Ashley National Forest
Roosevelt/Duchesne Ranger District
Petty Mountain Prescribed Burn
Post Burn Review
Uintah Basin Interagency Fire Center Conference Room
Facilitator: Ivan Erskine
November 17, 2003

I. What was planned, or what was our intent?

A. Essentially planned as a range burn, burn primarily sage brush above the access road that extends from the Petty Mountain road approximately 2 miles to the west.
B. Aspen stands up hill north of the sage brush and access road were expected to contain fire.
C. Burn plan was to burn the fuel above the road (sage brush), and come back in the spring and burn the sage brush below the access road to the south.
B. The project intent was to burn 400 acres of sage brush above the access road and 600 acres below the access road.

II. What actually happened, or what did we accomplish?

A. Wednesday, September 24, 2003: Spot forecast was completed at 1014 MDT. A high pressure over the project area would result in warm and very dry weather. Northwest transport winds would prevail through Thursday, September 25. Scattered high clouds would drift across the area Thursday. LAL of 1, Haines Index of 5, Clearing Index of 575, Sky/weather sunny, max temperatures 73-77 degrees F, minimum humidity 7-12%, and wind eye level upslope 3-7 MPH with occasional gusts to 20 MPH after 1200. Ridgetop winds Northwest 5-9 MPH with gusts to 20 MPH. A test fire was started on the far west corner above the access road at approximately 1220 hour. The fire severity range prescribed for the primary prescription was 58-78 points. The maximum points projected for this day from1600-1800 hour was 76, two points below the maximum of 78.

The test fire burned into the aspen and fire looked good; the aspen slowed the fire. Burn boss decided to continue with burn above the access road since the fire was holding in the aspen at approximately 1257 hour. The intent was to have crew check the burn the following day. The Burn Boss was called to the Uinta escaped prescribed fire with his Type 2 Team that afternoon. The ignitions were completed at approximately 1800 hour. The fire looked like it was being held in the aspen as planned. All personnel left the fire at approximately 1845 hour. The prescribed fire covered approximately 233 acres.

B. **Thursday, September 25, 2003:** The District Range Conservationist checked on fire in the morning and determined that additional fire fighters were needed in the vicinity of Petty Creek. The Fire had burned through the aspen and was within 100 yards of the conifer to the north. The squad from Altonah G.S. arrived first and requested assistance from the rest of the Ashley Fire Crew. The Ashley Fire Crew had been ordered to the Uinta Escaped Rx Burn earlier that morning. After the remainder of the crew arrived at the Petty Rx Burn at approximately 1030 hour, it was determined that they could not contain the fire in the aspen. The fire had burned into the conifer on the west side of Petty Creek. Additional resources were ordered. Ashley Engine 111 from DJ was requested to the Petty Rx Fire at 1227 hour. Ashley Engine 141 was on the scene at 1030 hour. BLM heavy engine was ordered at 1329 hour.

The spot weather forecast for the 25th was for the ridge of high pressure to continue to bring warm and dry conditions tot he prescribed burn area. A push of cooler air would move over the area that night with an enhanced northwesterly flow aloft with slight cooling temperatures and mixing moisture down to the surface. The conditions were predicted as follows: LAL 1, Haines Index 6, clearing index 950, mostly clear (0-2 tenths), maximum temperature 72-74 degrees, minimum relative humidity 6-9%, and winds eye level upslope/up valley 5-8 MPH with afternoon gusts 10-13 MPH. The maximum severity points predicted from 1600-1800 hour was 76 points, which is 2 points below the maximum of 78. The predicted fire behavior at 76 points in a fuel model 8, which covered 80-90% of the area above the sage/grass areas at the bottom of the prescribed burn area (Lodge pole pine, spruce fir, and aspen), was a rate of spread of 1-2 chains/hour or 1-2 feet/minute and a flame length of 1-1.3 feet. In isolated areas where fuel model 10 existed, the predicted rate of spread was 8-10 chains/hour or 9-11 feet/minute and flame lengths of 5-6 feet.

