness of fire safety at Monarto.

In addition to being encouraged, people must be assisted to be fire conscious. This will involve M.D.C. in providing certain facilities and equipment for residents and tenants at Monarto, recommendations regarding which are made in various sections of this PLAN. Though the prime purpose of these facilities and items of equipment is discussed when making each recommendation, a secondary and very important reason is to show tangible evidence to all who live at and visit Monarto that M.D.C. is concerned about fire protection in addition to being a visual aid in promoting fire consciousness.

## **PERSONNEL**

The whole concept of the Fire Protection Plan for Monarto relies on the appointment to the M.D.C. staff of an officer whose qualifications and subsequent duties are essentially orientated towards fire control. He must be, in effect, the Fire Control Ranger, and as such it is suggested that, if practicable, the title of his office be that of Fire Control Ranger.

Logically, this officer will have had some training and possess some knowledge of fire prevention, protection and suppression. Because the concept of fire prevention and protection through land management is not as widely disseminated through the community as is purely suppression at E.F.S. level, it is likely that any appointee to the office of F.C.R. will not be entirely familiar with the concept of this plan – that is, fire control through land management.

Therefore it is recommended that as soon as practicable after his appointment, the F.C.R. be given the opportunity of spending a period with B.R.C. Officers in the Department of Agriculture, Adelaide, to familiarise himself with the means of application of the various aspects of fire prevention, protection and suppression as evolved by B. R. C. Officers during the last 15 years.

It is further recommended that the F.C.R. in due course be officially appointed to the office of Supervisor of Fire Control Officers for the Municipality of Monarto as prescribed under Regulation 8 of the South Australian Bushfires Act. With this appointment in mind the F.C.R. should be given the opportunity of spending the necessary period at Emergency Fire Services headquarters at Adelaide to enable him to become completely familiar with the powers and duties of a Supervisor and to take part in any training programme conducted by E.F.S. headquarters considered to be desirable by the Director of Emergency Fire Services.

Although it is recommended that the implementation of fire control measures at Monarto be primarily the responsibility of the F.C.R. it is appreciated that in practice, more senior M.D.C. officers, in addition to all other Rangers or perhaps all members of M.D.C. staff could have an active role to play.

Therefore it is recommended that prior to the summer of 1975/76, a day be arranged when appropriate staff members attend a school at Monarto arranged and conducted by B.R.C. staff. Though the context of such a school would not necessarily contain the depth of subject matter required by the F.C.R., it would contain material which involves land management for fire control as it should be applied in practice at Monarto, with perhaps most emphasis on prevention. If desired by M.D.C. the school need not be confined to M.D.C. personnel but could be open to tenants, contractors or staff of other Government Departments who live and work at Monarto. The content of the subject matter and those who could be invited in addition to M.D.C. staff can be arranged by discussion between the appropriate M.D.C. and B.R.C. Officers.

By involving Monarto people in bushfire prevention, protection and suppression techniques at group level, an initial step in developing fire consciousness will be taken, in addition to making the duties of the F.C.R. more acceptable to those with whom he will be working.

## PROJECTED LAND USE

The concept for the development of the Monarto area of some 15 200 ha as it is foreseen at present (March of 1975) involves several types of land use. Some of these types of land use may change as the demands of physical development claim more of the area, until finally the City of Monarto is a reality. At the same time certain areas will not change in land use, even when the area contains a functioning city. For example, areas which the Monarto planners have set aside for what they term "parklands" will presumably remain much the same in the future as they are today. These are sensitive areas the ecosystems of which could easily be upset by uncontrolled human activity.

In the short term, that is 1975 until 1980, the M.D.C. foresees that the whole Monarto area will be utilised for various purposes. For example, portions may be leased for normal farming operations, restricted farming or restricted grazing. Other areas have been allocated for tree planting, and some of these have already been planted by the Woods and Forests Department. Still other areas may be set aside for complete regeneration, and others will probably remain intact pending the time when they will be used as parklands by the people of Monarto. Finally, a relatively small area has been designated as the site where initial development will take place.

At present, no firm decision has been made regarding the utilisation of much of the area. However, it is reasonable to assume that these uncommitted portions will be used for one or other of the purposes similar to those, regarding which decisions have been made.

When considering fire protection for any rural area, land use together with topography must be taken into account. Therefore a different concept of fire protection must be considered for each of the land use areas of the Monarto site combined with an overall plan to integrate and consolidate the various recommended methods of fire protection through land management.

The following general recommendations are made for what is considered to be the most practical and effective method of preventing, protecting and suppressing fires on the respective land use areas at Monarto.

### 1. Areas used for normal farming operations

It is assumed that areas used for farming will be subject to a Lease Agreement containing the usual obligations of a Lessor to a Lessee and vice versa. Because M.D.C. will be obliged to rely on the lessees of the land to play what could be a vital role in an integrated system of fire control for the whole area, it is considered that this obligation should be more than a moral obligation. Therefore it is recommended that clauses be included in the Lease Agreement stipulating the respective responsibilities toward fire control of both Lessor and Lessee.



The responsibility of M.D.C. to supply certain items of equipment and facilities and to carry out certain duties are pointed out in following sections. With these responsibilities in mind the Lease Agreement should contain an undertaking on the part of the Lessor to provide such items for the use and benefit of Lessees in the interest of mutual fire protection, as overhead hydrants, knapsack sprays, household fire extinguishers, fire tolerant fence posts, suitable farm fire units, and to make available an M.D.C. officer (the F.C.R.) who is qualified to encourage, advise and direct Lessees in all aspects of fire prevention and control.

In turn the Lessee has certain responsibilities to the Lessor. Therefore the Lease Agreement should contain an undertaking on the part of the Lessee to (1) plough, cultivate, mow, graze, burn or otherwise clear upon the land subject to lease, areas of such dimensions and to such numbers as the Lessor or his agent may determine, and to maintain the clearings free of flammable matter, and (2) to act as and when specified by the Lessor or his agent, with respect to anything which is upon the land and which in the opinion of the Lessor or his agent is or is likely to be conducive to the outbreak of a fire or the spread or extension of a fire.

It is further recommended that the "agent" of the Lessor be the Fire Control Ranger the appointment and training of whom were recommended under PERSONNEL. In this manner, it is anticipated that M.D.C. will be able to control all aspects of farm management and farming practice to ensure the optimum degree of land management for fire prevention, protection and suppression.

## **2. Areas used for restricted farming and grazing**

This area may be leased for cereal cropping and hay production over the whole area but grazing may be permitted only where there is no native vegetation which could be damaged by livestock.

If the land is leased it is recommended that the Lease Agreement include conditions as contained in the Agreements for the leasing of land to be used for normal or unrestricted farming and grazing. Thus M.D.C. will be obliged to provide similar items of equipment and facilities and the Lessee will be obliged to carry out fire prevention, protection and suppression precautions as determined from time to time by M.D.C. or its agent. In the event of portion of the "restricted area" being leased to the same lessee who leases portion of the unrestricted area, depending on the aggregate size of the combined areas, it may not be necessary for M.D.C. to duplicate equipment and facilities for respective areas.

