South Australian Country Fire Service

BROAD ACRE BURNING

CODE OF PRACTICE

A guide to assist in the practice of safe broad acre stubble burning outside of the fire danger season

April 2015

This Code of Practice has been endorsed by the State Bushfire Coordination Committee, 2015 and was developed in partnership with Primary Producers SA, Producers SA and PIRSA.
Scope

This Code of Practice applies to broad acre burning of stubble on private land across South Australia outside of the Fire Danger Season (FDS). This Code of Practice covers whole paddock, windrow and stubble dump burn operations.

It does not apply to the following types of burning practices:

• hazard reduction burning
• native vegetation burning for ecological purposes
• private burning of vegetation, commonly referred to as pile burning

Statewide Voluntary Code of Practice

This Code of Practice applies to all broad acre stubble burning activities occurring across South Australia outside of the Fire Danger Season (FDS). It supersedes Local Council Codes of Practice for broad acre stubble burning outside of the FDS.

Introduction

Broad acre stubble burning is the farm management practice that produces the greatest fire risk every summer and autumn if not carefully planned and implemented with caution.

Weather conditions conducive to burning continue after the FDS has finished and restrictions on the use of fire under the Fire and Emergency Services Act, 2005 no longer apply, unless a Total Fire Ban is declared. As there are no legislative conditions to adhere to, many stubble burning activities are conducted inappropriately increasing the risk of bushfire and the likelihood of fires escaping into unburnt neighbouring land.

This Code of Practice serves as a guide to the South Australian farming community to assist in the practice of safe broad acre stubble burning.

The following sections outline the process and resources recommended to plan for and conduct a safe broad acre burn outside of the Fire Danger Season.

Planning Your Burn

APPROPRIATE WEATHER CONDITIONS

Weather forecasts are important when planning a broad acre burn. The measurement of actual weather conditions at the burn site prior to lighting and during a burn is imperative to keep abreast of unfavourable changes. Wind speed is an important factor in achieving a complete and consistent burn but it also a major factor in fire escape due to spotting that may occur ahead of the fire front. A maximum wind speed and the Grass Fire Danger Index (GFDI) can indicate when a broad acre burn has potential to become uncontrollable.

Broad Acre Burn Objectives

The objectives of burning stubble are to reduce crop residue, weed seed and snails. A successful burn occurs under weather conditions that produce a complete and consistent burn. Burns that are patchy or incomplete leave areas of residue, weed seed and snails. The aim is to burn when combinations of weather parameters produce a burn that is consistent, or in the case of windrow and stubble dump burns, complete, and can be stopped by fuel breaks and easily extinguished with water.

Weather Forecast

On the day before you plan to burn access the Bureau of Meteorology website for the MetEyeTm weather forecast and warnings for your local area – www.bom.gov.au/australia/meteo/ . This will provide a general view of the weather conditions to expect in the coming two days. If the weather is forecast to be unfavourable for the day of your planned burn or the day after, the burn should be postponed until more favourable conditions are forecast.

Total Fire Ban Days

Severe, Extreme or Catastrophic fire danger rating days can still be declared outside of the FDS and, as a consequence, CFS will declare a Total Fire Ban. Broad acre burning is NOT permitted on days declared a Total Fire Ban unless you have a permit issued under the Fire and Emergency Services Act, 2005. If a Total Fire Ban has been declared for the following day and you don’t have a permit, the fire must be fully extinguished by midnight. On the day of the Total Fire Ban the burnt area must be inspected regularly to ensure there are no flare ups. Stubble dump burns are hard to extinguish completely and will need to be monitored closely.

Actual Weather - “In the Paddock”

Site specific weather conditions must be obtained prior to lighting and if unfavourable the planned burn should be postponed. Measure the weather conditions at least every 2 hours during the burn to keep abreast of any unfavourable changes; specifically wind speed
and direction and to a lesser degree temperature and relative humidity. A hand held weather meter is required with wind speed to be measured and averaged over a 10 minute period.

**Wind Speed and Spotting Potential**

Wind speed is an important factor influencing the success and potential failure of a broad acre burn. Moderate winds 20 - 29km/h can move debris resulting in greater potential for spotting over fuel breaks through movement of embers ahead of the fire front. Do NOT burn when the wind speed, averaged over 10 minutes, exceeds 19km/hr. Be aware of gusty wind conditions as embers can be picked up and transported increasing the potential for spotting issues.

