Prescribed Fire Plan

Element 1: Signature Page

Administrative Unit(s):	**BIA Crow Creek Agency**
Project Name:	**Crow Creek**
Burn Unit Name:	**Red Bull**
Ignition Unit Name:	
Complexity Rating:	**Moderate**
Minimum Burn Boss Qualification:	

	Name and Qualification or Position	Date
Prepared By:		
Technical Reviewer:		
Recommended By:		
Recommended By:		
Approved By:		
	Agency Administrator	

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Element 2, Part A: Agency Administrator Ignition Authorization

Instructions: The Agency Administrator's Ignition Authorization is the intermediate planning review process (i.e., between the Prescribed Fire Complexity Rating System Guide and Go/No-Go Checklist) that should be completed before a prescribed fire can be implemented. The Agency Administrator's Ignition Authorization evaluates whether compliance requirements, Prescribed Fire Plan elements, and internal and external notifications have been or will be completed and expresses the Agency Administrator's intent to implement the Prescribed Fire Plan. If ignition of the prescribed fire is not initiated prior to the expiration date determined by the Agency Administrator, a new approval is required.

Yes	No	Key Element Questions
		A. Has anything changed since the Prescribed Fire Plan was approved or revalidated? *Such as drought or other climate indicators of increased risk, insect activity, new subdivisions/structures, smoke requirements, Complexity Analysis Rating.*
		B. Have compliance requirements and pre-burn considerations been completed? *Such as preparation work, NEPA mitigation requirements, cultural, threatened and endangered species, smoke permits, state burn permits/authorizations.*
		C. Can all elements and conditions specified in the Prescribed Burn Plan be met? *Such as weather, scheduling, smoke management conditions, suitable prescription window, correct season, staffing and organization, safety considerations, etc.*
		D. Are processes in place to ensure all internal and external notifications and media releases will be completed?
		E. Have key agency staff been fully briefed about the implementation of this prescribed fire?
		F. Are there circumstances that could affect the successful implementation of the plan? *Such as preparedness level restrictions, resource availability, other prescribed fire or wildfire activity.*
		G. Have you communicated your expectations to the Burn Boss and FMO regarding if and when you are to be notified that contingency actions are being taken?
		H. Have you communicated your expectations to the Burn Boss and FMO regarding decisions to declare the prescribed fire a wildfire?
		Other:

Recommended by: _____ Date: _____
FMO/Prescribed Fire Burn Boss

Approved by: _____ Date: _____
Agency Administrator

Approval expires (date): _____

Element 2, Part B: Prescribed Fire Go/No-Go Checklist

Questions	Yes	No
A. Are there conditions (such as drought or fuel loading) in or adjacent to the ignition unit that have changed or that were not considered in the prescription development? • If **Yes**, go to item **B**. • If **No**, proceed to checklist below.		
B. Has the Prescribed Fire Plan been reviewed and have an amendment and technical review been completed, or has it been determined that no amendment is necessary? • If **Yes** to any, proceed to checklist below. • If **No**, **STOP. An amendment is needed.**		

Yes	No	Go/No-Go Checklist
		Have ALL permits and clearances been obtained?
		Have ALL the required notifications been made?
		Have ALL the pre-burn considerations and preparation work identified in the prescribed fire plan been completed or addressed and checked?
		Have ALL required current and projected fire weather forecasts been obtained and are they favorable?
		Are ALL prescription parameters met?
		Are ALL smoke management specifications met?
		Are ALL planned operations personnel and equipment onsite, available, and operational?
		Has the availability of contingency resources applicable to today's implementation been checked and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		After evaluating the test fire, in your judgment can the prescribed fire be carried out according to the Prescribed Fire Plan, and will it meet the planned objective?

If all the questions were answered with "Yes," proceed with a test fire. Document the current conditions, location, and results. Print one copy of this checklist for each day of active ignition.

_____ _____

Burn Boss Date

Element 3: Complexity Analysis Summary

This summary table is based on the ratings and rationale provided in the worksheet in Appendix C.

Ignition Unit Name: Red Bull			
Element	**Risk**	**Potential Consequences**	**Technical Difficulty**
1. Potential for escape	**Low**	**Moderate**	**Low**
2. The number and dependence of activities	**Moderate**	**Moderate**	**Moderate**
3. Offsite values	**Moderate**	**Moderate**	**Moderate**
4. Onsite values	**Moderate**	**Moderate**	**Moderate**
5. Fire behavior	**Moderate**	**Moderate**	**Low**
6. Management organization	**Moderate**	**Low**	**Moderate**
7. Public and political interest	**Moderate**	**Moderate**	**Low**
8. Fire treatment objectives	**Low**	**Moderate**	**Moderate**
9. Constraints	**Low**	**Low**	**Low**
10. Safety	**Moderate**	**Moderate**	**Moderate**
11. Ignition procedures/ methods	**Moderate**	**Moderate**	**Low**
12. Interagency coordination	**Low**	**Low**	**Low**
13. Project logistics	**Moderate**	**Moderate**	**Low**
14. Smoke management	**Low**	**Low**	**Low**

Complexity Rating Summary	
Complexity Factor	**Overall Rating**
Risk	**Moderate**
Potential Consequences	**Moderate**
Technical Difficulty	**Moderate**
Summary Complexity Determination	**Moderate**
Rationale: This burn rates a moderate complexity due to the homes and structures within the burn unit and the fact that slow and deliberate ignition procedures are required using	

highly mobile holding resources on constructed control lines. Even though this type of ignition is common in Indian Country and considered standard operating procedure for most of our Agency fire personnel, the consequences of failure are great. Care must be taken to complete the burn successfully to ensure public and crew safety. Safety and escaped fire risk have been mitigated by:

- Requiring the use of qualified personnel in all positions.
- Timing of the burn (both time of year and time of day).
- Requiring careful ignition methods to achieve desired fire behavior and adequate buffers before completing the burn by head-firing.
- The capability to halt burning virtually at any time during the operation.

Element 4: Description of the Prescribed Fire Area

Element 4: Description of the Prescribed Fire Area	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

A. Physical Description

Location: Narrative description of the location of the prescribed fire project area and ignition unit(s), including legal description, UTM coordinates and/or latitude/longitude (decimal degrees; NAD83 preferred), county, and state.