## **3. Tree planting areas**

The Woods and Forests Department has assumed responsibility for the land planned for tree planting. Though W. & F. Department will only be contributing to fire fighting equipment and manpower to the level needed for tree planting operations it is considered that the W. & F. personnel involved in land preparation, planting and nurturing of plantings are fully aware of the fire danger at Monarto. In

particular, the supervisory staff has such a background and training in rural fire prevention and control that any recommendations in this plan pertaining to tree planting areas would be superfluous.

Therefore, the only action needed on the part of M.D.C. regarding this area, is that the Fire Control Ranger liaise constantly with the Officer-in-Charge of W. & F. operations so that the fire control programme of M.D.C. and W. & F. are integrated and consequently complementary to each other.

#### 4. Parkland areas

The concept plan for Monarto incorporates considerable areas for eventual use for both intensive recreation and open space. Until such time as the plans for these areas are operative, the ecologically sensitive portions in particular will need careful protection from uncontrolled fires. To achieve fire protection in the conventional manner would involve some conflict with the aims of conservation. Thus to cultivate, mow or spray with herbicide would probably damage or destroy some native vegetation in the areas treated. Moreover much of the land allocated for parklands is non-arable due to steep slopes or rock or both rock and slopes, as instanced in the Rocky Gully parkland region.

The only practical method of providing protection is by periodically burning certain strategic sections of the sensitive parkland areas. This burning will need to be well controlled – not only in the sense that the fire must not “get away” but also that such a fire must burn slowly and with low intensity. Many authorities believe that fire is part of the process in the natural evolution of Australian flora and micro-fauna. There is a great deal of evidence to indicate that a low fire periodically, actually promotes the germination and establishment of native vegetation. Such evidence is cited in the Australian Academy of Science publication “Biological Science: The web of life”, which is a standard text book for pre-tertiary Biology studies in Australia. Professor H.G. Andrewartha in his “Urban and Regional Environment of Monarto. An Ecological and Faunal Survey”, favours controlled burning of such areas under certain circumstances as do the M.D.C. Landscape Architect Consultants, Tract Pty. Ltd..

Deciding the optimum location, extent and frequency of burning is particularly important in the parkland areas of Monarto because of the fragile nature of much of the landscape. The Landscape Architect Consultants for M.D.C. (Tract Pty. Ltd.) are currently carrying out intensive studies of the Rocky Gully parkland area to determine its future role as a park. These studies include many aspects by which the location, extent and desirable frequency of burning can be determined to give the optimum result for bushfire protection as well as preservation and regeneration of the landscape.

Therefore it is recommended that controlled burning of portions of the parkland areas be carried out at locations, frequency and to the extent as recommended by the principals involved in park management studies.

The technique required to safely and effectively carry out the controlled burning of prescribed areas, demands some expertise on the part of fire controllers. This technique is well known to Foresters of the Woods and Forests Department. Therefore it is recommended that the Forester resident at Monarto be invited to participate and perhaps manage, at least the first controlled burning operation on parkland areas at Monarto. Following one or two controlled burnings of prescribed areas, the Fire Control Ranger should be sufficiently experienced in the practical application of the principles to manage the operation without the assistance or advice of the local Forester if this is necessary, or desirable.

Though controlled burning of prescribed areas is the method recommended to provide fire protection within parklands areas, to provide external or perimeter protection one or other or a combination of several of the more conventional techniques should be used. Thus, cultivated breaks, mown strips or heavily grazed areas should be established at least on the northern and western perimeters (but outside) of parkland boundaries. This will lessen the risk of fires of outside origin spreading into parklands. Because there will be a progressive build-up of fuel following controlled burning until the next burning a great deal of care will need to be taken if the parklands are open to vehicular or pedestrian traffic. It may be necessary to restrict or confine access to the parks during the most dangerous summer months if fire safety is in question.

##### **5. Grazing only**

The inference of the designation restricts fire protection methods to grazing of livestock. The level and extent of grazing will depend on the amount of fuel from year to year and, if urban development is imminent, the practicability of grazing stock among pre-construction activities. Recommendations regarding the value of grazing sheep to achieve fire protection and the various management systems to achieve the desired result are made in later sections under "Urban development" and "Protection".

##### **6. Regeneration areas**

For vegetation to regenerate naturally, would require that plant growth be not disturbed. Therefore any fire protection of these areas would have to be carried out outside the boundaries. In the case of regeneration areas already designated this is practicable because adjoining land is to be used for either 'normal farming' or 'restricted farming'. Therefore it is recommended that the (presumably) leased land adjoining the regeneration areas be used to provide fire protection as recommended under the headings "Farms used for normal farming operations" and "Areas leased for restricted farming and grazing".

If any of the uncommitted areas are designated regeneration areas in the future, it is likely that the adjoining areas could be used for one or the other fire protection methods recommended previously for one or the other land uses.

## **PREVENTION**

Many fire authorities claim that of the three aspects of fire control — namely, prevention, protection and suppression — the most important is prevention. Logically, if all fires could be prevented the need for protection and suppression would not arise. Unfortunately, even in the most careful communities, fires do occur. Inevitably sometime, someone will be careless or an accident will happen, or events beyond man's control such as lightning can and do cause fires.

The means by which bushfires can start are manifold. The statistics of fire causes as published each year in the E.F.S. Manual, show that such bizarre happenings as dead possums shorting electrical circuits have caused fires. Such causes are virtually impossible to combat, and fortunately they are reasonably infrequent. The most frequently reported known causes originate from burning-off, children with matches, farm machinery, motor vehicles, and household and rubbish fires of various descriptions. Activities from which these most frequent causes originate will be common place at Monarto. Therefore an awareness of how readily fires can start from routine activities is essential.

### **Burning-off**

The burning of cereal and grass residue for agronomic and fire protection purposes will presumably take place at Monarto. The Bushfires Act prescribes precautions and rules for the burning of stubble which were framed to lessen the likelihood of fires escaping. These rules should be considered to be minimum precautions, and additional men and fire fighting equipment should be on hand if at all possible. It must be ensured that a stubble fire is OUT before leaving the scene, then a further check made at intervals within the next (say) 12 hours depending on the time of day and existing and anticipated weather conditions. Smoldering remnants of manure, wood and hessian should be given special attention.

### **Children with matches**

The fact that children playing with matches is a major cause of bushfires is a reflection on society generally rather than on children as a group. How this cause of fires can be overcome is a debatable topic. Some opinions suggest that children should be allowed to handle and light matches under supervision so that their use will not be a novelty or a forbidden activity. This in turn should lessen the desire of children to take a box of matches and play with them out of sight of parents. Other opinions suggest that the danger of matches should be expounded to children, and all matches kept out of reach in the same manner as other dangerous articles are kept out of reach.

