INEEL/CON-02-01354
PREPRINT

Using The National Environmental Policy Act To Fight Wildland Fires At The Idaho National Engineering And Environmental Laboratory

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June 22, 2003

National Association of Environmental Professionals

USING THE NATIONAL ENVIRONMENTAL POLICY ACT
TO FIGHT WILDLAND FIRES AT THE
IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

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ABSTRACT

The decade of the 90s saw an average of 106,000 wildland fires each year, resulting in an average yearly loss of 3.7 million acres across the United States. The total number of acres burned during the past decade exceeded 36 million acres (about 57 thousand square miles). This is an area about the size of the state of Iowa. The impact from wildland fires on federal lands came to the nation's attention in May of 2000, when the "Cerro Grande" fire near Los Alamos, New Mexico burned 47,650 acres while destroying 235 structures. Firefighting activities for federal agencies alone exceeded 1.3 billion dollars in 2000. The dollar amount spent on firefighting does not approach the dollars lost in terms of timber resources, homes, and wildlife habitat. Following several fires on U. S. Department of Energy lands, the Deputy Secretary of Energy placed a moratorium on "prescribed burns" in June 2000.

From 1994 to 2000, about 130,000 acres of the INEEL (or the Site) and several hundred thousand acres of surrounding Bureau of Land Management lands burned on the Snake River Plain of southeast Idaho. The fires on the INEEL threatened facilities and exposed soils to wind erosion, resulting in severe dust storms, affecting operations and creating traffic hazards for weeks. Most of the acreage burned on the Site between 1994 and 2000 is recovering well. With the exception of sagebrush, most native plant species are recovering. However, cheatgrass, a non-native species is a component. In isolated areas, cheatgrass and other annual non-native weeds are dominant. If this situation persists and the Site does not change the way it manages wildland fires, and there is no intervention to reduce cheatgrass and manage for sagebrush, the Site may transition from sagebrush steppe to cheatgrass. This would have cascading effects not only on wildland fires management, but also on wildlife and on their habitat.

This paper describes how to use the NEPA process to identify different ways decision-makers can manage wildland fires and evaluate the trade-offs between management activities such as pre-fire, suppression, and post-fire activities. In addition, the paper compares the potential impact of each fire management activity on air, water, wildlife/habitat, and cultural resources. Finally, we describe the choices facing the decision-makers, how to implement the decisions, and the role the environmental assessment played in those decisions.

Purpose of NEPA –

The National Environmental Policy Act (NEPA) created a process and forum for decision-makers to make decisions related to man's activity on the environment. The process not only provides information to the decision-makers on potential environmental impacts that may be significant, but also makes the information and decisions available to the public. However, perhaps the most underused (and most misapplied) purpose of NEPA is the opportunity to use NEPA to help plan activities in an environmentally friendly way. All too often, Federal agencies enter the 'NEPA Process' long after important decision have been made, such as site location, construction and operational design criteria, and potential alternatives to the proposed action. Such an approach defeats the intent of NEPA to "utilize a systematic, interdisciplinary approach" [NEPA, Title I, Section 102(A)]. Properly used, NEPA can help agencies in planning their future actions; Eccleston (1999) describes how NEPA and planning can work together to avoid costly permitting and regulatory requirements. Proper planning of projects can reduce potentially significant environmental impacts, either by avoidance or by mitigation.

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The Council of Environmental Quality (CEQ), created as a result of NEPA (NEPA, Title II, Section 201), a very defined process for Federal agencies to comply with NEPA (see 10 CFR Parts 1500-1508). Environmental documentation such as environmental assessments and environmental impact studies, are an important part of the 'NEPA Process.' It is through these documents that the true purpose of NEPA occurs, that is, to facilitate informed decision-making. However, 'informed' decision can only occur if done as part of planning. Decisions made by "Records of Decision" and "Findings of No Significant Impacts", if done outside the planning process, <u>are not</u> 'informed' decisions.

Background –

The U.S. Department of Energy, Idaho Operations Office (DOE-ID) sought to involve decision-makers, other federal and state agencies, and the Tribes in the decision on how best to prevent, fight, and repair damage from wildland fires Idaho National Engineering and Environmental Laboratory (INEEL) by preparing the Wildland Fire Management Environmental Assessment (DOE-ID 2003).