Buffalo County, South Dakota
T107N, R72W, Sect. 23 & 24
Latitude: 44.0015, Longitude: -99.2526

Size: Area, in acres, of the project with a breakdown by ignition unit and/or ownership if applicable.

Project size: 37 acres
Acres to be burned: 28

Topography: Identify the upper and lower range of elevation, slopes (max, min, and average), and aspect(s) of the prescribed fire project area.

Elevation: Top: 1465 ft, Bottom: 1375 ft
Aspect: South
Slope % (Average):
5% - upper (north side) flats,
40% - south third, flat bottom - 50 ft average north of the south project boundary

Project Area: The prescribed fire project area covers the entire area where the fire will be ignited and may be allowed to burn under the plan as documented in the NEPA decision. Describe the physical, natural, and/or human-made boundaries (including multiple units) of the prescribed fire project.

The project boundary is 37 acres located north of the Missouri River, approximately .3 miles east of Gingway housing, and approximately .2 miles west of East housing (see attached map). Some portions of the unit are adjacent to resident properties and three structures are within the burn unit, with one being an abandoned, dilapidated house. The unit is bordered by predominantly U.S. Corps of Engineers land to the south, with the Missouri River to the south of that, private property to the east, tribal lands to the northeast, private property (cropland) to the north and northwest, with a 2.5 acre home-site in the northwest corner of the project area and predominately U.S. Corps of Engineers land on the west border of the burn unit. The entire project area is within the boundaries of the Crow Creek Reservation on Tribal lands.

B. Vegetation and Fuels Description

Onsite Fuels Data	Adjacent/Surrounding Area Fuels Data
Onsite fuels data: Fuel model 3 (over 75%) and 1, with grass as the primary carrier, and small inclusions of hardwoods, characterized as a fuel model 9. Fuel model 3 best represents fire behavior inside of the burn unit. The burn site is dominated by smooth brome, big bluestem, and other native grasses. Coverage is continuous with only minor breaks. **0-1/4 in. 1-hour fuels: ~3 tons/acre** **Fuel height: 3 ft.** **Duff depth: Ã‚Â½ in.**	**Adjacent fuels data: Fuel models 1, 3 and 9, scattered along all the boundaries. On the lower edge are scattered stands of hardwood tree species and narrow wooded draws to the east and west, best described by fuel model 9. Fuel model 3 best represents fire behavior outside of the burn unit.**

Vegetation Percent Cover and Fuel Models

75% Grass (smooth brome, big bluestem, native grasses)-FM 3
25% Hardwood Inclusions-FM 9

C. Description of Unique Features, Natural Resources, Values

The burn unit has structures within it that will need to be protected prior to burning. A dirt road accesses the structures from the middle of the north side of the unit. A fence line runs in an east west direction thru the middle of the prescribed fire unit. Power poles, wooden fence poles, and old dump sites are areas that will be protected or excluded from the burn. Two archaeology sites are located along the east boundary and north, middle flat that do not require any special protection, other than to make sure that no equipment drives over these sites.

Special Considerations: The only smoke receptors of concern are the homes within and adjacent to the burn unit, adjacent communities and disbursed housing along nearby roads. According to Fire Management, local authorities and residents, smoke is not a concern with community members. Water sources are numerous and close by; hydrants, water at home-sites and the Missouri River.

D. Maps

Include maps in Appendix A. See IPFPIPG (2014) pp. 26-27 for more information about the required and optional maps.

Element 5: Objectives

Element 5: Objectives	Project Name: Crow Creek
	Ignition Unit Name: Red Bull
Specific, Measurable, and Attainable Resource and Fire Objectives	
Resource Objectives	
Reduce the risk of future wildland urban interface fire from destroying homes/structures or other special features.	
Prescribed Fire Objectives	
a. Burn at least 90% of the target area. **b. Reduce the fine dead herbaceous fuel loading by 90% or more immediately following the completion of ignition.**	

Element 6: Funding

Element 6: Funding	Project Name: Crow Creek	
	Ignition Unit Name: Red Bull	
Prescribed Fire Phase	**Funding Source**	**Estimated Cost**
Administration	WUI Program	$240.00
Planning	WUI Program	$840.00
Implementation (Personnel/Labor)	WUI Program	$2150.00
Implementation (Equipment/Supplies)	WUI Program	$225.00
Total of All Estimated Costs		$3,455.00

Process for Tracking Project Expenses (Optional)
Burn boss will be responsible for reporting implementation cost within 5 days of completion of this project.

Element 7: Prescription

See also Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation.

Element 7: Prescription (Fire Behavior Narrative)	Project Name: Crow Creek
	Ignition Unit Name: Red Bull
	Prescription Coverage:

Fire Behavior Narrative or Description of Empirical Evidence

Summarize the fire behavior identified in the prescription and how it will achieve the desired treatment objectives.

The tables below indicate acceptable ranges of weather elements, fuel moisture and fire behavior characteristics for a successful burn. See Appendix E for an operating range of allowable and desired prescription conditions.

When temperature and/or 1-hour fuel moisture elements are at the maximum allowable fire behavior end of the prescription range, allowable wind speeds need to be limited. Example: For the burn, the acceptable range of relative humidity (RH) is 25-70%, 1-hour fuel moisture (FM) is 6-14%, and mid-flame wind speed (MWS) is 3-11 mph. Objectives can be met when RH and FM are at the high fire behavior end of their acceptable range (25% and 6% respectively), but under these conditions a MWS >7 mph may be too risky and may cause an escape. To adjust to this and still accomplish the burn safely at the hot, dry end of the prescription, a MWS limitation of 3-7 mph will be established to limit flame lengths and rates of spread and thereby decrease spot fire potential and assist crews in catching the fire in the event of an escape.

At the high end of the prescription spotting potential is projected to be 0.9 miles and probability of ignition as high as 60%. The Contain module outputs indicate that an escaped fire could quickly grow beyond a 300 acre burned area target, likely making control efforts at the head of the fire ineffective. Thus, indirect attack with engines will be the most effective tactic in the event of an escape (see Contingency Plan Element 17).