Prior to leaving the fire at approximately 1800 hour Forest Fuels Technician was assigned the duty of Type 4 IC until relieved the next morning. A Type 3 IC was ordered to take over management of the Rx fire the next morning. ASF fire crew started burning along the Petty Mountain Road (196), on the south and east side of the fire late that afternoon. The crew accomplished about a 1/4 mile from the first switchback north. Ignitions were stopped due to darkness and unfamiliarity with the road and fuels to the north. The IC reported that they were done for the night and were returning to camp at 2121 hour. The Type 3 IC, that was going to replace the Type 4 IC Friday morning, was briefed at the strategy meeting in the S.O. at approximately 2130 hour. The Forest Supervisor and District Ranger decided to continue to manage the prescribed burn with project funds and take holding action along the Petty Mountain road, east of the fire (FS road # 196). Additional fuels funds would be requested from the R.O. on Friday, September 26,

2003. The fire grew approximately 550 acres with a total acres burned of 783 acres.

C. **Friday, September 26, 2003:** The spot weather forecast was complete at 814 hour. The strong high pressure of the Oregon coast would slowly build east over the weekend keeping Northern Utah in a dry and stable northerly flow. Relative humidity would increase slightly over the next several days. The conditions were predicted as follows: LAL 1, Haines Index 3, Clearing Index 550, sky/weather sunny, max temperature 69-73, minimum relative humidity 8-12 %, and wind eye level upslope 3-5 MPH with gusts to 7 MPH. The projected maximum severity points from 1600-1800 hour were 74, 4 points below the maximum of 78. The fire behavior was similar to the previous day with slow rates of spread and low flame lengths, except in isolated jack pots of heavy fuels and occasional trees torching.

The objective selected by the line officers the night before was to hold the fire within the Prescribed Burn Area (MMA) with project funds. The Prescribed Burn Area was identified along the east perimeter on FS road 196. A fixed wing out of Moab was ordered (to function as a lookout since there were limited vantage points on the ground), 2 engines off of the Manti-LaSal N.F., 1 engine from the NPS at Dinosaur N. M., 1 BLM tender, 1 contract tender, and 1 20-person contract fire crew. The R.O. gave authorization to spend $90,000 of fuels dollars. The Forest AO projected that there would be sufficient funds to manage the fire with the resources ordered for a total of three days, September 26, 27, and 28. The Type 4 IC started ignitions south of road 196 on the west side of the prescribed burn area igniting from west to east at 0700 hour. Type 3 IC took over from Type 4 IC at 1000 hour. The Petty Mountain road (#196) was closed to public access. Forest FMO in Recon 08U was over fire as the primary lookout at 1128 hour and was in contact with the IC. Ignitions started west of the intended starting point which was on the east perimeter where road 196 turns to the northwest. Initially the wind was favorable from the north so that the smoke was pushed to the south and east over the Prescribed Burn Area. At approximately 1145 hour winds shifted from a favorable northwest direction to upslope which was from the south. Ignitions stopped at 1236 hour since the wind was pushing the smoke over the road and visibility was too poor to continue. BIA Engine 624 was positioned at Twin Potts area south of the fire at 1252 hour as a secondary lookout. At 1259 hour Recon 08U left fire in route to Vernal. Burning out along road 196 was not possible since the upslope winds were pushing the smoke to the north over the road. All resources were used for remainder of day to hold the existing burnout to the north and pick up any spots across road 196. Recon 08U was back over the fire at 1506 hour and in contact with the IC. The Recon 08U left the fire at 1857 hour back to Vernal. A few spots were located and worked north of the road at 1859

hour. Resources continued to work spots until 2205 hour after which they all return to camp. The fire grew approximately 415 acres with a total acres burned of 1198 acres.

D. **Saturday, September 27, 2003:** The spot weather forecast for the 27th was completed at 1010 MDT from SLC. The strong high pressure was to remain centered over the west cost that morning. The high was forecasted to slowly build east over the weekend. High and dry conditions would remain the rule over all of Utah at least until Tuesday, September 30, 2003. The weather conditions that were predicted are as follows: LAL 1, Haines Index 3, clearing index 550, sky/weather sunny, maximum temperature 69-73, minimum relative humidity 12-17%, and the wind at eye level upslope 3-6 MPH with gusts to 8 MPH. The high severity point projected for 1600-1800 hour was 74 points, 4 points the high range of 78.