The INEEL (hereafter referred to as the 'site') is an 890 square mile DOE reservation located in southeastern Idaho (see Figure 1). The site consists of several facility areas situated on an expanse of otherwise undeveloped cool desert terrain. Buildings and structures are clustered within facility areas, which are typically less than a few square miles in size and separated from each other by miles of primarily undeveloped land (see Figure 1). The site land consists of flat-to-gently-rolling, high-desert terrain that lies about 5,000 feet above sea level. However, isolated buttes on the site reach 6,572 feet. Individual mountain peaks just north and west of the site's boundary approach 11,000 feet. Vast sagebrush flats, however, dominate the site landscape. Outcroppings of basalt rock (lava) are also common. Surface water at the site is scarce. Intermittent streams flow onto the site, where they evaporate and infiltrate into the Snake River Plain Aquifer. The site contains the largest remnant of undeveloped, ungrazed sagebrush steppe ecosystem in the Intermountain West (DOE-ID 1997). Reports from the Department of Interior identify this ecosystem as critically endangered with less than two percent of its original vegetation remaining (Noss et al. 1995; Saab and Rich 1997). Because it contains the largest remnant of this ecosystem type, the site is an internationally significant ecological resource.

Wildland Fires –

The potential for wildland fires on the site is routinely high because of rapid growth of grasses and brush during cool, wet springs followed by extended dry weather in late spring and early summer months. The result is dry vegetation, accumulating year after year providing large quantities of fuel for fires. However, fire is a natural component of the ecosystem; and over time, the climax sagebrush steppe vegetation on the site has repeatedly burned and recovered through natural successional stages. Under natural conditions, the climax sagebrush steppe vegetation is composed of native shrubs, and annual and perennial grasses and forbs. When this native vegetation type burns, the following response is expected: Sagebrush is killed, perennial grasses, forbs re-sprout, and annuals survive as seed that germinates when conditions are favorable. Generally, over the course of several years, seed from surviving sagebrush in unburned areas is distributed by the wind, seedling sagebrush are established, and after five years of growth, produce seeds of their own. The maturing sagebrush competes with other native plants for water and nutrients and the ecosystem establishes a natural balance. As the plant community matures, the fuel load increases and the stage is set for another fire recovery cycle. The entire cycle typically takes between 40 and 70 years.

The Problem –

From 1994 to 2002, about 130,000 acres+ of the site and several hundred thousand acres of Bureau of Land Management managed public land burned on the Snake River Plain in southeastern Idaho. Introducing non-native annual plants, such as cheatgrass, into the sagebrush steppe ecosystem has already altered the natural fire frequency and recovery cycle. Cheatgrass sprouts from seed in the spring, fall, or winter, goes to seed, and dries by early summer. When cheatgrass is present and fire occurs, the cheatgrass seed quickly germinates and competes for moisture and nutrient with native seeds and surviving plants. As the vegetation recovers from fire, cheatgrass represents a higher percent of the fuel load and tends to create a continuous 'carpet' of fuel that is extremely prone to fire. If there is another fire before the sagebrush matures and produces seed, sagebrush will disappear from the plant community. As the frequency of fire increases, cheatgrass will continue to increase in this fire-altered environment. Without intervention, the sagebrush steppe ecosystem and the habitat it provides may be irretrievably lost, along with those native animals and plant species associated with the sagebrush steppe ecosystem, such as sage grouse, pigmy rabbits, etc.

The Approach –

Wildland fire management requires planning to consider pre-fire, fire suppression, and post-fire activities best suited to preventing, fighting, and recovering from a fire. The kinds and extent of those activities depends on a number of factors, such as funding and resources available. More basic, however, are the overall land management objectives. Management goals and objectives may differ depending on the perspective. For instance, the objectives associated with air resources differ (or may differ) from cultural resources objectives. While DOE realizes that as a first priority, no resource or property is worth endangering people, DOE must still weight proposed actions and alternatives against other management goals and objectives such as those for infrastructure, air resources, water resources, wildlife and habitat resources and cultural resources. DOE prepared this EA to help manage pre-fire, fire suppression, and post-fire activities that best meet the many management goals and objectives – one of which is to preserve this important component of the western ecosystem.

As in typical EAs, this EA describes the potential environmental impacts across alternatives. The EA identifies four alternative approaches to managing wildland fire at the INEEL: (1) Maximum Fire Protection Approach, (2) Balanced Fire Protection Approach, (3) Protect Infrastructure and Personnel Safety Approach, and (4) No Action or Traditional Fire Protection Approach. Each alternative assessed different levels of pre-fire activities (fuel management zones, road improvements, defensible space), fire suppression activities (staged response strategy, fire fighting tactics) and post-fire activities (dust suppression and site restoration). In addition, other activities consider creating a Wildland Fire Management Committee and using Minimum Impact Suppression Tactics (MIST) to fight wildland fires. MIST emphasizes suppressing a wildland fire with the least impact on the land. Table 1 provides a relative comparison of how the alternatives meet the different natural resource objectives. How an alternative <u>did</u> or <u>did not</u> meet a management objective was just as, if not more, important in determining the preferred alternative.

The Solution –

DOE recognizes that trade-offs exist between pre-fire, fire suppression and post-fire activities. For instance, pre-fire activities that emphasize upgrading unimproved roads will cause greater impact to air, water, biological and cultural resources or those fire suppression activities that do not include MIST can cause greater damage to those same resources.

