

Colorado APCD Prescribed Fire Smoke Permits

Guidance for Non-Standard Permits

Introduction

Standard conditions are appropriate for most burns. They also don't fit all projects. Standard conditions may be too loose, too tight or a bit of both.

- Example: For a small unit with a difficult perimeter, fewer daily acres with a later end ignition time may be a trade-off whose net smoke risk is about the same as standard conditions.
- Example: A burn may be a good candidate for ongoing experiments that use non-standard conditions, like winter burning in metro Denver.
- Example: If a project is so surrounded by homes that wind direction constraints could not protect them, burning at good or better ventilation may be prudent.
- Example: Aerial ignition of understory fuels is planned.

Non-standard conditions may expose the burn's home agency, Colorado's Air Division, and most importantly the public to increased risk of smoke impacts. Because of this, especially requests for non-standard conditions that on net are less restrictive than usual need both extra smoke **mitigations** and solid **justification**, and not just one or the other. Creating a package to propose then justifying it is the responsibility of the permit applicant, not of APCD.

Process

To request a non-standard permit, fill out a smoke permit application (Form B) as usual. Add a request for non-standard conditions (Form C).

Recommendations:

- We strongly recommend that only experienced burn bosses who've also previously worked with Colorado smoke permits request a non-standard permit, except conditions tighter than standard.
- Start by looking at standard conditions worksheets.
- Contact us early in the process.

Links to forms:

Pile Burn	Broadcast Burn
pile worksheet	broadcast worksheet
pile application	broadcast application
pile non-standard supplement	broadcast non-standard supplement

Committee Review:

Each non-standard permit is formally and separately reviewed by at least two APCD staff. Each reviewer's name is noted on the permit. Additional APCD staff may be involved with the review, and their concurrence with the approved terms may or may not be documented on the permit.

Kinds of Non-Standard Conditions

- A. Comparable Risk
- B. Unrestricted Wind Direction
- C. Tighter Constraints than Standard
- D. Elevated Smoke Risk
 - D1. Elevated Risk in Mapped Smoke-Sensitive Areas
 - D2. Burning High Smoke Risk Fuel
 - D3. Burning with a Forecast of Poor Ventilation

A. Comparable Risk

For some burns it makes operational sense to burn a few more acres than standard conditions provide but commit to end ignition a little earlier, or vice versa. The result is smoke risk essentially comparable to standard conditions. These requests require only a brief explanation on a non-standard request form and typically are approved as proposed.

B. Unrestricted Wind Direction

Standard permit conditions for most categories include limiting wind directions to protect nearby receptors. However there are some situations where doing so is impractical. For example, a burn may be so surrounded by homes that there is no wind direction that would protect all the receptors. If you are requesting a non-standard wind direction of 'any,' describe offsetting mitigations in the request form. Less common are situations where restricted wind directions are unnecessary. An example might be in a fuel with no potential to generate drainage smoke and significantly elevated above all surrounding homes and other receptors. Examples of offsetting mitigations are especially strong outreach, not burning at all if the day's best forecasted ventilation is fair, and/or burning fewer acres per day.

C. Tighter Constraints than Standard

Standard conditions are not designed to be protective in the most risky smoke possible situation that fits in each category, but for fairly typical ones. It is a mark of professionalism to recognize projects for which standard conditions are too permissive. In that case request non-standard conditions that are more restrictive, not less, than standard.

One test for a project is whether taking a particular condition to its logical allowed extreme would be unlikely ever to result in good smoke management. If you can't imagine that it would probably ever be prudent to burn a set of piles with only minimum windspeed to provide for dispersion but standard conditions would allow it, for example, request non-standard conditions.

Example situations when extra restraint has been needed in the past include:

- In especially narrow, deep or high (cold) mountain valleys

- Near or in communities intolerant of impacts below the health threshold. Towns or other places that rely heavily on tourism, are especially urban, have a high proportion of retirees or of guests from low altitudes, are removed from agriculture and rural lifestyles, and/or have been or are close to non-attainment of NAAQS may be candidates. To a large degree the smoke-sensitive areas map tries to capture these variables for broadcast burns.
- Near known smoke-sensitive individuals' homes, residential health-care facilities or schools
- Burns tightly surrounded by homes on all sides
- Burns just west of steep high walls, including most of the Continental Divide
- Very close to interstates or other high-speed roads
- Places where daytime smoke tends to back into canyons from which it can flow out into a community at night
- Difficult or uncertain fuels, including dirty piles

Every year some of the state's most senior burn bosses submit occasional applications for conditions that are tighter than standard. You'll be in august company.

D. Elevated Smoke Risk

Each application for more acres per day and/or later end ignition times than standard conditions should include offsetting smoke mitigations. It is the applicant's responsibility to propose these site-appropriate specifics.

Each year APCD staff approve some of the requests to burn more acres per day than standard conditions even though earlier end times and/or other offsetting mitigations do not result in comparable risk. Both APCD and the land management agency deliberately accept increased risk of excessive smoke impacts to the public in what all parties believe nevertheless is a responsible undertaking.