The decision regarding which of these two or any other approach is to be used is up to the parents to decide. The fact remains that if children have the desire and the opportunity to play with matches, fires are likely to result. Therefore, parents of children at Monarto should be made aware of this danger and be

urged to use whichever means they see fit to discourage their children from playing with matches. This can best be done by personal or group contact by the F.C.R. and other M.D.C. officers or through internal publicity brochures.

### **Motor vehicles and farm machinery**

The fact that motor vehicles are a cause of fires is well established. However it is not fully appreciated that in addition to spark emission from faulty muffler/spark arresters, a major cause of vehicles starting fires is the "snagging" of flammable grass or stubble by the exhaust system which is then held against hot metal. Often the rushing air cools the exhaust system sufficiently to prevent ignition while the vehicle is in motion. But if the vehicle stops or slows for any reason there is a rapid build up of heat to a degree which ignites the snagged vegetation, which then drops to the ground leaving a fire beneath or behind the vehicle.

The most obvious way to prevent fires starting from vehicle exhaust sparks and grass snagging, is to not drive vehicles in high grass on hot days. It is appreciated that this is not always practicable but the principle should be established within the M.D.C. area that vehicles should not be driven into paddocks or even along roads which are grassed between wheel tracks on hot days, or at least during the heat of the day. The development of fire consciousness among personnel will soon resolve the question of when is a hot day sufficiently hot to justify keeping vehicles out of high grass.

This principle applies not only to motor vehicles but to tractors, motor bikes, trucks and especially the use of rotary slashers and other machinery where friction can cause sparks.

The law as well as common sense dictates that all internal combustion engines must be fitted with spark arresters when being used near flammable vegetation during summer months.

A further precaution which should be taken is the carrying of knapsack sprays on all vehicles, tractors and engine powered machines which are used for field work during the summer months. The Bushfires Act makes demands for the carrying of knapsacks on certain vehicles and farm machinery, but these should be extended to cover circumstances not allowed for in the Bushfires Act. It is recommended that all personnel who use vehicles or farm machinery at Monarto be issued with Department of Agriculture of South Australia Leaflet No. 3984 titled "Fire safety with farm machinery" which covers the legal requirements as well as pointing out potential fire danger aspects in using machinery.

### **Household**

Fire consciousness in and around homesteads is essential to prevent both internal and external fires. Internally, such aspects as electrical fittings, curtains near stoves, and cooking fires, are all sources of damaging fire. Outside, ash heaps and incinerators are the most common danger spots.

The M.D.C. has a responsibility to its tenants in homes at Monarto as well as in protecting valuable assets. Therefore, it is recommended that each tenanted home should have installed a "B.C.F." fire extinguisher of a reputable brand and adequate capacity.

### **Rubbish**

The household rubbish collection service which it is planned to provide at Monarto will effectively remove a major fire hazard from around homes and buildings. Nevertheless some householders may neglect to use this service occasionally, or may wish to dispose of perishable wastes between collections. In either of these two or perhaps other circumstances the temptation to burn household rubbish may arise even though burying the material should be an acceptable alternative.

The uncontrolled burning of rubbish during summer months must be prohibited at Monarto. But if householders wish or need to burn during periods other than those prohibited by Council by-law, provision should be made to allow for emergency destruction of rubbish under relatively safe conditions. Therefore it is recommended that burning of rubbish be allowed only in incinerators meeting B.R.C. minimum specifications and under conditions as laid down in the Bushfires Act and Local Government by-laws pertaining to fires in the open air. Because such incinerators cost in the vicinity of \$60.00, few householders will be inclined to purchase a unit unless there is a genuine need to burn rubbish between collections.

If the planned regular rubbish collection service is not instituted for any reason, it is recommended that M.D.C. provide each tenanted home with a B.R.C. standard incinerator for the use of the occupants. Such incinerators if bought in quantity by M.D.C. would cost in the vicinity of \$50-\$60 per unit depending on brand.

If household incinerators rather than regular collections are used for removal of rubbish it is recommended that burning in approved incinerators be allowed during the summer months subject to State laws and Local Government by-laws.

## PROTECTION

Essentially, the protection from fire of any rural area and its attendant physical features (both man-made and natural) involves the reduction or removal of unwanted flammable material from strategic areas.

Fire protection planning in South Australia is based on the assumption that a damaging fire is most likely to be spread by winds from the north, north-west, west, or south-west. Only rarely is a damaging fire fanned by winds from the eastern sector. Nevertheless, local turbulence and turbulence created by the combustion process can fan fires in all directions within a given area of a major fire front travelling in a specific direction. Therefore every aspect should be considered when assessing fire protection requirements, but greater emphasis should be placed on northerly, westerly and southerly aspects.

There are many methods of reducing or removing unwanted vegetation. These include cultivation, mowing, grazing, burning and the use of herbicides. In normal farm fire protection any or all of these methods can be used but obviously different methods have different applications for different areas and circumstances. The qualifications for the use or non-use of the most common means of reducing fire hazards are much greater at Monarto than is usual in other situations because of the special need to conserve native vegetation for the future over the whole of the Monarto site.

Taking into account the projected land use methods for Monarto it is worthwhile to examine the possible uses of the fuel reduction methods listed above:

### Cultivation

Cultivation for fire protection is aimed at achieving a bare-earth surface. For this reason cultivated fire breaks are perhaps the most effective method of preventing the spread of fire. Where farming plant is available cultivated breaks are cheap and easy to construct and require little special knowledge or judgement on the part of the constructor. The criticism that a conventional cultivated fire break will not stop a major fire is valid up to a point. However, it will never be known how many small fires have been prevented from becoming large fires only because there happened to be an ordinary cultivated break near the spot where the outbreak occurred. Moreover, the flanks of many major fires have been prevented from spreading across wind by cultivated breaks, and they are especially effective when placed in locations of low fuel heights or densities.

Because sparse fuel does not always occur naturally in the positions where breaks are required it is often advisable to reduce the amount of fuel before construction begins — especially in years of prolific growth. This has the effect of reducing a fire's intensity before it reaches bare ground. By using this method, the width of a cultivated break can be lessened and still provide as great a value as a much wider cultivation without prior support from mowing and/or grazing (see following section).

## Mowing

Mowing in itself, even without an integrated cultivated or ploughed strip can be a very effective method of at least slowing a fire. In practice, on operational sheep/wheat farms it is found that livestock preferentially graze the mown strips early in summer reducing the amount of residue even further. Moreover stock tend to use these strips for travelling to and from water which leads to bare sheep tracks. Often, under these conditions the width of a bared sheep track is sufficient to halt the spread of low intensity fire. Even without grazing or cultivation, mowing alters fuel arrangement — that is, instead of dry residue standing upright which promotes fire spread, fuel is laid flat. Mown and subsequently compact fuels, though still capable of burning readily, tend to slow the rate of fire spread. Therefore mowing has a very important place in any fire protection programme. As mentioned under Protection, mowers and slashers when used in dry residue cause many fires. Therefore mowing should be confined to green vegetation or carried out during damp days or early mornings and evenings.

