

Alaska Department of Environmental Conservation



Amendments to: State Air Quality Control Plan

Volume III: Appendix III.K.8 Alaska Enhanced Smoke Management Plan

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

Public Review Draft

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APPENDIX III.K.8

Alaska Enhanced Smoke Management Plan

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).

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. As Alaska develops its State Implementation Plan (SIP) for regional haze, plan updates may be necessary to address additional fire tracking and emission management needs based upon policies and guidelines developed by the Western Regional Air Partnership. The updated ESMP will be incorporated into Alaska's regional haze SIP. DEC welcomes the participation of AWFCG agencies and the public in the process to improve the document.

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 (EPA) that we are implementing a smoke management plan which 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 reclassify an area, then states need to review the adequacy of their ESMP to make appropriate improvements in cooperation with Wildland owners/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/or 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, public health and 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 companion appendices will be updated as new information becomes available, but not more often than once a year.

2. GUIDELINES, MEMBERSHIP CRITERIA, AND RESPONSIBILITIES

2-1. Alaska Wildland Fire Coordinating Group (AWFCG)

The AWFCG (Appendix A), 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/owners that have fire management responsibilities for the lands they manage/own.

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/or future smoke emissions, is considered by DEC when promulgating policy, procedures and regulations.

The AWFCG established 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 / Air Quality Committee. The purpose of the committee is to address the AWFCG smoke management objectives and assist DEC with the development and revision of the Alaska Enhanced Smoke Management Plan (ESMP) for Prescribed Fire and propagation of policies, procedures and regulations related to smoke management. AWFCG members may provide representatives to serve on the Smoke Management / Air Quality Committee. Participation is not mandatory.

The DEC representative serves as Committee Chair. Each agency/organization representative is the point of contact for communicating information between the Smoke Management / Air Quality Committee and their agency/organization. The agency/organization representatives are responsible for assisting agency/organization personnel with pre-season permit applications and post-season reporting. The Smoke Management / Air Quality Committee was established through a charter with the AFWCG.

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/organization personnel, thereby keeping employees informed of the requirements and procedures of the ESMP.

- Attend Smoke Management / Air Quality Committee meetings as scheduled and assist with accomplishing committee objectives/assignments.

The responsibilities of the Smoke Management / Air Quality Committee include assisting in development of the ESMP and annually reviewing the effectiveness of the plan. In addition, the Regional Haze Rule requires five year progress reports to EPA describing how well the Enhanced Smoke Management Plan is being implemented as needed to meet reasonable further progress requirements.

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

- Implementation
- Burn activity summaries
- Smoke complaint summaries
- Compliance and enforcement
- Progress towards goals including visibility improvement/impact reduction
- 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 public comment periods. 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. The Responsible Authority submits the finalized Prescribed Burn or Land Clearing application to DEC. This person may also collect, review, and distribute any 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 Controlled Burning for Resource Management and Controlled Burning for Land Clearing Approvals 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. The Responsible Authority

must call and notify the DEC by telephone by noon the business day prior to any planned burn, Monday through Friday between 8:00 a.m. and 4:30 p.m. excluding State holidays. Call the number listed in the Open Burn Approval Letter.

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 proposed Test Burn (prescribed and land clearing only);
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 - when, in what publications, radio, etc.;
11. Consideration of weather forecast and air quality advisories in area of burn - Did contact person check the weather forecast for stagnant air conditions? Did contact person confirm there are no 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 restriction/no restriction information from the DEC Air Quality Air Advisory web site: http://www.dec.state.ak.us/air/am/aq_sr.htm. 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, if necessary. DEC will work with the Responsible Authority to provide monitoring assistance, if requested (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 the 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 at the end of the fire season. General information will be compiled from the AICC website at <http://fire.ak.blm.gov/>. Specific information required for compiling an electronic version for the annual emission inventory report can be obtained by calling AICC at (907) 356-5671;
- Ensuring that field oversight and enforcement is conducted and is uniformly applied;
- Coordinating with the Smoke Management Committee members to establish and facilitate support for smoke management techniques and mitigation strategies within the program;
- Ensuring that the ESMP is understood and communicated to all land management agencies and the AWFCG; and
- Facilitating Smoke Management Committee meetings to evaluate the program effectiveness, review policies, discuss new smoke management methods, and help solve agency smoke management issues.

The 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 approval for resource management and controlled burn for land clearing permits in specific areas, request burn suppression actions, or request burn bans/restrictions when meteorological and/or existing air quality conditions so warrant (i.e., if weather forecasters predict undesirable wind conditions and smoke 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/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/or 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 or any new ignition.

Controlled burns (prescribed burns and land clearing burns) and ignition of controlled 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 estimates for the burn, an estimate of mixing heights, and residual smoke behavior on 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. Your 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.

Smoke Management Techniques.

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, weather forecasts
- Appropriate modeling with accurate weather data and emission factors
- Scheduling burns to use weather fronts bringing rain/snow 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/science
- Identification of smoke sensitive features/receptors, and burning at times 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 / corporation 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 its own established format instead of the DEC application, but each controlled burn approval application submittal must contain the following information for each planned ignition/burn unit:

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 of DEC notification 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), 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.