DOE must choose a management approach that over the long run will minimize the conversion of native sagebrush steppe to non-native weeds. At the same time, DOE must protect air, water, biological and cultural resources to the extent practicable. However, maximizing protection for all those natural and cultural resources is not possible. For instance, the approach to only protect infrastructure and personnel safety meets most of the objects for cultural resources, but does not fully meet the objectives for the air resources. Conversely, the management approach to balance fire protection does not full meet the cultural resource objectives, but does meet most of the air and water management objectives. We ranked each management objective, providing a relative comparison across the different management approaches to help compare the different alternatives (see Tables 1 and 2). The Balanced Fire Protection Approach was the best approach overall for meeting the management objectives.

DOE chose to implement the Balanced Fire Protection Approach. This approach balances the need to minimize the size of wildland fire thus protecting sagebrush at the INEEL with the need to reduce habitat fragmentation and soil disturbance with its associated impacts on air, water, biological and cultural resources and the increased potential for the conversion of the sagebrush steppe ecosystem to non-native weeds.

DOE decided to implement the following actions. DOE will create a Wildland Fire Management Committee to provide recommendations for pre- and post-fire activities. The INEEL will undertake the following pre-fire activities to (1) mow vegetation or conduct prescribed burns along many of the highways and roads that pass through or border the INEEL, (2) create fuel management zones along unimproved roads within its borders (3) maintain key unimproved roads for wildland fire access and (4) provide defensible space around all INEEL buildings, structures and significant support equipment. In addition, the INEEL will use a staged response and when possible use MIST to suppress wildland fires. MIST includes minimizing, where possible, the width and depth of containment lines, avoiding waterways, using cold-trail tactics and using existing roads as containment lines. Finally, the INEEL will implement, as part of a post-fire actions, site restoration activities to help identify impacts to cultural resources and establish native plant communities to areas disturbed by suppression activities. Based on the analysis in the Environmental Assessment, the selected action would not have, and would likely prevent, a significant effect on the human environment within the meaning of NEPA.

Conclusion –

The process to develop this environmental assessment resulted in more than just a Finding of No Significant Impact (FONSI). While an approved FONSI is usually the desired outcome of an environmental assessment – it is not necessarily the most important result of the NEPA Process. In this case, the NEPA Process brought a cross-section of individuals together to work as an interdisciplinary team. That is, the NEPA Process brought together those individuals responsible for protecting the natural and cultural resources, those responsible for environmental compliance and those responsible for protecting the INEEL from wildland fires and caused them to understand the common problems, issues, and potential solutions surrounding wildland fire management on the INEEL. The NEPA Process resulted in going forward with a balanced approach to fighting wildland fires on the INEEL that will protect the site, and the sagebrush steppe ecosystem.

This environmental assessment provides decision makers with the information they need to make ‘informed’ decisions on wildland fires management on the INEEL, and thus satisfies the intent of NEPA and the Council on Environmental Quality. In addition, the environmental assessment will lead to better planning and coordinating of wildland fire management activities on the INEEL. This will result in less impact to the natural and cultural resources and protect the sagebrush steppe ecosystem, which in turn will lead to fewer and less severe wildland fires. The DOE successfully uses the NEPA Process to plan for and manage wildland fires on the INEEL.

References –

Eccleston, C. H., 1998, “The NEPA Planning Process: A Comprehensive Guide with Emphasis on Efficiency,” John Wiley & Sons, Inc.

Noss, R.F., E.T. Laroe III, and J.M. Scott, 1995, Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. U.S. Department of the Interior, National Biological Service, Biological Report 28, February. 60pp

Table 1. Evaluation matrix for natural resource objectives across alternatives – a relative comparison.