A place to start is with standard conditions shown on the worksheet. Think about each condition. If a non-standard alternative is more appropriate and *responsible*, request it and justify it. With an increase in acres, more mitigation should be proposed than standard. Consider beefing up especially public outreach, smoke monitoring and documentation, and enabling optimally accurate weather forecasts.

Your explanation of why you believe the proposed conditions are responsible is critical. Justify your requests *from an air quality perspective*. Your reasons to want tailored conditions may have nothing to do with smoke. For instance they may have to do with cost-effectiveness, ease of control, or a project window that is too tight in order to protect resources other than air. While we do happen personally to care about these things, whether we agree that your reasons unrelated to smoke are important or worthy is irrelevant to what APCD staff should sign in the project's smoke permit. Instead what we must judge, and what we need you to write, is why the conditions are reasonable with respect to potential for smoke impacts.

In reviewing non-standard requests, we typically look at four groups of considerations. The first two steps are similar to the structure of a burn plan's complexity analysis though probably in greater detail than tends to be provided for smoke in a burn plan appendix.

1. First, what initial smoke risk profile results from the burn's physical characteristics: location relative to receptors, fuels, topography, etc.?
2. Most importantly, what offsetting mitigations are being proposed that limit smoke risk? Examples include on-site weather stations and other coordination with the National Weather Service, intensive public outreach, realistic interior cutoff lines or separate non-concurrent units as part of a smoke contingency plan, site preparation to support efficient ignition, limited acres at fair or even good dispersion, second and subsequent days that are contingent on objective measures of minimal smoke impact, etc.

One note about aerial ignition is worth saying up front. Aerial ignition sometimes is rapid, sometimes does generate more heat per acre, ever so rarely overwhelms atmospheric stability, and sometimes does end early. But our experience has been that none of these attributes is assured or even all that common.

3. Third, what arrangements will there be for communal learning about smoke? From APCD's air quality perspective, the main reason for undertaking these elevated risk burns is to learn. If over time experience shows that a group of burns is in fact not especially high risk, standard conditions will evolve in that direction. Our goal is to make standard conditions as supportive of extensive burning as is responsible. The best way to move in that direction is to take carefully considered and managed risks to learn about possible changes.

We anticipate being involved in data collection to the extent we can given other tasks. But we cannot commit in advance to be at any burn. Both for that reason and to milk the burn for as much useful information about smoke as possible, the organization doing the burning needs to commit to participate in the work of learning. That usually means you must find and pay at least one additional person to staff the burn than you otherwise would need. Data collection efforts may involve particulate monitors, photographs, coordination with formal research projects, fuel load and consumption measurements, etc. For fuel with drainage potential, photos taken between dawn and sunrise the next morning are especially important - and, we realize, especially difficult to staff.

4. The final check applies only if the first three have been met well. To what extent has the agency unit established a strong track record of consistent and conservative adherence to smoke permit conditions, with sufficient depth of smoke experience to manage the extra smoke risk responsibly in real time? Familiarity with the site's specific air flow patterns and, if it exists, past smoke history nearby, can be important in this regard.

In short, there is considerably more work needed to prepare for high smoke risk than proposing looser conditions or justifying them on paper. It may involve increased costs to the burn agency, a longer smoke planning horizon than is otherwise necessary, and other extra effort.

For ideas of mitigations, look at the non-standard permit application. Also think more generally about actions you expect to take that give *you* confidence your proposal is responsible from an air quality perspective.

It is in requesting non-standard permit conditions that you are invited to tailor your own limits. We do not invite you to write wide conditions on the assumption that you or another burn boss you know will limit yourself in the field to the only narrower subset that is responsible. As a way

to judge, ask yourself whether your request is for conditions you'd want us to issue to every other unit, and burn boss you've watched. Put another way, picture the conditions being stretched to their outer limits without first subjecting implementation to the 'responsible in real time' test.

If you have a project that you think is a good candidate for an elevated risk smoke permit, we suggest that you [contact us](#) before submitting a written application. It may save all of us time, and it is possible that we can help you refine your proposal. Please, however, don't ask us to build it from scratch. It is good to discuss proposals for non-standard conditions with others also, especially the senior burn bosses you most respect.

Details follow about three special situations that have elevated smoke risk: daily acres higher than standard in mapped smoke-sensitive areas, burning fuel that is highest risk for smoke, and burning with a forecast of poor dispersion.

D1. Elevated Risk in [Mapped Smoke-Sensitive Areas](#)

A non-standard permit for a burn in a mapped smoke-sensitive area is likely to include the following conditions among its other smoke mitigations.