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 you will coordinate with other concerned agencies, including the Responsible Authorities of sensitive features:

Indicate how you will notify all concerned agencies, 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, prior to ignition. 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.

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 you will do 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, you must take technologically feasible and economically and environmentally reasonable steps to mitigate smoke impacts.

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

Indicate how you will predict smoke dispersion. 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 you will notify authorities of sensitive features if this occurs. 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.

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 or why burning is the selected alternative (e.g. marketing timber with a lumber company) 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 you will coordinate with air quality authorities having jurisdiction:

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. This document is available at: <http://www.wrapair.org/forums/fejf/docs.html>

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.

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 / 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 the 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 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.
- **Area of burn.** The entire burn unit less any unburned inclusions (Estimate in acres).
- **Fuel type(s).** The fuel type optimally represents the predominant fuel or cover type consumed in the fire (e.g. Sitka spruce). Specify CFDR/NFFL and descriptive model.
- **Pre-burn fuel loading information.**
- **Fuel consumption.** The amount of fuel actually consumed expressed in tons/acre (pre-burn fuel loading data is acceptable if actual numbers can not be determined).
- **Predominant configuration of the fuel burned,** e.g., pile, windrow, broadcast, underburn.
- **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.
- **Type of Burn.** “Anthropogenic” or “natural” classification (see glossary/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.**
- **Public complaints (if any).**

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://www.dec.state.ak.us/air/am/aq_sr.htm) 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); or
- 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 3 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:

- An 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; or
- 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). The DEC has the primary responsibility for SIP development and is currently in the process of determining Alaska's rate of progress toward meeting visibility goals.

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 which 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/airshed to the populated area. Monitoring may require the deployment of several samplers. Example: a land management agency is planning a large prescribed burn in fuels within the management area. 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.

In all monitoring site-placement, the focus is protection of public health. The DEC Monitoring and Quality Assurance Program may be requested to work with the Responsible Authority to identify appropriate monitoring sites. Time and materials fee or a reimbursement agreement with DEC will be necessary.

5-3. Smoke Monitoring Policy.

The 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. 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 the 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 caller's concerns will often solve the problem. If an AWFCG member receives the call 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 / landowner to take proper and necessary follow up actions. Information to be collected includes:

- Name and phone number of the caller
- Location of the burn (include best estimate of burn location / direction of smoke)
- Time of day
- Any other comments that will aid in the follow up process (e.g. people see and / 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). 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

If smoke impacts develop 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. According to 18 AAC 50.245, the DEC will, in its discretion, declare an air episode (Appendix I) and prescribe and publicize protective actions when the concentration of an air contaminant in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established by the National Ambient Air Quality Standards (NAAQS). The concentrations are $150 \mu\text{g}/\text{m}^3$ of particulate, PM_{10} (24-hour average).

Air Episodes for PM_{10}	
Episode Level	PM_{10} Level
Advisory	No monitored data available; qualitative based on smoke impact observations and meteorological conditions.
Alert	$150 \mu\text{g}/\text{m}^3$
Warning	$350 \mu\text{g}/\text{m}^3$
Emergency	$420+ \mu\text{g}/\text{m}^3$

Federal standards for $\text{PM}_{2.5}$ are in place; however, Alaska has not yet adopted these standards in regulation. The federal 24-hour health standard for $\text{PM}_{2.5}$ is $35 \mu\text{g}/\text{m}^3$. Prior to Alaska regulations being finalized, the $\text{PM}_{2.5}$ levels delineated in the Air Quality Index Chart (below) will be used for public notification and exposure reduction. The chart lists the levels proposed by EPA and cautionary statements for each level. This chart will be updated when Alaska's $\text{PM}_{2.5}$ regulations are final.

AQI Index Value	AQI Categories	AQI Cautionary Statements	24 Hour Particulate Level ($\mu\text{g}/\text{m}^3$)
0 - 50	Good	None	0 - 15.4
51 - 100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.	15.5 - 35.4
101 - 150	Unhealthy for Sensitive Groups	People with respiratory or heart disease, the elderly and children should limit prolonged exertion.	35.5 - 55.4

151 - 200	Unhealthy	People with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion.	55.5 - 150.4
201 - 300	Very Unhealthy	People with respiratory or heart disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.	150.5 – 250.4
Over 300	Hazardous	Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors.	over 250.5

The 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}. If the DEC declares an advisory, the DEC will request voluntary emission restrictions from any permitted activity that might impact the area subject to the advisory, and publicize actions to be taken to protect public health (18 AAC 50.245, Eff. 1/18/96, Register 141).

Air quality general advisories (Appendix I) include broad educational-type statements which advise people about the potential for smoke impacts in the area. The general advisory provides recommendations for persons with respiratory illnesses or heart disease, and suggests ways to limit exposure. “Advisory” status does not involve any required action on the part of the public or the burn agency. Advisories may be issued without monitoring data. When general advisories are issued by DEC, all AWFCG members will be notified.

For PM₁₀, alert, warning, and emergency episode levels each have corresponding 24-hour average particulate concentration levels and have required action statements that suggest ways that the general public and sensitive individuals can limit their exposure. These notices will be 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. The cooperating agencies / land owners will agree on trigger levels, communication strategies and contingency measures before the burn project is ignited.

