Alaska Department of Environmental Conservation

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Alaska Enhanced Smoke Management Plan

Appendix to Section III. K: Areawide Pollutant Control Program for Regional Haze

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Alaska
Enhanced Smoke Management Plan for Planned Fire

Procedures Manual

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ALASKA ENHANCED SMOKE MANAGEMENT PLAN

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1. EXECUTIVE SUMMARY

The Alaska Department of Environmental Conservation (DEC) in coordination with the Alaska Wildland Fire Coordinating Group (AWFCG) has led the development of Alaska's Enhanced Smoke Management Plan (ESMP). The ESMP and accompanying volume of appendices has been adopted by DEC and participating Wildland owners and managers through a Memorandum of Understanding (MOU).

This document is an updated version of the previous plan, which was approved in June 2009, and fulfills the U.S. Environmental Protection Agency (EPA) requirement, as outlined in the Interim Policy on Wildland and Prescribed fires, to review the ESMP every five years. The 2009 version of the ESMP was included as a component of the Alaska Regional Haze State Implementation Plan (SIP).

The ESMP helps fulfill Alaska's responsibilities for protection of air quality and human health under federal and state law and reflects the Clean Air Act requirement to improve regional haze in Alaska's Class I areas. The Regional Haze Rule requires that visibility at Class I areas be returned to natural background conditions by 2064. Alaska adopted its first State Implementation Plan (SIP) for regional haze on February 11, 2011. EPA published its final approval of the plan in the Federal Register on January 7, 2013. The next Regional Haze SIP is currently due July 31, 2018, although EPA has announced intentions to postpone this due date to 2021.

Future updates to this smoke management plan may be necessary to address additional fire tracking and emission management needs based upon policies and guidelines developed by the Western Regional Air Partnership. This update will be incorporated into the next Regional Haze SIP update, as will any future updates to the ESMP.

Under state regulation, all agencies, corporations, and individuals that burn areas larger than forty acres of land a year, whether slash or in situ, require a controlled burn approval application and written approval from DEC. The ESMP outlines the process and identifies issues that need to be addressed by DEC and land management agencies or private landowners / corporations to help ensure that prescribed fire (e.g., controlled burn) activities minimize smoke and air quality problems.

Adoption of this document enables the State to certify to the U.S. Environmental Protection Agency that we are implementing a smoke management plan that addresses elements of the EPA's Interim Air Quality Policy on Wildland and Prescribed Fire, April 23, 1998 (EPA's Interim Policy). If states do not certify that a basic smoke management plan is being implemented, EPA will not provide special consideration to particulate matter health standard violations attributed to fires managed for resource benefits. According to EPA's policy, a state adopted ESMP enables EPA to use its discretion in deciding to reclassify an area as non-attainment when fires cause or contribute to particulate matter air quality violations. If EPA does indeed reclassify an area, then states need to review the adequacy of their ESMP to make appropriate improvements in cooperation with wildland owners and managers.

The ESMP provides accurate and reliable guidance and direction to and from not only the fire

authorities who use prescribed fire as a resource management tool, but also to the private landowners and corporations who conduct land clearing burns. This ESMP describes and clarifies the relationship between fire authorities and DEC. These agencies must work together effectively to combine planned burning, resource management, and development with smoke, and public health with Class I area visibility goals.

The ESMP Appendices provide additional assistance for interagency sharing of information, the applicability and availability of current smoke management techniques, monitoring protocol, public education strategies, and emission reduction techniques. The ESMP Appendices include up-to-date techniques and tools (e.g. monitoring equipment, modeling, emission factors) available through the Western Regional Air Partnership (WRAP) and member organizations tasked with assisting states, tribes and land managers with smoke management.

Alaska's ESMP will be evaluated annually by the AWFCG and interested parties and revised at least every 5 years in accordance with EPA's Interim Policy on Wildland and Prescribed fires. The ESMP appendices will be updated as new information becomes available, but not more often than once a year.

DEC welcomes the participation of AWFCG agencies and the public in the process to improve the document.

2. GUIDELINES, MEMBERSHIP CRITERIA, AND RESPONSIBILITIES

A list of current AWFCG agency representatives is provided in Appendix A.

2.1 Alaska Wildland Fire Coordinating Group (AWFCG)

The AWFCG, formed in 1994 through the consolidation of the Alaska Multi-Agency Coordinating Group and the Alaska Interagency Fire Management Council, provides a forum that fosters cooperation, coordination, and communication for wildland fire and for planning and implementing interagency fire management statewide. The AWFCG membership includes state, federal, and native land management agencies and owners that have fire management responsibilities.

One of the objectives of the AWFCG is to provide a forum for anticipating smoke intrusions, resolving on-going smoke management issues, and improving smoke management techniques. Another objective is to ensure that prescribed fire, as a tool to reduce risk and future smoke emissions, is considered by DEC when promulgating policy, procedures, and regulations.

The AWFCG establishes committees and workgroups to address specific issues. Since smoke management is a critical and continuous issue in statewide fire management, the AWFCG established the Smoke Management and Air Quality Committee (AQ Committee). The purpose of the committee is to address the AWFCG smoke management objectives, assist DEC with the development and revision of the Alaska Enhanced Smoke Management Plan (ESMP) for

Prescribed Fire, and to disseminate policies, procedures, and regulations related to smoke management. AWFCG members may provide representatives to serve on the AQ Committee. Participation is not mandatory.

The DEC representative serves as Committee Chair. Each agency or organization representative is the point of contact for communicating information between the AQ Committee and their agency or organization. The agency or organization representatives are responsible for assisting agency or organization personnel with pre-season permit applications and post-season reporting. Committee members will:

- Represent an AWFCG member
- Have the authority to speak for their agency or organization on fire and smoke management issues
- Promote good smoke management practices, alternative methods to burning and emission reduction techniques
- Disseminate smoke management information to agency or organization personnel, thereby keeping employees informed of the requirements and procedures of the ESMP
- Attend AQ Committee meetings as scheduled and assist with accomplishing committee objectives and assignments

The responsibilities of the AQ Committee include assisting in development of the ESMP and annually reviewing the effectiveness of the plan. An annual report has been prepared by DEC with the AQ Committee for submittal and approval to the AWFCG since 2009.

The following elements of the ESMP will be reviewed during annual evaluations:

- Implementation
- Burn activity summaries
- Smoke complaint summaries
- Compliance and enforcement
- Scientific and technological advancements
- Sections needing clarification and improvement
- Recommendation for revisions

Changes to DEC's open burning regulations (DEC 18 AAC 50) may occur if DEC deems it necessary. All changes to state regulations must follow standard procedure, including a public comment period. Regulatory changes that affect prescribed burning in the state will be done in coordination with the AWFCG members and any other affected parties. It will be up to DEC to ensure that stakeholders are informed of any anticipated changes. The current DEC Open Burning Policy and Guidelines is contained in Appendix B. Changes to the ESMP MOU document can only be made after contacting each signatory in writing.

2.2 Responsible Authority for the Burn

The Responsible Authority is the individual who is primarily responsible for a Controlled Burn for Resource Management (prescribed burn) or Controlled Burn for Land Clearing and ensures the conditions of the permit are met. Prescribed and land clearing burns require written DEC

approval before starting the burn if the intent is to burn, or clear and burn, 40 acres or more during a year in the same locale. The Responsible Authority submits the finalized Prescribed Burn or Land Clearing application to DEC. This person may also collect, review, and distribute any required pre- and post-burn information to DEC. The Responsible Authority should be identified in the prescribed burn or land clearing burn approval application. The Responsible Authority is often the one who conducts public meetings and has the greatest ability to interact with the public and local authorities on prescribed burning activities in their area.

To obtain valid approval for a Controlled Burning for Resource Management or Controlled Burning for Land Clearing from DEC prior to each permitted ignition, the Responsible Authority must submit a controlled burn approval application to DEC containing the 15 elements listed in Section 3 of this document. Controlled burning for Resource Management and Controlled Burning for Land Clearing approval applications must include a section on smoke management contingencies that discuss actions to be taken in the event of smoke intrusions. The controlled burn approval for resource management (prescribed burns) or land clearing burns received from DEC will contain conditions to be met by the Responsible Authority. Applications for controlled burns may be submitted using the forms on DEC's open burn website[1] or electronically through DEC's Air Permittee Portal.[2]

The Responsible Authority must call and notify the DEC by noon the business day prior to any planned burn (call the number listed in the Open Burn Approval Letter) or email: dec.AQ.airreports@alaska.gov.

The person calling must provide the following information:

1. Controlled Burn Approval number
2. Authorized Agency Name
3. Burn Location
4. Burn Date(s)
5. Contact Name During Burn
6. Contact Telephone Number
7. Description of how and when the Test Burn will be completed
8. Estimated Duration of Active Firing (ignition) Phase (prescribed burning only)
9. Estimated Duration of the Smoldering Phase (prescribed burning only)
10. Description of Pre-Burn Public Notices
11. Consideration of weather forecast and air quality advisories in area of burn

DEC staff will verify the burn approval is current and send an email message with the eleven elements to the appropriate DEC controlled burn application personnel and air monitoring personnel.

The final responsibility for ensuring the conditions of the burn approval permit are met rests with the Responsible Authority. On the burn day, the Responsible Authority must check whether DEC has issued burn restrictions; this information is available on the DEC Air Quality Air Advisory

[1] http://dec.alaska.gov/air/ap/OpenBurn.htm
[2] http://dec.alaska.gov/Applications/Air/airtoolsweb/Home/Index

web site: http://dec.alaska.gov/Applications/Air/airtoolsweb/Advisories.

The Responsible Authority should curtail burning if, in their opinion, they are not getting adequate smoke dispersion or if local weather factors are such that smoke problems could result. The Responsible Authority communicates any potential or existing smoke problems to the DEC Meteorologist at 907-269-7676 (primary), or call 907- 269-6249 (secondary), and handles local coordination, local problem-solving, and local communication within the area affected by smoke intrusions. The Responsible Authority may request monitoring assistance from DEC, if necessary. DEC will work with the Responsible Authority (see "Emergency Monitoring Policy," Section 5-3).

2.3 DEC Smoke Management Program

The purpose of the Enhanced Smoke Management Plan (ESMP) is to provide a clear and equitable regulatory basis for smoke management in Alaska. DEC is responsible for protecting the health and welfare of Alaskans from the impacts of smoke from fire as well as protecting visibility according to federal Regional Haze Rules. The ESMP assists DEC in meeting these requirements. In order to ensure the ESMP is successful, DEC is responsible for the following:

- Development and implementation of the ESMP
- Reviewing controlled burn for resource management and controlled burn for land clearing approval applications and issuing controlled burn approvals
- Ensuring controlled burn approval applications comply with state air quality regulations (18 AAC 50.065) and ESMP guidelines
- Collecting, reviewing, tracking, and summarizing statewide pre- and post-burn data for annual ESMP emission inventory reports to be distributed to AWFCG, EPA, and the Western Regional Air Partnership (WRAP). This activity will require annual assistance from the Alaska Interagency Coordination Center (AICC) at the end of the fire season. General information will be compiled from the AICC website at http://fire.ak.blm.gov/. DEC will obtain the specific information required for compiling the annual emission inventory report from AICC.
- Ensuring that field oversight and enforcement is conducted and is uniformly applied
- Coordinating with the AQ Committee members to establish and facilitate support for smoke management techniques and mitigation strategies within the state
- Ensuring that the ESMP is understood and communicated to all land management agencies and the AWFCG
- Facilitating AQ Committee meetings to evaluate the program effectiveness, review policies, discuss new smoke management methods, approve air quality reports to be submitted to the AWFCG for approval, and help solve agency smoke management issues

DEC staff will notify health authorities, news media, the public-at-large, land management agencies, and all other appropriate agencies when unacceptable limits of smoke accumulation are approached or exceeded. DEC staff will restrict implementation of controlled burn approvals for resource management and controlled burn for land clearing permits in specific areas, request burn suppression actions, or request air quality burn bans or restrictions when meteorological or existing air quality conditions so warrant (i.e., if weather forecasters predict undesirable wind

conditions and smoke is drifting into sensitive areas).

3. OPERATIONS AND AUTHORIZATION TO BURN

3.1 Smoke Management

This section is designed to give guidance on preparing smoke management information for the controlled burn for resource management and controlled burn for land clearing approval applications. Consideration of smoke management is a critical component of every controlled burn approval application. This is important for meeting public health, welfare, and Class I area visibility goals as well as coordinating smoke management that may affect other burning in the area. These goals are discussed further in Section 5-1.

Evaluating potential dispersion of smoke emissions from a project is the single most important component of an effective ESMP. Land managers and owners may use a variety of evaluation methods for small projects that will not impact any sensitive features or where potential impacts are easily monitored and mitigated. For large projects, state-of-the-art tools exist to evaluate potential impacts.

DEC evaluates the controlled burn for resource management and controlled burn for land clearing approval applications for the potential of the project to contribute to unacceptable smoke impacts or particulate levels on smoke sensitive features. DEC is responsible for evaluating the cumulative impacts of multiple projects and authorizing only as many projects as the airshed can handle. If during the controlled burn approval process several individual projects request ignition at close time intervals, attempts will be made to ensure the agencies and landowners involved coordinate ignition times to minimize smoke impact.

When scheduling a burn and ignition time, the Responsible Authority must consider existing air quality, meteorological, and environmental conditions to evaluate smoke dispersion. The potential effects of multiple burn days, multiple ignitions, and residual smoke must be evaluated prior to ignition.

Controlled burns (prescribed burns and land clearing burns) will only be conducted when favorable dispersion conditions exist. The Responsible Authority should obtain wind forecasts from the National Weather Service (NWS) forecasters for wind speed and direction, an estimate of mixing heights, and expected residual smoke behavior for the night following the burn. The NWS forecast for smoke dispersion will generally integrate all pertinent weather information such as the timing of expected weather changes that may affect smoke dispersion. Prescribed burn approval conditions may require a pre-burn meteorological conference (METCON) between your fire weather team and DEC's meteorologist prior to ignition.

After ignition, if meteorological conditions change and smoke impacts sensitive features, technologically feasible and economically and environmentally reasonable actions must be taken to mitigate impacts.

<u>Smoke Management Techniques</u>

Below are some examples of smoke management techniques the Responsible Authority should consider to minimize emissions and smoke impacts:

- Use of ventilation factors, up-to-date weather data, and weather forecasts
- Appropriate modeling with accurate weather data and emission factors
- Scheduling burns to use weather fronts bringing precipitation to assist with minimizing air quality impacts when appropriate
- Burning when fuel moistures are low enough to prevent excessive smoldering
- Reference historic (e.g., over the last 10 years) emissions from burns in the area
- Emission projections based on sound data and science
- Identification of smoke sensitive features and receptors, burn when wind direction and dispersion will mitigate impacts to sensitive features
- Visual observations
- Monitoring
- Test burns (small piles or representative areas)

3.2 Elements of Controlled Burn for Resource Management and Controlled Burn for Land Clearing Approval Application

Prior to each planned burn that requires DEC's approval (land management agency or landowner intends to burn, or clear and burn 40 acres or more during a calendar year), the Responsible Authority will submit their controlled burn approval application for controlled burning for resource management or controlled burning for land clearing (Appendix C) to DEC. Each controlled burn approval (Appendix C) will expire on December 31st of the year it was issued. Each agency or landowner may use the DEC application format or the online Permittee Portal[3] to submit their burn approval application. The following information is required to process an approval application:

1. **Indicate the location, duration, and inclusive dates considered for the burn**

   Provide a legal description or latitude and longitude of the location to be burned and the expected duration of both single events and the entire burning project. Minor changes or additional information for the burn plan can be discussed at the time DEC is notified by phone. At a minimum, the applicant is required to call DEC by noon at least one working day prior to ignition. Call the number listed in the Open Burn Approval Letter.

2. **Identify the location of all sensitive features that might be impacted by smoke**

   The Responsible Authority should identify on a map all sensitive features, which include population centers such as communities, cities, towns, hospitals, health clinics, nursing homes, schools (in session), campgrounds, numbered Alaska highways and roads, airports, Prevention of Significant Deterioration Class I Areas, and any other areas where smoke and air pollutants can adversely affect public health, safety, and welfare.

[3] http://dec.alaska.gov/Applications/Air/airtoolsweb/Home/Index

3. **Indicate how the public will be informed prior to, during, and after the burning**

   The best way to avoid complaints is to make sure everyone around the burn area knows when the burn will occur so they can take steps to avoid the smoke. The Responsible Authority's local contact phone number should be publicized so the public can contact you. The public must be notified at least three days prior to the anticipated burn through the local news media or the local Post Office.

4. **Indicate how coordination with other concerned agencies, including the Responsible Authorities of sensitive features, will be carried out**

   Indicate how all concerned agencies will be notified prior to ignition, , including authorities in control of sensitive features identified in item 2 (such as the FAA, State Troopers, military, fire department, adjacent land managers, etc.) who are potentially affected by impaired visibility or adverse smoke impacts. Include a list of telephone numbers or email addresses of agencies that must be contacted prior to ignition.

   The Department of Natural Resources, Division of Forestry (DOF) also issues burn permits; contact DOF to determine what requirements apply. The DOF burn permits are in addition to DEC burn approvals and address fire safety and other issues.

5. **Indicate the source of the weather forecast and how it will be used to prevent smoke impacts**

   Identify how the local and spot weather forecast will be obtained (e.g., through the NWS) prior to ignition of the controlled burn. Parameters that should be obtained are the predicted visibility, dispersion conditions, wind direction, and wind speed.

6. **Indicate how weather changes will be monitored and what will be done to reduce or mitigate smoke impacts if unfavorable weather should occur after ignition**

   Indicate how the weather will be monitored throughout the controlled burn. Identify what actions will be taken if a wind shift or other weather change begins to create an adverse smoke impact on sensitive features identified in Item 2. For example, if an inversion is expected to occur during the night, active ignitions could be ceased.