## Grazing

The grazing of livestock is the most economical, in fact most profitable method of providing fire protection. However it does require a greater degree of managerial skill to produce the optimum balance between fire protection, stock health and the conservation of soil and desirable plant species. Depending on the intensity of stocking rates, fuel can be reduced to any degree from a mere "trampling" to bare earth.

Within the Monarto area there is a need for using livestock to graze to almost bare earth around homes and farm buildings where soil conditions are appropriate i.e. the hard soils not prone to drift or water erosion. Obviously to obtain the best results, fencing and water must be provided so that stock can be confined on the chosen areas when and for as long a period as required. Ideally a mob of wethers should be used for this programme. They can be used in smaller numbers for a long period — say at 20 wethers to the hectare from August to November — or in large number for a short period — say up to 100 sheep to the hectare for a few days.

The former system usually gives the best results, because large mobs tend to foul the vegetation making it unpalatable and it is "trampled" rather than consumed. But if there is a need to protect some 20 to 30 homes and buildings at Monarto the relative practicability of having 20 to 30 mobs of about 50 sheep at separate sites will have to be weighed against moving a mob of 500 sheep 20 to 30 times within a period of about six weeks. On balance, taking into account current staffing intentions, indications are that 20 or 30 small mobs would be the better system.

A drawback to confining wethers to small areas is that through boredom they tend to eat or damage trees or other valuable plants unless a determined effort is made to protect such plants by providing sheep proof guards.



Sheep also have advantages in reducing hazards for broader scale protection. For example the enclosing of strategic strips for grazing early in the summer can provide major breaks for protecting large areas. When development of buildings begins at Monarto, sheep, grazing on the site of the actual buildings, marshalling areas, store areas or surrounding camp sites can give continuous and effective protection through hazard reduction. However it is stressed that before grazing can be used to its full potential as a fire protection method, first class fencing and stock water must be provided in the areas nominated or chosen to be intensively grazed.

It is difficult to reconcile optimum and practical hazard reduction over large areas such as the area controlled by M.D.C. without the use of livestock – particularly sheep. Although there could be a problem in protecting regenerating native species at high stocking rates, the alternative to low level and careful grazing could well be the destruction by intense bushfires of not only native vegetation but all manner of flammable assets or even human life. If this is the choice, controlled grazing must be preferred.

The number of sheep required to provide broad area and strategic hazard reduction will depend on the area over which grazing is an acceptable hazard reduction medium. Even if this were one tenth of the total M.D.C. area, it could involve from 3,000 to 5,000 sheep depending on seasonal conditions. Because M.D.C. would need to control the level of grazing and the location of stock at certain times of the year, particularly in the spring, M.D.C. would need either to acquire its own stock and appoint officers to manage them, or let grazing rights for the required stock numbers to private interests under conditions which must include that the lessee's stock be available to graze where, how and as required by M.D.C..

If the area to be protected is confined, such as around homes and buildings, stock grazing is an easy and effective method of removing unwanted growth. If "broadacre" protection is required, stock grazing is the only practical method to reduce the hazard. The use of livestock will be an essential part of achieving overall fire protection at Monarto, therefore it is recommended that M.D.C. either acquire its own sheep and employ specialist stock managers or let the grazing rights for selected areas to private interests, conditional that the stock be available to M.D.C. to graze where, how and as required by M.D.C..

### **Burning**

With the exception of cultivation, "burning off" is probably the most often used method of hazard reduction. Protective burning of dry grass in early summer is a quick and effective way to remove potential bushfire hazards, protect flammable assets or provide firebreaks. If extreme care is taken, and due consideration is given to weather conditions and the proximity of other flammable assets and vegetation, "burning off" can be reasonably safe. It has the advantage of leaving root systems and surface

soil intact thus reducing dust nuisance and erosion problems. In addition, early burning for fire protection enables fire units and equipment to be tested and used under fire conditions before the normal emergency needs arise, thus ensuring units are operational early in the summer, which is an essential step in preparing for every fire season.

Nevertheless burning has its dangers, and losses of tens of thousands of dollars have been reported through sheds of farming plant being destroyed by a protective fire which was supposedly 'out' hours previously. Fence posts and other timber structures, haystacks and all manner of farm material are vulnerable to any fire, including 'protective burning' fires which are not carefully managed. Trees also are vulnerable and many valued specimens have been accidentally damaged or destroyed by careless burning off.

The use of fire as a fire protection tool should have a place at Monarto, especially by periodical controlled burns of areas such as future parklands and roadsides where it is impracticable or undesirable to use any other method of fire protection.

### **Herbicides**

The use of herbicides to control vegetation is a comparatively recent fire protection medium. Basically there are two types of herbicides used for this purpose – desiccants and residuals. The desiccants dry green vegetation and are virtually inactivated immediately. They have little or no residual aftermath and affect only those plants which the herbicide contacts. The root systems are unaffected and plants often regrow after spraying – depending on species and conditions. Residual herbicides are usually taken up through the roots of plants. Their effect is slower but permanent. Residues of various herbicides of this type remain active in the soil for periods of a few weeks to several years – depending on the type. Herbicides are available which are a combination of desiccant (or contact) and residual.

The main use of a desiccant is to dry off areas while the surrounding vegetation is green, allowing subsequent burning of the dry areas without fear of the fire spreading. Residuals are used for total vegetation control, that is, to provide bare earth in the summer by killing vegetation in the winter or early spring. Desiccant herbicides should be used at Monarto in strategic areas which are impossible to cultivate, impracticable to graze or too dangerous to burn. Such areas could be in a rocky outcrop, under a fence line or perhaps against certain homes or buildings. Moreover, desiccants could well be used on a broader scale such as for spraying between two parallel cultivated strips, followed by burning of the dried residue to produce a major break.

### **Agronomic**

In addition to specialised treatment of relatively small areas or strips of land to prevent the spread of fires or protect assets, agricultural and grazing practice can have a marked bearing on the extent and

speed of fire spread and therefore ease of control. Such features as perennial pastures, fallow, irrigation and summer fodder crops if placed or grown in suitable situations and methodically used or grazed will complement an overall fire protection plan. Though the majority of the Monarto area will probably not be used for normal farming operations, those areas which will be, could well benefit if some thought is given to the practicability of utilisation of specific agronomic and grazing methods to obtain more effective localised and/or broad-scale fire protection.

Livestock and mobile plant and equipment would benefit from such planning and practice. It would make available fire-safe areas where stock and/or plant could be held or left safely in the event of a major fire.

### **Capital improvements**

The recommendations for protection (above) relate to existing flammable assets. It is probable that new buildings, plantations, fencing and so on, quite apart from the city development, will be constructed or installed at Monarto in the next few years. If thought is given to optional materials used or sites selected, a degree of inbuilt fire protection can be achieved.