If smoke intrusions are causing unacceptable area-wide impacts, including nuisance smoke, ignitions of any new controlled burns that could impact the area will be denied by DEC through air advisory postings. Air quality advisories are appropriate for situations where the potential for multiple-day smoke impacts exists. The WESTAR (Western States Air Resources) Council produced a document (the 1995 Wildland Emergency Action Plan Implementation Guideline) that outlined an emergency action plan for implementation in urban areas where significant smoke impact from wildfires affected sensitive population groups.

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.

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 (<http://www.firewise.org/>) and the FireWise Alaska handbook (<http://forestry.alaska.gov/pdfs/06Firewise.pdf>) 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/airshed level where appropriate. In addition, the National Wildland Fire Coordinating Group (NWFCG) and the EPA Wildland Fire and Air Quality Workgroup have both developed useful educational packages.

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 Approvals are posted in Alaska Administrative Code 18AAC50.400(l). Open burning regulations are located at 18AAC50.065. The ESMP is a required portion of the SIP, which outlines emission control strategies Alaska must address in accordance with the Clean Air Act and Regional Haze Rules.

9. ENFORCEMENT.

The implementation of the ESMP is usually done through regulation or through a Memorandum of Understanding between stakeholders. As the number, total acreage or complexity of prescribed fires increases, the State of Alaska may find its ESMP needs to be revised to ensure protection of the National Ambient Air Quality Standards and to meet regional haze visibility goals.

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 will be 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

µg/m³:	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
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)

PM₁₀ 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 15 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 Clean Air Act (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)

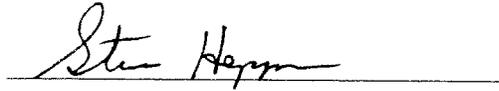
Wildland fire is any non-structure fire, other than prescribed fire, that occurs in the Wildland.(xi)

REFERENCES

- i EPA Interim Air Quality Policy on Wildland and Prescribed Fires
- ii Smoke Management Guide for Prescribed and Wildland Fire, 2001 Edition. National Wildfire Coordinating Group, Fire Use Working Team. 226pp.
- iii Idaho/Montana smoke mgmt operating guide/SMP
- iv NWFCG Wildland Fire Policy 1998.
- v Regional Haze Rules, 40 CFR Part 51, 1999.
- vi Alaska Wildland Fire Management Plan 1998.
- vii Washington state SMP
- viii National Wildfire Coordinating Group. 1996. Glossary of Wildland fire terminology. PMS 205. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 162 p.
- ix Policy for Categorizing Fire Emissions. November, 2001. Natural Background Task Team, Fire Emissions Joint Forum, Western Regional Air Partnership. Available: <http://www.wrapair.org/forums/fejf/documents/nbtt/FirePolicy.pdf>
- x WRAP Charter, Purpose, p.1.
- xi USDI and USDA Forest Service. 1998. Wildland and prescribed fire management policy-implementation procedures reference guide. National Interagency Fire Center, Boise, ID. 81pp.

Alaska Enhanced Smoke Management Plan Approval

The Alaska Wildland Fire Coordinating Group approved this version of the Alaska Enhanced Smoke Management Plan at its monthly meeting on June 3, 2009.



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Alaska Enhanced Smoke Management Plan for Planned Fire

Appendices

June 3, 2009



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Appendices

ALASKA ENHANCED SMOKE MANAGEMENT PLAN

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APPENDIX A

Alaska Wildland Fire Coordination Group (AWFCG) Contact List

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brian_mcmanus@fws.gov

NOTE: Primary & Alternate AWFCG Group members will received all agenda/meeting/information

APPENDIX B

DEC Open Burning Policy and Guidelines

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OPEN BURNING POLICY & GUIDELINES

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



January 2006

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

For Open Burning Questions Contact:

Interior Alaska:

Robin Wagner, (907) 451-2114

South Central Alaska:

Chris Kent, (907) 269-6847

Southeast Alaska & Aleutians:

Chris Kent, (907) 269-6847

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.

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 AAC 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 DEC approval. DEC 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 DEC 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** Error! Bookmark not defined.. 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.

(a) The DEC will, in its discretion, declare an air episode and prescribe and publicize curtailment action when the concentration of an air contaminant in the ambient air has reached, or is likely in the immediate future to reach, any of the concentrations established in Table 5 in this subsection.

(b) The DEC will declare an air quality advisory when, in its judgment, air quality or atmospheric dispersion conditions exist that might threaten public health.

(c) If the DEC declares an air quality advisory under (b) of this section, the DEC will

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

(2) publicize actions to be taken to protect public health. (Eff. 1/18/97, Register 141)

Table 5 - Concentrations Triggering an Air Episode
Error! Bookmark not defined.

Episode Type	Air Contaminant	Concentration (micrograms per cubic meter)
Air alert	Sulfur dioxide	365 (24-hour 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)
Air warning	Sulfur dioxide	800 (24-hour average)
	PM-10	350 (24-hour average)
	Carbon monoxide	17,000 (8-hour average)
Air emergency	Sulfur dioxide	1,600 (24-hour 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)

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

ARTICLE 4. USER FEES.

18 AAC 50.400. PERMIT ADMINISTRATION FEES.

(l) Except as provided in (m)(10) of this section, the fee for DEC approval of open burning under 18 AAC 50.065 is \$200.