   If any safety hazard is present as a result of smoke, or if requested by the authority of a sensitive feature, all technologically feasible and economically and environmentally reasonable steps to mitigate smoke impacts must be taken.

7. **Indicate what will be done to validate predicted smoke dispersion**

   Indicate how smoke dispersion will be predicted. If a recommended method (test fire, small piles or areas, etc.) fails to indicate that acceptable smoke dispersion will occur, no fires will be ignited.

8. **Indicate proposed techniques to be used to enhance the active fire phase and reduce the smoldering phase**

   Consider employing emission reduction techniques (Appendix D) to enhance the active fire phase and reduce smoldering, and indicate what is feasible to accomplish the burn objectives.

9. **Indicate how authorities in control of sensitive features will be contacted if visibility decreases**

   Provide a contingency plan (Appendix E) for smoke intrusion into populated areas, Class I areas, or other smoke sensitive features as notified in item 2. Authorities having control over sensitive features identified in item 2 must be notified if visibility is expected to decrease to less than three miles for over an hour. Indicate how authorities of sensitive features will be notified if this occurs. If any safety hazard is present, or if requested by the authority of a sensitive feature, impacts must be mitigated through steps that are technologically feasible and economically and environmentally reasonable. Contingency or emergency monitoring may be needed to measure and detect smoke intrusions on sensitive features.

10. **Identify alternative disposal options for material being controlled burned**

    An evaluation of alternatives to controlled burning (Appendix F) must demonstrate that controlled burning is the only technologically feasible and economically and environmentally reasonable alternative. Identify other alternative disposal options for material burned (e.g., marketing timber with a lumber company) or why burning is the selected alternative and why the alternatives were not used; or list any alternatives to burning that have been done to the burn units prior to ignition.

11. **Indicate how coordination with air quality authorities having jurisdiction will take place**

    At a minimum, notify DEC by telephone by noon one business day prior to ignition. Call the number listed in the Open Burn Approval Letter. Include the 11 items in Section 2.2. If a multiple day burn is planned, the responsible authority need only call before the first ignition day. A call to DEC after a multiple day burn is completed is requested. If the burn is not conducted, please notify DEC within 24 hours to schedule a new burn date.

12. **Indicate the type of vegetation to be burned, pre-burn and post-burn fuel loading estimates, and ignition technique to be used**

    Pre-burn fuel loading represents the amount of fuel present at the burn location (to be consumed) and should be expressed as the weight of fuel per unit area in tons per acre. The post-burn loading estimate represents the fuel remaining after the burn. The ignition technique should describe the method (e.g., hand ignition, drip torch, helitorch) and

technique (e.g., strip head fire, backing fire, etc.).

13. **For prescribed fires, indicate whether the fire is considered "anthropogenic" or "natural." Note: Land clearing burns will be considered "anthropogenic."**

    The WRAP document, "Policy for Categorizing Fire Emissions" explains what is considered a natural source of fire and what is considered a human-caused source.

14. **Provide the approximate emissions expected for each burn and method used to estimate.** Note: Emission estimates for Land Clearing Burns will be calculated by DEC.[4]

    Emissions can be estimated by multiplying the amount of fuel consumed (usually expressed in tons), by an emission factor expressed in pounds per ton of fuel. Emission factors can be found on EPA's website at http://www.epa.gov/ttn/chief/ap42/ch13/. Other emission factors or methods may also be used, including, but not limited to: CONSUME, FEPS, FOFEM, PFEP, and SASEM (Appendix D).

15. **Air monitoring to be conducted**

    Identify how the burn may affect or potentially impact air quality at smoke sensitive features, and how the visibility in Class I areas will be monitored (Appendix G). If the burn will not adversely affect visibility in a Class I area, state that there is low potential of the burn impacting visibility in a Class I area and that monitoring will not be conducted.

Items one through eleven are required in an open burning application under existing DEC regulation (Appendix B); items twelve through fifteen are elements that are necessary for managing smoke and developing and tracking emission inventories for regional haze.

3.3 Post-burn Reporting

After each burn, the Responsible Authority will submit a post burn report to DEC within 90 days. The Responsible Authority must maintain a copy of the application and post burn report. A post-burn report must include the following information:

- **Authorized agency**, controlled fire or range name, and approval number.
- **Date of burn(s)** – Actual dates of the burn (ignition, active burning, and smoldering phases).
- **Burn location** – Latitude and longitude of center of burn area, along with map showing burned area.
- **Total Area of burn** – The entire burn unit less any unburned inclusions (Estimate in acres).

[4] http://www.wrapair.org/forums/fejf/docs.html

- **Fuel type(s)** – The fuel type optimally represents the predominant fuel or cover type consumed in the fire (e.g., Sitka spruce). Specify source of fuel information (e.g,. CFDR, NFFL) and descriptive model.

- **Pre-burn fuel loading information** – Land managers who are unfamiliar with estimating pre-burn fuel loading should ask ~~A~~DEC to supply them with information, guidance documents, and models that are currently used to compile this information. Estimates of fuel loading are all that are necessary.

- **Fuel consumption** – The amount of fuel actually consumed expressed in tons/acre (pre-burn fuel loading data is acceptable if actual numbers cannot be determined).

- **Predominant configuration of the fuel burned,** e.g., pile, windrow, broadcast, or underburn.

- **Emission reduction techniques used** –Describe any techniques applied that reduced the actual amount of emissions, for example, changing ignition timing to allow for more efficient combustion.

- **Type of Burn** – "Anthropogenic" or "natural" classification (see glossary and Appendix). All controlled burns for land clearing are considered human-caused or anthropogenic.

- **Verification of weather forecasts and air quality advisory status** for the event date(s).

- **Description of public notifications made**

- **List of complaints received** concerning excess odors or smoke (if any), including name, phone number of complainant and any corrective action taken.

4. BURN RESTRICTIONS DUE TO AIR QUALITY CONCERNS

When DEC issues burning restrictions based on air quality concerns in any part of the state, all AWFCG members will be notified as soon as possible. If there is residual smoke in the area, it is the responsibility of the Responsible Authorities to contact DEC and check the DEC Air Advisory web site (http://dec.alaska.gov/Applications/Air/airtoolsweb/Advisories) prior to a scheduled burn to determine if a restriction is pending or in effect. Local government agencies and the Division of Forestry also need to be contacted to verify there are no open burning restrictions.

DEC Burn Restrictions can be issued as follows:

- Statewide
- By airshed(s)

- By proximity to smoke sensitive feature
- By DEC authority (18 AAC 50.245)
- Any combination of the above

Any restrictions will be based on local observations and available monitoring and meteorological data. Generally, restrictions due to poor air quality are in effect for 24 hours, although multiple day and weekend forecasts will be made. DEC encourages Responsible Authorities to restrict conducting prescribed burn projects on holiday weekends near sensitive areas or areas with high recreation use. The Responsible Authority should contact DEC if they wish to burn during holidays so that adequate contingencies are in place to manage any smoke intrusions.

The final responsibility for smoke management in the locality of the prescribed burn rests with the Responsible Authority who is conducting the burning. The Responsible Authorities are expected to mitigate smoke by choosing optimal times and weather conditions that meet the needs of the prescribed burn and also minimizes smoke intrusions if, in their opinion, they are not getting adequate smoke dispersion, or if local weather factors or topographical features are such that smoke problems could result. Conversely, if local weather conditions appear to be more favorable for burning than what was forecast, Responsible Authorities should contact DEC to discuss options.

Prescribed burn ignitions should not occur if:

- A DEC Air Quality Advisory is in place for areas that could be impacted by the burn
- Air quality is deteriorating and is expected to continue to deteriorate
- There is a high probability that a significant amount of smoke will intrude into "sensitive features”
- The burn will not comply with the Alaska State Implementation Plan (SIP) or the federal Clean Air Act regarding visibility protection of Class I federal areas (Appendix H)
- Any state or federal air quality standards, regulations, laws, or rules would be violated
- Air quality is deteriorating and is expected to continue to deteriorate which may result in an Air Quality Episode (Appendix I) being declared in the next 24-hour period. Additional ignitions will be denied until conditions improve in the area.

5. AIR QUALITY MONITORING

5.1 Visibility and Regional Haze Goals

All states must develop programs to make “reasonable progress” toward meeting the visibility goals in designated Class I areas as part of their air quality State Implementation Plans (SIPs). Alaska has four Class I areas: Denali National Park & Preserve, Tuxedni Wilderness Area,

Simeonof Wilderness Area, and Bering Sea Wilderness Area (Appendix H). DEC has the primary responsibility for SIP development. The state's first Regional Haze SIP was adopted February 11, 2011, and received final EPA approval on March 18, 2013. The state is currently preparing the first five-year progress report. The next Regional Haze SIP is currently due July 2018.

5.2 Ambient Air Monitoring

"Ambient air monitoring" within the context of the ESMP refers to air quality monitoring conducted as a consequence of wildfire activity or in support of prescribed fire activities. All monitoring should be performed with DEC approved air monitoring samplers using standard operating procedures for monitor operation, data collection, and QA/QC. Samplers should be placed outside of the fire zone in a location that is representative of a smoke sensitive area, such as a hospital or health clinic.

Monitor site placement depends on the meteorology (primarily wind direction), area topography, and the relationship of the smoke and airshed to the populated area. Monitoring may require the deployment of several samplers. Example: a land management agency is planning a large prescribed burn and the closest community is fifteen miles away. Weather forecasts indicate that the winds could blow toward the town; therefore, a monitor should be placed in or near the community.

Public health protection is the focus of all monitoring site placement. Responsible Authorities may request assistance from the DEC Monitoring and Quality Assurance Program to identify appropriate monitoring sites. Time and materials fee or a reimbursement agreement with DEC will be necessary.

5.3 Smoke Monitoring Policy

DEC is willing to work with land managers or land owners to assess smoke impacts and protect public health through ambient air monitoring assistance. While DEC does not have funding to support prescribed fire activity, the air monitoring section does have trained staff who could be mobilized to support a fire event by evaluating smoke impacts or monitoring air quality for prescribed burns. Funding agreements will be necessary for DEC to support monitoring.

Emergency response air monitoring support from DEC has been utilized once before on the Carla Lake Fire in 1998. With newer and more portable real-time monitors, the ability to monitor smoke impacts has become easier and more accurate.

6. AIR QUALITY COMPLAINT PROCEDURES

6.1 General Procedures

There may be occasional intrusions of smoke into smoke sensitive areas. The Responsible Authority and DEC are responsible for complaint processing and smoke-intrusion reporting. Documentation of such occurrences will improve future prevention measures and properly inform

Responsible Officials and the public.

The nature of the complaint will determine what procedure is to be followed to address the complainant. Every attempt should be made to resolve the complaint at the lowest possible level. Any agency or landowner receiving complaints should handle the initial situation if they are knowledgeable of the ESMP or the specific burn and should learn as much information about the burn as possible in order for proper follow-up to take place.

Complaints can come in several forms. Historically, complaints have been received from the public at large where the basis for the complaint is an objection to seeing smoke, smelling smoke, and health concerns because of smoke. Local explanation of the program and resolution of the complainant's concerns will often solve the problem. If an AWFCG member receives the complaint they should explain the purpose and basis for the ESMP in order to inform the caller that a control program is in place in Alaska.

The following information needs to be collected in order for the organization or landowner to take proper and necessary follow up actions. Information to be collected includes:

- Name and contact information of the complainant
- Description of the complaint
- Location of the burn (include best estimate of burn location and direction of smoke)
- Time of day
- Any other comments that will aid in the follow up process (e.g., people see or smell smoke, etc.)

The Responsible Authority should forward any complaints received to DEC with their post-burn report or when requested by DEC. If another AWFCG member receives a smoke complaint, it will be forwarded to the appropriate agency representative (usually the Responsible Authority or DEC) as soon as possible. If a smoke complaint on a land clearing burn is received by an AWFCG member, the complaint will be forwarded to DEC as soon as possible. DEC will immediately forward complaints it receives to the Responsible Authority for resolution if the complaint information suggests a prescribed burn is conducted during a restricted period or if smoke dispersion is less than adequate for the burn.

DEC will log all complaints received into the DEC Complaint Automated Tracking System (CATS) via AirTools, the DEC Air Quality database. For each complaint received by the Responsible Authority and DEC, pertinent data will be recorded along with the final resolution or actions taken to address the complaint. This information may be valuable for contacting community residents prior to future planned burns.

6.2 Public Notification and Exposure Reduction

The cooperating agencies and land owners will agree on trigger levels, communication strategies, and contingency measures before the burn project is ignited.

If smoke impacts develop from a prescribed burn and it becomes necessary to issue air quality

notices (e.g., advisories, alerts, warnings, or emergencies), DEC and the Responsible Authority will cooperatively determine a course of action. The Responsible Authority should consult with DEC regarding appropriate short-term fire management response to abate verified impacts to smoke sensitive areas. Management responses should be implemented that will mitigate adverse impacts to public health using technologically feasible and environmentally and economically reasonable actions.

According to 18 AAC 50.245, DEC may, at its discretion, declare an air episode or advisory (Appendix I) and prescribe and publicize curtailment actions when the concentration of $PM_{2.5}$ in the ambient air has reached the levels described in the table below. Advisories are based on current and expected smoke impacts, meteorological conditions, and qualitative assessment by trained staff. Advisories may be issued without monitoring data. Episodes are called at specific levels of air pollution and have associated regulatory requirements. Currently, the $PM_{2.5}$ episode requirements limit the opacity of emissions from woodstoves.

DEC uses the levels in the chart below to announce air quality advisories and episodes. The National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ are 35μg/m^3 for the 24-hour average and 12 μg/m^3 for the annual average. DEC will follow the AQI levels and will call air quality advisories when levels reach the AQI category of 'Unhealthy for Sensitive Groups,' i.e., when levels exceed or are expected to exceed the NAAQS for $PM_{2.5}$.

Episode Levels for $PM_{2.5}$

AQI Level	AQI Value	24-Hr $PM_{2.5}$ (μg/m^3)	Episode Levels	Cautionary Statements	Descriptive Statements
Good	0-50	0-12.0		None	None
Moderate	51-100	12.1-35.4		None	None
Unhealthy for Sensitive Groups	101-150	35.5-55.4	Alert	People with respiratory or heart disease, the elderly and children should limit prolonged exertion.	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	55.5-150.4		People with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion.	Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.
Very Unhealthy	201-300	150.5-250.4		People with respiratory or heart disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.	Health Alert: Everyone may experience more serious health effects.
Hazardous 1	301-400	250.5-350.4	Warning	Everyone should avoid any outdoor exertion;	Health warnings of emergency conditions.

AQI Level	AQI Value	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Episode Levels	Cautionary Statements	Descriptive Statements
Hazardous 2	401-500	350.5-500	Emergency	people with respiratory or heart disease, the elderly and children should remain indoors.	The entire population is more likely to be affected.

When DEC declares an advisory, DEC will publicize actions individuals can take to protect public health and may request voluntary emission restrictions from any permitted activity that might impact the area subject to the advisory (18 AAC 50.245). Air quality advisories (Appendix I) include broad educational statements that advise people about the potential for smoke impacts in the area, recommend actions for persons with respiratory illnesses or heart disease, and suggest ways to limit exposure. Advisories may also include restrictions on open burning (18 AAC 50.065(e)). Advisories are posted on DEC's advisory website.[5]

$PM_{2.5}$, alert, warning, and emergency episode levels each have 24-hour average particulate concentration levels and have action statements that suggest ways that the general public and sensitive individuals can limit their exposure. These notices re based on real-time ambient monitoring, in combination with weather forecasts. Alerts will not be issued based solely on visual estimations of smoke impacts, nor on suspected smoke impacts.

A children's Activity Guideline for use during wildfire smoke events, prepared by the Idaho Department of Health and Welfare, lists activities, such as recess and athletic practices, with recommendations for children during smoke events. This document can be found at: http://healthandwelfare.idaho.gov/Portals/0/Health/EnvironmentalHealth/Wildfire-table-for-schools%20mkedits.pdf

If smoke intrusions cause unacceptable area-wide impacts, including nuisance smoke, DEC will deny the ignition of new controlled burns that could impact the area and announce air quality advisories. Air quality advisories are typically appropriate for situations where the potential for multiple-day smoke impacts exists.

[5] http://dec.alaska.gov/Applications/Air/airtoolsweb/Advisories

7. PUBLIC EDUCATION

Public education and outreach prior to burn ignition greatly decreases public complaints and often significantly decreases potential public health impacts attributed to smoke intrusion. Every effort should be made by the Responsible Authority to involve the potentially affected community in an early and on-going discourse on the use of prescribed fires in their area.

Public outreach often helps avoid conflicts which might not otherwise be identified, such as igniting burns during scheduled athletic events, or during annual hunting/fishing opening dates, holidays, or other special events.

Public education guidance should be cooperatively developed and/or distributed by the AWFCG for use by Responsible Authorities. Such guidance would discuss options available for adequate public education, including public meetings, public service announcements, news articles, and public comment periods. The FireWise campaign[6] and the FireWise Alaska handbook[7] have been successful public education processes, and could easily be used as a pattern or as a vehicle to promote public education on prescribed burning objectives at a local or airshed level where appropriate. In addition, the National Wildland Fire Coordinating Group (NWFCG)[8] has developed useful educational materials.

Other Public Education Suggestions:

- Seek out appropriate forums to provide written information about rules and regulations, and answer questions
- Initiate contacts with local news media to generate feature stories about the prescribed fire program and burn regulations
- Include appropriate information about prescribed and land clearing burns in displays used at public gatherings, such as fairs
- Provide press releases and public service announcements when needed
- Coordinate with other agencies' public affairs offices to combine information about burning when appropriate
- Develop brochures and other printed materials for distribution to appropriate sources and recipients

8. FEES AND PROGRAM FUNDING

Fees for a Controlled Burn for Resource Management and Controlled Burn for Land Clearing

[6] http://www.firewise.org/
[7] http://forestry.alaska.gov/pdfs/firewise09.pdf
[8] http://www.nwcg.gov/pms/prev_ed_wui.htm

Approvals are posted in Alaska Administrative Code 18 AAC 50.400(l). Open burning regulations are located at 18 AAC 50.065.

