Crop Residue Burning Operating Guide



State of Idaho

Department of Environmental Quality

May 2026

Prepared by
Idaho Department of Environmental Quality
Air Quality Division
1410 N. Hilton St.
Boise, ID 83706

Accessibility Services: The Idaho Department of Environmental Quality will provide reasonable language access services and/or disability services for documents at no charge. To request an accommodation under Title VI of the Civil Rights Act of 1964 or Americans with Disabilities Act, contact DEQ's nondiscrimination coordinator at (208) 373-0271 or *accessibility@deq.idaho.gov*. Para obtener información en español, visite *https://www.deq.idaho.gov/about-us/accessibility/*.

DEQ, August 2026, Cost codes: 24520112.245012.22502. Costs associated with this publication are available from the State of Idaho Department of Environmental Quality in accordance with Idaho Code § 60-202.

Table of Contents

Acronyms, Abbreviations, and Symbols v
1 General Program Overview 1
1.1 Burning Subject to DEQ's Crop Residue Burning Program 1
1.1.1 DEQ Requirements per Rules and Statute 2
1.1.2 Permit by Rule 3
1.2 DEQ Staff Roles and Responsibilities 3
1.2.1 Smoke Management Supervisor 3
1.2.2 CRB Smoke Management Analyst 3
1.2.3 Seasonal Smoke Specialists 4
1.2.4 Regional Office 4
1.2.5 Meteorologist 4
1.3 Program Evaluation and Annual Review 4
2 Grower Requirements 5
2.1 Grower Requirements for CRB Activities 5
2.1.1 Grower Submittal of Registration and Fees 6
2.1.2 Grower Training 6
2.1.3 Notification of "Ready to Burn" 7
2.1.4 Burn Day Activities for Growers 7
2.2 Grower Requirements for Spot and Bale Burning 7
2.3 Grower Requirements for Propane Flaming 9
3 DEQ Program Guidelines 10
3.1 DEQ Processing of Registrations 10
3.2 Burn Decisions Criteria 10
3.2.1 Smoke Management Areas 12
3.2.2 Air Quality Criteria 14
3.2.3 Meteorological Conditions 14
3.2.4 Other Relevant Factors 17
3.3 Making a Burn Decision 17
3.4 Field Approval Process 17
3.5 Public Notification of Burn Approvals 18
3.6 Field Observations 18
3.7 Enhanced Documentation 19
3.8 Complaint Response, Compliance, and Enforcement 19

Appendix A. Standard Operating Procedures for CRB Smoke Management Analyst 21
Appendix B. Standard Operating Procedures for CRB Seasonal Smoke Specialists 23
Appendix C. Standard Operating Procedures for Regional Office Staff Assigned to CRB Tasks... 27
Appendix D. Standard Operating Procedures for Field Observations Exemptions 28
Appendix E. Standard Operating Procedures for Enhanced Documentation 30
Appendix F. Standard Operating Procedures for Determining Compliance with Permit Conditions 35
Appendix G. Summary of Operating Guide Changes 38

List of Tables

Table 1. Burn decision meteorological parameters. 15
Table 2. Enhanced documentation trigger levels for $PM_{2.5}$ and ozone. 19
Table E-1. Crop residue burning program air quality monitors. 33
Table F-1. Stopping sight distance as a function of speed 37

List of Figures

Figure 1. Burn decision process. 11
Figure 2. Smoke management areas. 13
Figure F-1. Compass directions for wind direction permit condition compliance. 36

Acronyms, Abbreviations, and Symbols

µg	micrograms
CRB	crop residue burning
CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhancement Program
DEQ	Idaho Department of Environmental Quality
IDAPA	Idaho's administrative rules numbering designation
ISP	institutions with sensitive populations
m^3	cubic meters
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NWS	National Weather Service
O_3	ozone
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
SIP	State Implementation Plan
SMA	smoke management area

1 General Program Overview

This operating guide provides details on the overall and day-to-day operation of the crop residue burning (CRB) smoke management program, including grower and Idaho Department of Environmental Quality (DEQ) requirements, CRB program guidelines, and program evaluation and annual review requirements. DEQ will review and revise this operating guide annually as necessary and provide a Summary of Operating Guide Changes in the last appendix.

DEQ's CRB program and this guide do not apply to crop residue burning within reservation boundaries other than where DEQ implements the CRB program for the Kootenai Tribe per the *Memorandum of Agreement between the Idaho State Department of Environmental Quality and the Kootenai Tribe of Idaho Relating to the Smoke Management Program*, November 2008. Interested parties should contact individual tribes for residue burning on reservations in Idaho.

This operating guide refers to persons who conduct crop residue burns as "growers." Any person may conduct crop residue burning so long as the burning is conducted in accordance with the requirements of the CRB program, CRB rule (IDAPA 58.01.01.617–624), and State Implementation Plan (SIP).

This guide includes the commitments made during the crop residue disposal negotiation process and memorialized in Idaho Code § 39-114 (House Bill 557), CRB rule, and 2018 SIP update. The guidelines and procedures are described in the following sections and appendices.

1.1 Burning Subject to DEQ's Crop Residue Burning Program

The following burning is regulated under DEQ's CRB program, and growers must comply with the rules and regulations of the program:

- Residue from traditional crops—Includes, but is not limited to, cereal grain, row crops, alfalfa, hay, Kentucky blue grass, and other grass seed varieties.
- Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) lands—Includes the burning of CRP and CREP land within the programs, and when the land is taken out of the programs to return to agricultural production.
- Pasture—Includes introduced or domesticated native forage species, that are used primarily for livestock production. Lands receive periodic renovation and/or cultural treatments such as tillage, fertilization, mowing, and weed control and may be irrigated (US Department of Agriculture, Natural Resources Conservation Service, *National Range and Pasture Handbook*, December 2003).
- Wildlife habitat areas or habitat improvement areas, including planted nonnative vegetation or food crops that provide forage.
- Weed patches within a crop field.
- Spot and bale burning.
- Propane flaming.

1.1.1 DEQ Requirements per Rules and Statute

The following is required before DEQ approves crop residue burn (program guidelines, section 3).

- Ambient air quality levels must meet two criteria before DEQ may approve a burn:
  1) Do not exceed 90% of the ozone national ambient air quality standard (NAAQS) and 75% of the level of any other NAAQS on any day and are not projected to exceed such level over the next 24 hours (IDAPA 58.01.01.621).
  2) Have not reached, and are not forecast to reach and persist at, 80% of the 1-hour action criteria for particulate matter identified in "Air Pollution Emergency Rule" (IDAPA 58.01.01.550), "Criteria for Defining Levels within Stages" (IDAPA 58.01.01.556), and "Burn Determination" (IDAPA 58.01.01.621). Eighty percent of the 1-hour action criteria for fine particulate matter ($PM_{2.5}$) is currently equal to 64 micrograms per cubic meter ($\mu g/m^3$).
- DEQ may not approve crop residue burning on weekends, federal or state holidays, after sunset or before sunrise, or during air stagnation or degraded air quality episodes (IDAPA 58.01.01.622.01).
- DEQ may not approve crop residue burning within 3 miles of institutions with sensitive populations (ISPs) when surface wind speeds exceed 12 miles per hour (mph) at the field (IDAPA 58.01.01.621.01).
- DEQ must consider the following when making burn decisions (section 3.2) (IDAPA 58.01.01.621.01):
  - Expected emissions from all burns proposed for the same date
  - Proximity and emissions from other burns within the area
  - Moisture content of the crop residue
  - Acreage, crop type, and fuel characteristics
  - Meteorological conditions
  - Proximity to ISPs, public roadways, and airports
  - Any other factors relevant to preventing program concentration thresholds or action levels exceedances defined by the statute, CRB rule, or SIP
- DEQ must designate burn or no burn days, post the burn decision daily on the website, and offer an email update service with the following information (IDAPA 58.01.01.623):
  - Burn or no burn determination
  - Proposed burn locations and number of acres permitted to be burned in each county
  - Meteorological conditions and real-time ambient air quality monitoring data
  - Toll-free hotline number to receive requests for information
- DEQ must prepare an annual report that includes, at a minimum, (a) an analysis of exceedances of the program concentration thresholds that were reasonably suspected to have been caused or contributed to by an approved crop residue burning and (b) an assessment of the circumstances around any reported endangerment to human health associated with approved crop residue burning. The report must also include recommended revisions to the CRB rule or this operating guide needed to prevent

future exceedances of the program concentration thresholds (IDAPA 58.01.01.622.02). To fulfill this requirement, DEQ developed an enhanced documentation process when air quality levels reach trigger thresholds (section 3.7). An advisory committee consisting of representatives from environmental organizations, grower organizations, tribal organizations, health organizations, Idaho State Department of Agriculture, and DEQ was assembled to discuss the CRB program (IDAPA 58.01.01.622.03).

- DEQ has no authority or explicit responsibility for crop residue burn fire safety or prevention outside of "Preventative Measures" (IDAPA 58.01.01.619.05). The person conducting the burn is responsible for obtaining all required permits, preparing appropriate fire safety measures and fire safety equipment, and overseeing the burn until the fire is out. The person conducting the burn can be held liable for damage and fire suppression costs if the fire escapes. Failure to take measures to prevent a crop residue burn from escaping is a violation of General Permit Condition 2.

1.1.2 Permit by Rule

Permit by rule consists of registration, notification of final burn approval (online), and burn fee.

DEQ provides the following documents during the burn season:

- "Registration Receipt and Initial Permit Requirements" confirms receipt of registration and provides the initial field requirements. This document is not an approval to burn.
- Final burn approval permit is available on DEQ's website after approval to burn is granted. The permit may include additional requirements or conditions.
- Burn fee invoice. The grower will receive an annual invoice for the total acreage burned. A spot and bale burn permit fee is due at the time of registration.

The notification of final burn approval posted online is the only document authorizing the grower to burn crop residue. Seasonal Smoke Specialists, or anyone completing the task of contacting the permittee, must ensure all permit conditions are understood by the permittee.

1.2 DEQ Staff Roles and Responsibilities

The following sections describe the burn program roles and responsibilities of DEQ staff.