(m) 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 50.405, 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:

(10) 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.

(Eff. 1/18/97, Register 141; am 6/21/98, Register 146; am 10/1/04, Register 171; am 12/1/04, Register 172)

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, naphthalene, 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.

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.

Since prescribed burning is the burning of ground cover, the normal requirements of "maximum combustion efficiency" do not completely apply. Land Management Agencies, when conducting prescribed burning, shall follow the Alaska Smoke Management Plan.

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:

Indicate the type and quantity of material, the condition, and the expected duration of both single events and the entire burning project. Changes or additional information for the burn plan can be discussed at the time of DEC notification by phone.

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

The applicant should list all population centers, including airports, medical facilities, schools (in session), and numbered Alaska highways, that are within an appropriate radius of the project. The “appropriate radius” should include an adequate margin of safety to include all potentially impacted sensitive populations and activities.

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

A successful burn is one in which no complaints are received. The best way to do this is to make sure everyone around you knows when the burn will occur so that they can take steps to either avoid the smoke or tolerate it. Your direct contact phone number should be publicized so that public can contact you if need be. In the case of fire training, notify the public through news media.

4. Indicate how you will coordinate with other concerned agencies, including authorities of sensitive features:

Indicate how you will notify all concerned agencies, 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 visibility or adverse smoke impacts prior to ignition. Indicate if you obtained a permit and notified the Forestry Division of the Department of Natural Resources.

5. Indicate where the weather forecasts will be obtained and how it will be used to prevent smoke impacts:

Identify how the weather forecast will be obtained during the open burn. Parameters that should be obtained are the predicted visibility, 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 forecast will be monitored throughout the open burn. Identify what you do if a wind shift or other weather change begins to create an adverse smoke impact on sensitive feature identified in Item 2. For example, if you expect an inversion to occur during the night, you would put the fire out at the end of the day. If any safety hazard is present or if requested by the authority of a sensitive feature, you must extinguish the fire as soon as possible.

7. Indicate what will be done to predicted smoke dispersion:

Indicate how you will predict smoke dispersion. If a recommended method (smoke bomb, test fire, etc.) fails to indicate that acceptable smoke dispersion will occur, no fires will be ignited. “Unacceptable smoke dispersion” is defined as an unacceptable decrease in air quality for any sensitive feature identified in Item 2.

8. Indicate what will be done to enhance the active fire phase and reduce the smoldering phase:

Indicate what will be done to enhance the active fire phase and reduce smoldering. For example, material should be stacked in order to enhance oxygen flow to the flames.

For land clearing, indicate if you will conform to the following: berm piles should contain less than five percent of non-combustibles (soil, ice or snow); be readily extinguishable by the applicant within two hours; be loosely stacked to allow for natural draft; be cured for at least one year prior to ignition; and be no longer than 1000 feet without a firebreak.

9. Indicate how sensitive features will be contacted if visibility decreases:

Authorities having control over sensitive features identified in Item 2 will be notified if visibility is expected to be decreased to less than three miles for greater than 30 consecutive minutes and/or 180 minutes during a 24-hour period. Indicate how you will notify authorities of sensitive features if this occurs. If any safety hazard is present or if requested by the authority of a sensitive feature, you must extinguish the fire as soon as possible.

10. Identify alternative disposal options for material being open burned:

For fires other than fire fighter training, evaluate alternatives to open burning must demonstrate that open burning is the only feasible alternative. Identify if you looked into other options of disposal, such as marketing timber with a lumber company.

11. Indicate how you will coordinate with air quality authorities having jurisdiction:

Indicate that you will notify DEC by telephone at least 24 hours prior to ignition Monday thru Friday between 8:00 AM and 4:30 PM excluding State holidays: (907) 269 7577 (Anchorage Administrative Clerk), (907) 451-5173 (Fairbanks Administrative Clerk), or (907) 456-5100 (Juneau Administrative Clerk). Identify your name, location of burn, contact phone number, what your test burn was like, how long you expect the active fire phase and the smoldering phase to last, and what kind of notification procedures you have done.

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:

Interior Alaska:

Robin Wagner (907) 451-2114

South Central Alaska:

Chris Kent, (907) 269-6847

Southeast Alaska & Aleutians:

Chris Kent, (907) 269-6847

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APPENDIX C

Example DEC Controlled Burning for Resource Management (Prescribed Burning) Approval Application

Example DEC Controlled Burning for Land Clearing Approval Application

Example DEC Controlled Burn Approval Letter

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**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:	
Mailing Address:		Mailing Address:	
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):			
<input type="checkbox"/>	KP = Kenai Peninsula	<input type="checkbox"/>	DJ = Delta Junction
<input type="checkbox"/>	SE = Southeast	<input type="checkbox"/>	AL = Aleutian (inc. Kodiak, Iliamna)
<input type="checkbox"/>	MS = Mat-Su Borough	<input type="checkbox"/>	FBX = areas north of Talkeetna