Historical evidence from previous prescribed fire projects in the area show that a minimum of 3 mph winds and limited temperatures/relative humidity, that allow at least 8- to 10-foot flame lengths (up to a maximum of 17 feet) and projected unit interior rates of spread greater than 50 chains/hour (following completion of adequate blacklines), are needed to meet treatment objectives. It has also been found that fuel model 3 can be burned with adequate results at higher RHs, fine dead fuel moistures and under cloud cover. A wide prescription window has been established to accommodate this.

Element 7: Prescription (Environmental)	Project Name: Crow Creek			
	Ignition Unit Name: Red Bull			
	Prescription Coverage:			
Weather	**Low Fire Behavior (Within Unit)**	**High Fire Behavior (Within Unit)**	**Optimal Fire Behavior (Within Unit)**	**Maximum Fire Behavior (Outside Unit)**
Temperature	50	80	70	80
Relative humidity	70	25	30	25
Mid-flame wind speed (mi/h)	3	11	5	15
Mid-flame wind direction (°)	Northerly, NE-NW	Northerly, NE-NW	Northerly, NE-NW	Northerly, NE-NW
20-ft wind speed (mi/h)	7.5	27.5	15.5	37.5
20-ft wind direction (°)	Northerly, NE-NW	Northerly, NE-NW	Northerly, NE-NW	Northerly, NE-NW
Cloud cover (%)	100	0	0	0
Fuel shading from sun (%)	100	0	0	0
Aspect (°)	South (180 degrees)	South (180 degrees)	South (180 degrees)	South (180 degrees)
Slope (%)	5	5	5	40
Fuel Moisture				
1 hour (%)	14	6	8	4
10 hour (%)	16	8	10	6
100 hour (%)	20	12	14	8
1000 hour sound (%)	n/a	n/a	n/a	n/a
Live woody (%)	180	170	170	160
Live herbaceous (%)	100	90	90	80
Duff moisture (%)	n/a	n/a	n/a	n/a
Soil moisture (%)	n/a	n/a	n/a	n/a
KBDI[1]	0	500	300	500

[1] The Keetch-Byram Drought Index (KBDI) is a soil/duff moisture (%) index. It ranges from 0 (no drought) to 800 (extreme drought). A KBDI of 600 indicates that lower litter/duff layers contribute to active fire intensity. A KBDI of 200–400 is typical of late spring, where lower litter/duff layers begin to dry and contribute to fire intensity.

Element 7: Prescription #1 (Fire Behavior Outputs)	Project Name: Crow Creek											
	Ignition Unit Name: Red Bull											
	Fuel Model:											
	Prescription Coverage:											
Fire Behavior ➔	**Low Fire Behavior (Within Unit)**			**High Fire Behavior (Within Unit)**			**Optimal Fire Behavior (Within Unit)**			**Maximum Fire Behavior (Outside Unit)**		
Type of Fire	**H**	**B**	**F**	**H**	**B**	**F**	**H**	**B**	**F**	**H**	**B**	**F**
Fuel Model	**FM3: Tall grass**			**FM3: Tall grass**			**FM3: Tall grass**			**FM3: Tall grass**		
Flame length (ft)	**7.74**	**2.67**	**3.51**	**21.33**	**3.40**	**4.64**	**12.13**	**3.19**	**4.29**	**29.34**	**3.77**	**5.16**
Rate of spread (ch/hr)	**41.63**	**4.11**	**7.48**	**322.78**	**5.95**	**11.69**	**101.99**	**5.61**	**10.64**	**574.16**	**6.65**	**13.14**
Fireline intensity (btu/ft/s)	**484.76**	**47.84**	**87.09**	**4,393.3**	**81.05**	**159.17**	**1,288.23**	**70.88**	**134.37**	**8,790.60**	**101.76**	**201.18**
Spotting distance (mi)	**0.2**	**0.09**	**0.1**	**0.97**	**0.27**	**0.28**	**0.4**	**0.2**	**0.2**	**1.5**	**0.36**	**0.38**
Scorch height (ft)	**42.07**	**7.39**	**12.00**	**246.84**	**4.72**	**10.10**	**91.78**	**8.04**	**14.87**	**380.17**	**3.91**	**8.54**
Probability of ignition (%)	**13**			**57**			**41**			**75**		
Reaction intensity (btu/ft^2/min)	**2,481.15**			**2,900.07**			**2,691.17**			**3,262.17**		
Heat per unit area (btu/ft^2)	**635.18**			**742.42**			**688.94**			**835.12**		

(H = Head Fire, B = Backing Fire, F = Flanking Fire)

Fire behavior outputs may be derived from BEHAVE models, nomograms, or historical or empirical evidence. Include modeling and/or empirical evidence documentation as an appendix or in the fire behavior narrative.

Element 8: Scheduling

Element 8: Scheduling	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

A. Implementation Schedule

Spring or Fall, annually.

B. Project Duration

This prescribed fire unit may be divided into five ignition phases. If weather and fuel conditions are within prescription, all five phases may be ignited together with one to two days planned to complete ignition, and one additional day through the mop-up and patrol phase, until declared out.

C. Constraints

Technical review annually, with new technical review and superintendent signatures. If for any reason burn bans are imposed they will be honored.

Element 9: Pre-Burn Considerations and Weather

Element 9: Pre-Burn Considerations and Weather	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

A. Onsite and Offsite Considerations

Onsite: A spot weather forecast is required prior to ignition. If phases are implemented over multiple days a spot weather forecast is required for each day of ignition.

Offsite: Spot weather data will be called in to the National Weather Service (NWS) by either the Burn Boss or Fire Dispatch office. If the spot weather forecast is received back after the Burn Boss and burn crew have left for the field, the Dispatcher will read off the forecast over the radio and then provide it to the Burn Boss for the prescribed fire plan records. Depending on the time of year, the spot weather forecast may need to be called in to NWS on the day prior to the burn.

B. Method and Frequency for Obtaining Weather and Smoke Management Forecast(s)

Fuel sticks and weather will be taken daily, as designated by the Burn Boss, for at least 5 days prior to ignition operations.

NWS in Aberdeen, South Dakota, xxx-xxx-xxxx or xxx-xxx-xxxx, will be contacted for spot weather forecast(s). Daily weather forecasts copies will be made available to the Burn Boss as needed prior to, during and after implementation and will also be placed in the prescribed fire project files.