1.2.1 Smoke Management Supervisor

DEQ's Smoke Management Supervisor works for the Air Quality Planning Bureau. The Smoke Management Supervisor is responsible for smoke management for all types of allowable open burning statewide on lands outside the five tribal reservations. The Smoke Management Supervisor ensures the program implementation complies with the statute, CRB rules, and SIP.

1.2.2 CRB Smoke Management Analyst

The CRB Smoke Management Analyst performs CRB program functions and is the primary contact for the CRB program. The CRB Smoke Management Analyst reviews registrations,

makes final burn decisions, and coordinates with meteorologists, Seasonal Smoke Specialists, and regional office staff. Appendix A provides a complete list of responsibilities and procedures.

1.2.3 Seasonal Smoke Specialists

DEQ's Seasonal Smoke Specialists work out of the regional offices. (Some regional offices also use permanent staff to carry out Seasonal Smoke Specialist duties.) The Seasonal Smoke Specialists are the primary point of contact for growers during the burn season and observe and document burns. Appendix B provides a complete list of responsibilities and procedures.

1.2.4 Regional Office

DEQ's six regional offices have staff assigned for tasks that support the CRB program, including supervising and deploying Seasonal Smoke Specialists and serving as an additional point of contact for growers and the public. Appendix C provides a list of responsibilities and procedures.

1.2.5 Meteorologist

DEQ's meteorologists provide burn decision process support, CRB staff support, and fire weather and smoke dispersion forecasting for northern and southern Idaho. During the fall, the meteorologist provides daily forecasts, participates in daily CRB coordination calls, and provides specific field forecasts as requested.

1.3 Program Evaluation and Annual Review

DEQ is required to review the CRB program and this operating guide annually. DEQ staff continually review air quality and burn decision data to determine the efficacy of the program. The following are examples of evaluation and analysis that take place annually as needed:

- Days with approved CRB that had elevated air pollutant concentrations will be analyzed to determine whether the CRB caused or contributed to the measured concentration.
- Days with approved CRB that had low air pollutant concentrations will be analyzed to find parameters that may have contributed to good smoke dispersion characteristics.

DEQ seeks feedback and recommendations from the public, participating growers, the United States Environmental Protection Agency, fire districts, tribes, and other smoke management agencies.

DEQ staff strive to improve program operations. Burns are continuously monitored throughout the day and if unexpected weather conditions or smoke management issues occur, staff investigate why they occurred, to make process adjustments for subsequent burn days.

2 Grower Requirements

2.1 Grower Requirements for CRB Activities

Growers must complete the following activities to burn crop residue. Section 2 requirements are primarily accommodated in the *grower online tool*.

- Register for a permit before the proposed burn date. IDAPA 58.01.01.619 requires registration at least 30 days in advance; however, review times are typically less, and DEQ can often accommodate less than 30-days advance notice when resources are available. The following information must be included in the registration:
  - Location of the field (the online map tool pinpoints the latitude and longitude).
  - Applicant information including name, address, and telephone number.
  - Burn manager and portable communication details (e.g., cell phone number).
  - Type of crop residue and total acreage to burn.
  - Fire prevention measures that will be available.
  - Requested date of the field burn.
- Obtain all necessary local and/or state fire safety permits. DEQ's online tool automatically issues Idaho Department of Lands fire safety permits.
- CRB training is required before burning and every 5 years thereafter.
- To add a field to the ready-to-burn list, use the online tool or contact the Seasonal Smoke Specialist or regional staff.
  - DEQ requires fields to be on the list for at least 24 hours (for public notice) before considering them for burning. Exceptions include application failures, communication errors between the grower and DEQ, and pending meteorological smoke dispersion evaluations.
- Contact the appropriate agency, such as the state or local highway district, to determine if any requirements for public roadway safety must be considered if you are burning near a roadway. Avoiding impacts on public roadways, per IDAPA 58.01.01.621.02.g (proximity to public roadways considerations), is a critical factor in determining an appropriate burn day.
- Obtain approval from DEQ and follow all permit conditions on the day of the burn. Approval must be given before ignition.
- Use a portable communication device, identified on initial registration, during the burn. If the cell number or communication tool has changed, the grower must inform DEQ.
- Burn crop residue only in the field where it was generated.
- A postburn report must be submitted by growers to maintain priority for their next burn. Submit the report online or contact the Seasonal Smoke Specialist or regional office before the end of the business day if the grower wants to burn the next day.
- A $2 fee per acre burned applies to crop residue burning.

2.1.1 Grower Submittal of Registration and Fees

Registration and fee payment is available in the *grower online tool*. Additional information is found at *Crop Residue Burning*. The regional office staff and CRB Smoke Management Analyst are available to assist growers who do not have internet access or are having trouble navigating the online registration process.

The following information is required for registration:

- Location of the field (the online map tool pinpoints the latitude and longitude).
- Applicant information including name, address, and telephone number.
- Burn manager and portable communication details (e.g., cell phone number).
- Type of crop residue and total acreage to burn.
- Fire prevention measures that will be available.
- Requested date of the field burn.

Any additional information that helps DEQ make a burn decision should also be included on the registration form, including topographical features (e.g., canyon rims) or special conditions (e.g., specific wind direction needed), and any known ISPs.

CRB field burn fees are invoiced and mailed out the first workweek of January each year. Growers may pay fees online, by mail, or by hand delivery to the State Office or the nearest DEQ regional office. Send signed the registration and fee to the State Office at:

Idaho Department of Environmental Quality
CRB Program
1410 N. Hilton St.
Boise, ID 83706-1255

Fees received must be processed by DEQ's Fiscal office and may take up to 10 business days to be applied to the grower's account.

2.1.2 Grower Training

Grower CRB training is required before being approved for a crop residue burn, spot and bale burn, or conducting propane flaming. Refresher training is required every 5 years. Training includes the following:

- Air quality protection and smoke management
- Open burning rules and CRB rules
- Grower responsibilities and requirements
- DEQ responsibilities and requirements
- Ignition and burning techniques for good smoke management
- Weather conditions and how it relates to smoke management considerations

The training is offered periodically through the regional offices based upon demand and online at *Crop Residue Burning in Idaho Grower Training*.

2.1.3 Notification of "Ready to Burn"

Growers must notify DEQ when a registered field is ready to burn. Once the grower has notified DEQ, either online or by phone, that they are ready to burn (preferably 2–3 days before the field is ready), the field will be placed on the ready-to-burn list for burn approvals. The CRB online application will not allow a field on the ready-to-burn list if the grower or burn manager does not have a CRB training completion date. A regional office manages the ready-to-burn list, ensuring only growers genuinely prepared to burn are included.

2.1.4 Burn Day Activities for Growers

DEQ must operate the CRB program to safeguard public health and the environment. Growers should stay flexible for maximum field burning opportunities. DEQ will try to find suitable burn days for all desired fields; however, at times the requests exceed the atmosphere's smoke capacity or site requirements, like wind direction, are not met. DEQ Seasonal Smoke Specialists will inform growers of burn decisions as soon as possible; DEQ typically makes the final decision at 9:00 a.m. and 11:00 a.m. the day of the burn.

When DEQ has given final burn approval for a field, the Seasonal Smoke Specialist will notify the grower of final burn before 11:00 a.m. If the grower is ready for the burn, the Seasonal Smoke Specialist will issue the permit, including any additional permit requirements. If the burn cannot be conducted that day, the grower should inform the Seasonal Smoke Specialist as soon as possible so the field can be placed back on the ready-to-burn list, if desired. During morning notifications, the Seasonal Smoke Specialist will verify permittees understand the permit conditions, highlighting specific field conditions, such as verbal/written approval or time in which smoke must no longer be emitted. The final burn approval notifications will be posted on the DEQ's website, along with any additional permit requirements.

The grower must comply with permit requirements, statutes, or rules, and may face enforcement action if they fail to do so. Section 3.8 provides information on how DEQ addresses compliance and enforcement. Growers may need to carry out a test burn before being allowed to burn more acres. **DEQ staff must be present to evaluate smoke dispersion during test burns.** Growers must be accessible via cell phone or other portable communication. The grower must obey the Seasonal Smoke Specialist's instructions to cease burns if necessary. If the agency determines the burn is adversely impacting ISPs, the grower will be instructed to stop ignition promptly. More fuel cannot be added or ignited once a stop ignition requirement has been communicated.

2.2 Grower Requirements for Spot and Bale Burning

The spot and baled agricultural residue burn permit (spot and bale burn permit) can be used to burn small areas of residue or weeds or equivalent piled or baled residue under the following conditions:

- No more than 1 acre of spots and/or equivalent piled or baled agricultural residue may be burned per day. For this permit, 2 tons of piled or baled agricultural residue is equivalent to 1 acre of spots.
  - A spot or pile burn may include weed patches, spots of heavy residue, equipment plugs or dumps, pivot corners, and very small pastures but does not include the open burning of wind rows.
  - Baled agricultural residue may be burned to dispose of broken, mildewed, diseased, or otherwise pest-ridden bales still in the field where they were generated. Once a bale has been removed from the field, it cannot be returned to the field and then burned. If the grower has a significant disease or pest problem that cannot be addressed under the spot and bale rule limitations, the grower could consider burning under "Infectious Waste Burning" (IDAPA 58.01.01.616).
  - No more than 10 acres of spots and/or equivalent piled or baled agricultural residue may be burned per calendar year, per permit.
- Burning under the spot and bale burn permit is only allowed on DEQ-designated burn days for the county where the field is located and within the designated burn window. Spot and bale burns cannot smolder and generate smoke outside of the designated burn window. See *DEQ's Burn Decisions*.
- Burning under a spot and bale burn permit may be allowed on weekdays, weekends, and holidays.
- All burning must be conducted according to the permit issued by DEQ. The permit includes general requirements that apply to all burning conducted under the spot and bale burn permit and field-specific requirements due to location (e.g., proximity to a school).
- The permittee must record the date, time frame, type of burn, type of crop, and amount burned on the date of the burn. Records must be retained for 2 years and made available to DEQ upon request. DEQ provides an online recordkeeping program within the grower's account.
- A spot and bale burn permit is valid for the calendar year. All permits issued in a given calendar year expire on December 31 of that calendar year.
- The permittee must attend a CRB training session provided by DEQ that is offered periodically through the regional offices or online at *Crop Residue Burning in Idaho Grower Training*.