<input type="checkbox"/>	One time event? (yes or no)	<input type="checkbox"/>	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:	<input type="checkbox"/>	1 Year	<input type="checkbox"/>
			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):			
<input type="checkbox"/>	1 = Broadcast, forested, not piled, heavy	<input type="checkbox"/>	4 = Machine piled slash
<input type="checkbox"/>	2 = Range/tundra	<input type="checkbox"/>	5 = Hand piled slash
<input type="checkbox"/>	3 = Wildlife habitat improvement	<input type="checkbox"/>	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 wild-fire 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)
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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/fej/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 (907-269-3070). 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>*

Attachment 1
Prescribed Fire Complexity Rating System Guide

Smoke Management – Risk		
	Low	Smoke concerns are generally few or easily mitigated. The project will produce smoke for only a short period of time or is barely visible to the public. Smoke exposure or amounts are not expected to cause health or safety concerns to project personnel or the public. Members of the public have expressed few or no concerns about smoke.
	Moderate	Smoke concerns are moderate and some concerns require special mitigation. The project will produce smoke visible to the public over several days. Smoke exposures or amounts may cause some health or safety concerns over a short period of time. Members of the public have expressed some concerns about smoke.
	High	Smoke concerns are high and require special and sometimes difficult mitigation. Smoke will be readily visible to the public and last several days to weeks. Smoke exposures or amounts are likely to cause some health and safety concerns that will require special mitigation. Large segments of the public are concerned about smoke.

Smoke Management - Potential Consequences		
	Low	No impacts OR minor impacts to isolated residences, remote roads or other facilities are expected. Firefighter exposure to smoke is expected to be minimal and not cause health and safety concerns.
	Moderate	Vistas, roads, and some residences may experience short-term decreases in visibility. A few health related complaints may occur. Minor smoke intrusions may occur into smoke sensitive areas, but below levels that trigger regulatory concern. Project personnel may be exposed to dense smoke for short periods of time.
	High	Vistas, roads, and residences may experience longer-term decreases in visibility OR significant decreases in visibility over the short-term. Major smoke intrusions may occur into smoke sensitive areas, such as Class I airsheds, non-attainment areas, hospitals, and / or major airports, at levels that trigger regulatory concern. Project personnel may be exposed to dense smoke for prolonged periods of time.

Smoke Management - Technical Difficulty		
	Low	No special operational procedures are required. Limitations on wind direction, season, etc. may be present in the plan. No mitigation efforts are deemed necessary
	Moderate	Some considerations are needed in the prescription OR ignition portions of the plan. Burn window / opportunities are reduced by the required weather / dispersion conditions. Normal coordination with air quality officials is required. Some mitigation measures or additional smoke modeling may be needed to address potential concerns with smoke impacts. Specific smoke monitoring may be required to determine smoke plume heights and directions. Rotating project personnel out of dense smoke is necessary but easy to accomplish. Some mitigation efforts can be used and will be placed into effect as necessary.
	High	Special considerations are needed in the prescribed fire plan. Special smoke management techniques will be used. Burn window / opportunities are limited by the required weather / dispersion conditions. Special coordination with air quality officials is required. Accelerated mop up may be planned to reduce smoke impacts. Some mitigation measures or additional smoke modeling are required to address potential concerns with smoke impacts. Specific smoke monitoring is required to determine smoke plume heights and directions. Rotating project personnel out of dense smoke is necessary but may be difficult to accomplish. Mitigation efforts can be used, but are difficult or will not be applied.

Attachment 2
DEC Smoke Management Public Health Impact Complexity Rating System Guide

Smoke Management Public Health Impact – Risk		
	Low	Smoke will not extend into local communities or travel aloft to distant communities. Health risk minimal.
	Moderate	Smoke will be in and around the public with some potential impact to sensitive individuals.
	High	Smoke would impact communities in the vicinity of the fire or in the distance which will probably require healthy and sensitive individuals to take precautionary actions.

Smoke Management Public Health Impact - Potential Consequences		
	Low	Little impact on public health. No one expected to require hospitalization.
	Moderate	Some impact anticipated. Sensitive individuals may need to take action to protect themselves.
	High	The public will be impacted by smoke from this fire. Sensitive people and some healthy individuals will most probably be impacted and require medical attention or be required to take direct precautionary action such as staying indoor, using an air filtration system or taking medicine.

Smoke Management Public Health Impact - Technical Difficulty		
	Low	No special operational precautions or advisories require to protect public health.
	Moderate	Further consideration of operational actions will need to be undertaken to ensure protection of potentially impacted public. Monitoring will need to be planned and samplers deployed for potential use in protecting the public.
	High	Action will be required to protect public health. Monitoring will be necessary. Samplers will be set up and operated and advisories issued if smoke levels exceed EPA air quality thresholds.

Example DEC Controlled Burning for Land Clearing Approval 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 land owner, 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.	
<input type="checkbox"/> KP = Kenai Peninsula	<input type="checkbox"/> DJ = Delta Junction
<input type="checkbox"/> SE = Southeast	<input type="checkbox"/> AL = Aleutian (inc. Kodiak, Iliamna)
<input type="checkbox"/> MS = Mat-Su Borough	<input type="checkbox"/> FBX = areas north of Talkeetna
<input type="checkbox"/> OL = Other Location, please specify:	

<input type="checkbox"/> One time event? (yes or no)	<input type="checkbox"/> 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? (ie, excessive smoke)	
Can this be accomplished within two hours?	
Permit Approval Requested Length:	<input type="checkbox"/> One Event <input type="checkbox"/> 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. <i>An evaluation of alternatives to open burning must demonstrate that open burning is technologically, economically, and environmentally the best alternative.</i>
List any alternatives to burning that have been done to the burn units prior to ignition.