To access KBDI: http://www.fs.fed.us/land/wfas/kbdi/ Burn boss or designee will get the KBDI at least one day prior to ignition operations.

C. Notifications

(Internal and external organizations and individuals that might be affected by the burn)

Organizations and Individuals (Including Emergency Dispatchers)

Organization	When to Notify	Contact Information	Contact Name	Date of Contact	Contact Method
Homeowner	No later than 1 week prior	xxx-xxx-xxxx	Jane Doe		Personal Contact
Homeowner	No later than 1 week prior	xxx-xxx-xxxx	John Doe		Personal Contact
Adjacent Landowner	No later than 1 week prior	xxx-xxx-xxxx	Smokey Bear		Personal Contact
Ft. Thompson Post Office	No later than 1 week prior	xxx-xxx-xxxx	Smokey Bear Jr.		Flyers
Local Store	No later than 1 week prior	xxx-xxx-xxxx			Personal Contact

Media Contacts			
Type of Media	**Media Name**	**Location**	**Telephone Number**

Element 10: Briefing

The Prescribed Fire Burn Boss will ensure that any new personnel arriving at the prescribed fire receives a briefing prior to assignment.

Element 10: Briefing		Project Name: Crow Creek
		Ignition Unit Name: Red Bull
Briefing Checklist		
Yes	**No**	**Item**
		Burn organization and assignments
		Prescribed fire objectives and prescription
		Description of the prescribed fire area (including special considerations and sensitive features)
		Expected weather and fire behavior
		Communications
		Ignition plan
		Holding plan
		Contingency plan and assignments
		Wildfire declaration
		Safety and medical plan
		Aerial ignition briefing (if aerial ignition devices will be used)
		Incident action plan (IAP). The IAP is optional, but is recommended for large multi-day or high-complexity prescribed fires.

Element 11: Organization and Equipment

Specify the minimum required implementation organization or capabilities (line production rates, etc.) by position, equipment, and the supplies needed for all phases of the prescribed fire until the fire is declared out. See the *Interagency Prescribed Fire Planning and Implementation Procedures Guide* for details.

Element 11: Organization and Equipment	**Project Name: Crow Creek**
	Ignition Unit Name: Red Bull

A. Implementation Organization or Capabilities

Position	ICS Code	Amount Needed	Line Building Rates (ch/hr)
Prescribed Fire Burn Boss	**RXB2**	**1**	
Ignition Specialist Function	**FIRB**	**1**	
Holding Specialist Function	**TFLD**	**1**	
Fire Effects Monitor	**FEMO**	**1**	
Lookout	**FFT1**	**1**	
Engine Boss, Operator, and Crew	**ENGB**	**5**	
Ignition Crew	**FFT1**	**3**	
Holding Crew	**FFT2**	**6**	
Aerial Ignition Crew (as needed)	**n/a**	**n/a**	
Public Information	**PIO**	**1**	

B. Equipment

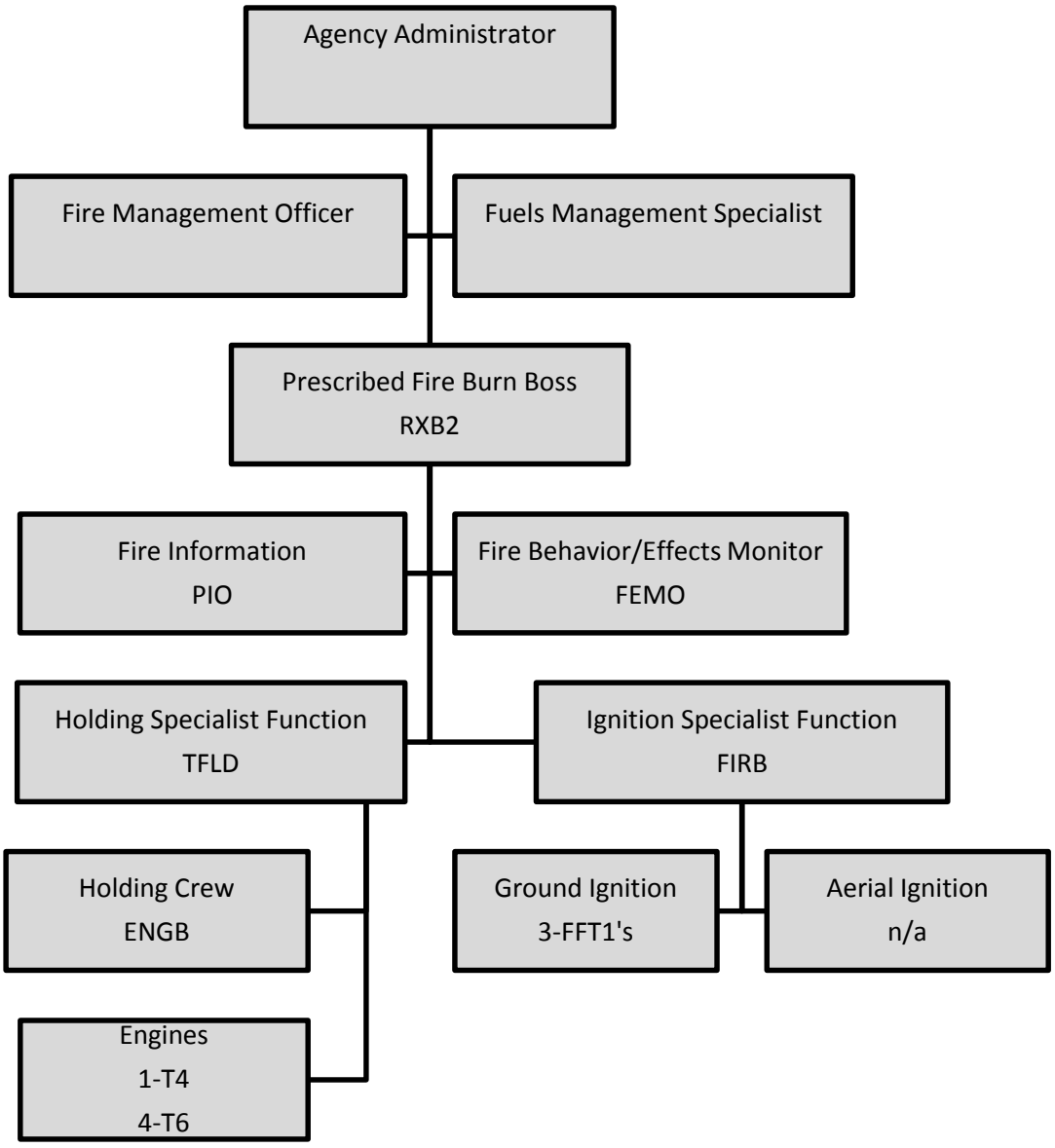
Equipment	Type	Amount Needed	Number of Personnel	Line Building Rates (ch/hr)
Engine	**Type 6**	**4**	**8**	
Engine	**Type 4**	**1**	**2**	
Dozer				
Water Tender				
Aviation Resources				