Category, Distance to homes - see worksheet	Public comment (1)	Consult (2)	Instrument & Order IMET (3)
Drainage Potential & Sensitive Areas			
3a. >5.0 mi.	If \geq 1500 ac/day	If > 500 ac/d & within 10 miles of an occupied home	
3b. 2.0 - 5.0 mi.	If \geq 1000 ac/day	If > 300 ac/d	
3c. 0 - 1.9 mi.	If \geq 300 ac/day	If >150 ac/d	If >250 ac/d
Highest Smoke Hazard & Sensitive Areas			
4a. >5.0 mi.	If \geq 750 ac/day	If >250 ac/d & within 10 miles of an occupied home	
4b. 2.0 - 5.0 mi.	If \geq 500 ac/day	If >150 ac/d	
4c. 0 - 1.9 mi.	If \geq 150 acres/day	If >25 ac/d	If >100 ac/d

Notes:

1. For information about **public comment** periods, [contact us](#). [Regulation 9](#) requires public comment opportunities on the highest smoke risk permits.
2. '**Consult**' means consultation with the National Weather Service fire weather lead or other forecaster that the lead names. Consults must occur at least 2 weeks before burning and after the forecaster has received the burn plan and project maps. Also, weather observations from within the project area are required. Only APCD may

approve substituting off-site weather observations. Consultations must be completed before a permit is finalized.

3. **'Instrument'** means to set out a DataRam, eSampler, or similar real-time particulate monitoring equipment at the nearest occupied downdrainage home or other location and timing as agreed with APCD.

'Order IMET' means to place a resource order for an incident meteorologist for burn day(s). The IMET will decide whether they would be most effective on site or in their office, but should be dedicated to (which probably means paid by) the project for the day. If you place an order at least 3 days ahead and the order can't be filled (UTF), you have met your obligation with respect to this permit condition and may burn anyway.

D2. Burning High Smoke Risk Fuel

As described on the [broadcast worksheet](#), APCD categorizes as highest smoke risk (category 4) those fuel profiles that have average depth of combined duff and litter ≥ 3 " and/or 1000-hour fuel load ≥ 10 tons/acre. These burns may be in moist or dense mixed conifer, blowdown, bug-kill, low-utilization sales, chaining, thick mastication, etc.. These are difficult fuels from many perspectives. Despite the many possible forestry situations they represent, permits for only a couple category 4 broadcast burns are requested each year. We have noticed that they have a lower rate of implementation per year than is average for broadcast burns.

Permits for category 4 fuels are automatically non-standard because they involve fuels that both vary significantly and have high potential for significant smoke impacts. Among other considerations, we will almost certainly be looking for photos and other robust documentation of the drainage smoke. Our starting assumption is that category 4 burns tend to have typical high-end smoke risk if half as many acres are burned per day as are standard for drainage potential.

Beyond that, please refer to general guidance for elevated smoke risk burns (section D) above.

D3. Burning with a Forecast of Poor Ventilation

Generally, a forecast of 'poor' dispersion means a no-burn day in Colorado. Following is an option intended to provide a very limited opportunity for blacklining on some burns on days when otherwise no burning at all could occur. There is no place in Colorado so remote that our intent is to provide for full-scale production burning when dispersion will remain poor all day.

For burning with an unrestricted ventilation forecast:

<u>Expected Burn Unit Characteristics</u>	<u>Conditions</u>	<u>Application Procedure</u>
---	-------------------	------------------------------

<u>Expected Burn Unit Characteristics</u>	<u>Conditions</u>	<u>Application Procedure</u>
<ul style="list-style-type: none"> ▪ Site 1000-hr fuel load no more than 5 tons/acre ▪ Outside of the mapped ‘smoke-sensitive communities’ ▪ At least 1.0 mile from nearest home ▪ In a 30° cone downdrainage, at least 5 miles from nearest home 	<ul style="list-style-type: none"> ▪ Burn at most 15 acres per day. ▪ Burn with eye-level wind of 4(+) mph, measured as for piles. ▪ End ignition by 3 hours before sunset. ▪ Close all open line (unextinguished edge of fire, including interior) by 1 hr before sunset. ▪ Send smoke monitoring report with photos within 1 week. 	<ul style="list-style-type: none"> ▪ Receive approval at least 48 hrs before ignition. ▪ Estimate fuel loads on Form A with photo series or transects. ▪ In the supplemental application, include a description of how fire edges will be held and at what kind of feature. ▪ Send map(s) that include (a) boundaries of unit(s) proposed for unrestricted ventilation burning, (b) 1-mile buffer, (c) homes or areas of homes within the 1 mile buffer, and (d) 5-mile downdrainage cone.

For reference in relation to blacklining, 15 acres equals one chain wide by 1.8 miles long [(15*43560)/(66*5280)].

We are especially skeptical of proposals to burn with poor ventilation. It’s because easily half of the ones that have been implemented in the last decade haven’t gone particularly well for smoke - by our judgment, and as often also by the burn boss’.

Suggestion: If the only practical, safe, controlled way you can envision implementing a burn involves burning with poor dispersion, ask yourself why. We’ve noticed that sometimes when other resource considerations tie a burn boss’ hands unreasonably tightly, there can be a tendency to take it out on air quality since that’s one of the latest stages in the planning process. If, for example, you’re being asked to burn a knoll of bug kill with heavy down fuel and no road access, but not burn any of the chest-high sage surrounding it (this is a real example that remained within its intended perimeter but didn’t go well for smoke), consider that maybe smoke isn’t the place to restore a reasonable balance.