9. ENFORCEMENT

Regulations currently exist that prohibit burning in a manner that adversely impacts public health or the environment (18 AAC 50.065, 50.110, and 50.245). Adherence to State of Alaska regulations is mandatory. It is the responsibility of DEC to enforce the regulations. Additional regulations may be promulgated if the State determines that present regulations are inadequate for protecting public health.

Unacceptable smoke impacts that occur because the Responsible Authority was negligent or failed to follow the open burning regulations may result in enforcement action. Should an agency or land owner fail to follow procedures, requirements, or restrictions issued under the open burning regulation, it may be considered grounds for revocation of the burn permit.

A mechanism similar to the program used to enforce air quality regulations for industrial sources is used to enforce Wildland burning regulations or agreements. Such a program will provide:

- A process for notifying land managers of the unacceptable impacts.
- An opportunity for the land managers to respond to allegations of unacceptable impacts.
- The ability for DEC to take regulatory action, including cooperative agreements, which may require ESMP revisions.
- An appeal process.

In addition, the ESMP program will be reevaluated if a Responsible Authority follows ESMP guidelines, but resultant smoke still violates the NAAQS or produces significant complaints.

10. LIST OF ACRONYMS, ABBREVIATIONS and DEFINITIONS

($\mu g/m^3$)	micrograms per cubic meter
AAC	Alaska Administrative Code
AQ	Air quality
AICC	Alaska Interagency Coordination Center
AWFCG	Alaska Wildland Fire Coordinating Group
CAA	Clean Air Act
CFR	Code of Federal Regulations
DEC	Alaska Department of Environmental Conservation
ESMP	Enhanced Smoke Management Plan (includes Regional Haze requirements)
NAAQS	National Ambient Air Quality Standards

(μg/m^3)	micrograms per cubic meter
PM	Particulate matter
SIP	State Implementation Plan
WESTAR	Western States Air Resources Council
WRAP	Western Regional Air Partnership

Agricultural Burn – also known as Controlled Burning for Land Clearing – open burning of woody debris material by farmers and developers. Approval is required from DEC if the intent is to clear and burn 40 acres or more per year.

Airshed is a geographical area where atmospheric characteristics are similar (e.g. mixing height and transport winds). (i)

Air Quality Advisory refers to a period where an air episode may warrant public notification. Air quality advisories are general, educational-type statements which advise the general public about the potential for smoke impacts and suggest ways to limit exposure. "Advisory" status does not involve any required action on the part of the public or the burn agency and often does not have monitoring data associated with it, though it may refer to weather forecasts.

Air Quality Alert, Warning or Emergency status refers to a period where an air episode is declared, as stated in 18 AAC 50.245. Valid air quality monitoring data and weather forecasts should be used to document air quality status and duration. Regardless of the source of the emissions, air episodes involve required actions on the part of the public (such as avoiding outdoor exercise) or land managers (such as avoiding additional emissions for the area).

Alternatives (or "burning alternatives") refer to mechanical, biological or chemical treatment methods of fuel reduction that do not include burning, such as chipping, grinding, logging, mechanical/hand thinning with removal, etc.

Ambient air is that portion of the atmosphere, external to buildings, to which the general public has access.

Ambient air monitoring in this document refers to air quality monitoring done in support of prescribed fire activities or in response to Wildland fire activities.

Anthropogenic emissions are produced by human activities. (ii)

Approval or controlled burn approval (or "permit") refers to the DEC written approval that is required if material from land clearing operations for prescribed fire for agricultural, development, hazard fuel reduction, and forest or habitat management if the area burned, or the material collected to be burned, is 40 acres or greater per year. (18 AAC 50.065(g))

AP-42 Handbook is the EPA's Compilation of Air Pollutant Emission Factors for stationary point, area, and mobile sources. An emission factor is a representative value that attempts to

relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. Emission factors are then used to estimate the magnitude of a source's pollutant emissions.(iii)

Burn plan is a strategic plan for managing a specific fire project to meet specific resource management objects. The plan includes the project objective, fire prescription (including smoke management components), personnel, organization, equipment, etc. It is used to apply for a DEC Controlled Burn Approval. (iv)

Burn restriction (see "Restriction").

Class I Area refers to an area set aside under the Clean Air Act (CAA) Section 162 to receive the most stringent protection from air quality degradation. This classification protects air quality in international parks, national parks greater than 6,000 acres in size, and national wildernesses greater than 5,000 acres in size, that were in existence on August 7, 1977 and any additions to those areas.

Clean Air Act (CAA) means 42 U.S.C. 7401 – 7671q, as amended through November 15, 1990. (18 AAC 50.990(17)).

Controlled Burn Approval application is the permit application required by DEC as part of the controlled burn approval process.

Controlled Burning for Land Clearing – see "Agricultural Burn"

Controlled Burning for Resource Management – see "Prescribed Burn"

Emission factors are typically based on the EPA's AP-42 Handbook. Emission units are stated as "pounds of emission produced per ton of fuel consumed." An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. Emission factors are not yet available for accurately predicting emissions from burns in fuels such as Sitka spruce forests, tundra or deep duff layers commonly found in Alaska. Efforts are being made by the USDA Forest Service, Pacific Northwest Experiment Station to conduct research that will lead to more accurate estimations of emissions factors for Alaska. (iii)

Enhanced Smoke Management Plan (ESMP) is the agreement and program plan developed and agreed upon by the AWFCG. The purposes of ESMPs are to mitigate the nuisance and public health/safety hazards (e.g., on roadways and at airports, and at smoke sensitive features) posed by smoke intrusions into populated areas, to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with the regional haze rules. (iii)

Fuel includes combustible vegetative matter such as grass, tundra, trees, shrubs, limbs, duff, and stumps.(iii)

Fuel loading is the amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight. (ii)

Fuel type is an identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions. (ii)

Inversion refers to a layer of air in which the temperature increases with height. The effect of various types of inversions is to greatly retard the dispersal of smoke. (vii)

Land manager/owner is the responsible Line Officer for the Federal agencies or designated individual in Federal, State, and private organizations who is authorized to make decisions concerning the management of specified land areas. (vi)

Member representative (or **Representative member** or **AQ Member**) means the individual who represents his or her organizational entity (agency or company) and is responsible for collecting and submitting pertinent agency burn information to the DEC Coordinator and AWFCG from their representative agency or company. They attend the annual meetings of the AWFCG.

Mixing height is measured from the surface upward, the height to which relatively vigorous mixing occurs in the atmosphere due to turbulence and diffusion. (viii)

National Ambient Air Quality Standards (NAAQS) are the standards established by the EPA for maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g. visibility impairment, materials damage, etc.) in the ambient air. (iii)

Natural background condition is an estimate of the visibility conditions at each Federal Class I area that would exist in the absence of human-caused impairment. (ix)

Non-attainment areas are areas that exceed the National Ambient Air Quality Standards (NAAQS) for certain "criteria pollutants" established by EPA or the States. Criteria pollutants have specific standards and exist for ozone, carbon monoxide, oxides of sulfur, oxides of nitrogen, lead, and particulate matter. (i)

Nuisance smoke is the amount of smoke in the ambient air at concentrations below the NAAQS which interfere with a right or privilege common to members of the public, including the use or enjoyment of public or private resources. Nuisance smoke is regulated by Alaska regulation 18 AAC 50.110, "Air Pollution Prohibited: A person may not cause or permit any emission that is injurious to human health or welfare, animal or plant life, or property, or that would unreasonably interfere with the enjoyment of life or property." (iv)

Open burning means the burning of a material that results in the products of combustion being emitted directly into the ambient air without passing through a contaminant outlet. (18 AAC

50.990(59)) Open burning includes prescribed fire (Controlled Burning for Resource Management) and Controlled Burning for Land Clearing (agricultural burning). The terms are used interchangeably in this document.

Particulate matter (PM) refers to any airborne material, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., dust, smoke, mist, fumes or smog). (iii)

PM_{10} refers to particles with an aerodynamic diameter less than or equal to 10 micrometers. Emissions of PM10 are significant from fugitive dust, power plants, commercial boilers, metallurgical industries, mineral industries, forest and residential fires, and motor vehicles. (iii)

$PM_{2.5}$ refers to particles with an aerodynamic diameter less than or equal to 2.5 micrometers. A measure of fine particles of particulate matter that comes from fuel combustion, agricultural burning, woodstoves, etc. (iii)

Prescribed fire is any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist. In a federal action National Environmental Policy Act requirements must be met prior to ignition. (vi) Prescribed fire is a type of open burning. The terms are used interchangeably in this document.

Prescription is a written statement defining the objectives to be attained and may include, but is not limited to, temperature, humidity, wind direction, wind speed, fuel moisture, soil moisture, and fire behavior characteristics under which a fire will be allowed to burn. A prescription is generally expressed as acceptable ranges of the prescription elements. The extent of the geographic area to be burned may also be a prescriptive element.

Regional haze is defined in 40 CFR 51.301 and generally refers to concentrations of fine particles in the atmosphere extending up to hundreds of miles across a region and promoting noticeably hazy conditions, wide-spread visibility impairment, especially in mandatory Class I Federal areas where visibility is an important value. (iii)

Responsible Authority (Burn Boss, Fire Management Officer, land manager, etc.) is the individual who collects, reviews, and disseminates pre- and post- burn information to the DEC staff in the form of the Burn Application and Post-burn Report. This person is tasked with the responsibility of ensuring compliance with the approved burn permit, daily operations, coordinating burn information, providing smoke forecasting and air quality restrictions for their burns. This person(s) may also facilitate local area meetings to evaluate program effectiveness, and solve local issues related to their agency's burn plans. The Responsible Authority often has line authority and is the primary person with whom DEC will interact prior to, during, and after a burn. The Responsible Authority should be identified in the Burn Application that is submitted to DEC. (i)

Restriction to burning occurs when an air quality episode is declared which covers the area of concern. Restrictions to burning are generally issued for a twenty-four hour period but may be for a longer period. The alert may be based on an assessment that inadequate air ventilation is available which would inhibit the dispersal of pollutants, such as inversions and low wind speeds.

Regardless of the source of the emissions, public notifications will be issued when smoke is impacting the area. Persons with controlled burn approvals must curtail their fire if their portion of the airshed is becoming overloaded or local weather factors would create smoke problems, even though no other restrictions have been imposed, i.e. wind moving directly into sensitive areas, inversions, etc.

Smoke dispersion refers to the processes within the atmosphere which mix and transport smoke away from the source. This depends on three atmospheric characteristics: atmospheric stability, mixing height, and transport winds. (vii)

Smoke intrusion refers to smoke from a prescribed fire entering a designated area at unacceptable levels. (vii)

Smoke sensitive features are population centers, such as towns and villages, camp grounds and trails, hospitals, health clinics, nursing homes, schools (in session), numbered Alaska highways and roads, airports, Federal Class I Areas, etc., where smoke and air pollutants can adversely affect public health, safety and welfare. (iv)

Smolder means to burn and smoke without flame. (18 AAC 50.990(81))

State Implementation Plan (SIP) is a CAA Section 110 required document in which States adopt emission reduction measures necessary to attain and maintain NAAQS and meet other requirements of the Act (such as regional haze). (iii)

Transport winds is a term that refers to the wind speed and direction at the final height of smoke plume rise. (vii)

Violation of the PM NAAQS refers to 40 CFR Part 50, last revised in 2006. The daily PM10 standard is violated when the 24-hour concentrations exceeds 150 µg/m3 at any monitor within an area more than one time per year. The annual PM10 standard has been revoked.

The NAAQS levels for $PM_{2.5}$ are set at a daily concentration less than or equal to 35 µg/m3 and an annual mean concentration of less than or equal to 15 µg/m3. The daily standard is violated when the 98th percentile of the distribution of the 24-hour concentrations for a period of one year (averaged over three calendar years) exceeds 35 µg/m3 at any monitor within an area. The annual standard is violated when the annual arithmetic mean of the 24-hour concentrations from a network of one or more population-oriented monitors (averaged over three calendar years) exceeds 12 µg/m3. Compliance with the annual $PM_{2.5}$ NAAQS is based on population-oriented monitors because the health information, upon which the standard is based, relates area-wide health statistics to area-wide air quality as measured by one or more monitors. (iii)

Visibility Protection refers to Section 169A of the federal (CAA) which establishes a national visibility goal to ". . . prevent any future, and remedy any existing, impairment of visibility in mandatory Class I areas." Alaska has four federal Class I areas that are national parks or wilderness areas (Appendix H). (iii)

Western Regional Air Partnership (WRAP) is a voluntary organization comprised of western governors, tribal leaders and federal agencies, and is charged "to identify regional or common air management issues, develop and implement strategies to address these issues, and formulate and advance western regional policy positions on air quality. (x)

Western States Air Resources Council (WESTAR) is an organization which consists of fifteen states including Alaska. WESTAR was formed to promote the exchange of information between the States, serve as a forum for western regional air quality issues of common concern and share resources for the common benefit of the member states.

Wildland is an area where development is generally limited to roads, railroads, power lines, and widely scattered structures. The land may be neglected altogether or managed for such purposes as wood or forage production, wildlife, recreation, wetlands or protective plant cover. (iv)

Wildland fire is any non-structure fire, other than prescribed fire, that occurs in the Wildland.(xi)

11. REFERENCES

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12. SIGNATURE PAGE

Alaska Enhanced Smoke Management Plan Approval

The Alaska Wildland Fire Coordinating Group approved this version of the Alaska Enhanced Smoke Management Plan on June 3, 2015,

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Alaska
Enhanced Smoke Management Plan for Planned Fire

Appendices

June 3, 2015

Prepared by:

Department of Environmental Conservation
Division of Air Quality
with the Air Quality & Smoke Management Committee
for the Alaska Wildland Fire Coordinating Group

ALASKA ENHANCED SMOKE MANAGEMENT PLAN

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Appendix A

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Appendix B

DEC Open Burning Policy and Guidelines

OPEN BURNING
POLICY & GUIDELINES

18 AAC 50 as amended through May 5, 2015

State of Alaska
Department of Environmental Conservation
Division of Air Quality
Air Permits Program

"A successful burn is one in which no complaints are received by the Department."

For Open Burning Questions, Contact (updated June 2014):

Person	Area	Phone	E-mail
Andrew Mohrmann	South Central and SW Alaska Open Burn Approvals and Complaints	(907) 269-4718	andrew.mohrmann@alaska.gov
Adam Reed	SE Alaska Open Burn Approvals and Complaints	(907) 465-5127	adam.reed@alaska.gov
Steven Hoke	Interior and Northern Alaska Open Burn Approvals and Complaints	(907) 451-2132	steven.hoke@alaska.gov

POLICY AND GUIDELINES

The State of Alaska has two basic concerns with open burning: 1) that it does not spread and become a wildfire, and 2) that it does not cause air pollution that creates a health hazard or a public nuisance. The Department of Natural Resources (DNR) is responsible for regulations and permits to address the first concern (fire safety). The Department of Environmental Conservation (DEC) is responsible for regulations and permits to address the second concern (environmental protection).

It is the policy of the DEC to eliminate, minimize, or control open burning and to encourage other methods of disposal where possible. When open burning is permitted by the DEC, the permittee must provide for the most efficient combustion possible for the material to be burned. The DEC supports the maximum recycling and utilization of wood and forest products to reduce the volume of material requiring burning.

All open burning in the state, whether requiring written approval from DEC or not, must be done in a way that maintains maximum combustion efficiency throughout the burning period.

The Enhanced Smoke Management Plan (ESMP) establishes the procedures for resource management and land clearing burns in the state and is a part of the state's Regional Haze State Implementation Plan.

18 AAC 50.110. AIR POLLUTION PROHIBITED.

A person may not cause or permit any emission that is injurious to human health or welfare, animal or plant life, or property, or that would unreasonably interfere with the enjoyment of life or property.

18 AC 50.065. OPEN BURNING.

(a) Except when conducting open burning under (g), (h), or (i) of this section, a person conducting open burning shall comply with the limitations of (b) - (f) of this section and shall ensure that
    (1) the material is dried or kept covered to the greatest extent possible prior to burning
    (2) before igniting the burn, noncombustibles are separated;
    (3) natural or artificially induced draft is present;
    (4) to the greatest extent practicable, combustibles are separated from grass or peat layer;
    (5) combustibles are not allowed to smolder (burn and smoke without flame).

(b) **Black Smoke Prohibited**. Except for firefighter training conducted under (h) or (i) of this section, open burning of asphalt products, rubber products, plastics, tars, oils, oily wastes, contaminated oil cleanup materials, or other materials in a way that gives off black smoke is prohibited without written department approval. Department approval of open burning as an oil spill response countermeasure is subject to the DEC's *In Situ Burning Guidelines*

for Alaska, adopted by reference in 18 AAC 50.035. Open burning approved under this section is subject to the following limitations:

(1) opening burning of liquid hydrocarbons produced during oil or gas well flow tests may occur only when there are no practical means available to recycle, reuse, or dispose of the fluids in a more environmentally acceptable manner;
(2) the person who conducts open burning shall establish reasonable procedures to minimize adverse environmental effects and limit the amount of smoke generated; and
(3) the department will, in its discretion, as a condition of approval issued under this subsection, require public notice as described in (j) of this section.

(c) **Toxic and Acid Gases and Particulate Matter Prohibited.** Open burning or incineration of pesticides, halogenated organic compounds, cyanic compounds, or polyurethane products in a way that gives off toxic or acidic gases or particulate matter is prohibited.

