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EXHIBIT 2

REPORT TO SHAW, PITTMAN, POTTS & TROWBRIDGE

PRIVATE FUEL STORAGE

by Carlton M. Britton, Ph.D. February 8, 1999

QUESTION: The annual probability of fire severe enough to reach the PFS ISFSI site.

This question is confusing as fire severity is not directly related to fire spread. Fire severity is usually used in relation to fire impacts on plants. More to the point is the chance of ignition occurring close enough to the PFS ISFSI site for a fire to reach the site boundary. Fire spread is totally dependent on having sufficient fuel (lbs/ac) and adequate fuel continuity to ensure continuous fire propagation. I assume that cheatgrass is the dominant fine fuel in Skull Valley and through the eastern portion of Tooele County, Utah. Fire spreads easily in this fuel especially in years of average or higher precipitation and on non-alkaline sites.

Historic evidence of fire in the sagebrush type of the Great Basin has been evaluated and summarized by Bunting et al. (1987). Given the accepted difficulty of determining fire frequency in any non-forested type, he reports that in the Wyoming big sagebrush type the mean fire-free interval (MFI) was probably 75 to 100 years. Bunting et al. (1987) goes on to state, "This agrees with Oregon Trail travelers' diaries that paint a picture of this landscape as dominated by that 'everlasting wormwood' and seldom write of burned vegetation or abundant grass until they reach the mountain big sagebrush dominated areas." Thus, fires were probably infrequent in the dryer areas of the Great Basin.

Although several dramatic changes have occurred in the Great Basin sagebrush type, the introduction of cheatgrass is the most important. In terms of ignition, I do not believe that cheatgrass fuel has a major impact on frequency of occurrence. However, when ignition occurs the probability of spread is extremely high compared to a typical bunch grass site.

Tooele County extends from the Nevada border east to the outskirts of Salt Lake City and contains about 4,430,700 acres. The western half of the county has only sparse vegetation. Skull Valley in the east central part of the county does not have an agreed upon size, but for the purpose of this report and calculation herein, I am assigning an approximate size of 500,000 acres.

Data from the Utah Forestry, Fire and State Lands (*this may not include BLM data*) covering the period from 1980 through 1997 state that 109 fires occurred in Skull Valley (Fig. 1). This is an average of slightly over 6 fires (6.06) per year on 500,000 acres. Over the 18 years of records used, a total of 63,593 acres have burned, or about 3,533 acres per year. Thus, on average 0.71% percent of the valley is involved in fire each year. However, averages rarely indicate an adequate portrayal of fact. One fire in 1996 accounted for 28,380 acres or 44.6% of the 18 year total. If we look at the 10 largest fires over the 18 year period, some 56,994 acres were burned. This is about 89.6% of the total acreage burned in 18 years. Fires less than 100 acres numerically dominate the Skull Valley fire environment (Fig. 2).

The largest single fire (28,380 ac) represents the worst case available for assessing a given fire reaching the PFS ISFSI site. Assuming that a fire spreads from the point of ignition as an expanding triangle, this large fire would have the potential to move about 13.7 miles with the wind. This worst case scenario would imply, that based on area calculations, a 5.7% chance would exist for a worst case fire originating in Skull Valley to encounter the PFS ISFSI site over an 18 year period or about 0.32% in a given year.

This analysis supports the estimate of MFI of about 50 to 100 years, considering the fine fuel is now dominated by cheatgrass. The other major influence is the BLM's aggressive initial attack on fires. All this data is modified by the change in ignition from mostly natural occurring lightning to about half coming from man-caused sources. Even with this mix of influences, little has changed from our historic and prehistoric estimates of fire occurrence.

Even though fires will always occur with some degree of certainty, their effects can be modified. Fuel modifications and control efforts will determine a fire's impact.

Summary

Data from state and federal sources clearly support the following conclusions:

- Fires occur every year in Skull Valley;
- Number of fires are very low on average at about 6 per year over a large area;
- The chance, on a percentage area basis, of a worst case fire even encountering the perimeter of the PFS ISFSI is well below 1% in a

given year;

- With the use of planning (fuel modification and fuel breaks) and current attack methods (aerial slurry drops), I believe it would be 99.9% certain that a fire would never reach the site perimeter;
- With a 100 ft fuel break, no heat damage could be caused to either equipment, structures, or any life form on the ground.

QUESTION: The fire magnitude, duration, flame propagation, heat generation, etc.