Natural Resources Objectives / Alternatives	Maximum Fire Protection Approach Alternative 1	Balanced Fire Protection Approach Alternative 2	Protect Infrastructure and Personnel Safety Approach Alternative 3	No Action – Traditional Fire Protection Approach Alternative 4
Air Resources				
Minimize pre-fire dust generation	1	2	2	2
Minimize dust generation during fire suppression activities	1	2	2	1
Minimize smoke from fires	3	2	0	2
Minimize post-fire windstorm-generated dust	3	2	0	2
Minimize potential for burning SCAs and releasing contamination to air	3	2	0	2
If SCAs burn, minimize spread of contamination post-fire.	3	3	0	3
Air Resource Total	**14**	**13**	**4**	**12**
Water Resources				
Reduce risk of large frequent fire	3	2	0	0
Minimize pollutant exposure	1	3	1	0
Minimize erosion	1	3	1	0
Protect water utilities	3	2	0	0
Comply with standards and regulations	2	3	0	0
Use fiscal resources efficiently	1	3	1	0
Water Resource Total	**11**	**16**	**3**	**0**
Wildlife / Habitat Resource				
Limit the size of wildland fires	3	2	0	0
Promote a return to natural fire cycle and landscape-scale ecosystem diversity	2	2	0	0
Eliminate the need for rehabilitation following fire suppression	1	2	3	0
Protect threatened, endangered, and sensitive species and their habitat	1	2	1	2
Protect sage grouse and other sagebrush-obligate species and their habitat	0	1	0	1
Prevent habitat loss and habitat fragmentation	1	2	2	0
Maintain a large undeveloped sagebrush steppe ecosystem	0	2	0	0
Maintain plant genetic diversity	1	3	1	2
Protect unique ecological research opportunities	0	3	2	1
Prevent invasion of non-native species including noxious weeds	0	2	1	1
Wildlife / Habitat Resource Total	**9**	**21**	**10**	**7**
Cultural Resources				
Reduce disturbance of cultural resources	2	2	2	2
Demonstrate an effective balance between ongoing DOE missions and programs and cultural resource preservation and enhancement	2	3	1	2
Respond to existing executive orders, federal, state, and DOE mandates for historic preservation	2	3	1	2
Provide guidance on regulatory compliance to decision makers early in the fire suppression planning process	2	3	1	2
Cultural Resource Total	**8**	**11**	**5**	**8**
Grand Total	**42**	**61**	**22**	**27**

These evaluations describe the ability to meet the management goals and objectives presented in Table B-1. The higher the value, the better the alternatives meet the management objective.
3 Fully meets the natural resource management objectives.
2 May meet natural resource management objectives with implementation of objective-specific recommendations.
1 May meet natural resource management objects, but may cause other impacts (e.g., firebreaks reduce fire size but increase fragmentation).
0 Does not meet the natural resource management objectives.

Table 2. Comparison of management goals and objectives across alternatives.			
Alternatives			
Maximum Fire Protection Approach Alternative 1	**Balanced Fire Protection Approach Alternative 2**	**Protect Infrastructure and Personnel Safety Approach Alternative 3**	**No Action – Traditional Fire Protection Approach Alternative 4**
Infrastructure			
Alternative 1 would meet most of the INEEL Infrastructure management goals related to minimizing the vulnerability of the INEEL personnel and property to wildland fire damage. In addition, this alternative would achieve Infrastructures' goals to minimize impacts on natural and cultural resources.	Alternative 2 would meet most of the INEEL Infrastructure management goals related to minimizing the vulnerability of the INEEL personnel and property to wildland fire damage. In addition, this alternative would achieve Infrastructures' goals to minimize impacts on natural and cultural resources.	Alternative 3 would not meet most of the INEEL Infrastructure management goals. While the goals for this alternative would protect infrastructure and provide Personnel safety, it would not minimize damage to natural resources. In addition, allowing wildland fires to burn would not meet the specific objective to control all wildland fires within their first burning period or to minimize the potential to impact adjacent public and private lands.	Alternative 4 would not meet most of the INEEL Infrastructure management goals. This alternative would not minimize the impacts on natural or cultural resources, nor would it meet the specific objective related to restoration of disturbed areas by pre-fire, fire suppression and post-fire activities.
Air Resources			