(d) **Adverse Effects Prohibited**. Open burning of putrescible garbage, animal carcasses, or petroleum-based materials, including materials contaminated with petroleum or petroleum derivatives, is prohibited if it causes odor or black smoke that has an adverse effect on nearby persons or property.

(e) **Air Quality Advisory**. Open burning is prohibited in an area if the DEC declares an air quality advisory under 18 AAC 50.245, stating that burning is not permitted in that area for that day. This advisory will be based on a determination that there is or is likely to be inadequate air ventilation to maintain the standards set by 18 AAC 50.010. The DEC will make reasonable efforts to ensure that the advisory is broadcast on local radio or television.

(f) **Wood Smoke Control Areas**. Open burning is prohibited between November 1 and March 31 in a wood smoke control area identified in 18 AAC 50.025(b).

(g) **Controlled Burning**. Controlled burning to manage forest land, vegetative cover, fisheries, or wildlife habitat, other than burning to combat a natural wildfire, requires written DEC approval if the area to be burned exceeds 40 acres yearly. The DEC will, in its discretion, require public notice as described in (j) of this section.

(h) **Firefighter Training: Structures**. A fire service may open burn structures for firefighter training without ensuring maximum combustion efficiency under the following circumstances:

(1) before igniting the structure, the fire service shall
(A) obtain DEC approval for the location of the proposed firefighter training; approval will be based on whether the proposed open burning is likely to adversely affect public health in the neighborhood of the structure;
(B) visually identify materials in the structure that might contain asbestos, test those materials for asbestos, and remove all materials that contain

asbestos;

(C) ensure that the structure does not contain

(i) putrescible garbage;

(ii) electrical batteries;

(iii) stored chemicals such as fertilizers, pesticides, paints, glues, sealers, tars, solvents, household cleaners, or photographic reagents;

(iv) stored linoleum, plastics, rubber, tires, or insulated wire;

(v) hazardous waste;

(vi) lead piping;

(vii) plastic piping with an outside diameter of four inches or more; or

(viii) urethane or another plastic foam insulation;

(D) provide public notice consistent with (j) of this section; and

(E) ensure that a fire-service representative is on-site before igniting the structure;

(2) the fire service shall ignite and conduct training on only one main structure and any number of associated smaller structures at a time; examples of associated smaller structures are garages, sheds, and other outbuildings; and

(3) the fire service shall respond to complaints in accordance with (k) of this section.

(i) **Firefighter Training: Fuel Burning.** Unless a greater quantity is approved by the DEC, a fire service may open burn up to 250 gallons of uncontaminated fuel daily and up to 600 gallons yearly for firefighter training without ensuring maximum combustion efficiency. To conduct this training without prior written DEC approval, the fire service shall

(1) provide public notice consistent with (j) of this section before burning more than 20 gallons of uncontaminated fuel, unless waived in writing by the DEC; and

(2) respond to complaints in accordance with (k) of this section.

(j) **Public Notice**. A person required to provide public notice of open burning shall issue the notice through local news media or by other appropriate means if the area of the open burning does not have local news media. The public notice must be issued as directed by the DEC and must

(1) state the name of the person conducting the burn;

(2) provide a list of material to be burned;

(3) provide a telephone number to contact the person conducting the burn before and during the burn;

(4) for a surprise fire drill, state

(A) the address or location of the training; and

(B) the beginning and ending dates of the period during which a surprise fire drill may be conducted may not exceed 30 days; and

(5) for open burning other than a surprise fire drill, the notice must also state the expected time, date, and location of the open burning.

(k) **Complaints**. A person required to provide public notice of open burning shall:
(1) make a reasonable effort to respond to complaints received about the burn;
(2) keep a record for at least 30 days of all complaints received about the burn, including:
(A) the name, address, and telephone number of each person who complained;
(B) a short summary of each complaint; and
(C) any action the person conducting the open burning took to respond to each complaint; and
(3) upon request, provide the DEC with a copy of the records kept under (2) of this subsection. (Eff. 1/18/97, Register 141)

Authority: AS 46.03.020, AS 46.03.710, AS 46.14.010, AS 46.14.020, AS 46.14.030, Sec. 30, ch. 74, SLA 1993

AS 46.14.990 DEFINITION.

(2) “ambient air” has the meaning given in 40 CFR 50.1, which means that portion of the atmosphere, external to buildings, to which the general public has access.

18 AAC 50.990 DEFINITIONS.

(14) "black smoke” means smoke having the color of emissions produced by the incomplete combustion of toluene in the double wall combustion chamber of a smoke generator.

(40) "fire service" means a fire Department registered with the state fire Marshall under 13 AAC 52.030, an organized fire brigade established under 8 AAC 61.010, Subchapter 01.1302(a)(1), and a wildland fire suppression organization within the Alaska Department of Natural Resources, Division of Forestry, the United States Forest Service, or the United States Bureau of Land Management/Alaska Fire Service.

(47) "impairment of visibility" means a humanly perceptible change in visibility such as visual range, contrast, or coloration, from that which would exist under natural conditions.

(62) "open burning" means the burning of a material that results in the products of combustion being emitted directly into the ambient air without passing through a contaminant outlet.

(64) "organic vapors" means any organic compound or mixture of compounds evaporated from volatile liquid or any organic compound or mixture of compounds in aerosols formed from volatile liquid.

(74) "practical means available" means, when approving the open burning of liquid

hydrocarbons produced during oil or gas well testing, that all alternative disposal methods will have been analyzed and, where an environmentally acceptable procedure exists, it will be required.

(75) "putrescible garbage" means material capable of being decomposed with sufficient rapidity to cause nuisance or obnoxious odors.

(78) "reduction in visibility" means the obscuring of an observer's vision.

(81) ”responsible official” means:

(A) for a corporation, a president, secretary, treasurer, or vice-president of the corporation in charge of the principal business function, or any other person who performs similar policy or decision making functions for the corporation, or a duly authorized representative of that person if the representative is responsible for the overall operation of one or more manufacturing, production, or operation facilities applying for or subject to a permit under AS 46.14 or this chapter, and

(i) the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $35 million in second quarter 1980 dollars; or

(ii) the delegation of authority to the representative is approved in advance by DEC;

(B) for a partnership or sole proprietorship, a general partner or the proprietor, respectively; and

(C) for a public agency, a principal executive officer or ranking elected official; for the purposes of this chapter, a principal executive officer of a federal agency includes the chief executive officer with responsibility for the overall operations of a principal geographic unit in this state.

(85) "smolder" means to burn and smoke without flame.

(96) "uncontaminated fuel" means a hydrocarbon fuel, excluding propane, that does not contain used oil, crude oil, or a hazardous waste.

18 AAC 50.245. AIR EPISODES AND ADVISORIES.

18 AAC 50.245. Air quality episodes and advisories for air pollutants other than PM-2.5.
(a) The department or a local air quality control program may declare an air quality episode and prescribe and publicize curtailment action if the concentration of an air pollutant in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 6 in this subsection.

Table 6.
Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5

Episode Type	Air Pollutant	Concentration in micrograms per cubic meter {and in ppm where applicable}
Air Alert	Sulfur dioxide	365 (24-hour average) {0.14 ppm}
	* $PM_{2.5}$	40 (24-hr average)
	PM_{10}	150 (24-hour average)
	PM_{10} from wood burning (wood smoke control areas)	92 (24-hour average)
	Carbon monoxide	10,000 (8-hour average) {8.7 ppm}
Air Warning	Sulfur dioxide	800 (24-hour average) {0.31 ppm}
	* $PM_{2.5}$	150 (24-hr average)
	PM_{10}	350 (24-hour average)
	Carbon monoxide	17,000 (8-hour average) {15 ppm}
Air Emergency	Sulfur dioxide	1,600 (24-hour average) {0.61 ppm}
	* $PM_{2.5}$	250 (24-hr average)
	PM_{10}	420 (24-hour average)
	PM_{10} from wood burning (wood smoke control areas)	During an air alert, a concentration measured or predicted to exceed 92 (24-hour average), and to continue to increase beyond the concentration that triggered the air alert
	Carbon monoxide	34,000 (8-hour average) {30 ppm}

(b) The department or a local air quality control program will declare an air quality advisory if, in its judgment, air quality or atmospheric dispersion conditions exist that might threaten public health.

(c) If the department or a local air quality control program declares an air quality advisory under (b) of this section, the department or a local air quality control program will

(1) request voluntary emission curtailments from any person issued a permit under this chapter whose stationary source's emissions might impact the area subject to the advisory; and

(2) publicize actions to be taken to protect public health.

(d) Nothing in this section alters a local government's powers or obligations under a local air quality control program established under AS 46.14.400 and other local laws, as applicable. (Eff. 1/18/97, Register 141; am 10/1/2004, Register 171; am 2/28/2015, Register 213)

18 AAC 50.246. Air quality episodes and advisories for PM-2.5. (a) The department or a local air quality control program may declare an air quality episode and prescribe and publicize the actions to be taken if the concentrations of PM-2.5 in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 6a in this subsection. The episode thresholds and actions prescribed for any area that has a local air quality plan included in the *State Air Quality Control Plan* adopted by reference in 18 AAC 50.030 must be consistent with the emergency episode provisions included in that plan.

Table 6a
Concentrations Triggering an Air Quality Episode for PM-2.5

Episode Type	Air Pollutant	Concentration in micrograms per cubic meter
Air Alert	$PM_{2.5}$	35.5 (24-hour average)
Air Warning	$PM_{2.5}$	55.5 (24-hour average)
Air Emergency	$PM_{2.5}$	150.5 (24-hour average)

(b) The department or a local air quality control program authorized by the department under AS 46.14.400 will declare a PM-2.5 air quality advisory if, in its judgment, PM-2.5 air quality or atmospheric dispersion conditions exist that might threaten public health.

(c) If the department or a local air quality control program declares a PM-2.5 air quality advisory under (b) of this section, the department or a local air quality control program will

(1) request voluntary emission curtailments from any person issued a permit under this chapter whose stationary source's emissions might impact the area subject to the advisory; and

(2) publicize actions to be taken to protect public health.

(d) Nothing in this section alters a local government's powers or obligations under a local air quality control program established under AS 46.14.400 and other local laws, as applicable. (Eff. 2/28/2015, Register 213)

Authority: AS 46.03.020 AS 46.14.020 Sec. 30, ch. 74, SLA 1993
AS 46.14.010 AS 46.14.030

ARTICLE 4. USER FEES.
18 AAC 50.400. PERMIT ADMINISTRATION FEES.

(i) Except as provided in (j)(20) of this section, the fee for DEC approval of open burning under 18 AAC 50.065 is $200.

(j) Unless the designated regulator service is subject to a fixed fee set out in (a) – (l) of this section, or to the terms of a negotiated service agreement under AS 37.10.052(b) and 18 AAC 50.403, the permittee, owner, or operator shall pay an hourly permit administration fee for a designated regulatory service. The DEC will calculate the total amount due under this subsection by multiplying the number of hours the DEC spent to provide the designated regulatory service

by the hourly rate of salary and benefits of the DEC employees who provided the designated regulatory service, and by adding to the resulting amount any other direct costs. Designated regulatory services subject to this subsection include regulator services for:

(20) DEC approval of open burning under 18 AAC 50.065, if the DEC determines that smoke incursion into a public place, into an airport, into a Class I area, into a nonattainment area for CO or PM-10, or into a maintenance area for CO or PM-10 is likely.

Authority: AS 44.46.025, AS 46.14.140, AS 46.14.240, AS 46.03.020, AS 37.10.050, AS 37.10.052, AS 37.10.058

AREA-WIDE POLLUTANT CONTROL EFFORTS FOR OPEN BURNING

Control of open burning incidences for air pollution is the responsibility of the DEC. Open burning is defined as, "the burning of a material that results in the products of combustion being emitted directly into the ambient air without passing through a contaminant outlet." All open burning in the state, whether requiring written approval from the DEC or not, must be done in a way that maintains maximum combustion efficiency throughout the burning period.

Open burning at landfills is also controlled by solid waste disposal regulations, 18 AAC 60.355. Open burning is prohibited at Class I and II landfills.

MATERIALS THAT CANNOT BE OPEN BURNED:

- Spill absorbents and contaminated soils that are RCRA hazardous waste.
- Pesticides, halogenated organic compounds, cyanic compounds or polyurethane products burned in a way that gives off toxic or acidic gases or particulates.
- Putrescible garbage, animal carcasses, or petroleum-based materials burned in a way that causes odor or black smoke that may have an adverse effect on nearby persons or residences.
- Electrical batteries, all types and sizes.
- All liquid-form paints (e.g. in cans).
- Lead-based painted wood debris, if classified as RCRA hazardous waste. For more guidance concerning wood with lead-based paint, please contact EPA RCRA office, Diane Richardson, at 907-271-6329.
- All solvents, except those composed of water and soap/detergent solutions.
- All aerosol cans, except that those do not use chloro- or fluoro- carbon propellants.
- Asbestos or any metals or alloys containing beryllium, chromium, cobalt, arsenic, selenium, cadmium, mercury, lead, or any radioactive wastes.

- Any electrical or electronic lamps or components that contain any of the above metals/alloys (including fluorescent, high-pressure sodium, mercury vapor and metal halide lamps).
- Any plastics or other materials containing chlorine as an essential component (such as Polyvinyl Chloride - PVC pipe). However, empty containers containing salt residue may be burned (salt is any metal chloride used for thawing or ion exchange).
- Tires.
- Treated wood containing compounds such as creosote, napthlate, or tar.

WHO NEEDS WRITTEN APPROVAL?

Certain types of open burning require written approval from the DEC prior to the incident. These include:

1. **Controlled Burning For Land Clearing:**

Open burning of woody debris material by farmers and developers requires written DEC approval if the intent is to clear and burn 40 acres or more per year. DEC will, in its discretion, require public notice. Open burning should be done, as rapidly and safely as other considerations permit, to develop maximum heat energy per unit time and vent the smoke to the highest elevation possible. The burn material should be as dry as possible to create a high heat energy, less smoke, and a more efficient burn. Additional requirements for land clearing burns are outlined in the ESMP.

2. Controlled Burning For Resource Management (Prescribed Burning):

Prescribed burning, intentionally set fires to burn off ground and forest cover is usually, but not always, done by land management agencies. Prescribed burning is subject to obtaining written DEC approval if the intent is to clear 40 acres or more in a year. DEC will, in its discretion, require public notice. Additional requirements for resource prescribed burns are outlined in the ESMP.

3. Fire Fighter Training:

Fire fighter training using structures or fuels must be conducted pursuant to 18 AAC 50.065(b), (h), and (i) and requires written DEC approval. Public notification is required unless DEC issues a written waiver for burns conducted in remote areas, where the news media is not generally available, or where no public will be affected.

A fire service may ignite and conduct training on only one main structure and its associated smaller structures at a time; examples of associated smaller structures are garages, sheds, and other outbuildings within close proximity to the main structure. Structures must be inspected for hazardous wastes and other nonburnables prior to ignition. Materials listed on the "**MATERIALS THAT CANNOT BE OPEN BURNED**" list (page 9 of this Guidance) are to be removed from the structure prior to ignition.

A fire service may open burn up to 250 gallons of uncontaminated fuel daily and up to 600 gallons yearly for fire fighter training without prior DEC approval, provided that the fire service give public notice of the event before burning more than 20 gallons of fuel and responds to complaints in accord with 18 AAC 50.365(j) and (k) respectively.

Fire fighter training shall be conducted pursuant to 18 AAC 50.065(b) and (h) and is subject to written DEC approval. Public notification is required according to 18 AAC 50.065(j).

4. Burning Materials that Produce Black Smoke:

Open burning of petroleum-based materials, asphalt, rubber products, or other materials in a way that give off black smoke is subject to obtaining written DEC approval. In addition, DEC will, in its discretion, require public notice.

Open burning should be done using reasonable procedures to minimize adverse environmental effects and limit the amount of smoke generated.

Open burning of oil or gas well flow tests must conform to 18 AAC 50.065(b)(1) and the guidance contained in the *In situ Burning Guidelines for Alaska*. DEC intends to eliminate open burning of liquid hydrocarbons because alternative measures are generally available. If alternatives become unusable because of equipment breakdown or inclement weather, such events do not constitute the non-availability of alternatives.

OPEN BURNING PROHIBITION:

Open burning can be prohibited on an area-by-area basis if DEC issues an air quality advisory covering the area of concern. This advisory can be for a maximum of twenty-four hours but may be renewed daily. The advisory will be based on an assessment that inadequate air ventilation is available which would inhibit the dispersal of pollutants, such as inversions and low wind speeds.

BURN PLAN APPROVAL GUIDELINES

APPROVAL ISSUANCE:

Volume II, Section III-F of the Alaska Air Quality Control Plan incorporated by reference under 18 AAC 50.030 lists the requirements for obtaining approval to open burn. DEC has up to 30 days to issue an approval. Written approval is not automatic but must be evaluated for conformance with the following guidelines.

A contingency plan should be prepared in case of unforeseen changes in weather or other uncontrollable parameters that would affect your burn and the resultant smoke. Persons with approval must curtail their fire if air in the area is becoming overloaded or local weather factors would create smoke problems, even though no other restrictions have been imposed (i.e. wind moving directly into sensitive areas, inversions, etc.).

If any safety hazard is present, you must extinguish the fire as soon as possible. You will be held

legally responsible for any accident or adverse health effects that occur because of your open burn.

The guidelines of a burn plan should include the following:

1. **Indicate the location, duration, and inclusive dates considered for the burn**

   Provide a legal description or latitude and longitude of the location to be burned and the expected duration of both single events and the entire burning project. Minor changes or additional information for the burn plan can be discussed at the time DEC is notified by phone. At a minimum, the applicant is required to call DEC by noon at least one working day prior to ignition. Call the number listed in the Open Burn Approval Letter.