C. Supplies		
Supplies	**Amount Needed**	**Need to Order**
Drip Torches	**8**	
Chainsaws	**2**	
Hand Tools	**15**	
Fuel	**10 gallons**	
Portable Water Tanks	**1**	
Hoses		
Mark 3 Pump	**2**	

D. Total Line Production Rates	
Total line building capability at dry/hot end of prescription (ch/hr):	
Expected line building capability needed during initial escape at critical holding area at dry/hot end of prescription (ch/hr):	
The line building rate of on-site resources will exceed perimeter increase during initial escape if the wind speed is (mi/hr):	

Organization Chart

Organization will be assigned by the Burn Boss prior to commencing any prescribed fire operations and documented in the prescribed fire plan files.



Element 12: Communication

Element 12: Communications	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

Command, Tactical, and Air Operations Frequencies						
System	**RX**	**RX**	**TX**	**TX**	**Assignment**	**Remarks**
Low Band Ch 1	40.1				Command: All personnel on the burn	
Low Band Ch 3	40.1				Contingency Operations	
King-High Band Ch 9	154.7850				Medical Ops	
King-High Band Ch 1	162.875				Engine Group	Call Directly to Dispatch

Project Phone Numbers		
Personnel Name	**Agency/Affiliation**	**Telephone Number**
Local Dispatch	BIA	xxx-xxx-xxxx
N. Great Plains Dispatch	BIA	xxx-xxx-xxxx
Tribal Law Enforcement		xxx-xxx-xxxx
County Law Enforcement	County	xxx-xxx-xxxx

Element 13: Public and Personnel Safety, Medical

Element 13: Public and Personnel Safety and Medical Plan	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

Safety Hazards

Safety hazards are covered in Appendix D-Job Hazard Analysis. All safety hazards that are encountered during the implementation phase of this prescribed fire plan will immediately be brought to the attention of the Burn Boss who will make any necessary notifications and/or adjustments to tactics.

Measures Taken to Reduce the Hazards

All personnel in the burn area will have full PPE, including any member of the public who has permission from the Burn Boss to be on site. Members of the public must stay in a designated area accompanied by an assigned BIA employee.

No trainee will be expected to perform task functions without close supervision. All tactical vehicles will have a radio with common communication and any line crew members who work separately will have a radio. Crew members are expected to work in pairs. All equipment will be tested for satisfactory operation prior to ignition.

Cautions for stinging/biting insects, poisonous snakes, and poison ivy will be given at the pre-burn briefing. The abandoned house, with scattered debris and dump sites at the bottom end of the unit will be excluded during ignition, with wet lines from the engines. Care should be taken to avoid any dumped debris that may be hidden under the grass and brush within the burn unit. All ignition and holding operations will be closely monitored by the Burn Boss, Firing Boss and Holding Boss.

All Ignition personnel will carry a portable radio and the Firing Boss will maintain radio contact with all Igniters during ignition operations. The Holding Boss will work with his/her holding forces to ensure minimum exposure to smoke during the burning and mop-up operations.

Special emphasis will be placed on safety zones, ensuring that all line personnel have a clear understanding that areas of solid black are good safety zones. As ignition operations proceed, safety zones will follow the ignition.

An Agency/Tribal representative will be assigned as Safety Officer to monitor all aspects of the ignition and holding operations.

Emergency Medical Plan

Emergency Medical Procedures

In case of serious injury needing immediate medical attention, the Burn Boss will contact the servicing Dispatch Office, Police/Sheriffâ™s Office or medical facility, whichever is most appropriate for the project area, for medical services.

The nature of the injury will need to be conveyed to the ambulance/life flight crew to ensure proper response. DO NOT broadcast the name of any injured personnel. The Agency FMO and Superintendent are to be notified immediately in the event of a medical emergency. At the discretion of the Burn Boss, ignition operations may be halted or curtailed, in order to support the medical emergency.

Emergency Evacuation Methods
If the nature of injury requires medevac to trauma or burn center, request air ambulance from/to nearest center.
Emergency Facilities and Capabilities
Local Ambulance Fort Thompson, S.D. xxx-xxx-xxxx **Other Local Ambulance Chamberlain, S.D. 57325 xxx-xxx-xxxx** **Local Hospital Chamberlain, S.D. 57325 xxx-xxx-xxxx** **Local Healthcare Center Pierre, S.D. 57501 xxx-xxx-xxxx** **Area Burn Center Sioux Falls, S.D. xxx-xxx-xxxx** **Pierre Airport Pierre, SD xxx-xxx-xxxx**
Directions from Nearest Medical Facility to Project via Ground
Take Hwy 2 south to County Rd 16. Turn right on County Rd 16. Travel 3 miles on County Rd 16. Hospital is on the right.
Dispatch Centers and Key Contact Information
Local Dispatch office: xxx-xxx-xxxx **N. Great Plains Dispatch: xxx-xxx-xxxx** **Law Enforcement/EMS: xxx-xxx-xxxx**

Standardized Medical Emergency Procedures Reference: NWCG#025-2010
In the event of serious accidents or injuries, the Burn Boss shall be notified immediately. The Burn Boss will initiate on-site response (if not already in progress) and coordinate additional response needs using the following communications plan:

1. Declare the nature of the emergency
• **Type of medical injury or illness and whether it is life-threatening**
• **Type of response needed**
  ○ **Life-threatening = Medevac**
  ○ **Non-life-threatening = Medical Transport**