Alternative 1 would meet most air quality objectives; the possible exception being that aggressively fighting wildfires may necessitate greater short-term dust generation than the other alternatives. However, the reduction in fire smoke and post-fire windstorm-generated dust would more than offset any temporary increase in dust from firefighting activities.	Alternative 2 would mostly meet the air resource management goals since pre-fire and post-fire activities would meet all air quality objectives, and fire suppression activities would meet most air quality objectives.	Alternative 4 would not meet air quality objectives. Because only infrastructure would be protected, wildfires could be very large, with resultant major releases of smoke and dust.	Alternative 2 would not meet most of the objectives for air quality. Less emphasis on fire prevention would logically result in more fires. Fires would likely be larger than for Alternative 1, with resultant increases in smoke and post-fire dust emissions.
Water Resources			
Alternative 1 probably would slightly improve watershed resilience, water quality, and result in smaller less frequent fires due to aggressive vegetation management and fire suppression. The impact of this alternative on specific management objectives are: <u>Reduce risk of large frequent fires</u>. This objective would likely be met due to aggressive vegetation management and fire suppression. <u>Minimize pollutant exposure</u>. This objective would not likely be met because use of fire-inhibiting chemicals would not be avoided near waterways. However, contaminated sites would be protected and restored even though the contaminated sites pose minimal risk. <u>Minimize erosion</u>. This objective would not likely be met due to repeated disturbance of defensible space and T-roads, wide deep containment lines and firebreaks potentially near waterways and on steep terrain. However, dust suppression and site restoration would be performed.	Alternative 2 would likely improve watershed resilience and water quality, due to aggressive vegetation management, MIST, soil stabilization, and restoration. The impact of this alternative on specific management objectives are: <u>Reduce risk of large frequent fires</u>. This objective would likely be met by aggressive vegetation management. <u>Minimize pollutant exposure</u>. This objective would likely be met by using the least chemicals for soil sterilization and weed control, avoiding use of fire-inhibiting chemicals within 300 ft of waterways, and cleaning up spills. <u>Minimize erosion</u>. This objective would likely be met by stabilizing defensive space and road improvements, using narrow shallow containment lines and firebreaks away from waterways and steep terrain, controlling dust, and restoring sites. <u>Protect water utilities</u>. This objective would likely be met by aggressive vegetation management before fires and sediment control after fires adjacent to waterways and	Alternative 3 would likely decrease watershed stability, degrade water quality, and increase the size and frequency of fire due to lack of the following away from facilities: vegetation management, fire suppression, and restoration. The impact of this alternative on specific management objectives are: <u>Reduce risk of large frequent fires</u>. This objective would not be met due to lack of wildland vegetation management and lack of fire suppression away from facilities. <u>Minimize pollutant exposure.</u> This objective would likely be met because fire-inhibiting chemicals and response vehicles would be used near facilities only. <u>Minimize erosion</u>. This objective would likely be met because T-roads would not be destabilized, and containment lines and firebreaks would be near facilities only. However, defensible space would be disturbed near facilities and restoration would not be performed. <u>Protect water utilities</u>. This objective would not be met due	Alternative 4 would likely decrease watershed stability, degrade water quality, and increase the size and frequency of fire due to lack of vegetation management and lack of restoration. The impact of this alternative on specific management objectives are: <u>Reduce risk of large frequent fires</u>. This objective would not be met due to lack of vegetation management, during both pre- and post-fire activities. <u>Minimize pollutant exposure</u>. This objective would not be met because chemical use near waterways would not be avoided and the potential for spills would be increased by attempted rapid response on unmarked unstable roads. <u>Minimize erosion</u>. This objective would not be met due to lack of stabilization of defensible space, wide deep containment lines and firebreaks potentially near waterways and on steep terrain and that potentially become trails, lack of restoration, and minimal dust suppression.