2. **Identify the location of all sensitive features that might be impacted by smoke**

   The Responsible Authority should identify on a map all sensitive features, which include population centers such as communities, cities, towns, hospitals, health clinics, nursing homes, schools (in session), campgrounds, numbered Alaska highways and roads, airports, Prevention of Significant Deterioration Class I Areas, and any other areas where smoke and air pollutants can adversely affect public health, safety, and welfare.

3. **Indicate how the public will be informed prior to, during, and after the burning**

   The best way to avoid complaints is to make sure everyone around the burn area knows when the burn will occur so they can take steps to avoid the smoke. The Responsible Authority's local contact phone number should be publicized so the public can contact you. The public must be notified at least three days prior to the anticipated burn through the local news media or the local Post Office.

4. **Indicate how coordination with other concerned agencies, including the Responsible Authorities of sensitive features, will be carried out**

   Indicate how all concerned agencies will be notified prior to ignition, , including authorities in control of sensitive features identified in item 2 (such as the FAA, State Troopers, military, fire department, adjacent land managers, etc.) who are potentially affected by impaired visibility or adverse smoke impacts. Include a list of telephone numbers or email addresses of agencies that must be contacted prior to ignition.

   The Department of Natural Resources, Division of Forestry (DOF) also issues burn permits; contact DOF to determine what requirements apply. The DOF burn permits are in addition to DEC burn approvals and address fire safety and other issues.

5. **Indicate the source of the weather forecast and how it will be used to prevent smoke impacts**

   Identify how the local and spot weather forecast will be obtained (e.g., through the NWS)

prior to ignition of the controlled burn. Parameters that should be obtained are the predicted visibility, dispersion conditions, wind direction, and wind speed.

6. **Indicate how weather changes will be monitored and what will be done to reduce or mitigate smoke impacts if unfavorable weather should occur after ignition**

   Indicate how the weather will be monitored throughout the controlled burn. Identify what actions will be taken if a wind shift or other weather change begins to create an adverse smoke impact on sensitive features identified in Item 2. For example, if an inversion is expected to occur during the night, active ignitions could be ceased.

   If any safety hazard is present as a result of smoke, or if requested by the authority of a sensitive feature, all technologically feasible and economically and environmentally reasonable steps to mitigate smoke impacts must be taken.

7. **Indicate what will be done to validate predicted smoke dispersion**

   Indicate how smoke dispersion will be predicted. If a recommended method (test fire, small piles or areas, etc.) fails to indicate that acceptable smoke dispersion will occur, no fires will be ignited.

8. **Indicate proposed techniques to be used to enhance the active fire phase and reduce the smoldering phase**

   Consider employing emission reduction techniques (Appendix D) to enhance the active fire phase and reduce smoldering, and indicate what is feasible to accomplish the burn objectives.

9. **Indicate how authorities in control of sensitive features will be contacted if visibility decreases**

   Provide a contingency plan (Appendix E) for smoke intrusion into populated areas, Class I areas, or other smoke sensitive features as notified in item 2. Authorities having control over sensitive features identified in item 2 must be notified if visibility is expected to be decreased to less than three miles for an hour. Indicate how authorities of sensitive features will be notified if this occurs. If any safety hazard is present, or if requested by the authority of a sensitive feature, impacts must be mitigated through steps that are technologically feasible and economically and environmentally reasonable. Contingency or emergency monitoring may be needed to measure and detect smoke intrusions on sensitive features.

10. **Identify alternative disposal options for material being controlled burned**

    An evaluation of alternatives to controlled burning (Appendix F) must demonstrate that controlled burning is the only technologically feasible and economically and environmentally reasonable alternative. Identify other alternative disposal options for

material burned (e.g., marketing timber with a lumber company) or why burning is the selected alternative and why the alternatives were not used; or list any alternatives to burning that have been done to the burn units prior to ignition.

11. **Indicate how coordination with air quality authorities having jurisdiction will take place**

    At a minimum, notify DEC by telephone by noon one business day prior to ignition. Call the number listed in the Open Burn Approval Letter. Include the 11 items in Section 2.2. If a multiple day burn is planned, the responsible authority need only call before the first ignition day. A call to DEC after a multiple day burn is completed is requested. If the burn is not conducted, please notify DEC within 24 hours to schedule a new burn date.

12. **Indicate the type of vegetation to be burned, pre-burn and post-burn fuel loading estimates, and ignition technique to be used**

    Pre-burn fuel loading represents the amount of fuel present at the burn location (to be consumed) and should be expressed as the weight of fuel per unit area in tons per acre. The post-burn loading estimate represents the fuel remaining after the burn. The ignition technique should describe the method (e.g., hand ignition, drip torch, helitorch) and technique (e.g., strip head fire, backing fire, etc.)

13. **For prescribed fires, indicate whether the fire is considered "anthropogenic" or "natural." Note: Land clearing burns will be considered "anthropogenic."**

    The WRAP document, "Policy for Categorizing Fire Emissions" explains what is considered a natural source of fire and what is considered a human-caused source.

14. **Provide the approximate emissions expected for each burn and method used to estimate.** Note: Emission estimates for Land Clearing Burns will be calculated by DEC.[1]

    Emissions can be estimated by multiplying the amount of fuel consumed (usually expressed in tons), by an emission factor expressed in pounds per ton of fuel. Emission factors can be found on EPA's website at http://www.epa.gov/ttn/chief/ap42/ch13/. Other emission factors or methods may also be used, including, but not limited to: CONSUME, FEPS, FOFEM, PFEP, and SASEM (Appendix D).

15. **Air monitoring to be conducted**

    Identify how the burn may affect or potentially impact air quality at smoke sensitive features, and how the visibility in Class I areas will be monitored (Appendix G). If the burn will not adversely affect visibility in a Class I area, state that there is low potential of the burn impacting visibility in a Class I area and that monitoring will not be conducted.

[1] http://www.wrapair.org/forums/fejf/docs.html

HOW TO OBTAIN OPEN BURNING APPROVAL:

The applicant shall submit an application for the proposed open burning, which addresses each of the eleven concerns specified above. Application forms are available from DEC, or at http://www.state.ak.us/dec/air/ap/applic.htm.

Please note that there are fees for open burning approvals. With each open burn application, the applicant shall submit a $200 retainer payable to the State of Alaska, DEC. The cost of the approval will be $200 unless DEC determines that there may be smoke incursion into a public place, into an airport, into a Class I area, into a non-attainment area for CO or PM-10, or into a maintenance area for CO or PM-10. If DEC determines there may be smoke incursion, then DEC will notify the applicant that DEC will charge an hourly administrative fee and direct costs for approval processing and administration. DEC will prepare and send a monthly invoice itemizing fees and direct costs to the applicant.

Open burning in compliance with these guidelines or with the approval conditions does not exempt any person from any civil or criminal liability for consequences or damages resulting from such burning, nor does it exempt any person from complying with any other applicable law, ordinance, regulation, rule, permit, order, or decrees of this or any other governmental entity having jurisdiction.

For Open Burning Questions Contact:

Person	Area	Phone	E-mail
Andrew Mohrmann	South Central and SW Alaska Open Burn Approvals and Complaints	(907) 269-4718	andrew.mohrmann@alaska.gov
Adam Reed	SE Alaska Open Burn Approvals and Complaints	(907) 465-5127	adam.reed@alaska.gov
Steven Hoke	Interior and Northern Alaska Open Burn Approvals and Complaints	(907) 451-2132	steven.hoke@alaska.gov

Appendix C

DEC Open Burning Approval Applications

Example DEC Resource Management Burn Application

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF AIR QUALITY, AIR PERMITS PROGRAM
Anchorage Title V Permit Supervisor
619 Ship Creek Avenue, Suite 249
Anchorage, AK 99501

OPEN-BURNING APPROVAL APPLICATION

Controlled Burning for Resource Management

Prescribed burning, intentionally setting fires to burn off ground and forest cover, is usually, but not always, done by land management agencies. Prescribed burning requires written DEC approval before starting the burn if the intent is to burn, or clear and burn 40 acres or more during a year.

When conducting prescribed burning, Land Management Agencies shall follow the Enhanced Smoke Management Plan (ESMP). The ESMP is an agreement and program plan developed and agreed upon by the Alaska Wildland Fire Coordinating Group. The purposes of the ESMP is to mitigate the nuisance, health and safety hazards to transportation, such as, roadway and airport visibility impairment, smoke sensitive features (such as hospitals, schools, and clinics) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and Alaskan Ambient Air Quality Standard violations; and to reduce visibility impacts in mandatory Class I Federal Areas in accordance with Regional Haze Rules.

Note: Please type or cut/paste your responses into the appropriate cells; the cells will expand as required.

Person(s) Responsible:

Project Contact:		Phone Number:	

Land Owner:		Fire Manager:		Applicant:	
Mailing Address:		Mailing Address:		Mailing Address:	
Phone Number:		Phone Number:		Phone Number:	

Emergency contact number(s) in case of smoke intrusion:

Name:		Name:		Name:	
Title / Agency		Title / Agency:		Title / Agency:	
Primary contact Phone #:		Primary contact Phone #:		Primary contact Phone #:	
Cell or other contact #:		Cell or other contact #:		Cell or other contact #:	

1. LOCATION AND DATES OF PROPOSED BURN	
Indicate the location, duration, and inclusive dates considered for the burn:	
Legal Description of Burn Site(s):	
Physical Location of Burn Site(s):	
Anticipated Burn Date(s):	Anticipated Duration of Each Event:

2. BURN SUMMARY			
Location of Burn (please check):			
	KP = Kenai Peninsula		DJ = Delta Junction
	SE = Southeast		AL = Aleutian (inc. Kodiak, Iliamna)
	MS = Mat-Su Borough		FBX = areas north of Talkeetna

	One time event? (yes or no)			Multiple Events? (yes or no)
Total acreage to be burned and/or cleared and burned:				
Acreage to be burned per event (if applicable):				
Permit Approval Requested Length:		1 Year		Multi-Year
If a multi-year permit approval is requested, indicate which portions of the projects will be burned during each of the following years: Attach a map as necessary to further indicate where/when burning will occur.				

Indicate the type of vegetation to be burned (please check):			
	1 = Broadcast, forested, not piled, heavy		4 = Machine piled slash
	2 = Range/tundra		5 = Hand piled slash
	3 = Wildlife habitat improvement		6 = Understory burns

Pre-burn and post-burn fuel loading estimates:	
Size class (inches diameter):	Tons/acre (estimated):
0.00 to 0.25	
0.25 to 1.00	
1.00 to 3.00	
3.00 to 9.00	
Live Crown Mass	
Above Ground Mass	
Duff Layer (DMC, DC)	
Total:	
Ignition techniques to be used (please describe):	

Provide the approximate PM, CO, VOC and NOx emissions expected for each burn and method used to estimate. *Emissions can be estimated by multiplying the approximate level of activity, which is the amount of fuel consumed, usually expressed in tons, by an emission factor which is expressed in pounds per ton of material burned. Applicants may use wildfire emission factors, AP-42 factors, or other factors or methods if they are more specific to Alaskan fuels and conditions. AP-42 emission factors can be found on EPA's website:* http://www.epa.gov/ttn/chief/ap42/ch13/.

Burn Area:	Expected Emissions:	Method Used to Estimate Emissions:
	Ton per year PM	
	Ton per year CO	

	Ton per year VOC	
	Ton per year NOx	

3. SMOKE MANAGEMENT			
Have you developed a Smoke Management Plan for this burn (please check)?			
	Yes (Please attach and show ratings below)		No [Complete Attachment 1 (Smoke Complexity) and provide ratings below]

The Smoke Management Complexity ratings for this open burn are (check appropriate category):						
Risk:		Low (1 point)		Moderate (2 points)		High (3 points)
Potential Consequences:		Low (1 point)		Moderate (2 points		High (3 points)
Technical Difficulty:		Low (1 point)		Moderate (2 points		High (3 points)

Complete Attachment 2 (Public Health Impact Complexity) included with this application. Summarize the Smoke Management Public Health Impact Complexity below (check appropriate category):						
Risk:		Low (1 point)		Moderate (2 points)		High (3 points)
Potential Consequences:		Low (1 point)		Moderate (2 points		High (3 points)
Technical Difficulty:		Low (1 point)		Moderate (2 points		High (3 points)

Indicate the overall Smoke Management / Public Health Impact Complexity Rating Score for this burn (i.e., the total score of the above six ratings points): *Overall rating may be reduced through smoke mitigation efforts outlined in the complexity rating descriptions.*						
Revised overall smoke /health complexity rating with mitigation applied:		Low (6-8 points)		Moderate (8-12 points)		High (>12 points)

Indicate whether the fire is considered "anthropogenic" or "natural."	
anthropogenic*: a categorization that designates which fire emissions contribute to visibility impairment in a Federal Class I area. "Anthropogenic" emissions must be controlled to achieve progress toward the 2064 natural conditions goal for each Federal Class I area in Alaska. This classification includes natural and human-caused ignitions. Most fire emission sources are classified as "anthropogenic." Prescribed fire is an "anthropogenic" source, except where it is utilized to maintain an ecosystem that is currently in an ecologically functional and fire resilient condition (in which case it is classified as a "natural" source.)*	
natural*: a categorization that designates which fire emissions can result in a natural reduction of visibility for each Federal Class I area in Alaska. This classification includes natural and human-caused ignitions. Wildfire that is suppressed by management action is a "natural" source. Wildfire, when suppression is limited for safety, economic, or resource limitations, remains a "natural" source. Wildfires managed for resource objectives are classified the same as prescribed fires. Native American cultural burning for traditional, religious, and ceremonial purposes is a "natural" source.*	
Further clarification regarding the differences between "anthropogenic" and "natural" are explained in the WRAP document "Policy for Categorizing Fire Emissions." This document is available at http://www.wrapair.org/forums/fejf/docs.html	

4. SENSITIVE FEATURES

Sensitive Features *include population centers such as communities, cities, towns, hospitals, health clinics, nursing homes, schools (in session), camp grounds, numbered Alaska highways and roads, airports, Prevention of Significant Deterioration Class I Areas, where smoke and air pollutants can adversely affect public health, safety, and welfare.*

Include a map of the proposed burn area.

a. Indicate multiple burn sites (if any) within the proposed burn area;
b. List sensitive features as described below that may be adversely affected by low level smoke and distance of those areas from proposed burn area(s);
c. List sensitive features that may be adversely affected long-range transport of smoke and distance of those areas from proposed burn area(s).

How many maps are attached?	

5. MITIGATION:

If any safety hazard is present, or if requested by the authority of a Sensitive Feature, you must mitigate impacts through steps that are technologically feasible and economically and environmentally reasonable. Contingency or emergency monitoring may be needed to measure and detect smoke intrusions on Sensitive Features. Failure to have an effective mitigation measure may, in some cases, result in the application not being approved.

Indicate how authorities in control of Sensitive Features will be contacted if air quality degrades (visibility may be used as an indicator of air quality). Provide a contingency plan for smoke intrusion into Sensitive Feature areas. Indicate how you will notify Authorities having control over Sensitive Features identified above if visibility is expected to be decreased to less than three miles for an hour.

Is the burn expected to generate low-level smoke, transported locally?		Yes		No
If yes, could people coming into the proposed burn locality be adversely affected by smoke?		Yes		No
If yes, what mitigation practices / contingency plans are proposed to help keep the smoke from affecting Sensitive Features near to the burn site?				
Is the burn expected to be large enough (>1000 acres) or hot enough to create a smoke plume that is transported to upper level air currents?		Yes		No
If yes, what mitigation practices / contingency plans are proposed to help keep the smoke from affecting Sensitive Features far from the burn site?				

6. PUBLIC NOTICE

The Responsible Authority's / Fire Manager's local contact phone number should be publicized. The public must be notified at least three days prior to the anticipated open burn through the local news media or the local Post Office.

Indicate how the public will be informed prior to, during, and after the burning. How will you notify persons in control of the sensitive features identified on your map of your anticipated burn?

Indicate how you will coordinate with other concerned agencies, including the Responsible Authorities of sensitive features identified above *(such as the FAA, State Troopers, military, fire department, adjacent land managers, etc.).* Include a list of telephone numbers or email addresses of agencies you will contact prior to ignition.

Indicate how you will coordinate with DEC Air Quality. *At a minimum, the DEC Meteorologist must be notified two (2) weeks prior to anticipated project ignition (907-269-7676). If your application is approved, a conference should be scheduled for 24 - 96 hours prior to the actual burn for a burn-weather call*

Attach a copy of your approval for the DNR - Forestry Division Open Burn Permit for your planned activity, or explain below why a DNR Burn Permit is not required.

7**. METEOROLOGICAL / WEATHER FORECASTING**
The Division's meteorologist is responsible for ensuring, from the Department's standpoint, that smoke from a prescribed burn does not adversely impact the public. To allow their participation in the burn decision making process, please ensure that this application is completed and submitted at least 2 weeks prior to a scheduled burn so they can participate in pre-burn planning events 1-2 days prior to ignition.
Indicate how weather forecasts will be obtained and used to prevent smoke impacts. Identify how the local and spot weather forecast will be obtained prior to ignition of the open burn. *Parameters that should be obtained are the predicted visibility, dispersion conditions, transport and local area wind direction, and wind speed.*

Indicate how weather changes will be monitored.

Explain what will be done to reduce or mitigate smoke impacts if unfavorable weather should occur after ignition. *If any safety hazard is present, or if requested by the Authority of a Sensitive Feature, you must take technologically feasible and economically and environmentally reasonable steps to mitigate smoke impacts.*

Identify what you will do if a wind shift or other weather change begins to create an adverse smoke impact on Sensitive Features previously.

Indicate what will be done to validate predicted smoke dispersion. Note: If a test fire, small piles or areas fire, etc. fails to indicate that acceptable smoke dispersion will occur, no fires are to be ignited.