For example a house built on an eastern facing slope is likely to be safer from fire than one built on a western facing slope – all other factors being equal. If a hayshed is being built near other farm buildings it is safer if it is built on the south-eastern side of them. If it does catch alight, sparks and the intense heat from a burning haystack will be blown away from other buildings. If it is practicable it is even better to build haysheds or uncovered stacks on a site which is easy to protect, in locations well away from other capital improvements. The further away, the safer the situation.

Fence posts are very vulnerable to fire. Creosote-treated pine, concrete and steel posts are much more fire tolerant than other types of wooden posts – especially those which have been bored and not stapled to hold wires. Therefore posts used for new fencing should be of fire tolerant materials, and constructed to give maximum protection to the materials used.

## SUPPRESSION

To many people, fire suppression is synonymous with sophisticated E.F.S. units manned by hard-hatted fire fighters pouring huge quantities of water onto fires of terrifying proportions. The E.F.S. crew-men would be the first to concede that even if one man with a knapsack spray had been on hand at the time of the outbreak of the majority of fires they attend, the valuable time and services of E.F.S. crews may not have been needed and a great deal of loss and damage could have been prevented.

The farm-level fire suppression recommendations which follow are based on the fact that the best time to control a fire is as quickly as possible after outbreak. This means that as many men as practicable should have access to, and be capable of using small but highly mobile fire fighting units, in addition to the more prosaic, but nevertheless extremely valuable, knapsack sprays. The mobility of what could be termed "farm units" depends to a large degree on the amount of water carried with the units. Thus, a car type utility while very mobile when carrying loads up to about 300 kg becomes progressively less mobile as load increases up to its maximum recommended load of about 600 kg. Obviously it is better to arrive at a fire within minutes of outbreak with 200 litres of water than to arrive half an hour after outbreak with 2000 litres of water. Therefore it is considered that though an engine/pump combination for farm units could be standardised, (see Farm fire units) it will be necessary to provide water tanks of different capacities to suit the most common types of vehicles used in rural operations. These types are (1) light and heavy utilities, (2) tray top trucks.

As previously suggested, an optimum load for a light utility is about 300 kg. Therefore it could effectively carry for fire fighting purposes an engine/pump combination plus about 300 kg or about 300 litres of water. A tray top truck would be most effective carrying a standard engine/pump combination with a 1000 litre tank of water. This means that M.D.C. should acquire a quantity of standard engine-pump fire fighting units together with the same quantity of tanks made up of 300 litre and 1000 litre capacity. The number of each size of tank required will need to be decided when the number and type of available vehicles is known.

The total number of small, mobile units as described above, required to give adequate "first attack" equipment can best be assessed by treating the whole of the M.D.C. area in the same manner as it would be if it were used as previously for primary production. Thus, a district such as Monarto would probably have an average size holding of about 400 ha. It is believed that a farm of this area in the cereal/sheep areas of South Australia needs, and can justify a farm fire unit of the type described previously. The needs of the M.D.C. are not less than those of a normal farm but the total area of the Monarto site is 15 200 ha. Allowing one fire unit for each 400 ha indicates that no less than 30 and perhaps up to 40, small, mobile fire units are required in or adjacent to the Monarto site. Whether there are sufficient vehicles, and men available to drive and operate the vehicles and units, should be the only

reason why the number of these units will be less than 30.

In addition to this number of smaller units, obviously Monarto needs an efficient E.F.S. organisation. The details of vehicles, equipment, personnel, fire-control chain of command and administrative procedures required to give effective and efficient major fire suppression facilities is the subject of recommendations to M.D.C. from The Director, E.F.S..

#### **Farm fire units**

Obviously it is desirable to standardise the type and model of engine/pump fire fighting unit acquired for the use of lessees and selected resident staff at Monarto. It is considered that a unit comprising a 2.25 kw (or 3 h.p.) petrol engine, direct coupled to a 40 mm (or 1½ in.) self-priming centrifugal pump is the most suitable. It should be equipped with two, six to seven metre delivery hoses with adjustable nozzles and the unit mounted integrally with the water tank. Thus the standard farm type fire unit at Monarto will be the engine/pump combination described above, mounted together with either a 300 litre or 1000 litre tank. Similar units to those described are available commercially for about \$750. This approximate (S.A. Government) price includes a 200 gallon (909 litre) fibre glass tank, engine, pump, hoses, nozzles, and a cradle on which the complete unit is mounted for convenient loading and transport. The same assembly with an 80 gallon (364 litre) fibre glass tank is available for about \$650. Ideally, the tanks should be filled with water from late spring onwards and ready for use at a moment's notice. This raises a problem of storage while the unit is not on the vehicle and how the unit-tank (filled with water) can be quickly loaded onto a vehicle with a minimum of effort.

Many ingenious methods have been evolved over the years to suit loading requirements for individual vehicles. It is likely that the vehicles to be used at Monarto will vary from car-type high sided utilities to tray-top trucks. Therefore the standardisation of a loading device is restricted to a drop-on type, that is one whereby the tank/unit is suspended by an endless chain and pulley blocks from an overhead gantry. When the tank/unit is needed the vehicle can be backed beneath the tank and the tank lowered onto the tray. When being returned to storage the water tank should be filled, the vehicle driven beneath the gantry and the tank/unit raised by the endless chain to storage position.

It is recommended that an engine/pump unit described in this section, integrally mounted on an appropriate sized tank (that is either 300 or 1000 litre capacity) be provided by M.D.C. for resident tenants of farms and selected resident M.D.C. officers together with a quick loading device.

It is further recommended that a condition of the provision of this equipment is that those to whom it is provided undertake to maintain the equipment intact at all times and store it when not on a vehicle, suspended from the gantry provided — the whole being located accessibly at a site determined finally by the M.D.C. Fire Control Ranger.

## **Water supply**

Water is still considered to be the most effective and practical medium of controlling fire. Most mobile fire fighting units are only as effective as their water supply. Time taken in refilling fire water tanks is time spent not fighting the fire. Therefore the quicker and easier it is for fire fighters to replenish water supplies the more effective suppression is likely to be – all other factors being equal.

The most efficient way of making available water for fire fighting purposes is to provide a series of stand-pipes of not less than 5 cm diameter under which fire units can be driven to fill tanks in the shortest possible time. The location of these stand pipes is to some extent governed by the availability of water plus the fact that each must be easily found and readily accessible to fire fighters.

It is recommended that each homestead which is occupied or has the potential to be occupied has a stand-pipe erected within its vicinity. In addition, a suitable standardised sign should be erected on the roadway nearest to each stand-pipe indicating the direction and distance of fire water supplies. Such signs are essential to direct 'outside' fire fighters to water supplies when fire conditions often cause smoke to restrict visibility to a few metres.

## DETECTION

Rapid detection and location of fire outbreak are the first steps in controlling a fire. The PLAN for fire suppression at Monarto is based on the concept that a highly mobile fire unit should be within sight of most fire outbreaks on M.D.C. land. However other M.D.C. personnel will need to know the location of any outbreak as quickly as possible, particularly on days of high fire danger.