Table 2. Comparison of management goals and objectives across alternatives.			
Alternatives			
Maximum Fire Protection Approach Alternative 1	**Balanced Fire Protection Approach Alternative 2**	**Protect Infrastructure and Personnel Safety Approach Alternative 3**	**No Action – Traditional Fire Protection Approach Alternative 4**
<u>Protect water utilities</u>. This objective would likely be met by aggressive vegetation management before fires and sediment control after fires adjacent to waterways and wastewater facilities. <u>Comply with standards and regulations</u>. This objective may be met through partial sediment control for storm water discharges to deep injection wells and waterways; functional wastewater facilities, storm drain systems, and flood control systems; and aggressive vegetation management improving soil stabilization. <u>Use fiscal resources efficiently</u>. This objective would likely be met by avoiding expenditure of funds to fight large frequent fires, operation of impaired wastewater facilities, repair of flood damage, several attempts to achieve soil stabilization, and environmental fines.	wastewater facilities. <u>Comply with standards and regulations</u>. This objective would likely be met through sediment control for storm water discharges to deep injection wells and waterways, functional wastewater facilities, no chemical releases to waterways or deep injection wells, functional storm drain and flood control systems, soil stabilization, noxious weed control, and control of invasive plant species improving likelihood of successful soil stabilization with vegetation. <u>Use fiscal resources efficiently</u>. This objective would be met by avoiding expenditure of funds for the following: fighting large frequent fires, improving 84 miles of roads, extensive restoration due to MIST, operating impaired wastewater facilities, repairing flood damage, unsuccessful soil stabilization with vegetation, and paying environmental fines.	to lack of vegetation management and lack of sediment control adjacent to waterways and wastewater facilities. <u>Comply with standards and regulations</u>. This objective would likely not be met due to sediment in storm water discharges to deep injection wells and waterways, impaired wastewater facilities, potential chemical releases to waterways or deep injection wells, impaired storm drain and flood control systems, lack of control of noxious weeds, and lack of control of invasive plant species resulting in inability to achieve soil stabilization with vegetation. <u>Use fiscal resources efficiently</u>. This objective would most likely not be met due to expenditure of funds to fight large frequent fires, annually blade and mow near facilities, operate impaired wastewater facilities, repair flood damage, repeated attempts to achieve soil stabilization with vegetation in an unstable watershed with infestations of invasive plant species and noxious weeds, and payment of environmental fines.	<u>Protect water utilities</u>. This objective would not be met due to lack of vegetation management and lack of sediment control adjacent to waterways and wastewater facilities. <u>Comply with standards and regulations</u>. This objective would likely not be met due to sediment in storm water discharges to deep injection wells and waterways, impaired wastewater facilities, potential chemical releases to waterways or deep injection wells, impaired storm drain and flood control systems, lack of noxious weed control, and lack of control of invasive plant species resulting in inability to achieve soil stabilization with vegetation. <u>Use fiscal resources efficiently</u>. This objective would not be met due to expenditure of funds to fight large frequent fires, annually blade and mow, operate impaired wastewater facilities, repair flood damage, repeated attempts to achieve soil stabilization with vegetation in an unstable watershed with infestations of invasive plant species and noxious weeds, and payment of environmental fines.
Wildlife / Habitat Resources			
Alternative 1 would not meet all natural resource management objectives because of pre-fire, suppression, and post-fire and their associated activities. Although wildland fire management under this alternative may protect ecological resources from wildland fire, it will not protect the unique large, ecologically continuous sagebrush ecosystem from destruction. The impacts of this alternative on specific management objectives are: <u>Limit the size of wildland fires</u>. This objective may be met under this alternative if the planned firebreaks are effective. Green (1977) recommends using firebreaks that are a minimum of 300 ft wide. Because the proposed firebreaks on T-roads are only 32 ft wide, it is unlikely they will be capable of stopping a fire. It should also be noted that the blocks created by the proposed firebreaks are still quite large. Relying on these firebreaks to control fire size will still result in	Alternative 2 would meet most natural resource management objectives. Wildland fire management under this alternative should protect ecological resources from wildland fire and will protect resources from pre-fire, fire suppression, and post-fire activities through mitigation strategies and MIST. The impacts of this alternative on specific management objectives are: <u>Limit the size of wildland fires.</u> If Balanced Fire Protection Approach is taken, this objective will be met since limitation of fire size is an integral goal of this approach. <u>Promote a return to natural fire cycle and landscape-scale ecosystem diversity.</u> If fire size is not addressed, it is unlikely that a return to a normal fire cycle (80 to 100 years). <u>Eliminate the need for rehabilitation following fire suppression.</u> With the	Alternative 3 would not meet all natural resource management objectives because of fire suppression and its associated activities. Wildland fire management under this alternative may protect ecological resources from unwanted fire but will not protect resources from pre-fire, suppression, and post-fire activities. The impacts of this alternative on specific management objectives are: <u>Limit the size of wildland fires</u>. If no action is taken other than protection of human life and property under this scenario, then this objective cannot be met. <u>Promote a return to natural fire cycle and landscape-scale ecosystem diversity</u>. If fire size is not addressed, it is unlikely that a return to a normal fire cycle (80 to 100 years) is possible. Recent large fires (since 1994) suggest that the entire INEEL could burn within 35 years. We have also seen areas	**Alternative 4 would not meet all natural resource management objectives because of fire suppression and its associated activities. Wildland fire management under this alternative may protect ecological resources from wildland fire, but will not protect resources from pre-fire and suppression activities. The impacts of this alternative on specific management objectives are:** <u>Limit the size of wildland fires</u>. This objective is unlikely to be met under the current fire management regime. Limiting the size of fires can be controlled by two factors: reducing the probability of a fire reaching woody fuel (shrubs) and reducing the response time to a fire. The activities outlined in this alternative are primarily designed for defense of facilities rather than limiting the size of wildfire. Mowing vegetation along the major paved roads is a notable exception. However, if only a 5-ft-