If wind speed is too low, 5km/h or less, fire spread will not be consistent and burn objectives will not be met. However, light winds, between 10 - 18km/h, produce a consistent and complete burn with the fire being easier to control within fuel breaks with water.

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**FUEL BREAK PREPARATION**

Prior to conducting a burn a 4 metre wide fuel break must be established around the perimeter of the area to be burnt to reduce the risk of fire escaping. This also applies to paddocks containing windrows and stubble dumps.

A bare earth fuel break is desirable as it is efficient at stopping the forward spread of a fire however, this is not always possible. In the case that a fuel break cannot be bare earth then the 4m break must be sufficiently diced, ploughed or harrowed so as to break up the vegetation to provide a boundary where a fire will stop. Roads or tracks or rocky and sandy areas with minimal vegetation can act as a natural fuel break. Where paddocks abut vegetation ensure the firebreak is sufficient to prevent the burn from spotting into it.

Fuel breaks are effective as long as the fire is not spotting.

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**NATIVE VEGETATION CONSIDERATIONS**

If your burn area contains scattered trees and/or remnant vegetation you will need to adhere to the guidelines outlined in the Native Vegetation Council Information Sheet: Stubble Burning - Protection of scattered trees and remnant vegetation, which is available from the Department of Environment, Water and Natural Resources (DEWNR) website www.environment.sa.gov.au.

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**FIREFIGHTING RESOURCES**

It is important to plan for appropriate resourcing of a broad acre burn so that it can be easily controlled minimising fire escape potential. All equipment must be maintained to a fully operational standard at all times.

The appropriate amount of resources (people and equipment) must be readily available during and after the burn. Be aware that fire escape potential is influenced by a number of factors and can occur at any time during a burn. Do NOT attempt to burn any more area, windrows or stubble dumps than can be controlled by the number of able bodied people and resources.

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**Able Bodied People**

An able bodied person is a person who is competent able to drive a vehicle and operate a pump and hose. More able bodied people are required when any of the following conditions are present to counteract increased fire escape potential:

- Temperature is >30°C
- Relative Humidity is <30%
- Stubble fuel load exceeds 4 tonne per hectare
- Stubble height exceeds 15cm
- Windrow height exceeds 15cm
- Stubble residue is present beneath stalks in between windrows
- If the planned burn area is greater than 50 hectares
- If in excess of 3 stubble dumps are planned to be burnt at the one time

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**Water Resources**

It is recommended that the following water equipment is available at the burn site when whole paddock or windrow burning:

- Minimum of 400L of water
- Appropriate number of 9L knapsacks and/or 9L water extinguishers
- If available it is preferable to have a minimum of 1000L of water as extra fire unit(s) with pump and hose

For stubble dump burning a minimum of 1000L of water connected to a working firefighting pump and hose must be kept at hand to extinguish the fire. This is to remain at the location for a further 24 hours after the completion of the burn or until the area is ploughed.

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**Personal Safety Equipment**

Safety equipment must be provided and used appropriately, including a fully equipped first aid kit and plenty of drinking water. Appropriate protective clothing and eye wear must be worn during the burn operation as per the Farm Fire Unit Joint Guidelines, where practical.
**COMMUNICATION**

All neighbouring landholders and occupiers must be notified of your intention to burn 2 - 24 hours prior to conducting the burn. To prevent unnecessary call outs you must also notify Adelaide Fire on 8204 3782 of when and where you will be conducting your burn operation.

Communicate your burn plan to the able bodied persons assisting in the burn operation. It is important to ensure that everyone knows the type of stubble and composition, the lighting and burn method, their role(s) in the operation and understanding of contingency plans should the weather change and/or the fire become uncontrollable.

At all times ensure there is immediate access to a UHF CB radio and/or a fully charged mobile phone that has full service coverage in the burn area. The mobile phone should be carried on the person at all times. If relying upon a UHF CB radio there must be a responsible adult at the other end who can call “000”. If you lose control of your burn, call “000” immediately.