The objectives for the day were to hold the fire west and south of road 196 during the burning period, burn out the fire line from the lower switch back on road 196 southeast to Petty Creek tying into the black which was created the original burn day Wednesday, September 24, and execute an evening burn out after sunset when the down slope winds started along road 196. The objective of the evening burn out was to finish the burnout along road 196 from the top northwest corner south and east to the original burn out area that was started the previous day, September 26th. The Ashley crew and two engine crews were taken off shift early that afternoon to get some rest before starting the burnout around 2200 to 2400 hour after the down slope winds started. The down slope winds never really developed so the burnout went very slowly during the night to avoid any spotting tot he north and east of road 196. The fire grew approximately 125 acres with a total acres burned of 1323 acres.

E. **Sunday, September 28, 2003:** The spot weather forecast for the 28th was for the high pressure to remain over Utah Sunday and Monday. The burn area was to experience warm and dry and stable conditions. The transport winds were to be from the west around 12 MPH and increase to west 18-20 MPH tomorrow. The may be breezy conditions and gusty winds over exposed ridge tops tomorrow afternoon as the winds aloft mix downward. The forecasted weather conditions were as follows: LAL 1, Haines Index 3, clearing index 600, sky/weather clear, maximum temperatures 71-75 degrees, minimum relative humidity 16-20%, and the eye level winds upslope 2-5 MPH with afternoon gusts to 8 MPH.

The Ashley Crew and two engines worked beyond the work rest guidelines during the early morning of September 28th to finish the burnout along the east flank. The Type 1 Burn Boss documented the need for working the personnel past the 1 to 2 work rest guidelines to complete

the burnout and tie the east side of the project area in at the bottom of road 196. They were beaded down that morning.

This was the last day there were sufficient funds to take holding actions on the fire along the Prescribed Burn Area. It was obvious by 1800 hour that there were more spots occurring north and west of road 196 than the holding organization could handle. It was decided due to insufficient project funding, that all the holding personnel would be demobilized from the project area and the fire would be placed in monitoring status. If in 48 hours the fire did not stop significantly spreading to the north past road 196, the prescribed fire would be declared an escaped wildfire and a Wildland Fire Situation Analysis (WFSA) would be completed and an appropriate alternative would be selected. The 48 hours started at 1800 hour on Sunday, September 28th and would be reached at 1800 hour on Tuesday, September 30th, 2003. The fire did not grow significantly during this burning period.

F. **Monday, September 29, 2003:** The spot forecast was completed at 1306 MDT. The strong ridge was expected to remain over the State through Tuesday. The air mass would remain dry except for patchy high level moisture that would only produce a few cirrus clouds that afternoon. Low humidity's and above average temperatures would remain through Tuesday. Lower level moisture would slide northwards across the fire later Tuesday evening into Wednesday increasing humilities and bringing a litter better chance for some lower clouds and possibly some precipitation. The forecasted weather conditions were as follows: LAL 1, Haines Index 4, clearing index 1000+, sky/weather mostly sunny (10-20% cloud cover), Maximum temperature 66-72 degrees, minimum humidity 15-20%, and the eye level wind westerly or upslope/up valley 6-10 MPH.

The fire was spreading very slightly to the north and east on road 196 mainly by individual tree torching and short range spotting to adjacent spruce/fir patches. One engine crew and the fixed wing continued to monitor the fire spread through out the day. The fire grew approximately 377 acres with a total acres burned of 1700 acres.

G. **Tuesday, September 30, 2003:** The spot forecast was completed at 1102 MDT. The low relative humidities were forecasted to continue as a ridge of high pressure would remain over the burn area for the next two days. A storm system of the west coast would increase moisture beginning tomorrow before bringing the likely chance of wetting rains tot he burn area Thursday through Saturday. The forecasted weather conditions were as follows: LAL 1, Haines Index 5, clearing index 900, Sky/weather mostly clear early then partly cloudy (20-40% cloud cover), maximum temperatures 64-72 degrees, minimum humidity 15-20%, and eye level

winds becoming upslope/up valley to west winds 4-8 MPH with afternoon gusts to 10-12 MPH.

The fire continued to slowly spread in isolated patches north and east of road 196. The majority of the spread was due to torching trees and spotting. An engine continued to patrol the project area during the day. The fire grew approximately 793 acres with a total acres burned of 2493 acres. At 1800 hour, due to increased cloud cover and forecasted weather conditions for the next day calling for higher humidities and a chance of thunderstorms with wetting rains, it was decided that the fire would not be declared an escape at that time.