2. If emergency is life threatening, request that the designated frequency be cleared for emergency traffic
3. Identify the on-scene Point of Contact (POC) by resource position and last name (i.e., Burn Boss Smith)
4. Identify the following: • **Nature of the incident** • **Number of people injured or sick** • **Patient assessment** • **Location (geographic and lat/long coordinates)** • **Accessibility by ground and/or air**

5.	**Identify on-scene medical personnel by position and name (i.e., EMT Jones)**
6.	**Identify preferred method of patient transport**
7.	**Request any additional resources and/or equipment needed**
8.	**Document all information received and transmitted on the radio or phone**
9.	**Identify any changes in the on-scene POC or medical personnel as they occur**

Element 14: Test Fire

Element 14: Test Fire	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

Planned Locations and Specific Instructions

This prescribed fire unit may be divided into five ignition phases with ignition sequence to be determined by the Burn Boss, depending on site weather conditions during implementation. See Appendix A-Ignition/Holding Maps, Phase(s) 1-5 for a sample ignition plan, given north to northwest winds.

Planned location: A test burn will be conducted for each ignition phase. For the example in Appendix A and assuming a north to northwest wind, the test burns will be ignited in the southeast corner of each planned phase. Test burn locations may be adjusted to accommodate current weather conditions, as specified and documented by the Burn Boss.

For Phase 1, a flanking test strip will be ignited in a northerly direction, upslope for approximately 50-100 feet off a wet line, as determined by the Burn Boss. One or two additional, parallel strips may be ignited, at the discretion of the Burn Boss, to gauge fire spread and flame lengths.
Upon successful completion of the test burn, the Burn Boss/Firing Boss will direct the Ignition crew to commence with blacklining ignition operations for that phase. If the test burn does not meet fire behavior/effects objectives, then the test burn will be mopped up, at the direction of the Burn Boss.

Subsequent phases have similar test fire patterns, as directed by the Burn Boss, and will burn up against wet lines, blacklines or roads. These subsequent phase test fires are to re-validate fire behavior and fuel consumption and may not need to be as involved or complex as the initial test fire

Test Fire Documentation

Weather Conditions On Site

Test Fire Results

Did the test fire meet prescription parameters?	Yes	No

Comments

Element 15: Ignition Plan

Maps may be included.

Element 15: Ignition Plan	Project Name: Crow Creek
	Ignition Unit Name: Red Bull

Firing Methods (including techniques, sequences, and patterns)

Note: Multiple prescriptions may require identifying and developing multiple ignition organizations and implementation instructions.

A combination of flanking, backing and strip head fires, as directed by the Burn Boss and/or Firing Boss.

Techniques: On the flat areas of the burn, and depending on fire behavior of the backing fires, multiple strips may be lit, across slope and uphill, with spacing to be determined by the Burn/Firing Boss, in order to ensure a wide black line on the leeward side of the phased units. If multiple strip head/backing strips are to be lit on the south end of these units, then it is critical to hold up the upslope flanking fire strips until the multiple strips have been completed.

Sequences: Phases of ignition will be primarily dependent on wind conditions. The order of implementation will be specified by the Burn Boss. If weather and fuel conditions are within prescription, all five phases may be ignited in one day. Otherwise, they will be spread out until completed. Below is an example description of ignition sequences and patterns by phase, assuming a north to northwesterly wind. (These may be altered at any time, in consultation between the Burn Boss and Firing Boss): Other ignition sequences and patterns by phase may be identified on the implementation day dependent on wind conditions.

a. Phase 1 NE Flats: Following successful completion of a test fire in the southeast corner, Igniter 1 will light a flanking fire from the north end of the test fire to the north, toward BIA #4 road, supported by a wet/foam line along the east line. Igniter 1 will stop when he/she gets to BIA #4 road. Igniter 2 will wait for the FIRB to authorize him/her to proceed; then start a backing fire, supported by a wet/foam line to the south, from the test fire west toward the north side of the abandoned house. Igniter 2 will then turn north and light a flanking fire north to the east side of the Local house; turning west to the north of this house, tying in with the road and continuing the strip west, then north to the BIA #4 road. FIRB will then start Igniter 1, lighting a strip head fire along the BIA #4 road to the west, tying in with where Igniter 2 stopped. Igniters 1 and 2 will proceed to the south end of the loop road, west of the second house and light a ring fire, starting up the east and west ends of the loop. Start the ignition on the east loop first and proceed around the structure to the west, supported by a wet line. Once the ignition has proceeded past the structure, then start the west side ignition.

b. Phase 2 North Central Flats: Following successful completion of a test fire in the southeast corner, Igniter 1 will light a backing fire, supported by a wet/foam line, west to a tree patch approximately south of the housing that is in the northwest corner, and outside of the burn unit. Igniter 1 will continue to light on the north side of this tree patch and then straight to the north, in a flanking fire supported by wet/foam line, toward the northwest corner housing and road off the BIA #4 road, stopping at the BIA #4 road. FIRB will direct Igniter 2 to proceed with the flanking ignition on the west side of the Phase 1 road to the north, after

Igniter 1 has hit the tree patch and headed north. Igniter 2 will hold on BIA #4 road until the FIRB directs him/her to proceed west with a strip head fire to tie in with Igniter 1.

c. Phase 3 Northwest Flats: Following successful completion of a test fire in the southeast corner along the ridge break (south of the mowed line), Igniter 1 will light a backing fire, supported by a wet/foam line, west to the ridge top where it turns north. Igniter 1 will continue with a flanking fire, supported by a wet/foam line, north to the mowed line, then west to the timbered draw and then follow the timbered draw around to tie in with the phase 2 burn, south of the northwest housing. FIRB will then direct Igniter 2 to proceed north from the test burn, with a flanking fire supported by a wet/foam line, along the ridge break and then to the west of the tree patch, tying in with the black of phase 2, where he/she will close the loop with Igniter 1.