**SMOKE MANAGEMENT**

To manage smoke production, do not start burning too early in the day. It is generally recommended that burns are run between noon and midnight as fuel moisture will have decreased sufficiently by this time and will produce less smoke. Do not burn if there are large amounts of green fuels as this will also cause a smoke management problem.

Wind direction is a contributing factor to smoke causing adverse effects on sensitive sites, such as hospitals, schools, vineyards etc. Note whether or not there are any sensitive sites nearby and ensure the wind direction is such that it will not cause smoke to impact on them.

**BURN PLAN – SAFE LIGHTING AND BURNING**

**LIGHTING EQUIPMENT AND METHODS**

There are a number of unique home-made equipment and lighting methods that are constructed and used to light stubble burns. Safe work practices must be followed with respect to such devices and methods and it is the responsibility of the land manager to operate devices and execute lighting safety. A commercially constructed drip torch is recommended as it is purpose built with safety features to prevent unnecessary malfunction and injury.

**STUBBLE CHARACTERISTICS AND FIRE BEHAVIOUR**

Consider the type of stubble, height of stubble, fuel load, whether it’s a whole paddock, windrow or stubble dump burn and modify your burn technique to account for the differences.

**Stubble Type**

Burning different types of stubble will produce variations in fire behaviour. Cereal, canola and legume stubble exhibit differences in composition, density, stalk dimension and oil content, which affects fire spread and intensity.

**Stubble Height**

The resultant height of stubble after harvest can vary every year, farm to farm, across the State. In terms of fire behaviour it is well known that grasses 10 centimetres or less is a much lower risk as there is a lower flame height and the easier a fire will be controlled. Fuel height influences flame height, the longer the standing stubble the higher the flame height will be and the more difficult a fire will be to control.

**Stubble Fuel Load**

More people are to be in attendance if the stubble height is more than 15 centimetres.

*Stubble Dump*

A stubble dump burn produces different fire behaviour to that of whole paddock or windrow burns. A stubble dump is a pile of crop residue that is produced during harvest as opposed to the residue being spread across the paddock or concentrated in rows behind the

**WHOLE PADDock vs Windrow**

Whole paddock burning and windrow burning operations also create different fire behaviours with fuel load either spread over a whole paddock or concentrated in wide or narrow rows. Windrow burns can often turn into whole paddock burns due to the inter-row stubble catching alight. This occurs when the windrow height is greater than 15 centimetres and/or there is retained stubble on the surface in between rows.

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At all times ensure there is immediate access to a UHF CB radio and/or a fully charged mobile phone that has full service coverage in the burn area. The mobile phone should be carried on the person at all times. If relying upon a UHF CB radio there must be a responsible adult at the other end who can call “000”. If you lose control of your burn, call “000” immediately.

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Wind direction is a contributing factor to smoke causing adverse effects on sensitive sites, such as hospitals, schools, vineyards etc. Note whether or not there are any sensitive sites nearby and ensure the wind direction is such that it will not cause smoke to impact on them.

The signs may be temporary fixed to a rigid guide post but should not be fixed to other road signs. If stands are used they need to be capable of remaining upright and in place under windy conditions. To prevent the need for signing, make sure the wind direction directs smoke away from any roads.

**Smoke Taint and Grapevines**

Grapevines exposed to smoke during sensitive growing periods are likely to render the grapes and subsequent wine unfit for sale and consumption. The highest potential for smoke uptake occurs from when the grapes soften and ripen to harvest. This is typically from January in the Riverland to early May in the South East. Heavy exposure for a period of 30 minutes is sufficient to result in smoke taint.

Reducing the risk of smoke taint can be done by;

- Identifying the high risk periods in your area by contacting with your local grape and wine industry organisations (contact details are available from admin@wgcsa.com.au).
- Check with vineyard owners/managers in close proximity to the burn before commencing.
- Avoiding burning until the grape harvest has been completed.

**WHOLE PADDock vS Windrow**

Whole paddock burning and windrow burning operations also create different fire behaviours with fuel load either spread over a whole paddock or concentrated in wide or narrow rows. Windrow burns can often turn into whole paddock burns due to the inter-row stubble catching alight. This occurs when the windrow height is greater than 15 centimetres and/or there is retained stubble on the surface in between rows.

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harvester. A stubble dump can burn and smoulder for days due to the concentration and compaction of material. Such burns need to be monitored for longer as rekindling can occur at any time and embers can be blown with unfavourable winds many days after the burn increasing the potential of fire escape to unwanted areas.