H. **Wednesday, October 1, 2003:** The forecasted weather conditions were as follows: LAL 1, Haines Index 5, clearing index 1000+, sky/weather mostly cloudy (50-70% cloud cover), maximum temperatures 61-70 degrees, minimum humidity 18-23%, and eye level winds becoming down slope/down valley 1-4 MPH. Yellowstone RAWS, which is approximately 3-4 miles to the east of the project area, recorded at 12:05 PM a maximum temperature of 70 degrees, minimum relative humidity of 21%, and down canyon winds of 3 MPH. At 14:05 the temperature began to drop (57 degrees), relative humidity rise (44%), and precipitation recorded at 0.12 inches. By 19:05 PM the station had recorded a total of 0.29 inches of rain.

The fire grew extremely only 46 acres along the northern most perimeter. The total acres burned were 2539 acres. This was the last day of any significant growth. The prescribed fire was not declared an escape and a WFSA was not necessary.

I. **October 16, 2003:** A Safenet (ID: 5SDFVKVSGAE) was filed on this date pertaining to the Petty Mountain Prescribed Fire by a driver. Three main concerns were addressed: 1) The east flank which was in a drainage that ran north-south had a good sized smoke column boiling out of it. This did not appear to be to be anchored or contained and definitely was un-manned at that time. 2) One hand crew and three type-6 engines were working spot fires that had crossed the Charley Red Foot road (196). To the north the fuels in this area were cense re-prod Fir which could distort a person's view of the big picture. Although the south side of the road had been burned out some areas had burned real dirty, leaving plenty of unburned fuel (solid stands of conifer trees) between the east flank activity and the crews working above. 3) Escape routes, not being present at briefing I an unaware of planned escape routes and safety zones so this next statement is an assumption based on what I saw. Charley Red Foot road (196) is essentially a one-lane mountain road with multiple switchbacks and very few turnouts. The hand crew was working a spot on the NE corner of the fire; three Type-6 engines were running hose lays on

the north side of the road approximately 1/4 mile west of the hand crew (the most obvious safe zone I saw was approximately 1 mile west of the nearest crews). The hand crew was at the top of the drainage that contained the east flank activity, with no obvious safe zone in the immediate area. The engines were parked in opposing directions with at least on of them having their hard line fully extended. These actions hint of an inefficient escape plan.

III. Why did it happen or why were there differences?

A. The fall burn plan identified the aspen stands as natural barriers that would slow and eventually stop the north advancement of the fire. Due to the leaf fall that exposed the ground fuels to solar radiation from the sun, the ground fuels under the aspen stands were dry enough to carry the fire up the slope into the adjacent conifer stands. The fire eventually threatened the MMA (FS road 196) which prompted the holding actions from September 25-28, 2003.

B. On September 28, 2003, funding for additional holding actions was depleted. The line officers decided that the fire would be monitored for 48 hours to see if the conditions would change and the spread of the fire would decrease.

IV. How do we improve on what we did wrong?

A. The burn plan was modified from primarily a spring burn to a fall burn. The fall amendment to the burn plan was not well distributed there by confusing many individuals. Also the original burn plan was not issued to the Type 3 IC that replaced the original burn boss.

It is recommended that a completely new burn plan be written for the different season and conditions under which the project would be executed, rather than amending the original spring burn plan.

B. On Thursday, September 25, 2003, when the fire began to spread past the aspen patches, the original burn boss was called to a Type 2 Team assignment on another escaped prescribed fire. Instead of replacing him with another burn boss, the Forest assigned a Type 3 IC to manage the holding operations on Friday, September 26, 2003. Even though the Forest had not declared the prescribed fire an escape, this decision cause confusion with the firefighters and cooperating agencies. From their perspective and given the limited information on the management decisions that were being made at the Forest level, it was felt that the project should be declared an escaped fire.

It is recommended that the original assigned burn boss remain in that key management position throughout the entire project to maintain consistency. They should not be available or on call for any Overhead Team commitments while managing the prescribed burn project. Additionally, the only time that management position changes from a Burn Boss to an Incident Commander is after the burn project has been declared an escaped fire.