Therefore it is recommended that a radio equipped "look-out" post be constructed at the best vantage point, consistent with the most convenient location available at Monarto. The look-out should be manned during periods of high fire danger for the purpose of detecting outbreaks and reporting back to the radio base through which the fire control organisation can be alerted. In addition a network of at least seven alidades should be set up at suitable points over the Monarto area so that cross bearings can be taken on reported or observed smoke. The layout of the alidade network should be centred at the look-out with other solid-based installations at locations which allow wide angles for a greater degree of accuracy.

The procedure to be followed in detecting, locating and reporting of fires must be an essential part of all M.D.C. officers' training and, if practicable, extended to their families resident at Monarto.

On days or during periods of extreme fire danger, fire units should be loaded on M.D.C. vehicles and as many officers as are available should patrol allocated sectors of M.D.C. land in these vehicles from as early in the day as conditions demand, ready to detect, locate, and commence suppression of fires which may break out. Special attention should be given to patrolling main roads and areas where construction and other activities involving men and machinery are taking place.

## ACCESS TRACKS

As fuel residues build up over much of the Monarto area through lack of former fuel reducing agencies such as farming and grazing operations, difficulties in finding safe access for fire suppression vehicles will increase. It is unreasonable and dangerous to expect fire crews to travel to outbreaks and to fight fires in rough country covered with high grass and/or thick scrub when visibility is likely to be extremely low. At best, under these conditions, vehicles could be severely damaged and at worst fire crews could be trapped by the fire because there are no tracks as land marks or to guide them to safety through thick palls of smoke.

Areas at Monarto which are already dangerous for vehicles under fire conditions due to a build up of residues over rocks, stumps, and sharp depressions can be found in much of the "Parkland" area and in particular in the "Rockleigh Downs" area. Most of the non-arable "Parklands" on the plains are intersected with arable land and/or existing tracks which keep the size of most areas with difficult access within manageable limits. In these cases it is feasible to fight fires from the perimeter of the inaccessible areas without conceding too much country to unchecked fire. But the "Rockleigh Downs" country comprises over 1000 ha of hilly land with few existing tracks. The tracks which were used by the previous occupiers are already disappearing under regrowth through lack of use.

Because of the extent, topography and doubt as to its eventual use, the "Rockleigh Downs" area should be the subject of a special study and report incorporating recommendations for fire access tracks, fuel reduction methods, fuel breaks, fire breaks, establishment of fire-water points and optional land management techniques to mitigate the extreme fire danger which will inevitably exist in the country during summer months.

Therefore it is recommended that existing tracks through non-arable areas on the plain be maintained to enable safe access for fire fighting vehicles and that additional tracks be constructed by grading, then maintained to ensure that no non-arable areas greater than (say) 30 to 40 ha are without safe access for fire fighting vehicles. It is further recommended that the "Rockleigh Downs" area be the subject of a special study and report by B.R.C. to M.D.C. to incorporate ways and means of lessening the dangerous bushfire potential over this portion of M.D.C. land.



## HOMES AND BUILDINGS

Many of the farm homes and buildings within the Monarto area will be occupied by M.D.C. staff or perhaps private tenants. Other homes and buildings although not occupied, are of historical interest and therefore valuable. Special efforts must be made to protect these homes and buildings from fire.

This subject was considered briefly under PROTECTION while discussing the value of livestock for reducing fire hazards and also under PREVENTION while discussing the danger of fires starting inside or nearby occupied homes.

Homes which are occupied are or should be, in less danger from bushfires than unoccupied homes because, in most cases, lawns and gardens will be established and maintained, flammable rubbish will not (or should not) collect, wood work will be kept in good repair and surrounding vegetation will be kept down, all of which adds to safety from bushfires. If tenants are urged to assess the fire danger situation with the active involvement of the F.C.R. in each case, and a 'clean-up' week is organised prior to the onset of each summer, occupied homes and their tenants should be adequately protected from fires of outside origin provided the previously recommended field precautions have been taken.

Unoccupied homes of historical value present a different problem. Because there is no-one living in these homes they tend to deteriorate in structure and fittings and the surrounding vegetation usually grows prolifically as a result of gardening activities during the years of occupation.

To prevent fires spreading to the structures it is recommended that an area of at least 20 m surrounding the buildings be cleared of all material such as stones, wire and so on, which would prevent the operation of mowers. In addition all extraneous structures or growth such as old garden fences, delapidated tank stands, bushes, shrubs or creepers should be removed. This will enable the mowing of annual growth to be carried out each year without hindrance. If any other method of fuel reduction is chosen such as grazing or cultivation, the cleared surroundings will allow the work to be carried out much more effectively. The structural condition of the buildings should be examined, and restored to a sound state of repair if necessary. Special attention should be given to decaying timber and to any cavities or apertures which would enable sparks or air-borne burning debris to lodge under the roof, eaves, floor or vents.

When the surroundings have been cleared of extraneous objects and material, the method of reducing fuel becomes a matter of choice or convenience. Thus cultivation grazing or mowing could be used depending on the situation. If concentrated grazing is chosen, a sturdy sheep-proof fence surrounding the buildings is essential, together with a stock water supply and guards for trees or other vegetation needing protection from stock. Burning is not recommended to reduce vegetation near unoccupied buildings because of the danger of re-kindling after personnel have left the scene.

Therefore it is recommended that the occupiers of M.D.C. homes be urged to "clean-up" in and around buildings for which they are responsible and undertake an active programme of fuel reduction with accompanying firebreak construction late in each spring under the guidance and supervision of the F.C.R.. It is further recommended that unoccupied homes and buildings of historical significance have all extraneous materials removed for an area of approximately 20 m surrounding the buildings as soon as practicable, then an annual programme of fuel reduction with firebreaks (if the whole area is not cultivated) be carried out late in each spring.

## URBAN DEVELOPMENT

It is a stated goal of the M.D.C. that urban development will begin before 1980. During the early stages of this development newly constructed commercial or residential buildings could be vulnerable from bushfires, or conversely the surrounding open country could be endangered by fires starting at or near construction sites. Clearly the area surrounding construction sites must have flammable vegetation reduced to a level where it will not promote fire spread. Whether this reduction is to bare earth (as in cultivation) or to ground level (as in heavy grazing or burning) will depend on other priorities such as dust nuisance, risk of erosion, working conditions and so on. Whichever method is decided upon it is recommended that fuel be reduced for not less than 500 m beyond the furthest extent of activity, and that if ground level reduction is used, a bare earth firebreak 20 m wide be constructed surrounding and adjacent to the construction site and near the outside perimeter of the fuel reduced area.