SAFE PRACTICE BURN METHODS

There are stubble burning methods that can be used to control the direction and rate of burning to match the wind strength. This ensures the fire can be controlled should unpredictable and unfavourable weather conditions arise. The methods for windrow burning differ to whole paddock burning due to the characteristics of windrows. The requirements prior to lighting a stubble dump are different to whole paddock and windrow burning. Examples of each burning method are provided as a guide to safe practice.

Whole Paddock Burn Method

Following is a recommended burn method that incorporates safe practice for burning a whole paddock. Establish a Protective Burn Break

First light the fire on the leeward side of the land to establish a protective break of 10 – 20m. It is recommended to light a spot every 10m along the leeward edge, which will make the initial fire easy to manage. The spots will flank out and join up with moderate fire behaviour compared to lighting a strip of fire along the leeward edge. If the area to be burnt is on hilly land then burn downhill where possible. Burning up a steep incline, even against the wind, is always dangerous practice.

Light the Flank and Windward Sides

Once a protective break is established light part way up each flank – a length of about 10 – 20m up each side. Then lighting from the windward side of the land can be undertaken. The flank fires will join with the leeward fire and the windward fire will meet up with it, producing a technically safe burn.

Windrow Burn Method


Consider Fuel Type

Lupin and Canola windrows can be burnt with the wind due to less crop residue in the stubble, however a light cross wind is ideal. Wheat windrows, especially if yields were between 2 – 2.5t/ha, are harder to contain to the windrows so avoid burning or burn into the wind under cooler conditions. Avoid burning barley stubbles as the extra leaf residue makes it difficult to contain the fire to the windrows.

Establish a Protective Burn Break

In the first instance burn the outside two laps of the paddock before lighting the remainder of the paddock. Take care to contain the fire to the windrows. Consideration should be given to harvesting low to reduce the risk of fire spreading into adjacent stubble.

Light Remaining Windrows

Light up remaining windrows approximately every 200m under a light cross wind as it will fuel the fire to the soil surface. If burning into the wind a second able bodied person is required with a farm fire unit to extinguish the downwind fire. Do not light up and burn any more than the available resources can control.

Stubble Dump Burn Method

The following recommendations need to be followed to ensure safe stubble dump burning.

Stubble Dump Size

The larger the pile of stubble the harder it will be to achieve a complete burn and to extinguish. It is recommended that the size of a stubble dump does not exceed a height of 0.5 metres and a diameter of 1.5 metres.

Establish a Protective Burn Break

As with windrows, stubble dumps are surrounded by standing stubble +/- residue on the surface. In addition to the 4m fuel break around the paddock containing the dumps there must be a 20m burn or cleared area constructed around each pile. Extra vigilance and personnel must be employed if planning to burn around a pile to construct the fuel break.

No stubble dumps are to be burnt within 25 metres of a boundary fence.

Light a Stubble Dump

It is recommended to first light one stubble dump and monitor how it burns. If it appears to be burning consistently and not producing too much smoke then continue lighting a few more piles.

If it produces too much smoke and does not completely combust easily do not continue lighting and wait for more favourable conditions or spread out the pile to increase the amount of air available for combustion.

DO NOT light more stubble dumps than what can be managed with the resources on hand. More people and resources are required if you plan to burn more than 3 dumps at a time.

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WHEN THE BURN IS COMPLETE

When a whole paddock burn is complete always make sure there is no active fire for at least 20 metres into the burn area. In comparison, when a windrow burn is complete, all active fire is extinguished to prevent re-ignition and accidental lighting of the remaining standing stubble. Stubble dump burns will need to be spread out and then extinguished to prevent smouldering and potential rekindling.

PATROL THE BURN AREA

Regularly patrol the burn area for a number of days after the operation is completed to guard against rekindling. This patrolling is especially important if the following day is a forecast Total Fire Ban. In the case of burning stubble dumps the burn area and burnt piles must be monitored closely for a longer time period due to the difficulty of extinguishing them completely.

SA SAFE BROAD ACRE BURN IS YOUR RESPONSIBILITY

It is the burn operator’s responsibility to ensure that their broad acre burn is conducted safely and contained within the burn area. Every effort must be made to follow the recommendations to ensure the burn will not impact on surrounding land or become uncontrollable.