Spot and Baled Agriculture Residue Burn Permit Registration and Fees

Growers can register and pay fees at the *grower online tool*. Additional permit and grower information is found at *Crop Residue Burning*.

Registrations should be submitted to DEQ at least 14 days before the first desired burn date of the calendar year. Required information includes the following:

- Location of each field where the grower wants to conduct a spot or bale burn
- Grower's contact details, including email, mailing address, and phone number

Pay a nonrefundable permit fee of $20 to DEQ at least 14 days before the first desired burn date of the calendar year. Growers may pay fees online, by mail, or by hand delivery to the State Office or the nearest DEQ regional office. Send the signed registration and fee to the State Office (section 2.1.1). All fees received must be processed by DEQ's Fiscal office and may take up to 10 business days to be applied to the grower's account.

2.3 Grower Requirements for Propane Flaming

Propane flaming is the brief use of flame-generating equipment to heat the topsoil of a cultivated field of preemerged or plowed-under crop residue with less than 550 pounds of burnable, nongreen residue per acre, for the purpose of disease, insect, pest, and weed control. Propane flaming must be conducted on the field where the residue was generated.

Unlike other types of DEQ-regulated crop residue burning, propane flaming, as defined above, does not require growers to register fields or pay a fee. Instead, growers have a permit by rule if they comply with the following requirements (IDAPA 58.01.01.624.04 and 624.05):

- Permittee must ensure the burn does not create a hazard for public roadways.
- Propane flaming is only allowed on DEQ-designated burn days for the field's county and only within the designated burn window (*DEQ's Burn Decisions*).
- Propane flaming can be conducted on weekdays, weekends, and holidays.
- Permittees must keep 2 years of burn records (burn date, time frame, type of burn, crop type, and amount burned) and make them available upon DEQ's request.
- Person conducting the burning must carry a portable form of communication such as a cell phone to receive information necessary to protect air quality.
- Permittee must attend the DEQ's *Crop Residue Burning in Idaho Grower Training*.
- All persons intending to conduct propane flaming must obtain any additional permits from federal, state, or local fire control authorities before burning. DEQ's spot and bale burning web application assists growers with obtaining Idaho Department of Lands burn permits.

Propane Flaming Burning Restrictions

The following restrictions apply to propane flaming burning:

- Burning is prohibited within 3 miles of an ISP when surface wind speeds exceed 12 mph, or if smoke is expected to negatively impact an ISP.
- All open burning, including propane flaming, is prohibited when DEQ issues an air quality emergency episode notice (IDAPA 58.01.01.552).
- Tires and other restricted materials described in IDAPA 58.01.01.603 are not allowed for ignition in fields.

3 DEQ Program Guidelines

3.1 DEQ Processing of Registrations

The CRB Smoke Management Analyst reviews registrations for accuracy and completeness and then develops initial permit requirements. The CRB database identifies ISPs within a 3-mile radius of each field and includes special features like populated areas, public roads, and airfields. DEQ may also consider ISPs or other features beyond the 3-mile limit based on the analyst's consultation with the regional office. This decision could apply to large fields, specific crop residues that produce heavy smoke, growers with poor burning practices or new to the program, or areas with unique terrain or microclimates that may require a higher level of protection for ISPs. DEQ adds permit requirements for these field-specific features that remain attached to the field and apply every time the field is burned. The CRB Smoke Management Analyst revises permit conditions as needed.

After reviewing the registration, the CRB Smoke Management Analyst sends the "Registration Receipt and Initial Permit Requirements" and cover letter to the grower via email or mail. This document confirms the completeness of the information, acceptance by DEQ, satisfaction of registration requirements, and provides general permit conditions, field-specific requirements, and a field map with ISP locations. Registration approval for burning is conveyed to the regional office and Seasonal Smoke Specialist who contacts the grower before the requested burn date.

The “Registration Receipt and Initial Permit Requirements” document is NOT a final approval to burn.

3.2 Burn Decisions Criteria

DEQ uses multiple parameters and factors to decide whether to permit burning in each field. A combination of these parameters ensures optimal conditions for smoke management. Even if air quality is good, unfavorable weather conditions may prevent burning. On the other hand, moderate air quality and favorable weather and field conditions may allow limited burning.

The CRB Smoke Management Analyst makes preliminary and final burn decisions for each county based on factors such as weather conditions, air quality, and field conditions, with assistance from DEQ meteorologists. Coordination calls are held during the fall burn season, where Seasonal Smoke Specialists and regional office staff offer input based on local knowledge. The Seasonal Smoke Specialists communicates with growers to determine readiness and approve burns if appropriate, with guidance from DEQ meteorologists and the CRB analyst. The flowchart in Figure 1 shows the complete burn decision process.

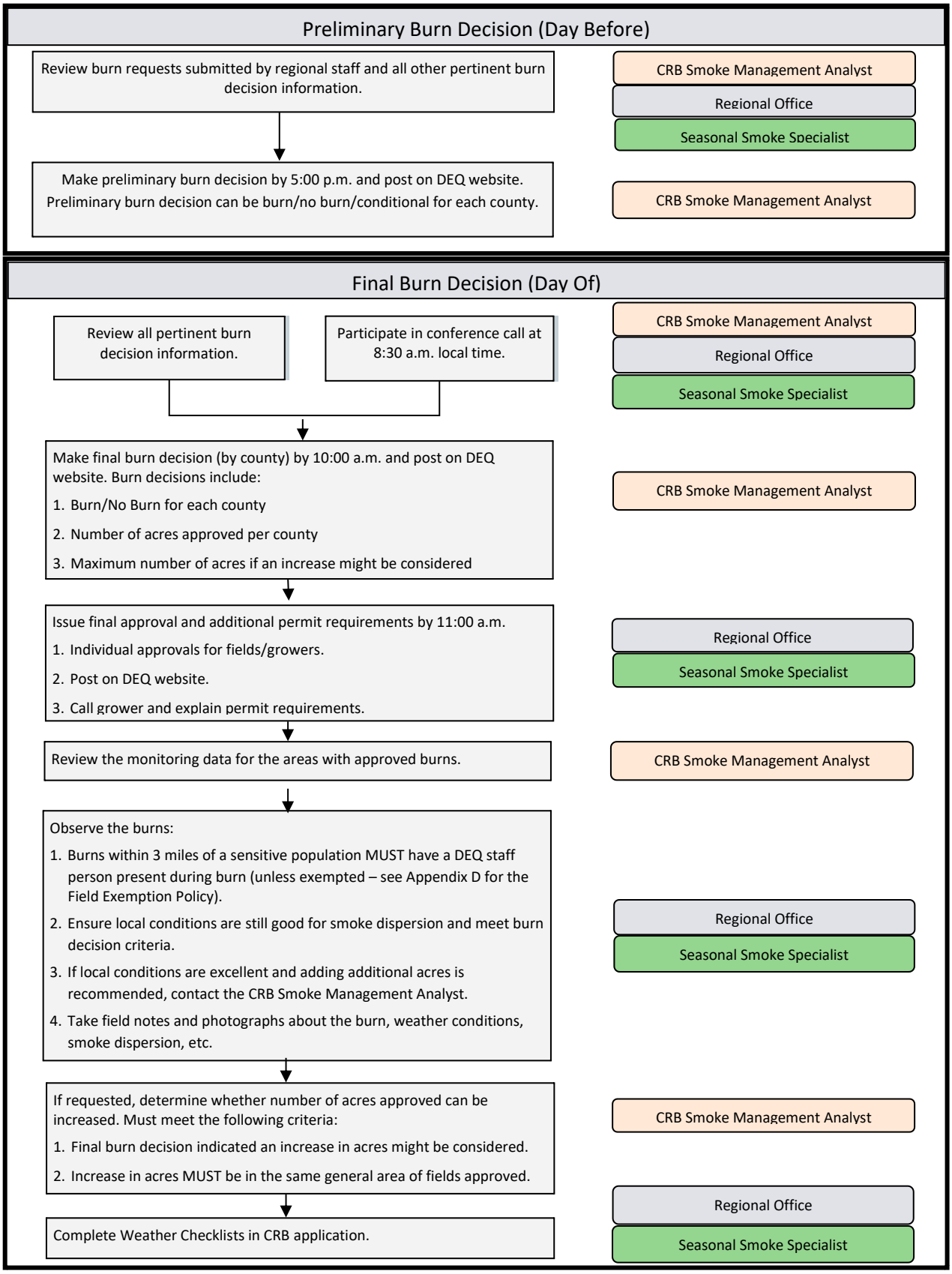

Figure 1. Burn decision process.

The preliminary burn decision is issued the day before the burn. For Monday burns, the preliminary decision is made the prior Friday. Preliminary burn decisions are either a “burn,” “no burn,” or “conditional burn” decision. A conditional burn decision is given when the forecast is unclear. **Preliminary no burn decisions cannot be changed during the final burn decision**, so it should only be issued when the analyst is confident that burning is not suitable the next day and no burning requests are anticipated.

Final burn decisions include a determination of burn or no burn, the number of approvable acres per county, an approved burn window, whether metered burning or test-burns are to be conducted, and if additional acreage is to be approved pending results from initial burns.

Test burns are conducted to evaluate dispersion conditions in areas with similar ventilation or dispersion conditions, particularly near challenging spots like canyon rims, near towns, or during uncertain dispersion periods. Ideally**, test burns should be avoided within a 3-mile radius of ISPs**, but if conducted, caution must be exercised. These burns should be large enough to accurately assess dispersion conditions but not so large that adverse impacts could occur. Typically, test burns cover around 40–80 acres and require supervision from DEQ staff. If dispersion results are satisfactory, further burning may be permitted in the represented area.

Metering is used to prevent overloading the airshed with smoke when dispersion conditions are limited. Metering helps field staff regulate acreage approval during smoke overloads by requiring verbal or written approval from DEQ based on earlier burn observations. This practice can be implemented for all or a portion of permits in a particular location.

3.2.1 Smoke Management Areas

DEQ has created smoke management areas (SMAs) to suit the varied topography, climate, soils, and crops of the state. These areas are further refined with forecast zones and county boundaries for effectiveness. Figure 2 shows the SMAs and county boundaries.