Every attention should be given to liaison with the construction authority and/or contractors to impress on them the danger and consequences of fire starting and spreading and to offer every assistance to them in precautions they are expected to take in fire prevention, protection and suppression. If the fire risk inherent in the nature of a contract is high, clauses should be included in the contract making it obligatory on the part of the contractor to carry out certain fire precautions. For example, operators of machinery working in or near flammable material must carry a fully charged knapsack on the machine. If practical, contracts involving the greatest fire risk should be timed to avoid operations during the period of greatest fire danger. In addition, "fire danger" signs should be erected near construction sites and hand-out literature aimed specifically at construction workers should be distributed during summer periods. By the time construction begins, the Monarto E.F.S. organisation should be functioning efficiently. However it is unreasonable to expect E.F.S. to cope with the type of fires which may occur during construction or more particularly in completed buildings. Present information indicates that steps have already been taken to arrange with the South Australian Fire Brigade to set up a S.A.F.B. station at Monarto as soon as construction for city development begins. It is recommended that these negotiations proceed and every assistance be offered to ensure that the S.A.F.B. establishes an operative station at Monarto, as soon as, if not prior to, construction development beginning.

## PUBLICITY

There is a need for publicity at Monarto to inform (a) travellers and visitors of fire risks, hazards and local laws and (b) remind residents of fire prevention, protection and suppression requirements and methods from year to year. Logically the value of the various publicity messages will not be confined to one group or the other, but messages and the methods of conveying messages should be tailored to suit both groups.

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It is considered that signs are the best method of informing travellers and visitors. These should be erected firstly on the main highway at both the . . . . . and western boundaries of Monarto and again at or near the Monarto South intersection. Whether signs are sited on other roads within Monarto will depend on traffic density. Currently perhaps there would not be much value from signs erected other than on the main highway. However as time passes and population and traffic density increases within Monarto, additional signs strategically located should be erected.

The messages on signs should be short and to the point. Little more than general messages can be conveyed by a sign which has to be read by motorists travelling up to and perhaps in excess of 100 kph. If detailed advice regarding construction, design, siting and message is required, it is recommended that the F.C.R. consult with the Secretary of B.R.C. who has special knowledge of publicity matters.

It is possible that the Highways Department may have objections to the locating of signs near the carriageway of the Princes Highway. In any event consultation with Highways Department officers is advisable before erecting signs.

Brochures should be designed to be issued to residents and contain information on fire prevention, protection and suppression especially applicable to Monarto. Seasonal reminders of such items as the dates of the prohibited and conditional burning periods and special restrictions together with State and Special laws applying during these periods, general fire prevention messages, and specific messages which may be topical at the time. For example if a fire had recently been caused at Monarto by children playing with matches, this information should be included and a plea made to parents to take appropriate steps to try and avoid a similar occurrence. In addition publicity should make it quite clear to residents that exceptions to the seasonal prohibition of fires such as gas barbecues, still are subject to State laws pertaining to fires in the open air as laid down in the Bushfires Act, and subject to Ministerial fire bans as may be imposed from time to time for the MURRAY LANDS FIRE BAN DISTRICT or throughout the State. Information regarding what to do in case of fire, the telephone numbers of E.F.S. units and/or officers could also be included in brochures. Again, detailed advice as to content and makeup can be obtained from the Secretary of the B.R.C.. A supply of brochures should be kept on hand at the M.D.C. office and made available to visitors as well as local people.

Therefore it is recommended that M.D.C. acquire and erect appropriate fire prevention signs at strategic locations at Monarto and have printed fire information brochures which should be made freely available to local residents and visitors.

The effectiveness of publicity should be evaluated from year to year and changed or expanded if considered necessary to keep abreast of changing needs and changing publicity methods.

## LEGAL

The responsibility for the functioning of many sections of the Bushfires Act is vested in Local Government. The sections and accompanying subsections with the greatest implications for M.D.C. are those pertaining to (1) the appointment of fire control personnel for the region, (2) the fixing and/or altering of dates for the prohibited and conditional burning periods and (3) the prohibition of fires in the open air, with exceptions if any.

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- (1) The appointment of fire control personnel and other details regarding the formation of a completely integrated volunteer fire fighting organisation as it involves obligations on the part of Councils has no doubt, been discussed in recommendations from the Director, E.F.S..
- (2) The procedure for the fixing of dates for the beginning and ending of Prohibited and Conditional burning periods is laid down in Section 40 et seq. of the Bushfires Act. The most suitable dates for these periods is a matter of judgement on the part of Councillors based on their previous experience in the area. Because the experience of M.D.C. personnel is of a relatively short duration it is suggested that the longer experience of the adjoining Mobilong Council be used as a guide for the first few years at least. Therefore it is recommended that the dates set for the prohibited and conditional burning periods in the Municipality of Monarto for 1975-1976 be the same as those set for the D.C. of Mobilong. The suitability of these dates should be reviewed from year to year and changed if local conditions indicate that it would be advantageous. The practicability and desirability of fixing a conditional period prior to the prohibited period as well as after, as allowed in the Act, also should be considered as more experience is gained with local needs and conditions.
- (3) The advantages and disadvantages of Councils imposing local restrictions as allowed in Section 61 is a controversial subject. In consideration of the unusual pattern of land use and other circumstances such as public interest in Monarto, it is considered advisable to impose some restrictions on the lighting of fires (additional to stubble and scrub fires) within the Municipality of Monarto during the prohibited burning period at least. The precise period during which these restrictions should operate, and whether fires in certain places, structures or circumstances should be exempted will depend on M.D.C. policy regarding such matters as whether campers, picnickers or the public generally are to be encouraged to visit the Monarto site. The activities of contractors and other personnel involved in urban development also will need to be considered.

The implications of fire restrictions imposed under Section 61 of the Bushfires Act can become quite complex and confusing if it is attempted to cover every aspect of fire control and at the same time be practical. The District Council of Mobilong has implemented restrictions which are relatively straight forward and appear to be a suitable pattern for Monarto, initially at least. Moreover if similar local restrictions are used it will have the value of further uniformity with Mobilong.

Therefore it is recommended that the Municipality of Monarto impose fire restrictions under Section 61 of the Bushfires Act incorporating the following:—

That the lighting of fires in the open air be totally prohibited during the prohibited burning period (1974/75, from November 16, to February 15) over the whole area EXCEPT (1) Household incinerators meeting B.R.C. minimum specifications between 8 p.m. and midnight\*. (2) Household gas barbecues. (3) Welding equipment, and gas burners used by Government Departments and M.D.C. or its authorised contractors on construction or emergency maintenance work.

Seasonal conditions have an important bearing on whether Section 61 restrictions should be imposed and also, if restrictions are imposed the most appropriate dates, together with the most appropriate dates for the prohibited and conditional burning periods. In years of little annual growth Section 61 restrictions could be dispensed with altogether. However, as previously suggested, the actions of the D.C. of Mobilong will be the most practical guide for Monarto in these matters.

The implementation of legal requirements made thus far will, in all likelihood, be the responsibility of the Site Administration Officer. However there are legal obligations on the part of all residents required by various sections and regulations of the South Australian Bushfires Act. These requirements have an important role in preventing the outbreak and spread of fire. Good sense in addition to a legal obligation dictates that all Monarto people whether resident or temporary be aware of their responsibilities under the Act. Thus, sections dealing with stubble burning, clearance around certain fires, Ministerial fire bans, engines, vehicles, aircraft, spark arresters, smoking and shooting among others all should become familiar to and conformed with by people at Monarto.