d. Phase 4 Southeast Flats: Following successful completion of a test fire in the southeast corner, Igniter 1 will light a backing fire, supported by a wet/foam line, west to the ridge break and then follow the ridge break around north and west until it ties in with the mowed line. Igniter 1 will hold at the mowed line and the FIRB will direct Igniter 2 to proceed north, supported by a wet/foam line, with a flanking fire to the mowed line. After Igniter 2 gets half way, FIRB will direct Igniter 1 to proceed east with a strip head fire, tying in with Igniter 2 in the northeast corner.

e. Phase 5 Southern Slopes: Following successful completion of a test fire in the southeast corner, Igniter 2 will light a flanking fire, supported by a wet/foam line, following the tree line on the east side of the unit and ending up at the phase 4 southeast corner. Igniter 2 will then walk thru the black and tie in with holding forces at the eastern houses. Igniters 1 and 3 will work in tandem off the jeep road at the south end of the prescribed fire unit, with backing/strip head firing, progressing west northwesterly; with strip width to be determined by the Firing Boss. Once they tie into the southwest corner of the prescribed fire unit, Igniter 1 will proceed northerly along the timbered draw, supported by a wet/foam line, tying in with the mowed line and black of the phase 3 burn. Igniter 3 will tie in with holding forces working the jeep road.

Patterns: Specific patterns will be developed when the project is ignited dependent on wind directions. Modifications to the patterns (spot firing, chevron firing) may be required by the Burn/Firing Boss to help successfully complete ignition operations.

Devices

Handheld drip torches

Minimum Ignition Staffing

Three igniters under the direct supervision of the Firing Boss, unless otherwise directed by the Burn/Firing Boss. Most phases only require two igniters, so igniters will rotate as directed by the Firing Boss.

Element 16: Holding Plan

If modeling outputs or worksheets (i.e., Fireline Handbook production rates, BEHAVE, etc.) and/or documented empirical evidence were used to justify minimum holding resources required, attach or reference them here.

Element 16: Holding Plan	Project Name: Crow Creek
	Ignition Unit Name: Red Bull
General Procedures for Holding	

Holding Procedures: A lookout will be designated and positioned in an area that allows for good viewing of the area outside of the project boundary. All holding personnel will monitor areas outside of the project boundary as able.

Engines will be assigned to coordinate with igniters. Holding resources will be stationed near the structures and other specific locations based on their capabilities and considering wind direction, fuel loading, fire behavior and weather factors. Slopovers and spot fires will need to be attacked quickly (to minimize fire spread and fire establishment into a running head fire) and will generally be attacked along the flanks, anchoring from the back, unless otherwise directed by the Holding Specialist. If a slopover or spot fires begin to overwhelm the holding forces, the Holding Specialist will notify the Burn Boss, who will direct the ignition forces to either stop ignition or look for a quick place to cut off the ignition. Ignition forces may then be directed by the Burn Boss to aid the holding forces in containing the slopover or spot fires.

Engines may refill at the hydrant located approximately 100 yards west of the burn area on BIA 4. A second hydrant is located at East Housing which is approximately 0.25 miles to the east on BIA 4 and from the Missouri River which is approximately 0.25 miles south from the burn unit. A water tender will be available for refilling and will be located by the holding boss before ignition operations begin. Water tender location will be made known to all personnel on the prescribed fire.

Mop-up Procedures: Mop-up will begin when determined by the Burn Boss. 100% mop-up of all burned areas will be completed following Category 1 Great Plains Region mop-up standards. Engines will be used, as assigned by the Burn Boss. Mop-up activities will be minimal due to the
fuel model, but there are scattered 1,000 hour fuels along the southern end that will need to be mopped up thoroughly and monitored. Mop-up will start with resources concentrating on extinguishing the outer 100 feet of the burn, and then proceed inward. The Burn Boss will be notified in the event any problem areas or situations are discovered during the mop-up phase and modify mop-up assignments as needed. It is anticipated that mop-up will be completed on the day of ignition.

Patrol Procedures and Declaring the Prescribed Fire Out: The Burn Boss will assign patrol needs until the prescribed fire is declared out. Typically, for the first day or two, one engine will be assigned to patrol the unit, paying particular attention to the areas adjacent to the structures, the timbered draws to the east and west of the unit and the southern area with scattered 1000 hour plus fuels. Additional resources may be assigned, as determined by the Burn Boss. Any smoke found during the patrol phase will be reported to the Burn Boss and 100% mopped up. The Burn Boss will declare the fire out after no additional smokes have been found and mopped up for at least seven consecutive days.

Critical Holding Points and Actions

Potential Holding Problems and Strategy to Handle: The heavily vegetated and debris filled draws (Fuel Model 9 areas adjacent to east and west ignition unit boundaries) that run north to south from the flat towards the Missouri River present the most potential for holding problems. The other potential problems are with the structures within and adjacent to the burn unit. These potential holding problem areas will be handled by close coordination between ignition and holding personnel. Holding engines will be stationed near the structures and draws in the event that fire behavior or spotting becomes a concern. (see Holding Map)

Protection of Sensitive Features (see Holding Map and Element 9, Pre-Burn Considerations for additional information): All features will be protected including houses, buildings, other structural improvements, power poles, phone junction boxes, signs, property markers, gravesites, historic/cultural landmarks and, fence poles. Archeological sites will be identified at the briefing with personnel instructed not to impact them (walking or driving over or through).

Minimum Organization or Capabilities Needed (also see Element 11)

Holding:
1 Single Resource Boss (preferably Engine Boss) + 6 Holding Personnel
1 Type 4 Engine & 4 Type 6 Engines, minimum of 2 & 1 personnel/engine respectively
1 Type 4 Tender

Mop-up:
1 FFT1 + Holding Personnel as assigned by Burn Boss
Engines as specified by the Burn Boss

Patrol:
Personnel & Equipment as specified by the Burn Boss

Element 17: Contingency Plan

The contingency plan is the portion of the prescribed fire plan that considers low-probability but high-consequence events and the actions needed to mitigate them. Contingency planning is the determination of what additional actions or additional resources (or both) are needed to keep the prescribed fire within the scope of the prescribed fire plan.

At a minimum, this element addresses contingency options related to maintaining the prescribed fire within the ignition unit and/or prescribed fire project area. The contingency plan establishes Management Action Points (MAPs) or limits that indicate when additional actions (tactical and non-tactical) or resources, or both, will be needed. If it is determined that contingency resources are not needed, the rationale for that decision should be documented in this element of the prescribed fire plan (IPFPIPG, 2014, p. 34).