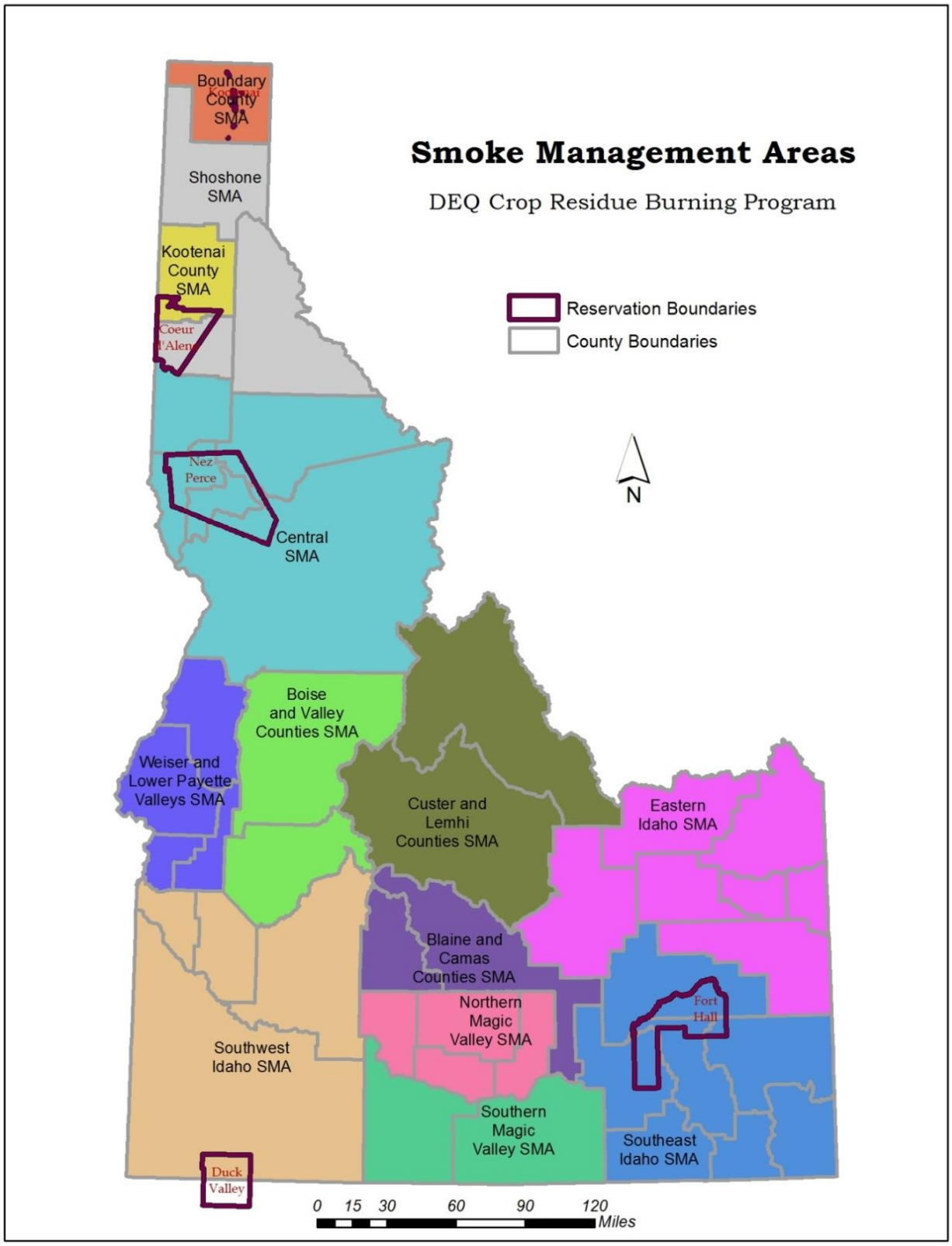

Figure 2. Smoke management areas.

3.2.2 Air Quality Criteria

To approve a request to burn, DEQ must determine that ambient air quality levels meet the criteria outlined in section 1.1.1.

Crop residue burning releases pollutants such as particulate matter less than 2.5 microns or less than 10 microns in diameter ($PM_{2.5}$ and PM_{10}, respectively) and ozone. If monitoring data is unavailable, visibility can be used as a factor in the burn decision process. If visibility remains poor throughout the day, a no burn decision can be made. However, it is important to consider that the presence of water and particulate matter in the air can severely reduce visibility, leading to inaccurate conclusions about particulate matter concentrations. When relative humidity exceeds 65%, caution should be exercised if using visibility as a component of the burn decision process.

3.2.3 Meteorological Conditions

Table 1 lists the meteorological parameters that DEQ reviews and evaluates when making a burn decision. This table serves as guidance only for identifying days when burning may be restricted or limited. The goal is to control smoke effectively (i.e., smoke rises and disperses away from populated areas and ISPs.) A combination of sources, including weather forecasts, informs the evaluation of these parameters.

Burning during a subsidence inversion requires careful consideration. Burning during radiation inversions should be avoided until mixing out, but DEQ may allow burning before the inversion clears to ensure safe transport of smoke and protection of populated areas.

For example, smoke from burns on the Camas Prairie can negatively impact Grangeville due to southerly winds, except in the morning when wind blows to the east. Taking advantage of this, burns can be started in the morning so that the smoke rises to the inversion layer and then travels eastward before shifting southward, minimizing the impact to Grangeville. Similar early burn windows occur throughout the state.

When using this technique, DEQ ensures the mixing height is sufficient to hold the smoke without adverse impacts by evaluating local wind patterns and temperature profiles beforehand. Seasonal Smoke Specialists collaborate with CRB Smoke Management Analysts and meteorologists to conduct the necessary evaluation and documentation.

Table 1. Burn decision meteorological parameters.

Parameter	Burn Day	Conditional Burn Day	No Burn Day
Ventilation	"Good" to "Excellent" ventilation is preferred; however, if ventilation is "Good" or "Excellent," check to ensure surface wind speeds are <12 miles per hour (mph).	"Good" to "Excellent" ventilation may be unacceptable if surface winds are >12 mph. Burning under "Limited" ventilation may be acceptable only if other criteria are met and burning proceeds with caution. "Poor" ventilation should be avoided unless there is good vertical convection with enough fuel and/or wind to carry the fire and good transport winds aloft.	"Poor" ventilation should be avoided.
Cloud cover	Mostly sunny to partly cloudy is typically best.	Clear bright skies may indicate a high-pressure system with stagnant conditions. Ensure other criteria are met if this is the case. Cloudy conditions may be acceptable if clouds are high, and all other criteria are met.	Mostly cloudy conditions with low clouds should be avoided.
Surface wind speed (sustained)	Moderate winds, 3 to 8 mph are preferred.	Calm or near calm winds should be avoided. Light winds <3 mph generally are insufficient to carry the fire. However, sunshine and abundant/dry fuel, especially on a hill, may result in good rise for lighter winds <3 mph. Winds 8–12 mph may be ok if there is strong sunshine to maximize vertical convection but proceed with caution.	Burning is not allowed at fields located within 3 miles of an ISP when wind speeds exceed 12 mph. Winds >12 mph should be avoided even in remote areas for fire safety reasons.
Surface wind direction	Avoid institutions with sensitive populations, populated areas, and nearby public roadways, etc. If possible, also avoid large bodies of water and large canyons/valleys. Be aware of typical wind shifting patterns in an area and atypical forecast wind shifts.	N/A	It is critical to avoid cities and institutions with sensitive populations.
Transport wind speed (at 850 millibar level or about 5,000 feet above ground level)	7–20 mph is preferred.	Use caution with transport winds that are <7 mph or >20 mph.	Upwind of cities and institutions with sensitive populations, transport winds >20 mph should be avoided.

Parameter	Burn Day	Conditional Burn Day	No Burn Day
Transport wind direction	Avoid institutions with sensitive populations, populated areas, and nearby public roadways, airports, etc.	Avoid transport winds taking smoke towards cities and institutions with sensitive populations unless ventilation is “Good” to “Excellent.”	It is most critical to avoid cities and institutions with sensitive populations at all times.
Mixing height	Greater than 5,000 feet above ground level is desired.	With mixing heights of 1,000–5,000 feet, caution should be used. If transport winds will transport smoke over large bodies of water and large canyons/valleys, avoid burning if mixing height is less than 5,000 feet.	Avoid burning if the mixing height is <1,000 feet above ground level.
Relative humidity	15%–45% relative humidity is the ideal range.	Relative humidity <15% is acceptable if fire control/safety concerns with surrounding fuels are low. Relative humidity between 45% and 60% may inhibit plume rise and smoke dispersion. For bluegrass, relative humidity >30% may inhibit plume rise and smoke dispersion.	Relative humidity >60% should be avoided as it may inhibit smoke dispersion and may leave unburned materials.
Inversion conditions Radiation and subsidence are two types of inversions that should be avoided.	Typically, burns should occur after 10:00 a.m. and be completed before 5:00 p.m. to avoid trapping the smoke in mountain valleys by radiation inversions. Weather forecasts and hourly ventilation indices will dictate start and stop times.	Radiation Inversion—A surface-based inversion that exists on most mornings and evenings, particularly when daytime heating is strong. Burning should not be permitted before the inversion has mixed out unless transport conditions after breakup would best protect population centers and burning during an inversion does not cause adverse impacts. A sufficient amount of time should be allowed at the end of the burn day for any residual smoke to disperse before a radiation inversion returns.	Subsidence Inversion—When a strong high-pressure system is present with clear skies, hot air subsides, causing stable air and poor dispersion. This condition is easy to forecast, and a no burn day should be called when a strong high-pressure system is over the region.