Remember, if you lose control of your burn call 000 immediately.

This immediate action may save lives, property and the environment.
CHECKLIST FOR PLANNING A BROAD ACRE BURN

1. Ensure the weather conditions are appropriate for a safe burn.
   - Review a weather forecast for day of and day after your burn.
   - Unfavourable forecast – postpone the burn.
   - Total Fire Ban Day – postpone the burn or plan to extinguish completely before midnight.
   - Hand held weather meter needs to be at the burn site.
   - Measure weather conditions “in the paddock” prior to and 2 hourly during the burn.

2. DO NOT burn when:
   - Wind speed exceeds 19km/h.
   - GFDI is >20.

3. Prepare a 4m wide fuel break around the burn area.
   - Bare earth is desirable as most effective.
   - Disced, ploughed or harrowed break sufficient.
   - Roads, tracks, rocky and sandy areas devoid of vegetation sufficient.
   - Must be able to stop the forward spread of the fire.

4. Native Vegetation Considerations
   - For burn areas containing trees or remnant vegetation.
   - Consult DEWNR website for protection information.
   - Put in appropriate fuel breaks as directed.

5. Arrange for extra able bodied people if:
   - Temperature is >30°C.
   - Relative Humidity is >30%.
   - Stubble fuel load exceeds 4 tonne per hectare.
   - Stubble height exceeds 15cm.
   - Window height exceeds 15cm.
   - Stubble residue is present beneath stalks in between windrows.
   - If the planned burn area is greater than 50 hectares.
   - In excess of 3 stubble dumps are planned to be burnt at the one time.

6. Plan for the following water resources to be available during and after the burn:
   - Minimum 400L of water.
   - 9L knapsacks and/or water extinguishers.
   - 1000L water truck or farm firefighting trailer with pump and hose, especially if stubble dump burning.

7. Plan for Farm Fire Unit(s) to be available during and after the burn.
   - Well maintained and fully operational.
   - Conform to Farm Fire Unit Joint Guidelines.
   - Amber rotating beacon activated during burn operation.

8. Ensure personal safety equipment is adequate, present at the burn site and includes:
   - First aid kit – fully equipped for burns.
   - Protective clothing.
   - Mobile is fully charged and operational at burn site.
   - Local CFS brigade.

9. Notify the following 2 – 24 hours prior to conducting the burn:
   - Neighbouring landholders and occupiers.
   - Local CFS brigade.

10. Ensure mobile phone and/or UHF CB radio are present and working at the burn site.
    - Mobile is fully charged and operational at burn site.
    - Responsible adult at other end of UHF CB radio.

11. Be aware of smoke production and wind direction and make sure:
    - Fuel moisture has decreased sufficiently.
    - Large amounts of green fuels are not present.
    - Wind direction is such that sensitive sites nearby will not be impacted.
    - Correct signage is used if smoke will impact a main road.

BURN PLAN CHECKLIST – SAFE LIGHTING AND BURNING

1. Articulate a Burn Plan and communicate to extra people who will be attending.
   - Area and type of stubble to be burnt.
   - Fuel load and expected fire behaviour.
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2. Whole Paddock Burn Method
   - Establish a protective burn break 10 – 20m on leeeward side of burn area.
   - Light 10 – 20m up flanks from leeward edge.
   - Light from the windward edge.
   - DO NOT burn any more than what the available resources can control.

3. Windrow Burn Method
   - Establish a protective burn break by burning the outside 2 laps of the paddock first.
   - Take care to contain fire to the windrows.
   - Light remaining windrows every 200m under a light cross wind.
   - DO NOT burn any more than what the available resources can control.

4. Stubble Dump Burn Method
   - Maximum size of pile = 5m high and 1.5m diameter.
   - Establish a 20m burn or cleared area around each pile – DO NOT burn the fuel break area if extra personnel are not present.

Remember, it is the burn operator’s responsibility to ensure that the broad acre burn is adequately resourced, conducted safely and contained within the burn area.
SA COUNTRY FIRE SERVICE STATE HEADQUARTERS
Level 7, 60 Waymouth St, Adelaide
Postal address: GPO Box 2468, Adelaide SA 5001
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