

Alaska Natural Resource Management Series



FWM-00112

BURNING LAND CLEARING DEBRIS

Burning has been a traditional component of land clearing operations to eliminate unwanted debris from fields. Burning under the proper conditions can be a cost efficient method of debris removal, and provides nutrient release into the soil. Burning, however, carries with it the inherent risk associated with escaped fire that can be disastrous and costly. In addition, smoke from burning can have an adverse impact on air quality.

THE BURN OPTION

Considering the risk of burning, one may want to evaluate other options. Hauling or burying piles is costly and not practical on a large scale. On a small scale around critical sites such as a homesite or out-buildings, burying or hauling some piles may be an appropriate alternative. Leaving the piles in place keeps land out of production, creates a fire hazard for several years, and may become a breeding ground for unwanted insects, weeds, and disease. Farming around the piles can be difficult, costly, and time consuming. On the other hand, the piles eventually decompose and could act as windbreaks. In any case, some burning is likely to be required and it should be conducted safely and efficiently.

PERMIT REQUIREMENTS

Under Alaska Statute 41.15.010, a burning permit is required from the local Division of Forestry forest warden from the period of May 1 to September 30. The burn permit prescribes conditions under which a burn may be carried out that reduces the chance of having an escaped fire. It is advisable to contact the local State Forestry office to discuss burning plans prior to beginning clearing operations. The forest warden will determine requirements that must be met for permit compliance. This prior site-specific knowledge will help in planning pile layout, thus preventing the possible need of pile construction changes to meet fire safety standards and obtain an efficient burn.

For projects that involve 40 or more acres, a Department of Environmental Conservation air quality permit for open burning is required. The purpose of this permit is to assist in managing and monitoring smoke

and particulate matter. To obtain an air quality permit, contact the local DEC field office at least 30 days before the planned burn.

INITIAL BURNING CONSIDERATIONS

A plan outlining the order in which individual berm piles and fields will be burned should be in place before burning begins. Base the plan on realistic development goals and within the control capabilities of the people and equipment doing the burning. Be sure that applicable permits have been obtained and that the required personnel and equipment are available and on the job when the burning begins.

Before burning, make sure the piles are properly cured. In general, such curing takes approximately one year. The time will vary depending on the size and species of trees and amount of dirt or snow in the pile. Small diameter black spruce may be ready to burn almost immediately whereas aspen or birch piles may take two full seasons to dry. Piles left for three years or longer may begin to decompose and become increasingly difficult to burn efficiently.

Cured piles burn faster, more completely, and emit less smoke than green or decomposing piles. Cured piles also have a shorter period of fire escape potential as their initial burn-down and smolder periods are less than those for incompletely cured piles.

TIMING THE BURN

Timing is critical to insure maximum pile consumption while maintaining a margin of safety. A prolonged period of wet weather makes logs harder to burn, whereas short-term rainfall has little effect on larger

fuels (logs and stumps). The short-term increases in moisture make smaller fuels (branches and twigs) harder to burn. A slight (3 to 7 mph) breeze also helps to obtain a clean burn by aerating the piles so they will not smolder.

The conditions under which the piles would burn best (i.e., fully cured, a dry burning prior, and some wind) are also conditions under which danger of an escaped fire could be high. Extreme care should be taken when deciding to burn, particularly when critical areas could be threatened. With rare exception, under no condition should a burn be conducted if the winds are in excess of 10 to 15 mph. Burning under wet conditions, such as following periods of prolonged rainfall or with snow or ice in piles, results in a burn that is difficult to start, smolders for a long period, requires extended monitoring, and results in poor consumption. Trying to burn wet piles often results in burning out only the small diameter fuels and leaving the large fuel logs only scorched. In such a case, it is difficult to re-ignite the large fuels.

Smaller fuels react faster to increases or decreases in moisture than do larger fuels. Ideal burn conditions that maximize consumption and are fire safe are characterized by a period of cloudiness, high humidity, or light rainfall that has been preceded by a dry period. Under such conditions, the large fuels burn efficiently because they are still dry, while the chance of windblown embers igniting unwanted berms or adjacent woodlands is significantly reduced due to the high moisture in the smaller fuels. Keep in mind that ideal situations do not often correspond with a need to do burning. Sacrificing some burning efficiency to meet deadlines or maintain fire safety may be required.

Burning late in the day, or under cloudy skies takes advantage of higher humidity, cooler temperatures, and generally calmer winds that reduce the chance of embers spreading the fire. Burning during twilight or evening makes it easier to see where the embers are landing. The local State Forestry Office will have current and predicted weather information available to help determine such optimum burn times.

IGNITION AND SEQUENCE OF BURNING

Once piles are sufficiently cured and it is a good time to burn, the need to initiate proper ignition techniques and burn sequence is critical to control the fire and have maximum pile consumption.

Wood moisture content, species and size of wood, and pile compactness all play roles in how well the piles ignite and burn. Extremely dry piles that are clean and have concentrations of small fuels will ignite with railroad flares, fuses, or even matches. Those pile conditions,

however, are ideal. If conditions are less than ideal, a more effective ignitor may be required. A mixture of 3 parts diesel to 1 part gasoline is the formula commonly used in drip torches by forest fire personnel, and is a good all-purpose ignitor. Drip torch fuel should work well if the piles are reasonable clean. NEVER USE STRAIGHT GASOLINE OR ANY MIXTURE OF GASOLINE LESS THAN 3:1 DIESEL TO GAS RATIO.