Indicate proposed techniques to be used to enhance the active fire phase and reduce the smoldering phase. Consider employing emission reduction techniques before, during, and after the fire. Indicate what is feasible to address the management objective.

Will air monitoring be conducted during the burn (check applicable boxes)?	
	No, monitoring will not be conducted during the burn. Explain why air quality monitoring for particulates should not be necessary for this burn.
	Yes, monitoring will be conducted. Describe the numbers and placement of monitors to be used, how often the data will be collected / stored, how the results will affect the burn operations, and where the monitoring data can be accessed by DEC staff.
Identify how the effect of the fire on air quality at Sensitive Features, and visibility in Class I areas will be monitored.	

The applicant will supply monitoring equipment and personnel *(Check Yes or No)*	YES	
	NO	
The applicant requests DEC supply monitoring equipment and personnel, and acknowledges that time and materials will be charged for DEC services *(Check Yes or No)*	YES	
	NO	

8. OTHER DISPOSAL OPTIONS
Identify alternative disposal options for material being open burned. *An evaluation of alternatives to open burning must demonstrate that open burning is the only technologically feasible and economically and environmentally reasonable alternative.*

Identify other alternative disposal options for material burned or explain why burning is the selected alternative and why the alternatives were not used.

List any alternatives to burning that have been done to the burn units prior to ignition.

Certification: (If signing as an Authorized Agent, please submit a copy of your authority to do so.)

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Landowner Signature Date	Fire Manager Signature Date	Applicant Signature Date
Printed Name of Landowner	Printed Name of Fire Manager	Printed Name of Applicant

With each open burn application, submit a $200 retainer payable to the State of Alaska, DEC. The cost of the approval will be $200 unless DEC determines there may be smoke incursion into a public place, into an airport, into a Class I area, or into a non-attainment area or maintenance area for CO or PM-10. If DEC determines there may be smoke incursion, DEC will notify the applicant that an hourly administrative fee and direct costs for approval processing and administration will be charged. DEC will prepare and send a monthly invoice itemizing fees and direct costs to the applicant.

Send each open burn application and check to:

ADEC Air Permits Program
Anchorage TV Permit Supervisor
Open Burn Request
619 Ship Creek Avenue, Suite 249
Anchorage, AK 99501

Your approval may be issued within 30 days. If approved, notification and burn summary requirements will be outlined in your letter of approval.

A copy of the open burning guidelines may be obtained through our website:
http://www.dec.state.ak.us/air/ap/docs/obrguide.pdf

Example DEC Land Clearing Burn Application

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF AIR QUALITY, AIR PERMITS PROGRAM

Anchorage Title V Permit
Supervisor 619 E. Ship Creek,
Suite 249
Anchorage, AK 99501

OPEN-BURNING APPROVAL APPLICATION

Controlled Burning for Land Clearing

Open burning of woody debris material by farmers and developers requires written DEC approval before lighting if the intent is to burn, or clear and burn, 40 acres or more during a year.

When conducting land clearing or agricultural burning, landowners and/or developers are encouraged to follow the Enhanced Smoke Management Plan (ESMP). The ESMP is an agreement and program plan developed and agreed upon by the Alaska Wildland Fire Coordinating Group. The purposes of the ESMP are to mitigate the nuisance, health, and safety hazards to transportation and smoke sensitive features posed by smoke intrusions into populated areas; to prevent deterioration of air quality and Alaskan Ambient Air Quality Standard violations; and to reduce visibility impacts in mandatory Class I Federal Areas in accordance with Regional Haze Rules.
Transportation concerns include roadway and airport visibility impairment; smoke sensitive features include hospitals, schools, clinics and etc.

Note: Please type or cut/paste your responses into the appropriate cells; the cells will expand as required.

Person(s) Responsible:

Project Contact:		Phone Number:	

Land Owner:	
Mailing Address:	
Physical Address:	
Phone Number:	

If the fire is being actively managed by someone other than the landowner, please provide their name and phone numbers:

Name:			
Phone Number:		Cell phone number:	

Emergency contact number(s) in case of smoke intrusion:

Name:	
Title / Agency	
Primary contact Phone #:	
Cell or other contact #:	

1. LOCATION AND DATES OF PROPOSED BURN	
Indicate the location, duration, and inclusive dates considered for the burn:	
Legal Description of Burn Site(s):	
Physical Location of Burn Site(s):	
Anticipated Burn Date(s):	Anticipated Duration of Each Event:

2. BURN SUMMARY			
Location of Burn (please check below). Please include a general map of the area showing where the burn is in relation to the nearest community or communities.			
	KP = Kenai Peninsula		DJ = Delta Junction
	SE = Southeast		AL = Aleutian (inc. Kodiak, Iliamna)
	MS = Mat-Su Borough		FBX = areas north of Talkeetna
	OL = Other Location, please specify:		

	One time event? (yes or no)		Multiple Events? (yes or no)
Total acreage to be burned and/or cleared and burned:			
Acreage to be burned per event (if applicable):			
Estimated number of piles/berms:			
Estimated composition of piles/berms:			
Estimated pile/berm size:			
Do piles/berms contain less than 5% non-combustibles (such as soil, snow, or ice)?			
Are piles/berms longer than 1000 feet without a fire break?			
Are piles/berms loosely stacked to allow for natural draft?			
Have the piles/berms been cured for one year prior to ignition?			
How do you propose to extinguish the piles/berms if necessary? (i.e., excessive smoke)			
Can this be accomplished within two hours?			
Permit Approval Requested Length:		One Event	Multiple Events

If a multi-year permit approval is requested, indicate which portions of the projects will be burned during each of the following years. Multi-Year permits will require a renewal application each year and are subject to the same fee. Attach a map as necessary to further indicate where/when burning will occur.

Indicate the type of vegetation to be burned (please check):			
	1 = Broadcast, forested, not piled, black spruce, shrub		5 = Hand piled slash
	2 = Broadcast, forested, not piled, white spruce		6 = Grassland / crop field
	3 = Range/tundra		7 = Other (explain below)
	4 = Machine piled slash		
Describe ignition techniques to be used:			
Note: DEC will calculate the emissions from this burn from the information included in the application.			

3. OTHER DISPOSAL OPTIONS
Identify alternative disposal options for material burned (such as marketing timber) and explain why they were not used. *An evaluation of alternatives to open burning must demonstrate that open burning is technologically, economically, and environmentally the best alternative.*
List any alternatives to burning that have been done to the burn units prior to ignition.

4. SENSITIVE FEATURES
Sensitive Features *include population centers such as communities, cities, towns, hospitals, health clinics, nursing homes, schools (in session), camp grounds, numbered Alaska highways and roads, airports, and Class I Areas, where smoke and air pollutants can adversely affect public health, safety, and welfare.*
Include a map of the proposed burn area showing all sensitive features within a five mile radius. Additional maps are encouraged. a. Indicate multiple burn sites (if any) within the proposed burn area; b. List sensitive features as described above that may be adversely affected by low level smoke and distance of those areas from proposed burn area(s); c. List sensitive features that may be adversely affected by long-range transport of smoke and distance of those areas from proposed burn area(s).

How many maps are attached?	

DEC's primary goal is to manage smoke to mitigate impacts on public health and visibility. Depending upon the potential for smoke incursions, special mitigation procedures may be required. The State of Alaska uses the following chart from Montana to relate visibility, as impacted by smoke, with air quality concentrations: http://www.deq.state.mt.us/FireUpdates/VisibilityRanges.asp. **If you have questions while completing the Smoke Management portion of the application, please contact DEC for assistance.**

Out of each group of 3 or 4 statements relating to smoke management issues, please check the one that most accurately describes your land clearing open burn:

☐ The project will only produce smoke for less than 1 day. No smoke related impacts to remote residences, roads, or other facilities.

☐ The project will produce smoke for 1 - 3 days or the smoke will be barely visible to the public. Minor or no smoke related impacts to isolated residences, remote roads or other facilities.

☐ The project will produce smoke visible to the public over 4 - 7 days. Vistas, roads, and some residences may experience short-term decreases in visibility.

☐ The smoke will be readily visible to the public and last more than 7 days. Vistas, roads, and some residences may experience longer-term decreases in visibility or significant decreases in visibility over the short-term. Smoke may affect smoke sensitive areas.

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6. MITIGATION: *If any safety hazard is present, or if requested by the authority of a Sensitive Feature, you must mitigate impacts through steps that are technologically feasible and economically and environmentally reasonable. Failure to have an effective mitigation measure may, in some cases, result in the application not being approved.*				
Indicate how authorities in control of Sensitive Features will be contacted if air quality degrades (visibility may be used as an indicator of air quality). Provide a contingency plan for smoke intrusion into Sensitive Feature areas. Indicate how you will notify Authorities having control over Sensitive Features identified above if visibility is expected to be decreased to less than three miles for an hour.				
What mitigation practices / contingency plans are proposed to help keep the smoke from affecting Sensitive Features near to the burn site?				
Is the burn expected to be large enough (>1000 acres) or hot enough to create a smoke plume that is transported to upper level air currents?		Yes		No
If yes, what mitigation practices / contingency plans are proposed to help keep the smoke from affecting Sensitive Features far from the burn site?				

7. PUBLIC NOTICE *The Responsible Individual's local contact phone number should be publicized. The public must be notified at least three days prior to the anticipated open burn through the local news media, the local Post Office, or by individual communication (written documentation is best).*			
Indicate how the public will be informed prior to, during, and after the burning. How will you notify persons in control of the sensitive features identified on your map of your anticipated burn?			
If burning is to occur within a non-urban area, list neighbors within a one-mile radius of the burn area. Use additional sheets if necessary.			
Name:		Name:	
Address:		Address:	
Telephone:		Telephone:	
Name:		Name:	
Address:		Address:	
Telephone:		Telephone:	

Indicate how you will coordinate with other concerned agencies, including the Responsible Authorities of sensitive features identified above *(such as the FAA, State Troopers, military, fire department, adjacent land managers, etc.)* Include a list of telephone numbers or email addresses of agencies you will contact prior to ignition.

Indicate how you will coordinate with DEC Air Quality. *At a minimum, the DEC Meteorologist must be notified one week prior to anticipated project ignition (907-269-7676). If your application is approved, a weather conference call should be scheduled for 24 - 96 hours prior to the actual burn.*

Attach a copy of your approval for the DNR - Forestry Division Open Burn Permit for your planned activity, or explain below why a DNR Burn Permit is not required.

8. **METEOROLOGICAL / WEATHER FORECASTING** *The Division's meteorologist is responsible for ensuring, from the Department's standpoint, that smoke from a land clearing / agricultural burn does not adversely impact the public. To allow their participation in the burn decision making process, please ensure that this application is completed and submitted at least 3 weeks prior to a scheduled burn so they can participate in pre-burn planning events several days prior to ignition.*
Indicate how weather forecasts will be obtained and used to prevent smoke impacts. Identify how the local and spot weather forecast will be obtained prior to ignition of the open burn (for example, contacting the National Weather Service). *Parameters that should be obtained are the predicted visibility, dispersion conditions, transport and local area wind direction, and wind speed.*

Indicate how weather changes will be monitored.

Explain what you will do if a wind shift or other weather change begins to create an adverse smoke impact on Sensitive Features previously identified.

Indicate what will be done to ensure smoke disperses as forecast. Note: If a test fire fails to indicate that acceptable smoke dispersion will occur, no more fires are to be ignited.

Indicate proposed techniques to be used to enhance the active fire phase and reduce the smoldering phase. Consider employing emission reduction techniques before, during and after the fire. Indicate what techniques are feasible for you to accomplish.

DEC may require monitoring for certain burns. Such burns are typically large-scale or very close to sensitive features. The monitoring requirements, if any, will be addressed within the approval process. If monitoring is required, DEC may supply monitoring equipment and personnel. The applicant acknowledges that time and materials will be charged for DEC services. _____Yes
If applicable, identify how the effect of the fire on air quality at Sensitive Features will be monitored.

If any safety hazard is present, or if requested by the persons in control of a sensitive area, you must mitigate the smoke impact of the fire as quickly as possible. You will be held legally responsible for any accidents or adverse health effects that occur because of your open burn.

Certification: (If signing as an Authorized Agent, please submit a copy of your authority to do so.)

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Landowner Signature Date	Fire Manager Signature (if applicable) Date
Printed Name of Landowner	Printed Name of Fire Manager (if applicable)

With each open burn application, submit a $200 retainer payable to the State of Alaska, DEC. The cost of the approval will be $200 unless DEC determines there may be smoke incursion into a public place, into an airport, into a Class I area, or into a non-attainment area or maintenance area for CO or PM-10. If DEC determines there may be smoke incursion, DEC will notify the applicant that an hourly administrative fee and direct costs for approval processing and administration will be charged. DEC will prepare and send a monthly invoice itemizing fees and direct costs to the applicant.

Send each open burn application and check to:

ADEC Air Permits Program
Anchorage TV Permit Supervisor
Open Burn Request
619 E. Ship Creek, Suite 249
Anchorage, AK 99501

Your approval may be issued within 30 days. If approved, notification and burn summary requirements will be outlined in your letter of approval.

A copy of the open burning guidelines may be obtained through our website:
http://www.dec.state.ak.us/air/ap/docs/obrguide.pdf

Example DEC Open Burn Approval

Alaska Department of Environmental Conservation
Air Quality Program
Open Burn Approval
Controlled Burning for Resource Management

Approval Number: AQXXX **Expiration Date**: October 31, 2015

Applicant:

AFS Military Zone
P.O. Box 35005, Mil Zone AK-316
Fort Wainwright, AK 99703

Contact:

Location: Fort Wainwright Small Arms Range, Total of 2,825 acres

Description of Burn Unit: Fort Wainwright Small Arms Range (Township I south, Range 1 west, Section 24 and 25 / Township 1 south, Range I east, Sections 19, 20, 29 and 30, Fairbanks Meridian), has an anticipated two to eight day event to burn between **April 1 and October 31, 2015**. The area is located on Fort Wainwright Army (FWA) Base southeast of Fairbanks, Alaska, adjacent to the Richardson Highway. The total area consists of 2,825 acres, which includes the Small Arms Complex at 2,769 acres, Ammo Supply Point at 31 acres, and hand piles at 1-25 acres. The Small Arms Complex is divided into 5 units: Unit 1 at 237 acres; Unit 2 at 413 acres; Unit 3 at 263 acres; Unit 4 at 386 acres; and Unit 5 at 745 acres. On the north and west the flat burn area is bounded by gravel roads, on the south and east the burn area is bounded by two-track dirt roads and the dyke road. The goals of the prescribed burn are to reduce the chance of wildfire, by reducing grassy thatch fuel loading, and reduce part of the unexploded ordnance and munitions hazards by attempting to detonate them with the use of the prescribed fire. Fuels range from grass and mixed shrubs to black spruce /hardwood mix at approximately 1.7 tons/acre. Matted grass is the primary fire carrier.
Sensitive areas are noted at: Richardson Highway 1/3 mile north; Ladd Army Airfield 1.5 miles north; Badger Rd 1/2; Fort Wainwright ½ mile north and northwest; residential areas 1/2 mile north, E, and W; Fairbanks 1 mile northwest; North Pole 7 miles east.

The State of Alaska Department of Environmental Conservation (ADEC), under the authority of AS 46.03, AS 46.14 and 18 AAC 50, issues this written approval to the Alaska Fire Service for controlled burning to manage forest land, vegetative cover, fisheries, or wildlife habitat *(18 AAC 50.065(g))*.

This approval is subject to the following conditions:

1. Provide a copy of this burn approval to the Burn Boss and keep a copy at the burn unit staging area during the burn.

2. Air Meteorologist Notification: Contact ADEC Air Meteorology staff at (907) 269-7676 at least one week prior to a scheduled burn to arrange the Meteorologist's participation in the pre-burn weather conference scheduled with your fire weather team prior to ignition. Our meteorologist will provide an

independent evaluation of the predicted fire weather forecast to assist in the burn decision making process.

3. If the anticipated active fire phase and/or the smoldering fire phase lengths are different than those in the approved application, please contact ADEC meteorology staff at (907) 269-7676. If the burn is not conducted, please notify the ADEC Meteorologist within 24 hours of canceling the scheduled burn. Please provide a new anticipated burn date at that time if possible.

4. Air Permits Notification: Notify ADEC by noon the business day prior to any planned burn, telephone: (907) 451-5173 (Fairbanks Administrative Clerk), Fax: (907) 451-2187, or email: dec.AQ.airreports@alaska.gov.

Notification shall include:

a) Open Burn Approval number;
b) Authorized Agency Name;
c) Burn Location;
d) Burn Date(s);
e) Contact Name During Burn;
f) Contact Telephone Number;
g) Description of how and when the Test Burn will be completed (prescribed and land clearing only);
h) Estimated Duration of Active Firing (ignition) Phase (prescribed burning only);
i) Estimated Duration of the Smoldering Phase (prescribed burning only);
j) Description of Pre-Burn Public Notices; and
k) Consideration of weather forecast and air quality advisories in area of burn.

5. Notify the public through the local news media (if available in the nearest community to the burn site) or at the local Post Office at least three days prior to the burn *(18 AAC 50.065 (j))*. The public notice shall contain:

a) Contact name;
b) Contact's telephone number;
c) Location of the burn;
d) Burn dates; and
e) Brief description of activity (such as what is to be burned and why).

6. Notify the local fire departments, the Federal Aviation Administration Office and/or the Airport Control Tower before each burn event.

7. Record complaints received concerning excess smoke (if any), including name, phone number of complainant and any corrective action taken *(18 AAC 50.065(k))*. Maintain records of complaints during the life of this approval and provide copies of the records to the department upon request.

8. PM-2.5 Nonattainment Areas. As provided under 18 AAC 50.065(f): Open burning is prohibited between November 1 and March 31.