4. SENSITIVE FEATURES
<i>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.</i>
Include a map of the proposed burn area showing all sensitive features within a five mile radius. Additional maps are encouraged.
<ul style="list-style-type: none"> 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?

5. SMOKE MANAGEMENT

*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.
-
- Smoke will not extend into local communities or travel aloft to distant communities. Little impact expected on public health from smoke.
 - Smoke will be around the public with potential impact to sensitive individuals who may need to take action to protect themselves.
 - Smoke will impact communities in the vicinity of the fire or in the distance - the public will be impacted by smoke from this fire. Sensitive people and some healthy individuals may be required to take precautionary actions or need medical attention.
-
- No special operational precautions required to protect public health.
 - Consideration of operational actions will need to be undertaken to ensure protection of potentially impacted public.
 - Action will be required to protect public health; air quality monitoring will be necessary.
-
- No operational difficulties (wind direction, weather) are expected.
 - Burn window(s) may be reduced by weather / dispersion conditions.
 - Burn window opportunities are limited by weather / dispersion conditions. Accelerated mop up may be planned to reduce smoke impacts.

I do not know what smoke impacts my fire will cause, please provide assistance.

Note: All land clearing / agricultural burns will be considered "anthropogenic" (human caused ignition).

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>*

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Example: DEC Controlled Burn Approval Letter

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

Approval Number: AQ1048OBR36

Expiration Date: April 1, 2009

Applicant: Alaska Fire Service
P.O. Box 35005
1541 Gaffney Road
Fort Wainwright, AK 99703

Contact: Jason Dollard / Tami DeFries
(907) 356-5877
(907)356-5875)

Location: Manchu Range Burn, Total of 435 acres.

Description of Burn Unit: The Manchu Range Burn, located in the Yukon Training Area (Township 2 South, Range 4 East, Sections 31 & 30 / Lat and Long: 64 degrees 42.25' X 147 degrees 01.01'), has an anticipated one to eight days to burn in April through August 2008. Because the range is a live fire training area for small munitions and ordnances, the presence of unexploded ordnance exists. To the north and east, the Manchu unit is surrounded by an old dozer trail that has transformed into wet grassy marshes. On the south, there is a well established 20 ft. wide trail and to the west a 25 ft. gravel road. The goal of the prescribed burn is to reduce fuel loads and prevent serious fires from occurring as a result of small arms training activities. Aerial ignition is the planned method due to size, terrain, and the possibility of unexploded munitions on the ground. Fuels within the unit are predominantly black spruce, shrubs, and sphagnum mix. The sensitive sites nearby are Eielson AFB which hosts a major military airfield and residential areas, are located 2.5 miles SSW of the unit. The Moose Creek Trailer Park is located 3.5 miles to the west. The Two Rivers School is 12 miles north of the unit. The Richardson highway parallels the unit to the west, and is 3 miles away at its closest point. The community of North Pole is located approximately 10 miles WNW of the unit and the Trans-Alaska Pipeline 2 miles to the southwest.

The State of Alaska Department of Environmental Conservation (DEC), 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)).

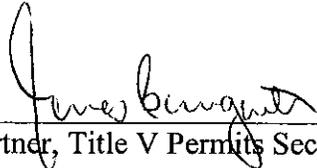
This approval is subject to the following conditions:

1. Provide a copy of this burn approval to the Burn Boss and keep a copy at the burn unit staging area during active burn activities.
2. Air Meteorologist Notification: Contact the DEC meteorologist at (907) 269-7676 or (907) 269-3070, at least one week prior to a scheduled burn and arrange with the meteorologist to participate in the pre-burn meteorological conference scheduled with your fire weather team prior to ignition. DEC Air Quality Division's meteorologist will review prescribed burn plans to check whether smoke from a prescribed burn could adversely impact the public. Our meteorologist will provide an independent evaluation of the predicted fire weather forecast to assist in the burn decision making process. If the anticipated active fire phase and/or the smoldering fire phase lengths are different than those in the approved application, contact DEC personnel. If the burn is not conducted, please notify the DEC Meteorologist within 24 hours of canceling the scheduled burn. Provide a new anticipated burn date if possible.
3. Air Permits Notification: Notify DEC by noon the business day prior to any planned burn, telephone: (907) 269-7577 (Anchorage Administrative Clerk), (907) 451-5173 (Fairbanks Administrative Clerk), or (907) 456-5100 (Juneau Administrative Clerk). 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 Test Burn (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.
4. 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).