3.2.4 Other Relevant Factors

When deciding to burn, consider these additional factors:

- **Burning method**—Burning method includes both the ignition method (e.g., matches or lighters, propane torches, modified harrow rakes, or diesel burners), the number of ignitors on the field, and the pattern of lighting. Generally, hotter fires will result in less smoke production and better smoke lift.
- **Fuel type, size, and arrangement**—These characteristics also affect smoke emissions. Generally, denser fuel results in more smoke production. Fuel density can change by crop type and variety (e.g., wheat stubble is typically less dense than bluegrass residue and certain wheat or bluegrass varieties can be denser than others).
- **Fuel loading**, or the amount of residue available to burn per acre, correlates to the amount of smoke produced.
- **Fuel moisture**—Fuel moisture content depends upon fuel type, recent precipitation, and relative humidity. To promote a hot burn and good plume rise, the fuel moisture should be as low as possible throughout the residue layer. Generally, higher fuel moisture levels result in more smoke and reduced plume rise.
- **Soil moisture**—Moisture from the soil will cool the smoke and result in a reduced plume rise.
- **Red Flag Warnings** issued by the National Weather Service (NWS), will automatically shut down burn approvals. DEQ will not allow burning while the warning is in effect.

3.3 Making a Burn Decision

The CRB Smoke Management Analyst makes preliminary and final burn decisions (burn/no burn/conditional), including the approved number of acres for each county. Appendix A outlines the CRB Smoke Management Analyst's burn decision responsibilities.

3.4 Field Approval Process

The Seasonal Smoke Specialists and Regional Office Analyst work together with the CRB Smoke Management Analyst, to determine which fields can be approved for burning. Their responsibilities are outlined in Appendix B and Appendix C. The approval process considers the forecast conditions and the amount of time a field has been registered. They also consider factors such as coordinating with other burning activities and avoiding overloading an airshed with too much smoke. Safeguards like coordination calls and in-field observations are in place to prevent airshed overload.

The following should also be considered when approving burns:

- **Burning near canyon rims and large bodies of water** should only be done when winds are blowing away from them.
- **Favorable winds**—Some areas have predictable wind patterns, including predominant wind directions, wind shifts, and diurnal (daily) patterns. In these areas, burns may be

timed to take advantage of such patterns, and priority for burn approval may be appropriate if these conditions are forecast.

- **Burning near ISPs** should be conducted in a way that directs smoke away from ISPs. Permit conditions typically include this restriction. Burn approval priority will be given to fields that pose no risk to sensitive populations.
- **Elevation and field aspect** should be considered regarding the mixing height. An elevated field may be just below the top of the mixed layer, resulting in little room for the smoke plume to disperse within the layer.
- **Fields with infestation issues** should be considered for priority approval to prevent the infestation from worsening or spreading. Discussions with the grower and local Idaho State Department of Agriculture representatives should occur in these instances.

3.5 Public Notification of Burn Approvals

DEQ will notify the public of approved burns by posting the following burn decision information on the website:

- Whether a given day is a burn or no burn day.
- Location and number of acres permitted to be burned.
- Location and amount of additional acres that may be added, if applicable, pending adequate results from test burns.
- Meteorological conditions and any other real-time ambient air quality monitoring data.

The public can receive burn decision information, provide a comment, or submit a complaint using DEQ's toll-free hotline at (800) 345-1007 or online at *DEQ's Burn Decisions*. The hotline is shared with the Nez Perce and Coeur d'Alene Tribes. DEQ also sends a listserv email to announce that a burn decision has been made. Additional notifications may be required in some regions to address specific local conditions. For example, DEQ's Coeur d'Alene Regional Office must contact the Kootenai Tribe directly to notify them of burn approvals in the Kootenai River Valley of the Boundary County SMA. DEQ implements the CRB program for growers burning inside reservation and allotment lands of the Kootenai Tribe according to the 2008 Memorandum of Understanding.

3.6 Field Observations

Seasonal Smoke Specialists observe burns in their SMAs on approved burning days. Burns within 3 miles of an ISP **require** observation, unless exempted. Details on field observation activity are found in Appendix B.

Appendix D provides the field observation exemption criteria. If a field is approved for burning without DEQ observation, DEQ must inform the ISPs before ignition, providing the burn's date, time, location, and DEQ contact information. Seasonal Smoke Specialists also conduct field observations on days without burn approvals to detect potential unauthorized CRB activity and engage in outreach and education.

3.7 Enhanced Documentation

DEQ established procedures to ensure the provisions of IDAPA 58.01.01.621 and the SIP are met. Section 1.1.1 provides specific IDAPA 58.01.01.621 criteria. The pollutant concentration thresholds that trigger preburn and postburn enhanced documentation are shown in Table 2. Additional details on enhanced documentation are found in Appendix E.

Enhanced documentation aims to (1) record burn approval decisions when pollution levels surpass preburn thresholds (preburn enhanced documentation); (2) document air quality events after a burn to assess potential impacts (postburn enhanced documentation); (3) evaluate burn success to enhance program implementation; and (4) set new field-specific permit conditions as needed.

Table 2. Enhanced documentation trigger levels for $PM_{2.5}$ and ozone.

Averaging Period and Pollutant	Preburn Level	Postburn Level
1-hour $PM_{2.5}$	N/A	64 µg/m^3
4-hour $PM_{2.5}$	22 µg/m^3	32 µg/m^3
24-hour $PM_{2.5}$	16 µg/m^3 (Air Quality Index = 59)	26 µg/m^3 (Air Quality Index = 80)
8-hour ozone	N/A	63 ppb (Air Quality Index = 77)

Note: µg/m^3 = micrograms per cubic meter; ppb = parts per billion

3.8 Complaint Response, Compliance, and Enforcement

The regional offices are responsible for handling CRB complaints and investigating possible violations and can refer violations to the State Office for formal enforcement consideration. The CRB Smoke Management Analyst plays a role in determining appropriate enforcement actions and assisting with documentation. Appendix F provides information on assessing compliance with permit conditions. Complaints can be received through the DEQ toll-free hotline, DEQ web submission, or direct contact with regional offices.

To ensure consistency and compliance with state rules, regional office staff follow these steps when addressing CRB complaints:

- Respond to complaints as soon as possible, ideally on the same day.
- Log all complaints into the tracking system, regardless of the source.
- Document relevant information such as law enforcement reports or physical evidence.
- Address complaint allegations with specific data, such as in-field observations by Seasonal Smoke Specialists, web cam images, or talking with the grower.
- Provide a determination of compliance if possible. For example, if the complainant states smoke crossed the county border and impacted their residence, the response must include the field observations compiled that day.

- Consult with the CRB Smoke Management Analyst for guidance on enforcement actions. Enforcement guidance and procedures are found in the policy, *Air Quality Guidelines and Procedures for Issuing Notices of Violation*, July 2021.
- The CRB Smoke Management Analyst tracks complaint responses and reminds regional staff if a response is overdue.
- Complaint responses must meet the DEQ's compliance program requirements.

Appendix A. Standard Operating Procedures for CRB Smoke Management Analyst

The CRB Smoke Management Analyst implements all aspects of the CRB program and is expected to know all the roles and facets of the operating guide and appendices.

General Tasks

- Review and process registration forms.
- Serve as the main point of contact for the CRB program in support of the air quality enforcement program.
- Compile data and complete the annual report.
- Provide support to regional offices.
- Inform the Smoke Management Supervisor of issues as necessary.
- Assist with outreach activities.
- Develop, propose, and promote program improvements to the Smoke Management Supervisor.
- Develop annual training for CRB staff.

Daily Burn Decision Tasks—Day Before Burn

- Review current monitor readings and trends for particulate matter and ozone within the SMA. Compare current readings to the regulations (i.e., 90% of the ozone NAAQS, 75% of any other NAAQS, and 80% of the 1-hour trigger for particulate matter).
- 64 µg/m^3 for $PM_{2.5}$ (1-hour average)
- 26 µg/m^3 for $PM_{2.5}$ (24-hour average)
- 112 µg/m^3 for PM_{10} (24-hour average)
- 63 parts per billion (ppb) for ozone (8-hour average)

Note: A no burn decision may be made at this point and the following steps will not be needed.

1. Briefly review meteorological forecast models, tools, and real-time data.
2. Review wildland fire and prescribed burn information.
3. Make preliminary burn decision (burn/no burn/conditional) for each county based on the information and tools reviewed.

Daily Burn Decision Tasks—Day of Burn

1. Review the preliminary burn decision. If it was no burn, no further action is needed.
2. Review current $PM_{2.5}$ and ozone monitor readings and trends within the SMA for the following data.
    - Current 1-hour, 4-hour, and 24-hour average $PM_{2.5}$ concentrations
    - Current 1-hour and forecast 8-hour ozone concentration

3. Compare monitoring data to trigger levels for enhanced documentation. Notify the Seasonal Smoke Specialists and/or regional office when trigger levels for enhanced documentation have been reached.
4. Compare data to the regulations (i.e., 90% of the ozone NAAQS, 75% of any other NAAQS, and 80% of the 1-hour trigger level for particulate matter).
    - 64 µg/m^3 for $PM_{2.5}$ (1-hour average)
    - 26 µg/m^3 for $PM_{2.5}$ (24-hour average)
    - 112 µg/m^3 for PM_{10} (24-hour average)
    - 63 ppb for ozone (8-hour average)

Note: A no burn decision may be made at this point and the following steps will not be needed.

5. Review meteorological forecast and coordinate with the DEQ meteorologist for real-time data according to DEQ's CRB burn decision standard operating procedure.
6. Review wildland fire and prescribed burn information.
7. Review the ready-to-burn fields, noting field locations and size for each SMA.
8. Review the smoke dispersion forecast from the meteorologists (available by 8:00 a.m.) during the fall burn season or the NWS forecast if the meteorologists' forecast is unavailable.
9. Submit proposed burn decision. An email is sent to recipients on the distribution list upon submission.
10. Host daily coordination calls with the meteorologists, regional office staff, Seasonal Smoke Specialists, and other smoke managers at 8:30 a.m. local time.
11. Make the final burn decision for each county (burn/no burn and number of acres) based on review of information and consultation with regional office staff by 10:00 a.m. local time.
12. Throughout the burn day, monitor the air quality and coordinate with DEQ meteorologists for real-time conditions. If air quality and/or meteorological conditions result in the burn decision being changed during the day, proper documentation should be maintained to support decisions to increase or decrease the acres to be burned. An increase in acres during the burn day is only allowed if it was noted in the final burn decision. If the burn decision changes, coordinate with the regional office staff to document the change as follows:
    - Thoroughly document the reasons and conditions supporting the change.
    - Ensure all applicable staff is updated.
    - Continue to monitor air quality conditions.