Table 2. Comparison of management goals and objectives across alternatives.

Alternatives			
Maximum Fire Protection Approach Alternative 1	**Balanced Fire Protection Approach Alternative 2**	**Protect Infrastructure and Personnel Safety Approach Alternative 3**	**No Action – Traditional Fire Protection Approach Alternative 4**
large fires. Mowing only 12 ft either side of the major paved roads is also unlikely to limit the spread of a fire ignited on or near the road from spreading. Another approach to reducing fire size is to decrease the response time to the fire. The only activity designed to accomplish this is to improve the condition of certain T-roads. Promote a return to natural fire cycle and landscape-scale ecosystem diversity. If the proposed firebreaks can control fire size, it might be possible to facilitate a return to a normal fire cycle (80 to 100 years). Eliminate the need for rehabilitation following fire suppression. Because the alternative calls for 24-foot wide containment lines cut around the fire, rather than only that necessary, the need for rehabilitation is increased. Protect threatened, endangered, and sensitive species and their habitat. Creating firebreaks in pristine areas reduces and fragments habitat resulting in this objective not being met. Identifying key habitat areas will aid in attempting to reduce fragmentation of habitat needed by protected species. Protect sage grouse and other sagebrush-obligate species and their habitat. Pre-fire, and fire suppression activities under Alternative 1 will not meet this objective due to increased fragmentation and removal of native vegetation needed for sagebrush-obligate species survival. Prevent habitat loss and habitat fragmentation. If the firebreaks work to reduce fire size, then habitat loss may be prevented. However, those same firebreaks also cause significant habitat fragmentation. Also, back burning and burnouts cause additional habitat loss. Protect culturally significant species. This objective may not be met due to the fragmentation and habitat loss that pre-fire activities will cause. Following appropriate fire suppression and rehabilitation techniques, this objective could be met.	use of narrower containment lines and the use of MIST, rehabilitation needs should be reduced. Protect threatened, endangered and sensitive species and their habitat. Not creating large pre-fire firebreaks and the use of MIST means that direct loss of habitat and fragmentation impacts are reduced in this alternative. Additional habitat loss due to larger fires would likely be minimal. Protect sage grouse and other sagebrush-obligate species and their habitat. Not creating large pre-fire firebreaks and the use of MIST means that direct loss of habitat and fragmentation impacts are reduced in this alternative. Additional habitat loss due to larger fires would likely be minimal. Prevent habitat loss and fragmentation. This objective likely can be partially met under this alternative by minimizing impacts from pre- and post-fire, use of MIST, and mitigating impacts, which may occur. Protect culturally significant species. This objective can be met under this alternative for most species by following appropriate fire suppression and rehabilitation techniques. Maintain a large undeveloped, sagebrush steppe ecosystem. This objective may be met under this alternative due to the application of, and the elimination of pre-fire firebreak construction. Maintain plant genetic diversity. Because the greatest risk to plant genetic diversity will result from improper revegetation planning, and since this alternative includes rehabilitation, this alternative will allow this objective to be met for the majority of species as long a proper revegetation planning is conducted. Protect unique ecological research opportunities. The most significant "unique ecological research opportunities" are related to the large, undeveloped, unfragmented sagebrush steppe found on the INEEL. These sagebrush attributes are more likely maintained by this	burned in 1995 and 1996, burn a second time in 1999. Because this alternative does not include fire control beyond that necessary to protect infrastructure and people, this problem will likely be made worse. Under these conditions it is likely that fire return intervals will be much less than that necessary to support Wyoming big sagebrush. Eliminate the need for rehabilitation following fire suppression. Meeting this objective will depend upon the fire suppression techniques used. If fire suppression is eliminated, then this objective will be met. If fire suppression is used, the suppression techniques will determine the level of rehabilitation required. However, because this alternative does not include any restoration, any need for rehabilitation will not be met. Protect threatened, endangered, and sensitive species and their habitat. Eliminating fire suppression could result in significant habitat loss to uncontrolled fires. Meeting this objective will require managing fire suppression activities to minimize impact and proper rehabilitation of those sites. Protect sage grouse and other sagebrush-obligate species and their habitat. This objective likely cannot be met under this alternative because it fails to address the need to reduce the size of wildfires so that large areas of sagebrush habitat are not lost. Prevent habitat loss and fragmentation. Protecting only people and infrastructure will likely result in large areas of lost sagebrush habitat. Any containment lines or firebreaks constructed will likely result in fragmentation (see Appendix C, Habitat Fragmentation as a Result of Fire Suppression). Protect culturally significant species. This objective can be met under this alternative for some species by following appropriate fire suppression and rehabilitation techniques. Any sagebrush-obligate species, however, are not protected by this alternative. Maintain a large undeveloped,	wide strip is mowed, this is unlikely to slow spread to nearby shrubs. There is no activity mentioned designed to reduce response time. Promote a return to natural fire cycle and landscape-scale ecosystem diversity. If fire size is not addressed, it is unlikely that a return to a normal fire cycle (80 to 100 years) is possible. Recent large fires (since 1994) suggest that the entire INEEL could burn within 35 years. We have also seen areas burned in 1995 and 1996, burn a second time in 1999. Under these conditions it is likely that fire return intervals will be much less than that necessary to support Wyoming big sagebrush. Eliminate the need for rehabilitation following fire suppression. Because the alternative calls for "double containment lines" cut around the fire, rather than only that necessary, and the construction of "emergency firebreaks," the need for rehabilitation is increased. However, because this alternative does not include any restoration, any need for rehabilitation will not be met. Protect threatened, endangered and sensitive species and their habitat. Using proper fire suppression techniques and reducing habitat fragmentation through suppression may better meet this objective. Meeting this objective will require managing fire suppression activities to minimize impact and proper rehabilitation of those sites. Protect sage grouse and other sagebrush-obligate species and their habitat. This objective likely cannot be met under this alternative because it fails to address the need to reduce the size of wildfires so that large areas of sagebrush habitat are not lost. Habitat fragmentation will likely result, due to construction of the doublewide containment lines and emergency firebreaks. Prevent habitat loss and fragmentation. It is unlikely that this objective will be met under this alternative. Habitat loss and fragmentation can be caused both by suppressing fires and by letting fires burn. Uncontrolled fires generally do not fragment habitat,