5. Notify the local fire departments, the Federal Aviation Administration Office and/or the Airport Control Tower before each burn event.
6. 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.
7. Do not conduct burning during stagnant air conditions (fogs or inversions) or when air quality alerts have been posted for that air shed. 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 http://www.dec.state.ak.us/air/am/aq_sr.htm, or telephone (907) 269-7676 or (907) 269-3070. 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 southeast, low-level smoke may move into smoke sensitive areas (Eielson airfield and residential areas, Moose Creek Trailer Park, and the Richardson Highway). It is advised to avoid burning under this wind flow; in any event, be sure to monitor smoke movement to prevent impacting these sensitive areas.
8. Use test burns to evaluate smoke dispersion.
9. Follow the Enhanced Smoke Management Plan adopted by the Alaska Air Quality Committee in October 2003.
10. As required by Appendix D of the Enhanced Smoke Management Plan, Post-burn Data Reporting, submit a summary to the DEC Air Permits Program, 610 University Avenue, Fairbanks, AK 99709-3643, AND 410 Willoughby Avenue, Suite 303, PO Box 111800, Juneau, AK 99811-1800, attn: Alice Edwards, within 30 days of 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) Area of burn(s);
 - e) Fuel type(s);
 - f) Pre-burn fuel loading information; Land Managers who are unfamiliar with estimating pre-burn fuel loading should ask 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, 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 under burn.
- i) Type of burn: "anthropogenic" or "natural" classification; "Anthropogenic" is defined as a fire that is produced by human activities. "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 DEC; other agency permits or approvals may be necessary.

Signed: 
James Baumgartner, Title V Permits Section Manager

Date: April 7, 2008

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APPENDIX D

Estimating Emissions for Prescribed Fire

Emission Calculations

Emission Reduction Techniques

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- ◆ 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

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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 air strips. 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

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APPENDIX F

Alternatives to Burning

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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).

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APPENDIX G

Air Quality Monitors

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Air Quality Monitors

There are several types of air monitors that can be used to assess ambient levels of particulate. 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 PM_{2.5} 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. 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 (USDOl), 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 PM_{2.5} 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 PM10 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 can be unhealthy for sensitive individuals only. 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

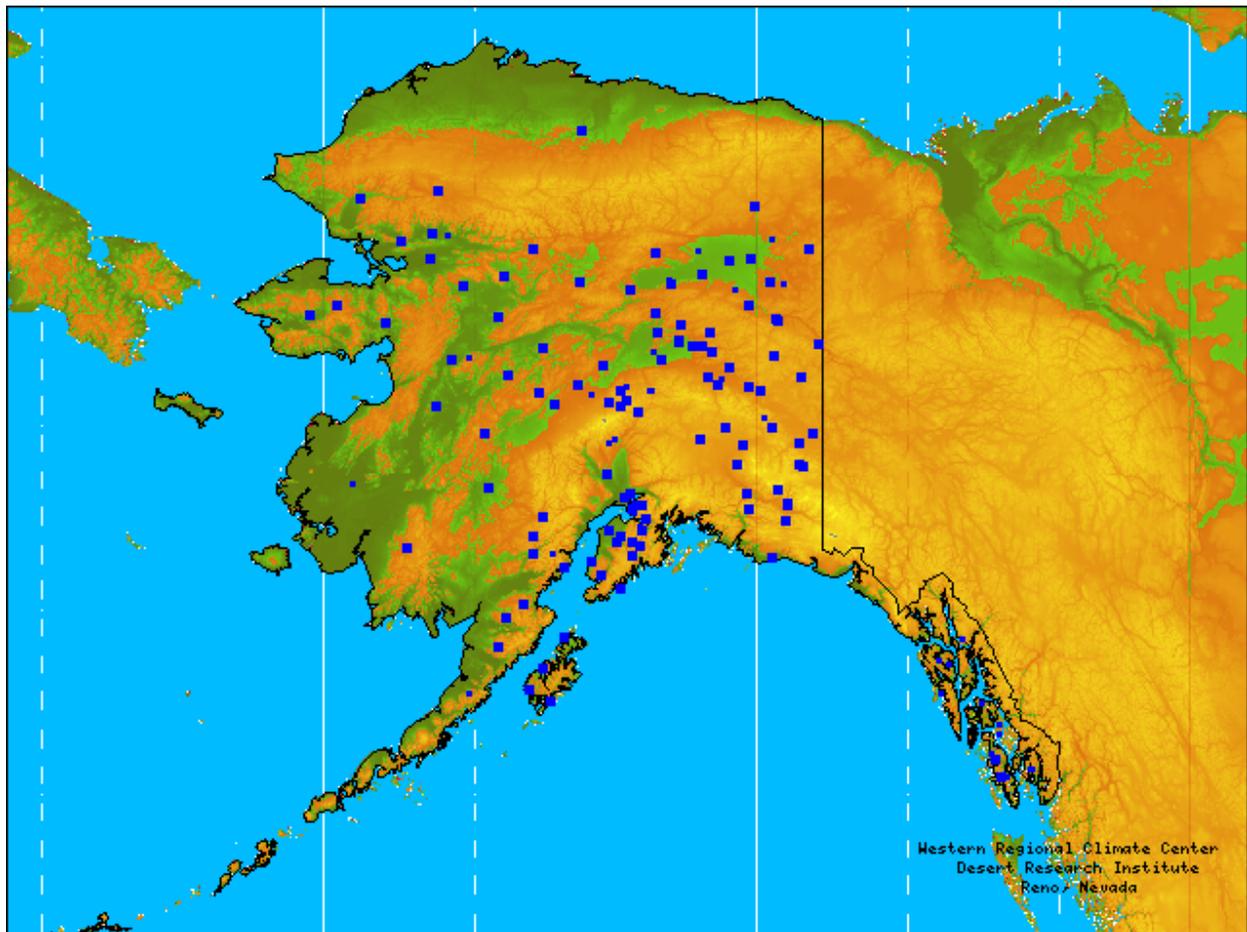
Map of Fire Weather Monitoring Stations

Map of Class I Areas, Non-Attainment and Maintenance areas

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Map of Fire Weather Monitoring Stations