9. Do not conduct burning during stagnant air conditions (fogs or inversions) or when air quality advisories have been posted for that airshed. If weather conditions change after ignition such that any "sensitive feature" (as listed in the Open Burning Policy & Guidelines) is adversely impacted, extinguish the burn as soon as possible. Air Quality Advisory information for the state may be found

at https://myalaska.state.ak.us/dec/air/airtoolsweb/AirQualityAdvisories/Advisories.aspx , or telephone (907) 269-7676 Please also check with the Fairbanks North Star Borough for any local air quality advisories.

a. When conducting this burn, if winds are from the east or south, low-level smoke may quickly impact smoke sensitive areas (the Richardson Highway and Ft Wainwright Airfield to the north, residential areas to the west). It is advised to avoid burning under southerly or easterly wind flow; in any event, be sure to monitor smoke movement to prevent impacting these sensitive areas that are in close proximity to the burn.

10. Use test burns to evaluate smoke dispersion.

11. Follow the Enhanced Smoke Management Plan adopted by the Alaska Air Quality Committee in October 2003 and updated June 2009. You may find the plan at http://www.dec.alaska.gov/air/OpenBurn/OpenBurn.htm.

12. As required by Appendix D of the Enhanced Smoke Management Plan, *Post-burn Data Reporting*, please submit a summary to the ADEC Air Permits Program, 610 University Avenue, Fairbanks, AK 99709-3643, AND to 619 E. Ship Creek Ave., Ste. 249, Anchorage, AK 99501, Attn: Non-Point Section Manager, within 30 days of the completion of each burn. The summaries shall include the following information:

a) Authorized agency and approval number;
b) Date of burn(s);
c) Burn location(s);
d) Total area of burned(s);
e) Fuel type(s);
f) Pre-burn fuel loading information; *Land managers who are unfamiliar with estimating pre-burn fuel loading should ask ADEC to supply them with information, guidance documents, and models that are currently used to compile this information. Estimates of fuel loading are all that are necessary, and only for Size Class C burns (greater than 10 acres).*
g) Fuel consumption: The amount of fuel actually consumed expressed in tons/acres. Pre-burn numbers are acceptable if actual numbers cannot be determined.
h) Predominant configuration of the fuel burned: piled, windrows, broadcast, or underburn.
i) Type of burn: "anthropogenic" or "natural" classification;
   i. *"Anthropogenic" is defined as a fire that is produced by human activities.*
   ii. *"Natural" is defined as a fire that was ignited by lightning or other natural causes*.
j) Emission reduction techniques used: Describe any burning techniques applied that reduced the actual amount of emissions. For example, changing ignition timing to allow for more efficient combustion.
k) Description of public notifications made;
l) Verification of weather forecasts and area air quality advisory status for the event date(s); and
m) List of complaints received concerning excess odors or smoke (if any), including name, phone number of complainant and any corrective action taken.

This approval does not constitute a permit or approval from any agencies other than ADEC Division of Air Quality; other agency permits or approvals may be necessary.

Appendix D

Estimating Emissions from Prescribed Fire

Estimating Emissions for Prescribed Fire

Policy and Guidance Documents

This appendix will address the national policy goals for how to use fire as a management tool while still accomplishing visibility/smoke management goals.

Several documents are currently being written by the Western Regional Air Partnership/Fire Emission Joint Forum that should be helpful in assisting land managers use fire as a management tool. Should you need one of these documents please contact DEC staff or the WRAP website at http://www.wrapair.org/forums/fejf/docs.html.

- Integrated Assessment Update and 2018 Emissions Inventory for Prescribed Fire, Wildfire, and Agricultural Burning. Western Governors Association / Western Regional Air Partnership / Fire Emissions Joint Forum.
- 1996 Fire Emission Inventory – Draft Final Report. WGA/WRAP
- Non-burning Alternatives for Vegetation and Fuel Management, November 2002
- WRAP Policy Annual Emission Goals for Fire, DRAFT Prepared by the Annual Emission Goals Task Team for the Fire Emissions Joint Forum of the Western Regional Air Partnership, December 16, 2002
- Policy for Categorizing Fire Emissions, WRAP/FEJF 2001.
- Wildland and Prescribed Fire Public Outreach Materials. EPA 1999.
- Assessing Status of Incorporating Smoke Effects into Fire Planning and Operations. WGA/WRAP. 2002.
- Development of Emissions Inventory Methods for Wildland Fire. EPA 2002.

Other documents available:

- Smoke Management Guide for Prescribed and Wildland Fire. National Wildfire Coordination Group. 2001.
- National Assessment of Smoke Management Practices & Techniques. NWCG Workshop Synthesis. 1999.
- EPA's Interim Air Quality Policy on Wildland and Prescribed Fires
- Effects of Fire on Air. USDA Forest Service, 2002.
- Visibility/Regional Haze Requirements/Rules. CFR Title 40, Part 51 §308

List of Websites

- ADEC "Open Burning Policy & Guidelines" http://www.state.ak.us/dec/air/ap/permit.htm
- Alaska Dept. Natural Resources: www.dnr.state.ak.us/
- Alaska Interagency Wildland Fire Management Plan, October 1998: www.dnr.state.ak.us/forestry/pdfs/98AIFMP.pdf
- Alaska Zone forecasts: http://www.noaa.gov/wx.html
- Federal Aviation Administration Weather Cameras: http://avcams.faa.gov/
- Alaska Fire Service: http://fire.ak.blm.gov/
- EPA Air Monitoring data/reports: http://www.epa.gov/air/data/reports.html

- EPA Development of Emissions Inventory Methods for Wildland Fire: http://www.epa.gov/ttn/chief/ap42/ch13/related/c13s01.html
- Fire Emissions Joint Forum (WRAP): http://www.wrapair.org/forums/fejf/index.html
- "Forest Health and Safety Project" (Dec 18, 1997): http://clerk.ci.homer.ak.us/fhsproj.htm report containing information about the spruce bark beetle and related forestry topics, developed by the City of Homer and the US Forest Service.
- "Interim Air Quality Policy on Wildland and Prescribed Fires" (May 1998). US EPA www.epa.gov
- "National Assessment of Smoke Management Practices & Techniques" (Dec 1999). NWFCG Fire Use Working Team, c/o US Fish and Wildlife Service, NIFC, 3833 South Development Avenue, Boise ID 83705. (John Core at jcore@ibm.net)
- NOAA significant events, satellite photos: www.osei.noaa.gov/
- RAWS data (archived, all states) www.wrcc.dri.edu/wraws/
- Regional Haze Rules www.epa.gov
- Smoke Management Guide for Prescribed and Wildland fire, 2001 Edition. 226 pp. NWCG web site, an excellent resource: http://www.nwcg.gov/pms/pubs/large.html#SmokeManagement
- US EPA air contacts: http://www.epa.gov/air/data/contacts.html
- US Federal Wildland Fire Policy (Dec 1995) NIFC/NWFCG: www.wilderness.net/nwps/policy/fire_policy.cfm
- Visibility Info Exchange (multiagency): http://vista.cira.colostate.edu/views/
- Western Regional Air Partnership (WRAP): www.wrapair.org/

Models

A number of models are available at www.frames.gov/tools. Some of the models may not be applicable for Alaska. A copy of FOFEM (First Order Fire Effects Model) is available on a CD from DEC. It is very easy to use, but it does not contain emission factors for Alaska ecosystems. However, it does predict fuel consumption and smoke production over time, which will give you an idea of what to expect. When used in combination with reliable weather data and predictions, you can estimate emission production over time and what direction the smoke will move, how much it will accumulate, at what time during the process, estimates of accumulation, etc.

Emission Calculations

EPA's AP-42 (http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s01.pdf) provides emission factors for calculating approximate emissions from prescribed fires. Below is an example of an emission calculation.

Example problem for carbon monoxide (CO) emissions:

Equation: Emissions (tpy) **=** Area Burned **x** Fuel Loading **x** Emission Factor
Area Burned (fuel consumed) **=** 2700 acres (1093 hectares)
Fuel Loading = 11 tons/acre (25 Mg/kg) (AP-42 Table 13.1-1 Interior Alaska)
Emission factor = 126 g/kg (AP-42 table 13.1-3, CO, conifer, long needle/fire phase)

Emissions **=** 2700 acres **x** 11 tons/acre **x** 126 g/kg (to convert from g/kg to lb/ton divide by .5 so, 126 g/kg = 252 lbs/ton)

2700 acres **x** 11 tons/acre **x** 252 lb/ton = 7,484,400 lbs (divide by 2000 to get tons)
= 3742.2 tons per year of CO emitted from this 2700 acre fire

Emission Reduction Techniques

The DEC encourages land managers to use techniques that increase combustion efficiency and reduce the smoldering stage of burning, such as fans (when burning slash), mass ignition, accelerated mop-up, and other methods.

To maximize the effective use of fire within the emission levels allowed, it is necessary to employ improved burning techniques. The science of predicting the amount of emissions has improved within the last few years thanks to research done by the USFS Pacific Northwest Research Station, but more work needs to be done for Alaska-specific conditions.

Computer models allow land managers to analyze proposed burns and prepare burning prescriptions that will produce minimum emissions on each acre to be treated. Various site factors and burning technique scenarios can be tested in the models, and estimates of emissions that each scenario would produce can be calculated. This capability will allow land managers to treat maximum acreage with minimum emission production.

The following smoke management and emission reduction techniques are considered best management practices:

1. Reducing the biomass by use of techniques such as yarding or consolidation of unmerchandisable material, multi-product timber sales or public firewood access, when economically feasible. When allowing public firewood access, the public must also be informed of the adverse impact of using green or wet wood as fuel;
2. Burning in seasons characterized by meteorological conditions that allow for good smoke dispersion;
3. Using mass ignition techniques such as aerial ignition by helicopter to produce high intensity fires with short duration impacts;
4. Igniting burns under good-to-excellent ventilation conditions and suspending operations under poor smoke dispersion conditions;
5. Considering smoke impacts on activities conducted by local communities and land users;
6. Burning only those fuels essential to meet resource management objectives;
7. Minimizing duff consumption and smoldering through fuel moisture considerations;
8. Burning piles when other burns are not feasible, such as when snow or rain is present;
9. Implementing maintenance burning in a periodic rotation mimicking natural fire cycles to reduce excessive fuel accumulations and subsequent excessive smoke production through smoldering or wildfire; and
10. Managing smoke impacts as follows:
    a. Limiting smoke impacts to roads, highways, and airports to the amounts, frequencies, and durations consistent with any guidance provided by highway and airport personnel;
    b. Using appropriate signing if smoke will impact any point of public access, i.e. highways, dirt roads, trails, campgrounds, etc.
    c. Notifying potential impacted sensitive receptors; and
    d. Determining nighttime impacts and taking appropriate precautions.

Appendix E

Smoke Management Contingency Plan

Smoke Management Contingency Plan

Each Burn Plan submitted to DEC for written approval should contain a contingency plan for actions to be taken if smoke impacts sensitive features in the area. The format is entirely up to the Responsible Authority, but appropriate short-term (less than 24-hour) contingency actions should, among other things, include:

1. identification and location of smoke sensitive features;
2. smoke sensitive features distance from burn area, potential for problems;
3. notifying the affected public of elevated pollutant concentrations;
4. list of emergency contact numbers in case of smoke intrusions;
5. suggesting actions to be taken by sensitive persons to minimize their exposure (e.g., remain indoors, avoid vigorous activity);
6. providing clean-air facilities for sensitive persons or means of evacuation if needed;
7. halting ignitions of any new open burning that could impact the same area;
8. identification of fuel loading, consumption, and potential rates of emission production over time (so that you can anticipate when the highest emission production will occur).

Example text follows (for guidance purposes, these are not necessarily required items):

> "Smoke sensitive areas are primarily the communities of Tok, Chicken, and Northway. Potential smoke related problems include effects on individuals with respiratory problems and reduced visibility for aircraft at airstrips. The potential for smoke related problems are considered minimal due to the distances between these communities and the burn (from 25 to 50 miles away)."
>
> The following measures will be taken to reduce the potential for smoke related problems:
> 1. firing will not be conducted when fog or inversion potential exists; and
> 2. notification will be given to DEC, Alaska State Troopers in Tok, the FAA Flight Services in Northway, the Boundary and Alaskan Ports of Entry, and media contacts.

Table of Fuel loading and consumption information

Size class (inches dia)	surface fuel tons/acre	% consumption	duff fuel tons/acre	consumption tons/acre
0-0.25	0.2	40.0		0.08
0.25-1.0	0.3	12.5		0.04
1.00-3.0	0.5	7.5		0.04
>3	3.0	2.5		0.07
duff loading	(estimate)	30.0	10	3.0
TOTAL				3.23

Appendix F

Alternatives to Burning

Alternatives to Burning

The term "alternatives" refers to mechanical, biological or chemical treatment methods of fuel reduction that do not include burning, such as chipping, grinding, logging, and mechanical/hand thinning with removal. The need for using prescribed fire falls into three broad categories: reduction of hazardous fuels, ecological effects, and ecological restoration. In order to be considered a "non-burning alternative" the treatment must mimic at least some effect of a prescribed fire.

Land managers should consider the availability and feasibility of alternatives to burning in lieu of burning. This is particularly true where there is likelihood that burning in or near residential areas may cause an exceedance of the NAAQS, and/or when alternatives are available, feasible, economical, and when the use of the alternative will not cause other unacceptable environmental or human health effects. When alternatives to burning are used, land managers should report this to DEC so that the effort can be tracked as an emission reduction technique.

Examples of alternative measures include:

1. **Mechanical removal.** This category includes logging, onsite chipping, offsite use of brush or firewood, or treatment of unmerchantable material such that slash burning is not needed.

2. **Chemical treatments**.

3. **Land use change.** According to the NWFCG Smoke Management Guide (ii), changing Wildland to another land use category may result in elimination of the need to burn in a prescriptive manner. Conversion of a Wildland site to an urbanized use is the example that they gave (view website at: http://www.nwcg.gov/pms/pubs/large.html#SmokeManagement)

4. **Reduction of fuel consumed in a prescribed burn.** This is achieved when fuels are at or above the moisture of extinction, and therefore unavailable for combustion. This may not result in a real reduction in emissions, and may significantly increase smoldering. But if it is the intention of the land manager to leave the unburned fuels for biological decomposition (or for other reasons), then this method does qualify as an "alternative." (ii, p. 147).

Appendix G

Air Quality Monitors

Air Quality Monitors

There are several types of air monitors that can be used to assess ambient levels of particulate matter. Ambient monitoring determines when the public is being impacted by smoke and is a tool to help the burn agency and DEC take necessary steps to protect the public.

FRM or “Federal Reference Method” is a monitor that has been set up and operated in accordance with the procedures set out in the Code of Federal Regulations (CFR). Site placement is very important in determining whether it is a FRM monitor or not. These monitors are usually manually operated samplers with "paper" filters and a vacuum air flow which requires electrical power. While these monitors do provide official data, it often takes several days to process the filter. This type of monitor setup also includes various types, Hi-Vol (PM10), and R&P PM2.5 Partisol.

FEM or “Federal Equivalent Method” monitors are comprised of monitors and procedures which were approved after the FRM procedure was promulgated. Some of these monitors are filter-based, manual samplers and some are continuous samplers, like the "real-time" monitors. The real-time monitors are more costly than the filter-based systems, but they do have continuous read-outs which give concentrations in “real time.” Many of these monitors are portable, some are hand-held and operate on battery packs so they do not require electrical sources. This type of monitor includes betagauges, TEOMS, etc.

SLAMS or “State and Local Air Monitoring Site” A fixed monitoring site which is part of the federal monitoring network, which are normally used to determine compliance with the national particulate standard. An example would be one of the monitors in Anchorage.

SPM or “Special Purpose Monitors” may or may not be FRMs. By virtue of their being SPMs, the data could be used to assist, track, and evaluate a burn without “counting against” the land manager. Land managers should be encouraged to use SPMs to collect data. SPMs are usually used to assess pollutant levels and to determine whether a more long-term monitor is needed. They are usually set-up temporarily. Most monitors have been tested against a FRM unit. The assumption is that the data provide a good approximation of what the ambient particulate levels are. An example of each type of sampler would be the Anderson Hi-Vol manual PM10 sampler (FRM) and R&P PM2.5 Partisol (FRM), the Graseby Beta Gauge and R&P TEOMS (two FEM continuous PM10/2.5 monitors), and the nephelometer (a continuous, special purpose, fine-particulate monitor).

IMPROVE or “Interagency Monitoring of Protected Visual Environments.” Refers to the monitoring network used to assess air quality in Class I and Class II areas. These units monitor particulates, total carbon, and other components. IMPROVE consists of air quality data from Class I areas that include national parks and wilderness areas where visibility is deemed an important attribute. This monitoring program is an interagency effort with the U.S. Environmental Protection Agency (USEPA) and the U.S. Department of the Interior (USDOI), including the U.S. Forest Service, U.S. Fish and Wildlife Service, and the Bureau of Land Management. The National Park Service (NPS) provides monitoring and maintains the database to determine spatial and temporal trends in visibility in the NPS parks and wilderness areas and determine causes for

visibility degradation. The IMPROVE fine particle network collects PM2.5 and PM10 samples over a twenty four hour period every Monday and Friday using IMPROVE samplers. The network consists of over 110 monitoring sites, located in Class I ("Clean Air") areas, and has been in operation since 3/88. The PM samples are analyzed for $PM_{2.5}$ mass and its elemental constituents, organics, ions, light absorption, and PM_{10} mass. The data set contains the concentrations, minimum detection limit, error, and data quality flags.