C. The Prescribed Fire Area (MMA) that was designated in the burn plan was adequate for a spring burn but not large enough of a fall burn. Conversely, the NEPA that was prepared for this burn project did not cover a large enough area to designate a realistic MMA for a fall burn.

It is recommended that the NEPA cover a large enough area to define a realistic project area and easy to contain MMA. Planning all prescribed burns with this in mind where feasible will dramatically increase the chances for a successful project.

D. Avoid vague motherhood goal statements that can not be monitored and measured to verify reaching project objectives. Project objectives described in the NEPA should be clear, understandable and measurable over a specified period of time. These in turn will be directly carried into the accompanying prescribed burn plan.

It is recommended that if a project objective can not be monitored and measured indicating if an objective has been met, it should be re-written.

E. The work rest guidelines were exceeded on September 28, 2003. The burn out along road 196 took longer than expected.

It is recommended that this situation should be avoided in the future even though an operational objective will not be met when planned.

F. Much of the confusion and miscommunication that lead to the October 16, 2003 Safenet, could have been prevented if there had been daily morning briefings and afternoon After Action Reviews (AAR) with all the project personnel ***and*** the responsible Line Officers. Most of the management decisions that were being made by the Line Officers each evening in preparation for the next day were not being adequately conveyed and explained to all the project personnel. The IC was being briefed by the Line Officers and Forest FMO prior to each days work and debriefed at the end of the day. However, the explanation of WHY the decisions were being made about the management of the prescribed burn project needed to be heard by the project personnel directly from the Line Officers every morning and evening. The morning briefings with everyone would have permitted the project personnel to ask questions directly to the Line

Officers prior to the shift. Conversely, the afternoon AAR would have permitted project personnel to give the Line Officers important feed back on how things were functioning in the field and what would work better to accomplish the objectives the next day.

It is recommended in situations where a prescribed burn has the potential for threatening escape from the designated MMA and a WFAS may need to be written within 48 hours, that the responsible Line Officer be directly involved in the daily shift briefings and AARs at the end of each shift. Also, all agencies that would be involved in the prescribed burn project should receive a copy of the burn plan for review and comment well in advance of implementation.

G. Have someone who could document the situation while it is happening, documentation effort for the burn project. Help with remembering what happened in chronological order.

H. The concerns expressed in the October 16, 2003 Safenet were addressed and discussed. The following are the three key concerns and the discussion for each:

1. The concern that the smoke column boiling out of the north-south drainage on the east flank appeared to be not anchored or contained and un-manned.

   The fireline on the lower east flank, which consisted of a hand line tied into FS road 196, was anchored at the bottom of Petty Creek into the black where the sage and grass had been burned on September 24, 2003. The FS road 196 was being used as an indirect line along the east and northern flanks. These two flanks were being burned out starting on September 25th thru the 28th. These tactics were being executed due to the high potential for torching in isolated trees and subsequent short range spotting (less than a 300 ft) up hill to the north and the predicted fire behavior.

   Approximately 80 to 90% of the fuels were represented by the Fire Behavior Fuel Model 8. Fires in fuel model 8 Timber Group are characterized as follows:

   "Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional "jackpot" or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards."

Fire behavior calculations had been done by the FBAN on the project which indicated that the predicted fire behavior was characterized by very slow rates of spread (1-2 chains/hour)and low flame lengths (<2 feet) under the current and forecasted weather conditions throughout most of the burn area in the conifer and aspen stands.

2. Concern for heavy reproduction and poor view of the big picture (lack of adequate lookouts).

   On September 26, 2003, by 1128 hour a fixed wing was circling the project area functioning as a lookout. The fixed wing provided aerial coverage from 5 to 7 hours every day, primarily after 1100 AM until 1 hour before sunset. The fixed wing remained on the fire as an aerial platform lookout until the afternoon of October 1, 2003, when the weather dramatically changed and measurable precipitation was received on the project area.

3. Concern over adequate escape routes and safety zones.

   Given the fact that the fire behavior was low intensity and very slow moving on the ground and that there was excellent aerial coverage dedicated as a lookout during the most active part of the burning period, the management and all the fire fighters on the ground felt there was more than adequate time to move to the safety zones along the east flank and to the west along the north flank. Heavy engines (Type 3 and 4) could pass each other along FS road 196 with no difficulty.