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



Map last generated on 11/23/08

Map of Class I Areas, Non-Attainment and Maintenance areas



APPENDIX I

Example Air Quality Advisory Situation Report

Example Alert Fax List

Criteria Necessary to Issue Air Quality Episode or Alert

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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Air Quality
SITUATION REPORT

AIR QUALITY ADVISORY
East and Central Interior

LOCATION(S) IMPACTED: Eastern and Central Interior Alaska

TIME/DATE OF UPDATE: Wednesday, August 31, 10:00 AM.

VALID TIME: Valid August 31 until September 6 at 10:00 AM.

TIME/DATE OF THE NEXT REPORT: Tuesday, September 6, 10:00 AM.

ADVISORY: Air quality in the Interior is predominantly **good**, and will continue to be **good** through the next week. The exceptions are the Yukon Flats, the Upper Tanana River Valley, and the Upper Koyukuk, where some smoke is still being given off by active fires. In these locales, air quality may be **very unhealthy** at times. Approximately 10% of the Eastern and Central Interior is currently impacted by smoke.

Due to the proximity of fire to the Taylor Highway, travelers should review the latest road travel advisories prior to going to this area. Though conditions continue to improve, air quality may still be **very unhealthy**.

High pressure is expected to build over the Interior for the weekend, bringing partly cloudy skies and a few scattered showers. Temperatures will remain mild, and fire activity will remain low.

Keep in mind that areas immediately downwind of fires may still experience **hazardous** levels of smoke. Also, worse conditions will generally occur during the nighttime to early morning hours, as the atmosphere cools and brings smoke to the surface. During the day, surface heating will mix the smoke and carry it upwards, temporarily improving air quality conditions.

SMOKE AND PUBLIC IMPACT: This is an area forecast, and as such gives a general forecast for a large area. At this time, 10% of the area is experiencing a smoke problem which could impact public health. Therefore, 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>.

CURRENT BURN RESTRICTIONS: None.

DEC advises everyone with respiratory illness or heart disease, the elderly and children, to avoid exposure to smoke. All others are cautioned to avoid outdoor activities or physical exertion when conditions reach unhealthy levels, as specified below.

The following table is the Air Quality Index for Particle Pollution.

Index Values	Levels of Health Concern	Cautionary Statements
0-50	Good	None
51-100	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.
101-150	Unhealthy for Sensitive Groups	People with heart or lung disease, older adults and children should reduce prolonged or heavy exertion.
151-200	Unhealthy	People with heart or lung disease, older adults and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion.
201-300	Very Unhealthy	People with heart or lung disease, older adults and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion.
301-500	Hazardous	People with heart or lung disease, older adults and children should remain indoors and keep activity levels low. Everyone else should avoid all physical activity outdoors.

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 Wildfire Smoke from the Department of Health and Social Services, visit their website at <http://www.epi.hss.state.ak.us/wildfire/default.htm>.

For information on Wildfire Smoke from the Department of Environmental Conservation, Air Quality Division, visit the website at <http://www.dec.state.ak.us/air/smokemain.htm>.

For information on air quality conditions around Fairbanks, visit the Fairbanks North Star Borough web site at <http://co.fairbanks.ak.us/HotTopics/Fire2005/default.htm>.

For information on road conditions around Alaska, visit the Road Traveler Information System at <http://511.alaska.gov/>.

For information on this advisory, contact Heidi Strader, Division of Air Quality, [907-269-7676](tel:907-269-7676).

Example Alert Fax List

(Example list of people who might receive a notice of an air quality alert for the Mat-Su Valley)

AIR QUALITY ALERT	<u>FAX#</u>
1. Valley School District Office	(907) 745-6119
2. KMBQ, Wasilla Radio	(907) 376-1575
3. Channel 11	273-3188
4. KFQD Radio, Anchorage	344-0742
5. Channel 2	563-3318
6. Channel 13	561-8934
7. Anchorage Daily News	257-4342
8. SOA Public Health, Mat-Su	(907) 376-3096
9. EPA, Anchorage	271-3424

Notify internal DEC contacts, DEC receptionist, program managers, and other local authorities as needed.

Criteria Necessary to Issue Air Quality Episode or Alert

Ambient Air Concentrations Triggering an Air Episode

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}

*Note: PM_{2.5} levels are not yet included in state regulation but are being used under EPA's Air Quality Index system.

18 AAC 50.245. Air episodes and advisories. (a) The department may declare an air 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.

(b) The department 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 declares an air quality advisory under (b) of this section, the department 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. (Eff. 1/18/97, Register 141; am 10/1/2004, Register 171)

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

APPENDIX J

References

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References

- i Idaho/Montana smoke management operating guide/SMP
- ii EPA Interim Air Quality Policy on Wildland and Prescribed Fires
- iii Washington state SMP
- 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.