Table 2. Comparison of management goals and objectives across alternatives.			
Alternatives			
Maximum Fire Protection Approach Alternative 1	**Balanced Fire Protection Approach Alternative 2**	**Protect Infrastructure and Personnel Safety Approach Alternative 3**	**No Action – Traditional Fire Protection Approach Alternative 4**
<u>Maintain a large undeveloped sagebrush steppe ecosystem.</u> This objective cannot be met due to pre-fire activities under this alternative. Firebreak construction and T-road improvement will fragment large blocks of sagebrush habitat. Also, improving roads in order to allow for better vehicle access will likely increase human use of these areas and may open desirable areas for potential development. Fire suppression activities may meet this objective if fire control methods were designed to reduce fire initiation and size and minimize the impacts of the selected suppression activities. <u>Maintain plant genetic diversity.</u> This objective can be met under this alternative by using local, native seed sources during rehabilitation. <u>Protect unique ecological research opportunities.</u> The most significant "unique ecological research opportunities" are related to the large, undeveloped, unfragmented sagebrush steppe found on the INEEL. These attributes are not necessarily maintained by this alternative and, therefore, this objective may not be supported by this alternative. <u>Prevent invasion of non-native species including noxious weeds.</u> Disturbance of soil increases the opportunity for non-native or noxious weeds to become established. This objective can be met under this alternative if proper restoration and weed control procedures are used and the impacted areas are kept as small as possible.	alternative because of the elimination of the pre-suppression firebreak construction. <u>Prevent invasion of non-native species including noxious weeds.</u> This objective may be able to be met under this alternative because it includes restoration following fire or fire suppression activities.	<u>sagebrush steppe ecosystem</u>. This objective will be difficult to meet under this alternative. This is primarily because it does not provide sufficient control on limiting the size of fires. <u>Maintain plant genetic diversity</u>. Because the greatest risk to plant genetic diversity will result from improper revegetation planning, and since this alternative does not include any rehabilitation, this alternative will allow this objective to be met for all species except those, like big sagebrush, that are killed by fire. <u>Protect unique ecological research opportunities</u>. The most significant "unique ecological research opportunities" are related to the large, undeveloped, unfragmented sagebrush steppe found on the INEEL. These sagebrush attributes are not necessarily maintained by this alternative and, therefore, this objective may not be supported by this alternative. <u>Prevent invasion of non-native species including noxious weeds</u>. This objective may not be met under this alternative because it includes no restoration following fire or fire suppression activities. Including restoration activities is the only way to ensure invasive species have been controlled.	but tend to eliminate large habitat areas. Construction of containment lines and emergency firebreaks will result in fragmentation (see Appendix A, Habitat Fragmentation as a Result of Fire Suppression). <u>Protect culturally significant species.</u> This objective can be met under this alternative for some species by following appropriate fire suppression and rehabilitation techniques. Any sagebrush-obligate species, however, are not protected by this alternative. <u>Maintain a large undeveloped, sagebrush steppe ecosystem.</u> This objective will be difficult to meet under this alternative. This is primarily because it does not provide sufficient control on limiting the size of fires. <u>Maintain plant genetic diversity.</u> Because the greatest risk to plant genetic diversity will result from improper revegetation planning, and since this alternative does not include any rehabilitation, this alternative will allow this objective to be met for all species except those, like big sagebrush, that are killed by fire. <u>Protect unique ecological research opportunities.</u> The most significant "unique ecological research opportunities" are related to the large, undeveloped, unfragmented sagebrush steppe found on the INEEL. These sagebrush attributes are not necessarily maintained by this alternative and, therefore, this objective may not be supported by this alternative. <u>Prevent invasion of non-native species including noxious weeds.</u> This objective may not be met under this alternative because it includes no restoration following fire or fire suppression activities. Including restoration activities is the only way to ensure invasive species have been controlled.

Table 2. Comparison of management goals and objectives across alternatives.			
Alternatives			
Maximum Fire Protection Approach Alternative 1	**Balanced Fire Protection Approach Alternative 2**	**Protect Infrastructure and Personnel Safety Approach Alternative 3**	**No Action – Traditional Fire Protection Approach Alternative 4**
Cultural Resources			
Alternative 1 would not meet all of the cultural resource management objectives. Although Alternative 1 would likely result in damage to cultural resources, advanced planning and coordination would allow for the development of mitigation and management plans that would contribute to the identification, evaluation and protection of cultural resources.	Alternative 2, would not meet all of the cultural resource management objectives. However, by limiting the size of wildland fires, damage to cultural resources would be reduced by restricting the use of off-road emergency equipment, construction of containment lines and firebreaks, and the construction of staging areas.	Alternative 3 in many ways meets all of the cultural resource objectives. Damage caused by fire management and recovery activities, such as firebreak emplacement, blading, mowing vegetation, grubbing, and re-seeding or off-road travel is eliminated or greatly reduced; thus, Alternative 3 would result the least impact cultural resources.	Alternative 4 would most likely result in the most damage to cultural resources because of the lack of opportunity for planned mitigation before fire suppression activities; thus, does not meet cultural resource goals.