By fire magnitude, I assume this refers to size of a given fire (ignition). The maximum size measured during the period 1980 to 1997 was 28,380 acres. Given an ever increasing set of tools to contain wildland fires, I would assume this to be a reasonable estimate of the largest fire we might expect in the future. However, the question begs an explanation. We have long clung to the opinion that a fire that moves 50 feet through a given fuel bed under a given set of atmospheric conditions will produce a relatively uniform behavior, temperature profile, and energy release characteristics. Thus, the size (magnitude) is not a relevant consideration when addressing the impact of a flame front impinging on a section of fence perimeter or piece of equipment.

Duration is assumed to be the amount of time fire temperatures remain above some predetermined level. In terms of living organism, we tend to agree that 5 minutes above 140°F is lethal. The time temperatures remain elevated is a direct function of the amount of fuel available for combustion. Using rangeland fuels, my opinion is the temperature duration above about 200°F at the soil surface will last from about 5.4 to 9 minutes. At the top of the dominant fuel (sagebrush at about 30 inches), this period will diminish greatly with every inch above the fuel. My opinion is that at 10 feet, temperatures in rangeland fuels would have a duration above 200°F of less than 1 minute.

Flame propagation is an obtuse term. To propagate a fire is solely a function of fuel distribution and continuity. This valley site does not lend itself to continuous fuels due to a very dry climate and especially with the confounding factor of alkaline and salty soils. However, on sites with more desirable soils, cheatgrass is present in quantities that ensure fire spread. If we look at the frequency of fires for the past 18 years, it is obvious that the majority are small fires. Of the 109 fires of record, 76.1% were less than 100 acres in size. First this indicates that fuel continuity is marginal for large fire development. Second, this is an indication of the intensity of the initial attack efforts of the BLM or other fire fighting entities. Regardless of the point of view, on average less than two fires reach 100 acres per year.

Heat generation can be summarized as fire intensity. This often misused term does have real thermodynamic units (BTU/ft/sec). Very little data is available from which to draw meaningful inferences. Range et al. (1980) presents the only viable data. In several studies conducted in Nevada, he reported data very applicable to the Skull Valley site.

The Horse Haven study site near Ely, Nevada is similar to Skull Valley although this site is more productive with greater fuel loads. Thus, Range's data is at the upper limit compared to what might be found in Skull Valley. Basic fuel parameters reported are: foliage at 2319 lbs/ac; twigs at 1476 lbs/ac; and branches at 1561 lbs/ac for a total of 5311 lbs/ac. Burning in August, atmospheric condition were: air temperature at 86 to 92°F; relative humidity at 13 to 17%; and wind speed at 8 to 10 mph. While these are not the maximum for extreme wildfire condition, they are sufficient to produce close to maximum fire behavior characteristics.

Temperatures measured close to the soil surface with Templaq strips averaged about 1466°F. At mid canopy of the sagebrush (18 inches) the average maximum temperature was 1220°F. If temperature had been measured at 6 feet, they would have been lower and short in duration. Grass seed covered by less than 1/4 inch of soil survive these temperature environments every year.

Cheatgrass is a well recognized example of this fact.

Rate of spread measured by Range et al. (1980) were generally between 50 and 100 ft/min. The maximum measured was 590 ft/min on a site with a 12% slope. Flame lengths averaged between 10 and 18 feet with a maximum of 28 feet. Data generated from the U.S. Forest Service developed program 'BEHAVE' predicts the following;

With, 2% fine fuel moisture concentration
20 mph wind speed

Results in,
27.6 ft flame lengths
765 ft/min rate of spread
605 Btu's/ft^2 and
7712 Btu/ft/sec fire intensity.

It is obvious that the data used to model this fire behavior was based mostly on Range et al. (1982) research. Most fire experts that actually conduct burns agree that these predictions are always very high, and anything resembling these numbers only happens for a few seconds as a fire moves through very heavy rangeland fuel.

Summary

The question of fire magnitude, duration, flame propagation, heat generation can be addressed as follows;

- Data available describes fuel loading at about 5,000 lb/ac,
- With this fuel loading, flame length up to a maximum of 28 feet are possible for very short periods of time,
- Maximum fire temperatures are reached near the soil surface and decrease rapidly above the top of the primary fuel (grass),
- Rate of spread is highly variable, but where heavy fuel is available can be as high as 590 ft/min for short runs,
- Fire intensity is normal for this fuel type and fuel load,
- Fires in this fuel type can be easily modified by reducing fuel load (plant a crested wheatgrass buffer around all areas where fire might present a problem) or eliminate fuel in several narrow strips a site (50 ft of bare soil then 50 feet of native vegetation then another 50 of bare soil and so on). This would effectively break up an approaching fire front as it approached a site of concern.