Appendix B. Standard Operating Procedures for CRB Seasonal Smoke Specialists

Seasonal Smoke Specialists must understand section 3 of the *Crop Residue Burning Program Operating Guide* and be familiar with sections 1 and 2 to effectively and efficiently implement their CRB program responsibilities.

General Tasks

- Attend the preseason training session. Staff must not carry out Seasonal Smoke Specialists duties independently without completing training.
- Serve as primary point of contact for assigned growers during the burn season.
- Assist the Regional Office Analyst with complaint response, enforcement activities, investigating apparent violations, and developing enforcement referral packages as directed.
- Assist with compliance and enforcement as requested; the primary duties are coordinating program-related burning (section 3.8 provides complaint response and enforcement activities).
- Assist with outreach efforts and grower training as directed. This effort will likely occur early in the season when more flexibility in weekly scheduling is available.

Daily Burn Day Tasks—Day Before Burn

1. Provide input on the preliminary burn decision if needed.
2. Review and maintain the ready-to-burn list and plan the following day. Communicate directly with growers to secure reasonable assurance for the next day's planning.

Daily Burn Day Tasks—Day of Burn

1. Review the ready-to-burn list. Growers must have fields on the ready-to-burn list before noon local time the day before they would like to burn. Determine who may want to burn that day.
2. Check the pollutant data, visibility conditions, and be aware of fire safety issues.
3. Review the meteorologists' forecast (available by 8:00 a.m.) during the fall burn season or the NWS forecast discussion if the meteorologists' forecast is unavailable.
4. Based on relevant weather and fuel factors, propose requested acres by county, in writing (text or email), to the CRB Smoke Management Analyst by 8:30 a.m. This notification can also be done the day before.

    - To ensure efficient coordination, include the Smoke Management Supervisor, regional air quality manager, and staff meteorologists in these communications.
    - Outside of the fall burn season, the CRB Smoke Management Analyst will respond to your burn request by 9:30 a.m. local time with the final burn decision. The final burn decision will include a brief air quality and weather discussion, burn window, and burn

decision acres. Based on burn decision, determine what fields will be approved to burn. Approval priority is as follows:
   - Favorable conditions exist for sensitive areas
   - Forecast conditions favor the unique/specific requirements for the area
   - Date of burn requests

5. Participate in daily CRB coordination calls (fall burn season). Discuss who may want to burn that day and potential acreages. During the morning coordination call, provide feedback about the previous day's forecast based on field observations of smoke behavior.
6. Based on the burn decision, determine what fields will be approved to burn. Approval priority will be as follows:
   - Favorable conditions exist for sensitive areas (e.g., fields near towns, roads, and canyons) and ISPs.
   - The forecast conditions favor the unique or specific requirements of the area to be burned.
   - The earliest burn requests received from growers. Include considerations on when fields are actually ready to burn.
7. Post the notifications of final approval and contact the approved growers to notify them of final approval. Seasonal Smoke Specialists must supply the grower with the following information:
   - Approved burn window or ignition time.
   - Approved burn locations or specific field.
   - Specific permit requirements (conditions) for the burn (e.g., expected wind direction or speed, any conditions necessary to protect ISPs, or potential for rain).
   - Other relevant information such as if final verbal/written approval is needed and ensuring smoke is no longer emitted after burn window ends.
   - Document communications with growers and all the burn approvals and denials.
   - Submit preburn enhanced documentation as needed before the start of the burn.
   - Verify regional burn information is correct on *DEQ's Burn Decisions* web page.
8. Print, download, or create weather checklists (field notes) for fields that you will observe. This step can be done on the previous afternoon or evening to expedite morning deployment.
9. Attend ISP burns unless you have requested an exemption from the CRB Smoke Management Analyst or Regional Office Analyst, and an exemption has been granted by the CRB program staff. If ISP fields are not being burned that day, attend burns that are not sensitive in nature.
10. Receive updated instructions for the day from the regional office. These instructions may include driving to the burn location to monitor burns, responding to complaints, or investigating illegal burns.
11. When in the field, be aware of current atmospheric conditions that may affect burning (e.g., incoming storms or changes in temperature, humidity, wind speed and direction,

cloud type, and visibility conditions) and the effects of the surrounding terrain. Record field conditions and observations. Records must meet minimum requirements. Be aware of the weather checklist requirements.

12. If meteorological conditions in the field differ from the forecast, contact a staff meteorologist for an updated spot forecast. If conditions deteriorate, the Seasonal Smoke Specialist has the authority to require withholding of additional fuel to cause the fire to burn out and excluding additional burning for the day. Contact the growers if or when they are affected by deteriorated conditions.
13. The only time permit conditions might change is when an on-site Seasonal Smoke Specialist or Regional Office Analyst identifies permit conditions that are inaccurate due to an error during the registration process or because conditions do not represent the field. In such instances, the field staff must contact the CRB Smoke Management Analyst to change the permit conditions and a issue a corrected permit authorizing burning. If the CRB Smoke Management Analyst is unavailable, the burn must either proceed according to the existing permit conditions or not take place at all.
14. Remain in contact with growers throughout the day either by cell phone or in person. Acreage of burn may be increased (an increase must be according to the acreage listed on the final burn decision) or decreased during the burn day, depending on improving or deteriorating conditions. The CRB Smoke Management Analyst or assigned designee has the authority to increase acreage. If acreage is increased, the Seasonal Smoke Specialist will be contacted with the necessary information.
15. Compile field notes within 1 week of observations and submit into the application at least monthly.
    - When adding multiple fields to the field notes and selecting print, there is a map (available withing the application), and specific burn restrictions for each field. Only one section is available for field, weather, and smoke observations. Users can edit comments in the remarks section. PDFs, word documents, and Excel files can be uploaded.
    - Blank copies of field notes are available in the application. The template is found on the field notes page in the upper right-hand corner (the printer icon).
16. Track completion of postburn reports. Postburn reports should be completed within 24 hours. Staff should work with growers to complete postburn reports. If the grower fails to submit a postburn report, they risk losing priority for their next burn. Additional information must be entered if the postburn report is completed by a DEQ staff member:
    - Number of acres burned.
    - Comments about how the burn went (Did the weather forecast verify? Did smoke dissipate well?)
    - Provide feedback and describe if the program was effective or ineffective and suggest improvements.
    - Date of burn.
    - Date postburn report was submitted.
    - Name of staff submitting postburn report.

17. Follow up on new registrations (incomplete registrations and grower training).
18. Prepare for the next day by reviewing forecast and fields on the ready-to-burn list. Move growers to the ready-to-burn list when requested.
19. Complete postburn enhanced documentation as required and submit within 2 days. You will receive a notice on the landing page and by email if you need to complete postburn reports and enhanced documentation.

Appendix C. Standard Operating Procedures for Regional Office Staff Assigned to CRB Tasks

A Regional Office Analyst may have some or all the duties listed in Appendix B for the Seasonal Smoke Specialist if no specialist is assigned to the region, the specialist is unavailable, or activity levels exceed current Seasonal Smoke Specialists staffing.

General Tasks

- Train, supervise, and deploy Seasonal Smoke Specialists.
- Regional office supervisors are responsible for ensuring Seasonal Smoke Specialists are available to receive program training. The CRB program provides an annual training session for all CRB staff. If this training cannot be attended, an alternative training curriculum will be developed for this responsibility. Supervisors must work with the program office if an alternative training is necessary.
- Primary responsibility to respond to complaints received from regional activity per section 3.8 requirements.
- Investigate apparent violations or allegations of violation.
- Develop enforcement referral packages for potential violations per program practices.
- Operate seasonal monitors according to requirements of existing standard operating procedures.
- Implement outreach efforts, including contacting individual growers, grower groups, local fire departments, and ISPs.

Day Before Burn

1. Provide input to the preliminary burn decision as needed.

Day of Burn

1. Review the forecast from the staff meteorologist (available by 8:00 a.m. local time) during the fall burn season or the NWS forecast discussion if the meteorologists' forecast is unavailable.
2. Participate in daily CRB coordination calls with meteorologists, CRB Smoke Management Analyst, Seasonal Smoke Specialists, and regional office supervisors and staff at 8:30 a.m. local time.
3. During the daily CRB coordination call, participate in discussions on smoke behavior and weather forecast validation from the previous day. Share specific smoke descriptions and feedback about the previous day's forecast.
4. Provide input on the final burn decision as needed.
5. Support field staff during burn day.

Appendix D. Standard Operating Procedures for Field Observations Exemptions

Field staff is expected to observe burns when burning is approved in the region. Anytime field staff will not be present for burning, discuss with the CRB Smoke Management Analyst before the burn decision. The following categories of burns have specific requirements for DEQ observation:

- **Test burns**—Field staff *must* observe all test burns.
- **Burns located within 1 mile of an ISP**—Field staff must observe all crop residue burns within 1 mile of an ISP. Exemptions to this requirement **must be preapproved by the CRB Smoke Management Analyst or assigned designee**. Exemption requests must be completed in the CRB application. The CRB Smoke Management Analyst will review and approve or deny the request.
- **Burns located between 1 and 3 miles from an ISP**—For fields 20 acres or smaller, field staff must observe these burns unless regional office staff have evaluated the proposed burn and documented the justification that it is not necessary to observe the burn. Justification must be based on the parameters described below and documented on the exemption request form in the CRB application.

  For fields larger than 20 acres, field staff must observe these burns. Exemptions to this requirement **must be preapproved by the CRB Smoke Management Analyst or assigned designee**. Exemption requests must be completed in the CRB application. The CRB Smoke Management Analyst will review and approve or deny the request.
- **Burns located beyond 3 miles of an ISP**—Field staff is expected to be in the field observing burns when burning is approved in their SMA. Exemptions to this requirement must be discussed with the CRB Smoke Management Analyst or assigned designee before the final burn decision. Exemption requests must have documentation, such as email communication or phone log notes. The exemption documentation form is not necessary for fields burns located beyond 3 miles of an ISP.