If the piles are very old, or have a high component of dirt, snow, or moisture, it may be necessary to use an even more potent ignitor. Substances that jell gasoline work well in these situations. These make gasoline burn longer, and make it less volatile. Jelled gasoline can get a fire going under poor burn conditions due to the nature of the piles or prevailing weather conditions. Commercial products are available for this purpose. Use of any type of ignitor or fuel requires extreme care. Always follow appropriate instructions, keep unnecessary people away, do not smoke, and wear gloves, goggles, dust mask, hard hat, and protective clothing when igniting piles.

The initial ignition points always should be as deep inside the pile as possible, not on top or on the side. The fire then feeds itself by preheating woody material around it. Look for places deep in the pile where there is a heavy concentration of smaller fuels to get the fire started.

Have all required equipment and personnel on site before beginning ignition. Proper ignition sequence is critical to maintaining control of the fire. Always begin burning on the downwind side of the burn area, and work back into the wind. This minimizes the chance of airborne fire embers being carried ahead and running with the wind, jumping uncontrolled from pile to pile. Begin by igniting and monitoring through burn-down critical areas around the perimeter of the burn area which are closest to woodlands, structures, or other property. Never ignite more than can be handled with on-site equipment and personnel. Allow the fire to burn down to the point at which embers are no longer being carried by the wind or smoke column before beginning new ignitions. Always be aware of the weather conditions, particularly the wind speed and direction during burning operations, and stay within the guidelines outlined on the burn permit.

BURN DOWN AND MONITOR

Following the initial burn sequence (the period of most intense burning) comes a period of slow burn-down. Often, this is when fires escape if the individual is not monitoring the burn-down.

Depending on the condition of the piles and weather, most piles burn down to a smoldering phase within 6 to 24 hours after ignition. The piles may continue to

smolder for weeks or months depending on the weather and pile condition; the wetter and dirtier the pile, the longer it smolders. During this time, be aware of dry and windy conditions that could cause an ember from a smoldering pile to be blown into unburned berms or adjacent woodlands. Monitoring the pile must take place if dry, windy conditions exist and the risk of fire spread is high. Monitoring in smoky conditions requires use of safety equipment, fire resistant clothing, goggles, hard hat, gloves, and dust mask.

During the burn-down and smoldering phase, consider reconsolidating (pushing and repiling) the piles while they are still hot. This offers the advantage of not having to reignite the piles at a later date and speeds up the total burning process. The equipment should be on site during this time, and the piles will have to be reconsolidated later regardless, so doing this is cost efficient; however, doing hot piling can be dangerous. The equipment needs to be in good working order, have fire extinguishers readily available, be equipped with engine covers, have a push fan, should not have oil or fuel leaks, and have a clean belly pan. The air filter needs to be changed frequently and the radiator and belly pan hosed out often. This practice helps avoid belly pan fires and equipment breakdowns. The operator should wear goggles, dust mask, and fire resistant natural fiber clothing.

If the pile is allowed to burn down and out, two small berms are left after the center of the pile has burned out. Depending on the rate of pile consumption, these side berms may have to be reconsolidated into one berm and re-ignited. To do this, use the same procedures as for any other piling and burning. Whether or not hot piling is done, a toothed brush blade or root rake is the best bulldozer blade to use for reconsolidating.

Once enough debris has been removed through burning, reconsolidate into round piles any remaining debris and continue to burn it, until a small enough pile exists that can be plowed under, buried, or hauled off cost efficiently.

Reconsolidation and re-ignition of the piles may be necessary several times if the original piles are not properly constructed and/or the initial burning is not done efficiently. This process can be costly and time consuming. Thus it is important to avoid clearing, piling, and burning conditions that could cause delays later on.

BROADCAST BURNING

Broadcast burning (burning trees in their felled or chained condition) is a possible option. As with any other technique, it has advantages and drawbacks.

Broadcast burning of small diameter trees with a high percentage of black spruce can be an effective disposal method in addition to significantly reducing the organic layer of material above mineral soil. Broadcast burns of large diameter fuels comprised mainly of hardwoods is likely to be ineffective under any conditions. Following the broadcast burn, the residual debris needs to be berm- or round-piled and reburned. Fire control can be exceedingly difficult for broadcast burning. Assistance from your local forest warden is required in assessing the potential for this method and its execution.

IF A FIRE ESCAPES

Recognizing the potential to have an escaped fire, and taking appropriate action before it happens, are the keys to minimizing the risk associated with an escaped fire.

Prior to beginning burning operations, identify the areas (adjacent berms, or woodland) into which a fire is most likely to spread. Have a current weather forecast for the day and keep apprised of any changes in the weather, particularly the wind speed and direction. The local DOF field office has current weather information available for use in planning and conducting the burn.

Never ignite more fuel than can be controlled and monitored during the initial period of intense burning. If controlling capability is exceeded, stop any new ignition. If the wind increased dramatically or to the point where the embers are being carried more than halfway to the next berm or adjacent woods, stop all ignition. In addition, increase monitoring of the burning piles and let the Division of Forestry and neighbors who could help know that assistance may be needed if the fire spreads.

If fire embers begin to spread into adjacent berms or woodland, locate these spots and put them out with tools and water before they have a chance to increase in size and become uncontrollable. Have a bulldozer ready to construct fire breaks in the berm or woods if the spots are too big to handle with hand tools. If the spots do spread, call the Division of Forestry immediately and inform them of what is happening. They will be able to help, and early notification may avoid a potential problem fire.

In conclusion, the local Division of Forestry forest warden should be able to help with any and all of the above aspects of burning and more should the burning option be used as a method of removal. The information and experience the warden has to offer is a public resource available free of charge. For more information on berm pile construction, refer to the Alaska Cooperative Extension publication "Efficient Land Clearing Techniques."

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