In summary, wildland fire will pose no hazard to the PFS ISFSI site or the rail spur leading to it if only minimal fuel modifications are implemented.

Literature Cited

Bunting, S.C., B.M.. Kilgore, and C.L. Bushey. 1987. Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin. USDA Forest Service Gen. Tech. Rep. INT-231. 33p.

Range, P., P. Veisze, C. Beyer, and G. Zschaechner. 1982. Great Basin rate of spread study: Fire behavior/fire effects. Bureau of Land Management. Nevada State Office, Reno. 56p.

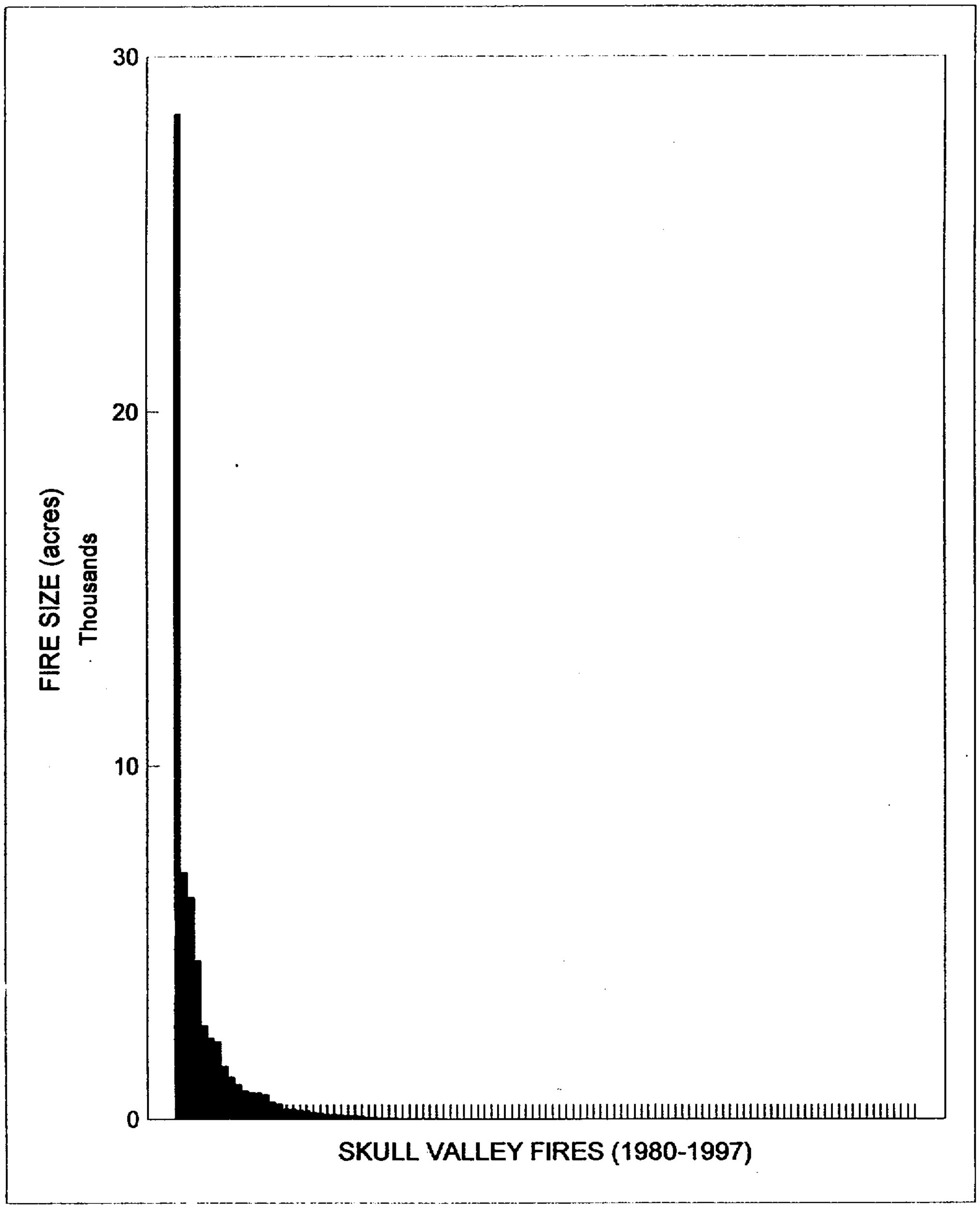

Figure 1. Individual fires by size occurring in Skull Valley, Utah

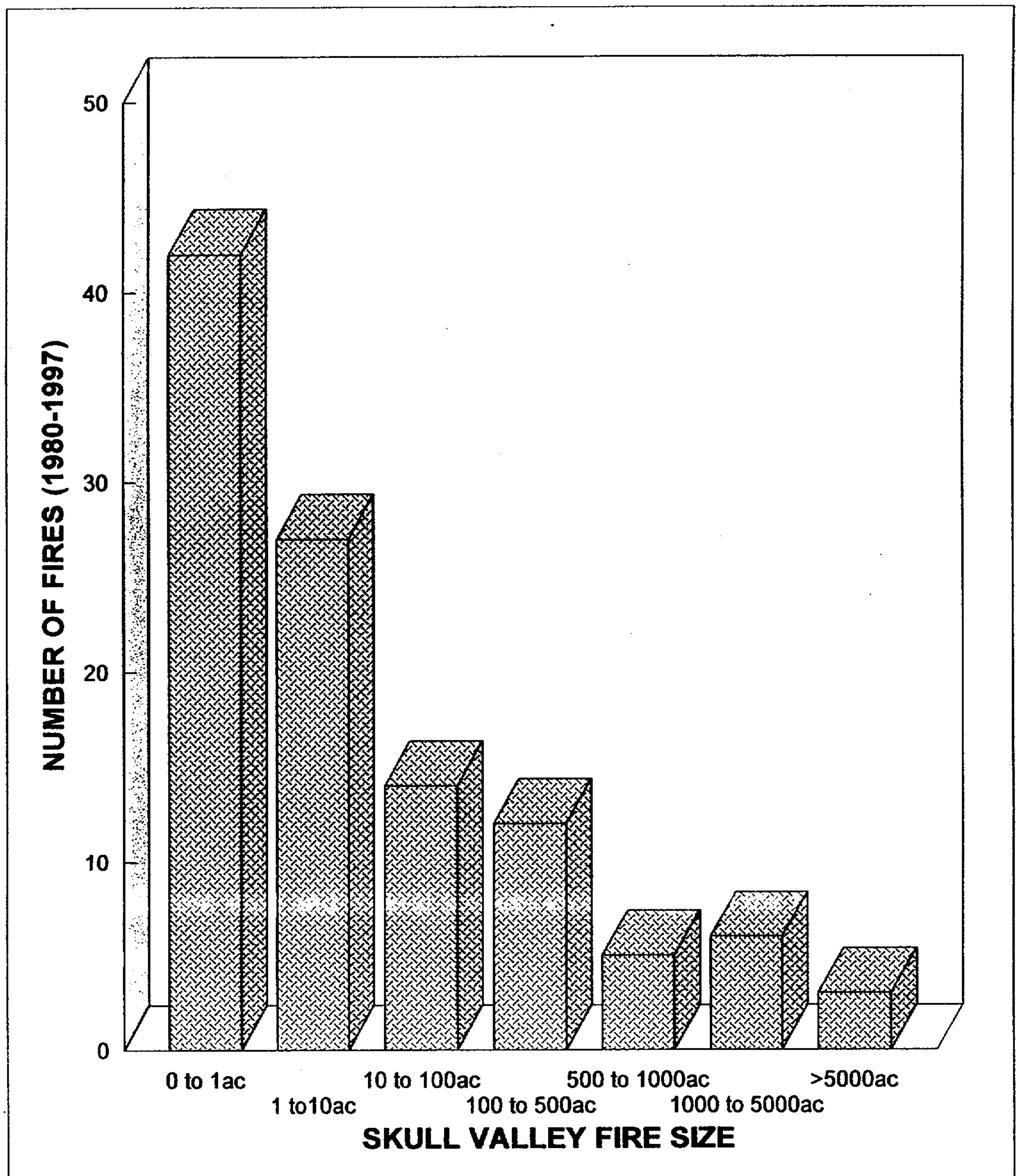

Figure 2. Fire occurrence by size class in Skull Valley, Utah from 1980 to 1997.