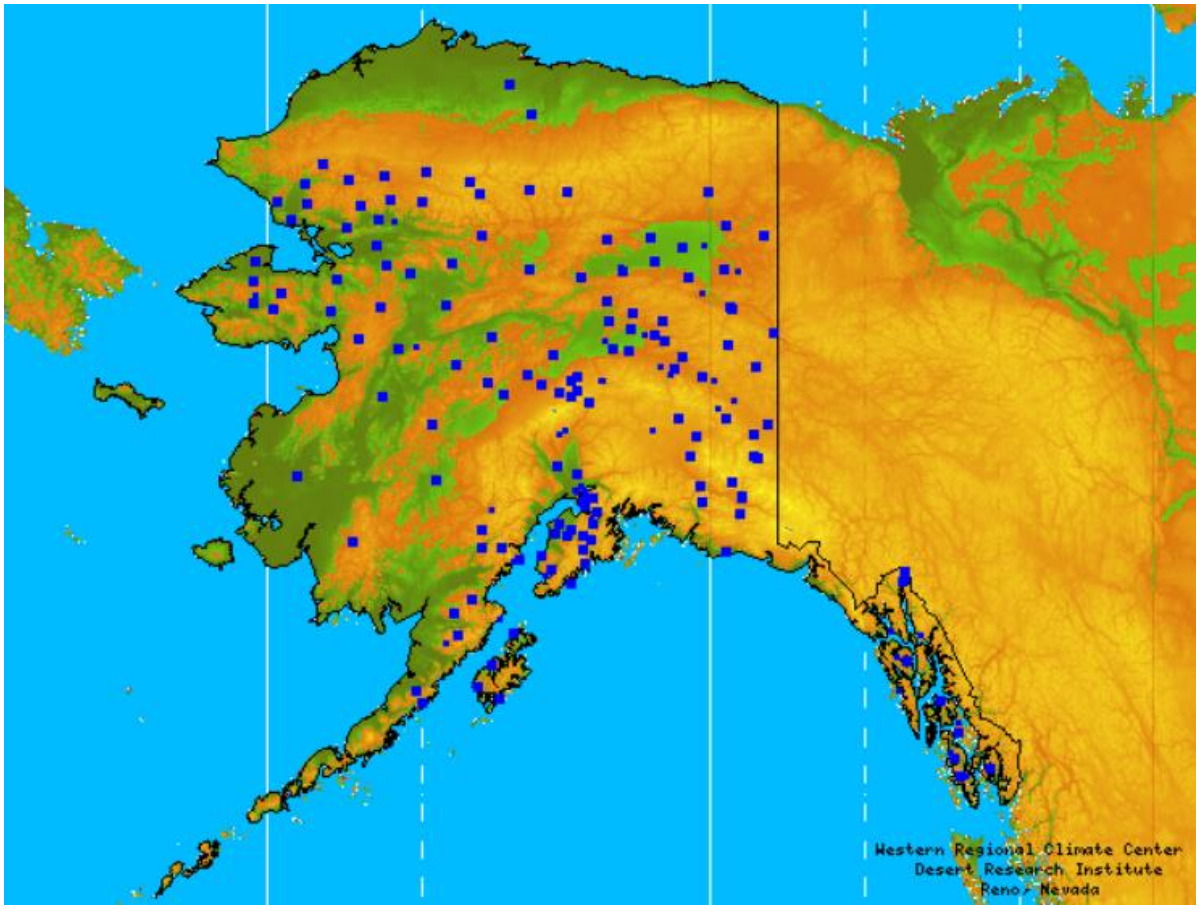
Visual: refers to the evaluation of smoke concentration based on visibility. Experienced personnel would be stationed along roadways, in communities, etc. to evaluate visibility impacts due to smoke. For example, visibility of ¾ mile or less can be indicative of very unhealthy air quality due to hazardous PM2.5 concentrations, whereas visibility of 3 to 5 miles indicates concentrations that can be unhealthy for sensitive individuals. This procedure, when done properly, could give somewhat valid information on smoke concentrations in an airshed. A good "rule of thumb" tabulation on this method is located in the Smoke Management Guide for Prescribed and Wildland Fire, 2001 edition, p.31. (www.nwcg.gov)

Smoke impacts at various receptors: a certain number of valid complaints from community residents may be evaluated and considered for taking mitigation action on a prescribed burn. Valid complaints from local safety, government, fire department or other authority will be given priority consideration.

Appendix H

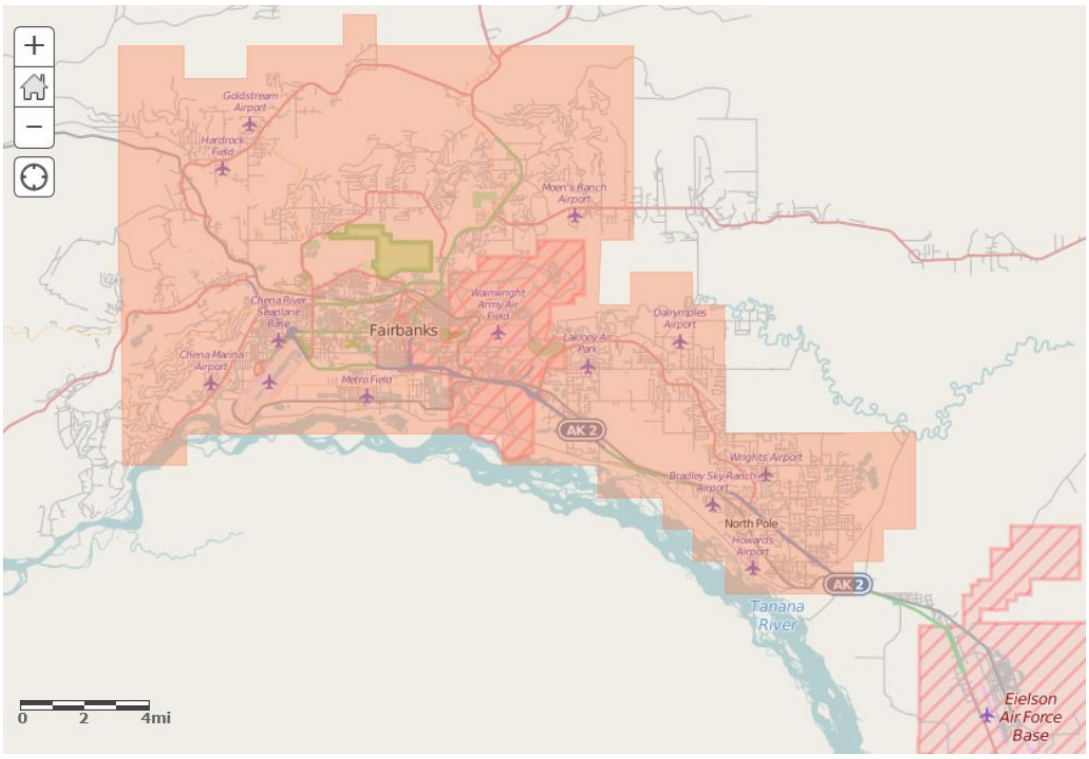
Maps

Fire Weather Monitoring Stations



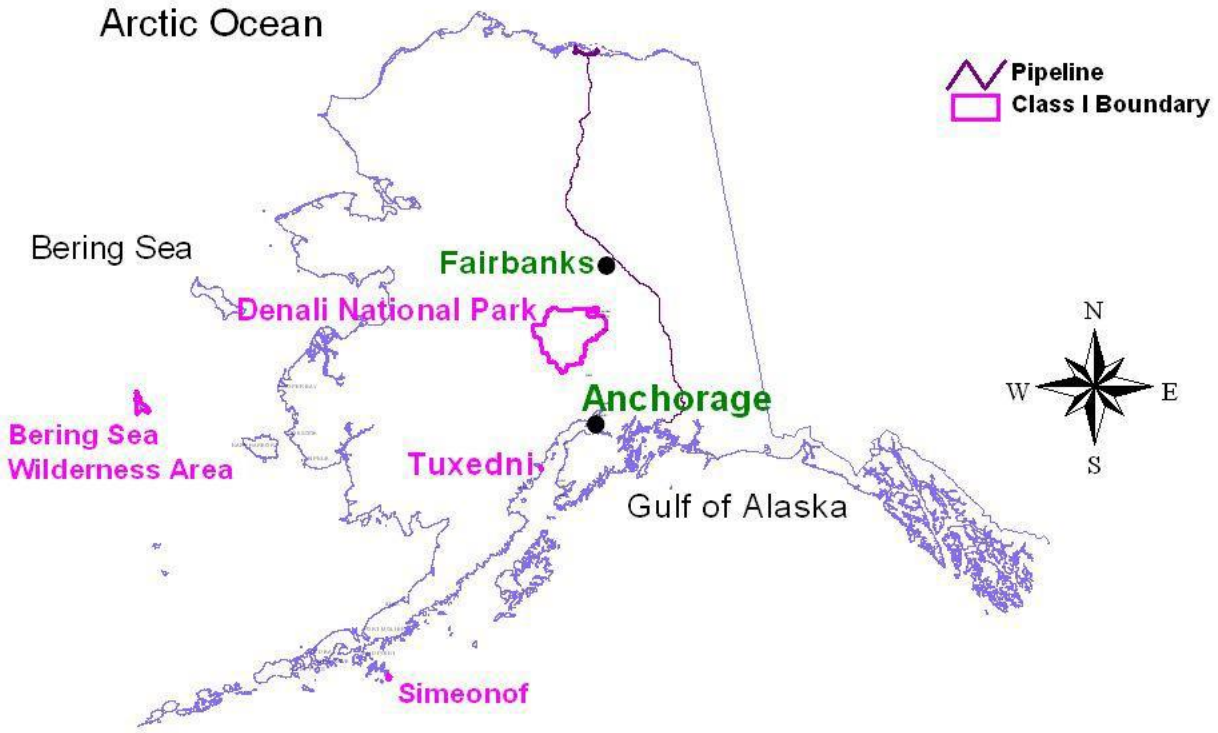
Archived Remote Automated Weather Station (RAWS) data available at
http://www.wrcc.dri.edu/wraws/

Fairbanks $PM_{2.5}$ Nonattainment Area



An online GIS version of this map is accessible from DEC's web map gallery: http://dec.alaska.gov/das/GIS/apps.htm.

Alaska's Class I Areas



Appendix I

Example Air Quality Advisory

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Air Quality
AIR QUALITY ADVISORY
South Central Alaska #2014-F3
Thursday May 22, 2014

LOCATION(S) IMPACTED: South Central Alaska. Fires near Tyonek and Soldotna are impacting air quality over a large portion of south-central Alaska to include the Mat-Su Valley, Anchorage, the western Kenai Peninsula and Kodiak Island. The Mat-Su and Anchorage air quality offices have issued advisories for those areas. This advisory is for the Western Kenai Peninsula. All these advisories are available on the DEC website.
http://dec.alaska.gov/Applications/Air/airtoolsweb/Advisories

TIME/DATE OF UPDATE: Thursday May 22, 2014 2:00 PM.

VALID TIME: Thursday May 22, 2014 2:00 PM. to Tuesday May 27, 2014 4:00 PM

TIME/DATE OF THE NEXT REPORT: Friday May 23, 2014 4:00 PM

ADVISORY: Fires near Tyonek and Soldotna are impacting air quality on the Kenai Peninsula. Smoke from these fires has saturated the air over a large portion of South-central Alaska. Main population areas impacted are Kenai, Nikiski, Soldotna, Ninilchik, Kasilof, Seldovia, and Homer. Although a large area of smoke is over Kodiak Island, concentrations are more diffuse in that area. Conditions are expected to continue through the weekend. Air Quality throughout the area will vary between **GOOD** and **VERY UNHEALTHY** depending on wind patterns and fire behavior.

Be aware that areas immediately downwind of any fire will experience **HAZARDOUS** levels of smoke. Generally, worse conditions occur overnight and during the early morning hours, as the atmosphere cools and brings smoke to the surface. During the day, surface heating will mix smoke and carry it upwards, temporarily improving air quality.

SMOKE AND PUBLIC IMPACT: This is an area forecast, and as such is a general forecast for portions of South Central Alaska. Smoke intensity will vary depending on precise location and local wind flow patterns. Smoke concentrations will be such that they could impact public health at times. It is advised that travelers check local weather as smoke conditions may vary considerably from one locality to the next. The most recent weather observations may be found on National Weather Service's homepage at **http://pafc.arh.noaa.gov/obs.php.**

In smoke impacted areas, DEC advises people with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion. See the table below for more guidance on the Air Quality Index categories and Cautionary Statements.

The following table contains the cautionary statements for the Air Quality for Particle Pollution.

Air Quality Category	Cautionary Statements
Good	None
Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
Unhealthy for Sensitive Groups	People with heart or lung disease, the elderly and children should reduce prolonged or heavy exertion.
Unhealthy	People with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion
Very Unhealthy	People with respiratory or heart disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged exertion
Hazardous	Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors

When air quality data is unavailable, the following **Air Quality Smoke Reference Guide** may be used to estimate air quality levels and potential health impacts:

Visibility	Air Quality
10+ miles	Good
6 - 9 miles	Moderate
3 - 5 miles	Unhealthy for sensitive groups
1.5 - 2.5 miles	Unhealthy
0.9 - 1.4 miles	Very Unhealthy
0.8 miles or less	Hazardous

FOR MORE INFORMATION: For information on this advisory, contact Michael Gravier with the Division of Air Quality at 907-269-7676.

Criteria to issue an Air Quality Alert

18 AAC 50.245. Air quality episodes and advisories for air pollutants other than PM-2.5.
(a) The department or a local air quality control program may declare an air quality episode and prescribe and publicize curtailment action if the concentration of an air pollutant in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 6 in this subsection.

Table 6.
Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5

Episode Type	Air Pollutant	Concentration in micrograms per cubic meter {and in ppm where applicable}
Air Alert	Sulfur dioxide	365 (24-hour average) {0.14 ppm}
	* $PM_{2.5}$	40 (24-hr average)
	PM_{10}	150 (24-hour average)
	PM_{10} from wood burning (wood smoke control areas)	92 (24-hour average)
	Carbon monoxide	10,000 (8-hour average) {8.7 ppm}
Air Warning	Sulfur dioxide	800 (24-hour average) {0.31 ppm}
	* $PM_{2.5}$	150 (24-hr average)
	PM_{10}	350 (24-hour average)
	Carbon monoxide	17,000 (8-hour average) {15 ppm}
Air Emergency	Sulfur dioxide	1,600 (24-hour average) {0.61 ppm}
	* $PM_{2.5}$	250 (24-hr average)
	PM_{10}	420 (24-hour average)
	PM_{10} from wood burning (wood smoke control areas)	During an air alert, a concentration measured or predicted to exceed 92 (24-hour average), and to continue to increase beyond the concentration that triggered the air alert
	Carbon monoxide	34,000 (8-hour average) {30 ppm}

(b) The department or a local air quality control program will declare an air quality advisory if, in its judgment, air quality or atmospheric dispersion conditions exist that might threaten public health.

(c) If the department or a local air quality control program declares an air quality advisory under (b) of this section, the department or a local air quality control program will

(1) request voluntary emission curtailments from any person issued a permit under this chapter whose stationary source's emissions might impact the area subject to the advisory; and

(2) publicize actions to be taken to protect public health.

(d) Nothing in this section alters a local government's powers or obligations under a local air quality control program established under AS 46.14.400 and other local laws, as applicable. (Eff. 1/18/97, Register 141; am 10/1/2004, Register 171; am 2/28/2015, Register 213)

18 AAC 50.246. Air quality episodes and advisories for PM-2.5. (a) The department or a local air quality control program may declare an air quality episode and prescribe and publicize the actions to be taken if the concentrations of PM-2.5 in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 6a in this subsection. The episode thresholds and actions prescribed for any area that has a local air quality plan included in the *State Air Quality Control Plan* adopted by reference in 18 AAC 50.030 must be consistent with the emergency episode provisions included in that plan.

Table 6a
Concentrations Triggering an Air Quality Episode for PM-2.5

Episode Type	Air Pollutant	Concentration in micrograms per cubic meter
Air Alert	$PM_{2.5}$	35.5 (24-hour average)
Air Warning	$PM_{2.5}$	55.5 (24-hour average)
Air Emergency	$PM_{2.5}$	150.5 (24-hour average)

(b) The department or a local air quality control program authorized by the department under AS 46.14.400 will declare a PM-2.5 air quality advisory if, in its judgment, PM-2.5 air quality or atmospheric dispersion conditions exist that might threaten public health.

(c) If the department or a local air quality control program declares a PM-2.5 air quality advisory under (b) of this section, the department or a local air quality control program will

(2) request voluntary emission curtailments from any person issued a permit under this chapter whose stationary source's emissions might impact the area subject to the advisory; and

(2) publicize actions to be taken to protect public health.

(d) Nothing in this section alters a local government's powers or obligations under a local air quality control program established under AS 46.14.400 and other local laws, as applicable. (Eff. 2/28/2015, Register 213)

Appendix K

References

References

i. Idaho/Montana smoke management operating guide/SMP

ii. EPA Interim Air Quality Policy on Wildland and Prescribed Fires

iii. Washington State Smoke Management Plan

iv. Regional Haze Rules, 40 CFR Part 51, 1999.

v. "Elements of a smoke management program," Colleen Campbell. Dec 31, 1997.

vi. NWFCG Wildland Fire Policy 1998.

vii. Alaska Wildland Fire Management Plan 1998.

viii. Policy for categorizing fire emissions. [online]. 2001. Natural Background Task Team, Fire Emissions Joint Forum, Western Regional Air Partnership. Available: URL [2001, Nov.].

ix. National Wildfire Coordinating Group. 1996. Glossary of Wildland fire terminology. PMS 205. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 162pp.

x. USDI and USDA Forest Service. 1998. Wildland and prescribed fire management policy-implementation procedures reference guide. National Interagency Fire Center, Boise, ID. 81pp.

xi. WRAP Charter, Purpose, p.1.

xii. Smoke Management Guide for Prescribed and Wildland Fire, 2001 Edition. National Wildfire Coordinating Group, Fire Use Working Team. 226pp.