Factors used to justify the exemptions may include, but are not limited to, the following:

- Fields considered to have a low risk of causing adverse impacts to an ISP.
- Fields located in remote areas where weather and terrain conditions are known to provide excellent dispersion conditions.
- Burning will be conducted by a highly proficient and adequately trained person with a history of complying with DEQ rules and implementing effective smoke management techniques.
- Total acreage approved for burning in the area is de minimis per modeled impact analysis.
- The SMA does not have a history of grower noncompliance with program requirements.

Exemption Parameters

The following parameters should be evaluated to determine the risk of a particular burn and whether it needs to be observed by DEQ staff:

- **Person conducting the burn**—The experience and proficiency of the person conducting the burn should be considered. Growers who have a history of using good burning techniques and have demonstrated good judgment in conducting past burns may be considered for burning without DEQ observation. Growers who are new to the program or who have a history of using unreliable or ineffective burning techniques or have not demonstrated good judgment should not be considered for burning without DEQ observation.
- **Forecast meteorological conditions**—Forecast meteorological conditions to consider in determining the relative risk that a particular burn may pose to an ISP include the following:
  - Surface wind speed and direction
  - Transport wind speed and direction
  - Mixing height and ventilation
  - Air temperature
  - Relative humidity
  - Inversion strength and timing of the mix-out
  - Elevation of ISP relative to field location
  - Confidence in forecast meteorological conditions
- **Field conditions**—Field conditions to consider in determining how well a particular field may be expected to burn include the following:
  - Crop type
  - Fuel load
  - Fuel moisture
  - Soil moisture
  - Past successful or unsuccessful attempts to burn the particular field
- **Terrain, local conditions, and monitoring network**—Knowledge of terrain and other local conditions should be considered, including how terrain, predominant wind patterns, and local diurnal patterns may affect smoke behavior. Air quality monitors located at ISPs may be factored into the decision-making process.

Appendix E. Standard Operating Procedures for Enhanced Documentation

Preburn enhanced documentation is only required when burning will be approved or when burning has been approved but has not yet commenced and either of the following two conditions occur:

- The rolling 4-hour average $PM_{2.5}$ concentration equals or exceeds 22 µg/m^3 any time from 5:00 a.m. up to the start of the burn.
- The rolling 24-hour average $PM_{2.5}$ concentration equals or exceeds 16 µg/m^3 any time from 5:00 a.m. up to the start of the burn.

Postburn enhanced documentation is **only required when burning has been approved and has occurred** and any one of the following occurs:

- The 1-hour average $PM_{2.5}$ concentration equals or exceeds 64 µg/m^3 any time after the start of the burn through 10:00 p.m. on the day of the burn.
- The rolling 4-hour average $PM_{2.5}$ concentration equals or exceeds 32 µg/m^3 any time after the start of the burn through 10:00 p.m. on the day of the burn.
- The 24-hour average $PM_{2.5}$ concentration equals or exceeds 26 µg/m^3 during the burn day (midnight to midnight).
- The 8-hour average ozone concentration equals or exceeds 63 ppb any time after the start of the burn to midnight.

DEQ Staff Responsibilities

The CRB Smoke Management Analyst is responsible for the following enhanced documentation tasks:

- Review the monitoring data before the morning burn decision to determine whether any preburn trigger levels have been exceeded.
- Notify the applicable regional office staff when approved burns will require preburn enhanced documentation.
- Track the monitoring data throughout the day and notify the applicable regional office staff of any enhanced documentation criteria that were triggered during the burn day. This criteria may consist of preburn triggers exceeded before the start of the burn or postburn triggers exceeded after the burn was started.
- For any 8-hour ozone concentration exceedance, the CRB Smoke Management Analyst or regional ozone forecaster is responsible for completing enhanced documentation if the forecast allows burning to occur, but concentrations for the burn day exceed the criteria for restricting burning.
- Participate in postburn enhanced documentation development to identify changes to the decision process or new field specific requirements needed to improve the overall decision making for the area or specific field.
- Ensure enhanced documentation is completed in the CRB application.

Regional office staff are responsible for the following tasks:

- Complete enhanced documentation within the CRB application for all applicable burns. If enhanced documentation is necessary for a given field, it will be flagged on the regional home page in the CRB application.
  - Preburn enhanced documentation, when required, must be completed before the final burn approval. If the preburn enhanced documentation requirement is triggered after the final burn approval but before the start of the burn, the preburn enhanced documentation should be completed while the information remains fresh (typically within a day or two). Preburn enhanced documentation is limited and explains why burning should be approved, such as ventilation is expected to clear the airshed before burning starts.
  - Postburn enhanced documentation should be completed within 2 days to ensure relevant conditions are captured, and archived meteorological forecast data from outside sources is available if needed. Contact ISPs if necessary. Immediate feedback from representatives of ISPs will be more valuable than feedback after several days or weeks. The Regional Office Analyst or field staff must attempt to contact ISPs within 1 day of possible impact. Refer to the enhanced documentation in section 3.7 while completing these forms to ensure the proper level of information is included in this document.

Preburn Enhanced Documentation

Preburn enhanced documentation must be completed when DEQ will be providing, or has provided, final burn approval and a measured pollutant concentration in the area exceeds a preburn trigger level shown in section 3.7, Table 2. Preburn enhanced documentation requires DEQ to evaluate elevated pollutant concentrations in the area before the start of the burn and assess how smoke from the approved burning will affect the concentrations. Preburn enhanced documentation, when triggered, must be completed before the final burn approval, and the final burn approval must be based on the enhanced documentation assessment. If the trigger occurred after final burn approval but before the start of the burn, enhanced documentation should be completed as soon as possible. For a final burn approval to be made, the assessment must conclude that smoke from the approved burn would not cause or contribute to a measured concentration above a program concentration limit and would not result in an adverse impact.

Preburn enhanced documentation is required when a trigger limit is met any time from 5:00 a.m. up to the start of the burn.

Postburn Enhanced Documentation

Postburn enhanced documentation must be completed when an approved crop residue burn could reasonably be suspected of causing or contributing to a possible adverse impact, public roadway safety hazard, or when a measured pollutant concentration has exceeded a trigger level (section 3.7, Table 2). A notification will be posted on the region's home page of the CRB

application if a field requires postburn enhanced documentation. Postburn enhanced documentation protocol requires DEQ to review and document the following:

- Forecast and observed monitoring data
- Other potential sources of air pollutants
- Forecast and observed meteorological conditions
- Unique or unanticipated events or circumstances
- Decision-making process
- Determination on whether smoke from approved burning affected pollutant concentrations.

When required, postburn enhanced documentation should be completed within 2 days following the burn so that details are not forgotten, and the assessment can be used as a learning tool for future burn decisions.

Postburn enhanced documentation is required when a 1-hour or 4-hour $PM_{2.5}$ trigger limit is met or exceeded any time from the start of the burn until 10:00 p.m. on the burn day or a 24-hour $PM_{2.5}$ trigger, or 8-hour ozone trigger is met any time from the start of the burn until midnight.

The purpose of evaluating and determining whether an adverse impact to an ISP occurred is to gauge how well implementation of the program complies with the SIP and to provide information for improving burn decisions. **DEQ currently conducts enhanced evaluation and documentation when smoke dispersion does not go as planned.** All CRB seasonal monitors in the state are within 3 miles of ISPs except for the Porthill monitor. To improve the burn decisions, DEQ will consider all monitors when evaluating if the enhanced documentation requirement has been triggered. DEQ will use the following procedure to evaluate whether an adverse impact at an ISP occurred.

- When a monitor is present and the maximum hourly $PM_{2.5}$ concentration is below 20 µg/m^3 (or visibility is at least 10 miles if no monitor is available):
  - Conclude that no adverse impact occurred.
  - No additional documentation needed unless DEQ received a complaint from an ISP.
  - If a complaint was received from an ISP, full evaluation and enhanced documentation will be completed. If a complaint was received from a non-ISP, it will be addressed through the DEQ complaint tracker.
- When a monitor is present and the maximum hourly $PM_{2.5}$ concentration is between 20 µg/m^3 and 26.2 µg/m^3:
  - Conclude adverse impact unlikely.
  - Brief evaluation needed to determine whether an adverse impact occurred. The following items will be reviewed for the evaluation:
    - Weather and air quality monitoring data
    - Field notes
  - If a complaint was received from an ISP, full enhanced documentation and evaluation will be completed.

- When a monitor is present and the maximum hourly $PM_{2.5}$ concentration is greater than 26.2 µg/m^3 (or visibility is less than 10 miles if no monitor is present):
  - Adverse impact possible.
  - Full evaluation and enhanced documentation will include review of the following:
    - Monitoring data
    - Weather data
    - Field notes
    - Contact with the ISP—The ISP will be asked questions identified on the enhanced documentation form and the responses documented.
    - Burn decisions
    - Smoke dispersion forecasts
    - Expected smoke behavior for the day
    - Smoke behavior observed
    - Forward trajectory analysis
    - Recommended/adopted changes

Tracking Enhanced Documentation and Impacts to ISPs

Events that trigger enhanced documentation are tracked in the CRB application. Trigger events are recorded, and completed enhanced documentation is tracked to provide a process that efficiently documents situations where circumstances unrelated to the approved burning trigger enhanced documentation.

DEQ should note if an ISP is impacted repeatedly and evaluate the burn decision and burn approval decision involved with those impacts to avoid further impacts to the ISP. Limiting impacts to ISPs is a critical function of the enhanced documentation process.

The tracking log includes date, monitor locations, burn location, trigger reason, brief description, ISPs affected, type of enhanced documentation, responsible staff, completion date, and summary.

Monitors

Table E-1 lists the $PM_{2.5}$ and ozone monitors that should be reviewed for evaluating compliance with the enhanced documentation standards described above.

Table E-1. Crop residue burning program air quality monitors.