The publicising of these laws, the reasons why each exists, and the encouraging of people to abide by them should be the responsibility of the F.C.R. in the first instance. This duty could be considered part of publicity work because it will involve the writing and distributing of information brochures explaining the obligations required by law and good sense. However it also will require the F.C.R. to ensure that the law is not only known and understood but being complied with — a task which will require constant vigilance throughout the summer months.

Therefore it is recommended that brochures explaining the requirements of the S.A. Bushfires Act as it concerns individuals be printed and distributed to all Monarto people, and that the F.C.R. be constantly alert for any disinclination on the part of individuals to abide by bushfire laws.

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\* Depending on whether or not rubbish collection service is instituted.

## CONCLUSION

The formulating of a fire control PLAN for Monarto has required introducing some new concepts into the integration of fire control methods and activities. This is because of the unusual circumstances existing at Monarto involving such factors as large total area, diverse land use with, in some cases, undetermined areas of control and responsibility, the number and location patterns of occupied homes and valuable but unoccupied buildings, and the scope and type of development activity which will take place in the near future. In addition, M.D.C. officers are relatively newly appointed to new positions in a new project and probably are still "feeling their way" to some extent in the nature and scope of their duties, which undoubtedly will expand as development at Monarto gathers pace.

In deference to the roles of other officers at Monarto this PLAN has placed the prime responsibility for overall fire control in the hands of one officer – the Fire Control Ranger. It is firmly believed that such an important duty which will require considerable knowledge, skill, tact and application, should not be one of divided responsibility. Nevertheless, the Fire Control Ranger alone cannot ensure fire safety at Monarto. Working within the framework of this PLAN he will need the full support of the M.D.C. at all levels to implement an integrated fire prevention, protection and suppression programme at Monarto.

It is inevitable, particularly during the first few years, that the Fire Control Ranger too will need to "feel his way" in his new position. If at any stage of any aspect of implementing this PLAN he has any doubts of ways and means of carrying it out he should be encouraged to consult with B.R.C. officers in matters of fire prevention and protection or with E.F.S. headquarters officers in matters pertaining to fire suppression at organised E.F.S. level.

Therefore it is recommended that the Fire Control Ranger be encouraged to consult with either or both B.R.C. and E.F.S. officers whenever the need arises, but in any case at least once a year at the beginning of each summer.



## SUMMARY OF RECOMMENDATIONS

### 1. PERSONNEL

- (a) That M.D.C. appoint an officer with the title of "Fire Control Ranger" (F.C.R.) whose prime duties and responsibilities are orientated toward fire prevention, protection and suppression principles and practice. Page 3. Original page has text missing
- (b) That such officer be given the opportunity and be directed to spend a period with B.R.C. and E.F.S. officers to familiarise himself with the principles of fire control through land management, and suppression through a registered S. organisation respectively. Page 3.
- (c) That other M.D.C. personnel and Monarto residents be involved in group activity to develop and maintain fire consciousness. Page 4.

### 2. PREVENTION

- (a) That the development of fire consciousness on the part of all Monarto people through the activities of the F.C.R., and methods as suggested in "c" above be given high priority. Page 4.
- (b) That the F.C.R. have authority to determine those days on which there is a serious fire risk and that M.D.C. exercise its authority to control or prohibit the use of vehicles with internal combustion engines on such days. Page 10.
- (c) That the occupier of each M.D.C. home be supplied with a suitable fire extinguisher for internal use, and a knapsack spray for use within the vicinity of the home. Page 11.

### 3. PROTECTION

- (a) That protection of people, property and natural physical features at Monarto be carried out by reducing unwanted flammable vegetation and other material from strategic areas. The methods used and the location of fuel reduction and/or removal to be determined from year to year by the Monarto F.C.R.. Page 12.

### 4. SUPPRESSION

- (a) That M.D.C. provide selected tenants and staff with standardised motor/pumps integrated with optional capacity tanks suitable to be carried by three types of vehicles. Page 18.
- (b) That M.D.C. supply hoists to personnel provided with units suitable for storage and quick loading onto vehicles. Page 18.
- (c) That M.D.C. install suitable stand-pipes at selected locations in sufficient quantities to ensure that accessible water supplies are available to fire fighting personnel and vehicles. Page 19.
- (d) That the recommendations of the Director, E.F.S., regarding the forming and functioning of an E.F.S. organisation be followed implicitly and that all other suppression facilities at Monarto be closely integrated with the Monarto E.F.S.. Page 18.

### 5. LAND USE

- (a) That Lease Agreements regarding agricultural land use, include clause/s requiring the Lessee to carry out such fire prevention and protection measures as deemed necessary by M.D.C.

or its agent to lessen the likelihood of fires starting and to restrict the spread of fires which do start. Pages 5 and 6.

- (b) That controlled burning of prescribed areas of "Parklands" be carried out at locations, frequency and to the extent as mutually determined in consultation with parkland management personnel. Page 7.
- (c) That the Forester resident at Monarto be invited to participate and perhaps manage the first controlled burning of parkland areas. Page 8.

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## 6. HOMES AND BUILDINGS

- (a) That the tenants of occupied homes be urged and actively encouraged by the F.C.R. to "clean up" around their homes each spring and M.D.C. attend to fuel reduction and fire break construction surrounding unoccupied homes and homes which are not subject to agricultural lease. Page 22.

## 7. URBAN DEVELOPMENT

- (a) That fuel be reduced at least to ground level for a distance of 500 m surrounding construction sites and a cultivated break at least 20 m wide be constructed around the perimeter of the development area. Page 24.
- (b) That contractors and employees be made aware of fire risk and danger through active liaison with the F.C.R. and fire prevention publicity. Page 24.
- (c) That every effort be made to ensure an S.A.F.B. station be set up as soon as, if not prior to, construction development beginning. Page 24.

## 8. PUBLICITY

- (a) That M.D.C. embark on a fire prevention and protection publicity programme prior to the onset of each summer aimed at travellers and residents, by means of roadside signs and brochures. Page 25.
- (b) That the F.C.R. be responsible for publicising to Monarto residents the requirements of the S.A. Bushfires Act as it affects individuals, and that the F.C.R. ensures that all residents and visitors comply with Bushfire Law. Pages 25 and 26.

## 9. LEGAL

That the Municipality of Monarto (1) appoint the F.C.R. Fire Supervisor for the area as soon as appropriate, (2) Fix dates for the prohibited and conditional burning periods similar to adjoining Mobilong D.C., and (3) Impose restrictions on certain fires in the open air under Section 61 of the South Australian Bushfires Act. Page 27.

## 10. CONCLUSION

That the Fire Control Ranger consult with either or both B.R.C. and E.F.S. officers whenever the need arises but in any case at least once a year prior to the summer period. Page 29.