Site Name	Location	Pollutants[a]	Smoke Management Area
DEQ Boise Regional Office Monitors			
Garden Valley	Garden Valley	$PM_{2.5}$	Boise and Valley Counties
McCall USFS	McCall	$PM_{2.5}$	
Idaho City	Idaho City	$PM_{2.5}$	
Fire Station #5	Boise	PM_{10}	Southwest Idaho
Nampa	Nampa	$PM_{2.5}$ / PM_{10}	
Garden City	Boise	$PM_{2.5}$	
White Pine Elementary	Boise	O_3 (seasonal)	

Site Name	Location	Pollutants[a]	Smoke Management Area
St. Luke's	Meridian	O_3 / $PM_{2.5}$	
Weiser High School	Weiser	$PM_{2.5}$ (seasonal)	Weiser and Lower Payette Valleys
DEQ Twin Falls Regional Office Monitors			
Rock Creek	Twin Falls	$PM_{2.5}$	Southern Magic Valley
Paul Elementary School	Paul	$PM_{2.5}$ (seasonal)	Northern Magic Valley
Ketchum	Ketchum	$PM_{2.5}$	Blaine and Camas Counties
DEQ Idaho Falls Regional Office Monitors			
Idaho Falls	Idaho Falls	$PM_{2.5}$	Eastern Idaho
Rexburg	Rexburg	$PM_{2.5}$ (seasonal)	
Salmon	Salmon	$PM_{2.5}$	Custer and Lemhi Counties
DEQ Pocatello Regional Office Monitors			
Pocatello	Pocatello	O_3 /$PM_{2.5}$ / PM_{10}	
Soda Springs	Soda Springs	$PM_{2.5}$ (seasonal)	Southeast Idaho
Preston	Preston	$PM_{2.5}$	
DEQ Lewiston Regional Office Monitors			
Grangeville	Grangeville	$PM_{2.5}$	Central
Cottonwood	Cottonwood	$PM_{2.5}$ (seasonal)	
Potlatch	Potlatch	$PM_{2.5}$ (seasonal)	
Juliaetta	Kendrick	$PM_{2.5}$ (seasonal)	
Moscow	Moscow	$PM_{2.5}$	
Lewiston	Lewiston	$PM_{2.5}$	
Kamiah[b]	Kamiah	O_3	
DEQ Coeur d'Alene Regional Office Monitors			
Nursery Road	Coeur d'Alene	$PM_{2.5}$	Kootenai County
Sandpoint	Sandpoint	$PM_{2.5}$ / PM_{10}	Shoshone
Pinehurst	Pinehurst	$PM_{2.5}$ / PM_{10}	
St. Maries	St. Maries	$PM_{2.5}$	
Mt. Hall	Copeland	$PM_{2.5}$ (seasonal)	Boundary County
Bonners Ferry[c]	Kootenai Tribe Mission	$PM_{2.5}$	
Porthill	Canadian Border	$PM_{2.5}$ (seasonal)	
National Park Service Monitors			
Yellowstone	Yellowstone National Park	O_3	Multiple smoke management areas
Craters of the Moon	Craters of the Moon	O_3	
Utah Department of Environmental Quality Monitors			
Cache County	Logan, Smithfield	O_3 / $PM_{2.5}$	Southeast Idaho
Box Elder County	Brigham City	O_3	Southeast Idaho
Washington Department of Ecology Monitors			
Colbert-Greenbluff Road	Spokane	O_3	Kootenai County

a. $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; O3 = ozone; PM_{10} = particulate matter less than 10 microns in diameter
b. Monitor operated by Nez Perce Tribe.
c. Monitor operated by Kootenai Tribe.

Appendix F. Standard Operating Procedures for Determining Compliance with Permit Conditions

This appendix provides a detailed description of how the DEQ determines compliance with permit conditions. Permit conditions are an important part of proper smoke management. Failure by the grower to comply with permit conditions may result in enforcement actions. Any enforcement action by DEQ will, at a minimum, require issuing a notice to comply. A regional notice of violation, or consent order, civil or criminal charges, and monetary penalties are all potential outcomes of documentable violation. Work with the CRB and Compliance programs to determine the appropriate level of enforcement action.

A Seasonal Smoke Specialist or regional office staff on site at a burn might identify permit conditions that are inaccurate due to an error during the registration review process or because conditions do not represent the field. If this occurs, the on-site DEQ staff **must** contact the CRB Smoke Management Analyst before ignition to have the permit conditions changed. If they are unable to contact the CRB Smoke Management Analyst (e.g., lack of cell service, analysts not available), the grower can proceed with the burn as specified on the current permit or not conduct the burn at all.

Permit Conditions

Wind Speed—CRB permits often contain a condition that restricts burning if "sustained surface wind speeds" are above 12 mph. This condition restricts burning during those times when strong surface winds could blow smoke along the ground toward ISPs, populated areas, public roadways, or other features that should be protected. DEQ is required to restrict burning at fields that are within 3 miles of an ISP when the sustained surface wind speed exceeds 12 mph. DEQ may also choose to include a wind speed restriction on fields that are near roadways, airfields, or populated areas to better protect these features. DEQ defines sustained wind speed as the average wind speed over a continuous 2-minute period.

Wind Direction—CRB permits often contain a condition that restricts burning if the surface wind is from a particular direction or combination of directions. This condition restricts burning during those times when the wind could carry smoke toward ISPs, populated areas, public roadways, or other features that should be protected.

DEQ uses the 4 cardinal wind directions and 12 intercardinal wind directions (north-northeast, northeast, east-northeast, east-southeast, southeast, south-southeast, south-southwest, southwest, west-southwest, west-northwest, northwest, and north-northwest) to describe the wind direction restrictions. The restriction includes the listed direction plus or minus 11.25 degrees. For example, if a permit condition restricts burning when winds are from the west-southwest (i.e., 247.5 degrees), burning is restricted when the sustained wind direction is anywhere from 236.25 to 258.75 degrees. To simplify these guidelines, DEQ has rounded these numbers to the nearest degree (Figure F-1).

Direction	Degree Range	
	From	To
North (N)	349°	<11
North-northeast (NNE)	11°	<34
Northeast (NE)	34°	<56
East-northeast (ENE)	56°	<79
East (E)	79°	<101
East-southeast (ESE)	101°	<124
Southeast (SE)	124°	<146
South-southeast (SSE)	146°	<169
South (S)	169°	<191
South-southwest (SSW)	191°	<214
Southwest (SW)	214°	<236
West-southwest (WSW)	236°	<259
West (W)	259°	<281
West-northwest (WNW)	281°	<304
Northwest (NW)	304°	<326
North-northwest (NNW)	326°	<349

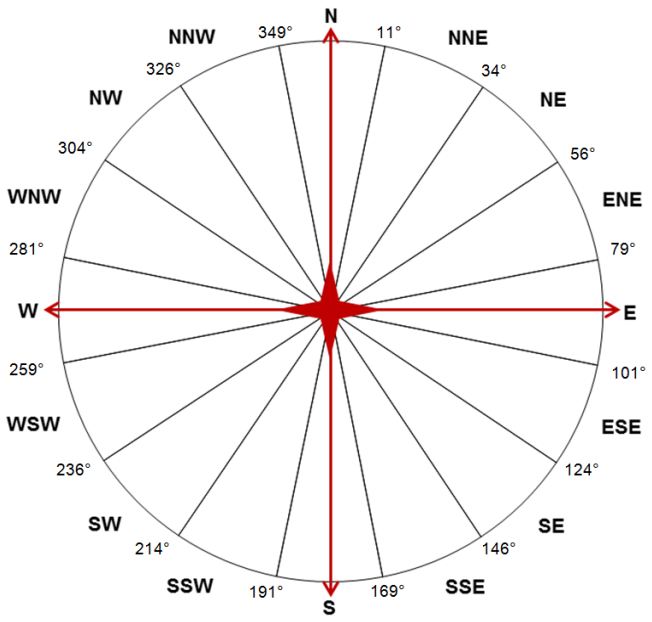

Figure F-1. Compass directions for wind direction permit condition compliance.

Burn Window—When DEQ issues a CRB permit, a start time and end time (burn window) will be specified. The burn window is based on several smoke management factors, including forecast mixing height and ventilation, forecast wind speeds and directions, forecast relative humidity, and other relevant factors. The burn window limits burning to the portion of the day when smoke from the burn is expected to disperse without causing an impact to the environment or public health. Burns may not be ignited before the start time and must be completed (fire out) by the end time.

Visibility Hazard on a Public Roadway—The following procedure is used to evaluate whether smoke from an approved burn has created a hazardous condition for travel on a public roadway.

DEQ documents any observations of smoke on a public roadway while field staff observes crop residue burns. DEQ staff will not observe all burns that are near public roadways but will observe burns that have been determined to pose a risk of creating a hazardous condition for travel on a public roadway.

Note: Before conducting burning adjacent to a state highway or interstate, the permittee should consult with the appropriate transportation agency (such as the Idaho Transportation Department) about obtaining a Right-of-Way Permit with an approved traffic control plan.

DEQ uses the stopping sight distance as a function of speed information (Table F-1) to determine if smoke is creating a hazardous condition for travel on a public roadway. If visibility is greater than the appropriate stopping sight distance, crop residue burning did not result in a hazardous condition. If visibility is less than the stopping sight distance for the appropriate speed limit, DEQ will determine whether the grower has an approved traffic control plan for burning and has followed that plan. If the grower has an approved traffic control plan in place

and followed the plan, the grower will be deemed in compliance with the permit requirement. If the grower did not have an approved traffic control plan or did not follow the plan, the grower will be deemed to be in violation of the permit requirement.

Table F-1. Stopping sight distance as a function of speed.

Speed (miles per hour)	Stopping Sight Distance (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

Source: *Manual on Uniform Traffic Control Devices for Streets and Highways*. 2009 Edition. Table 6C-2 (page 555). US Department of Transportation, Federal Highway Administration. *http://mutcd.fhwa.dot.gov*.

Appendix G. Summary of Operating Guide Changes

This appendix provides a brief summary of changes made from the previous version of the *Crop Residue Burning Program Operating Guide*. Simple changes to wording meant to provide improved clarity and understanding for DEQ staff implementation or updating outdated information such as hyperlinks or web page references are not identified in this summary. This summary lists minor process changes that were made to align with forecasting tools, measurement standards, newly available agency tools, and where responsibilities have shifted due to resources analysis or process improvements identified throughout the year.

Before incorporating any changes, each operating guide change is reviewed to determine if it could be considered a SIP or rule change. SIP- and rule-related changes are never made without extensive planning and rulemaking efforts with the advisory committee and other stakeholder involvement. Changes to any SIP-required conditions, if occurring, are explicitly identified.

- Updated and reworded language to clarify current processes.
- SIP and rule related changes: none.