Element 17: Contingency Plan	**Project Name: Crow Creek**
	Ignition Unit Name: Red Bull
Management Action Points (MAPs)	**MAP Narrative**
Designator and Description	**MAP #1 – Fire Behavior**
Condition	**Fire behavior is outside acceptable range as detailed in Element 7. Spot fires exceed capabilities of onsite resources.**
Management Intent	**Manage prescribed burn within allowable prescription parameters as outlined in Element 7 in order to meet resource objectives and maintain control of the prescribed burn. Control spot fires within 12 hours to prevent spread to adjacent WUI.**
Recommended Action(s) to Consider	**Consider stopping ignition until fire spread outside of the unit is controlled. Consider contacting law enforcement if evacuations are possible. Consider ordering contingency resources.**
Recommended Resources	**Type 6 Engines - 2, with a half hour maximum response time** **Type 4 Engine - 1, with a half hour maximum response time** **Tractor with Plow - 1, with a one hour maximum response time** **Availability of the above resources, their locations and response times will be confirmed by the Burn Boss and documented on the Prescribed Fire Go/No-Go Checklist (which will be made a part of the prescribed fire project file).**
Time Frame	**Engines-half hour or less** **Tractor Plow-1 hour or less**
Description of Consequences of Not Taking Action(s)	**Fire could threaten adjacent WUI. Holding problems could escalate.**
Responsibility	**Burn Boss/Agency Administrator**
Date Each Action Is Initiated	

Element 18: Wildfire Conversion

"A prescribed fire, or a portion or segment of a prescribed fire, must be declared a wildfire by those identified in the plan with the authority to do so, when either or both of the following criteria are met:

- Prescription parameters are exceeded and holding and contingency actions cannot secure the fire by the end of the next burning period
- The fire has spread outside the project area and the associated contingency actions have failed or are likely to fail and the fire cannot be contained by the end of the next burning period" (IPFPIPG, 2014, p. 36).

Element 18: Wildfire Conversion	**Project Name: Crow Creek**
	Ignition Unit Name: Red Bull
Wildfire Will Be Declared By (i.e., who has the authority to declare?)	
Burn Boss after consulting with Agency Administrator if time allows	
Incident Commander (IC) Assignment	
Burn Boss will become the initial attack IC. If the wildfire exceeds their qualifications/comfort level, a qualified IC will be ordered	
Notifications	
Burn Boss will notify the local dispatch, the FMO, and the superintendent of the wildfire declaration. Burn Boss will also have the local dispatch notify the North Great Plains Dispatch, Tribal Law Enforcement, and County Law Enforcement.	
Extended Attack Actions and Opportunities to Aid in Fire Suppression	
The IC will order needed resources thru the local Dispatch. Tribal/County Law Enforcement personnel will be used for traffic control along the BIA #4 road and others as necessary. They will also be used to notify adjacent landowners of the wildfire situation, impending suppression actions and the potential need for evacuation. A Wildland Fire Situation Analysis must be prepared by the FMO or designee if the declared wildfire goes beyond initial attack or if complexities require extended attack operations and organizations. The same two contingency lines identified in element 17B can be used as opportunities to aid in the suppression of the declared wildfire.	

Element 19: Smoke Management and Air Quality

How will the project comply with local community, county, state, tribal, and federal air quality regulations? For more information, see the *Smoke Management Guide for Prescribed and Wildland Fire, 2001 Edition* (http://www.fs.fed.us/pnw/pubs/journals/pnw_2001_ottmar001.pdf), and http://www.nifc.gov/smoke/.

Element 19: Smoke Management and Air Quality	**Project Name: Crow Creek**
	Ignition Unit Name: Red Bull

Compliance and Permits Needed

Compliance: The BIA Crow Creek Agency Fire Management has directed that smoke management for this burn is not a concern. The people of the community are more concerned about removing hazardous fuels from near their homes and property than the short-term effects of smoke. Burn Boss or designee will coordinate this prescribed burn with South Dakota Air Quality (605-773-6706/3151) by notifying them at least one day in advance of the start of ignition operations.

Smoke-Sensitive Receptors

These can be population centers, recreation areas, hospitals, airports, transportation corridors, schools, nonattainment areas, Class I areas, and restricted areas.

None

Potentially Impacted Areas

The burn area is approximately .3 miles east of Gingway housing and approximately .2 miles west of East Housing. Some portions of the unit are adjacent to resident properties and three structures are within the burn unit. BIA 4 (a paved highway) borders the unit on the north side and BIA 18 runs north to south and intersects BIA 4 near the center of the north side of the unit.

Mitigation Strategies and Techniques for Reducing Smoke Impacts

Any direction for the transport winds is allowed. Place smoke signs and provide road monitors/traffic controllers if wind direction causes smoke to lie over the local roads, as directed by the Burn Boss (see Appendix A-Holding Map for proposed locations of traffic signs with â□œSmoke Aheadâ□□).

Smoke is anticipated to dissipate very quickly minimizing any impacts to adjacent housing. No residual smoke impacts are anticipated due to the rapid burn out of this grass fuel model. Any smoke impacts that may occur can be mitigated fairly quickly by cutting off ignition operations. See Appendix A-Smoke Vectors Map.

Element 20: Monitoring

At a minimum, specify the weather (forecast and observed), fire behavior and fuels information, and smoke dispersal monitoring required during all phases of the project and the procedures for acquiring it, including who and when (IPFPIPG, 2014, p. 37).

Element 20: Monitoring	**Project Name: Crow Creek**
	Ignition Unit Name: Red Bull

Required Fuels Information and Procedures

Fuel moisture will be documented for at least five days prior to commencing ignition operations, and until ignition operations are completed.

Pre-Burn Conditions

Date/Time	Temperature	Relative Humidity	Midflame Wind Speed and Direction	1-hour Fuel Moisture	10-hour Fuel Moisture	100-hour Fuel Moisture	Live Fuel Moisture

Required Weather Monitoring (Forecast and Observed) and Procedures

General Weather forecasts will be monitored for at least five days prior to operations. Site weather conditions will be documented, as specified in the above and below tables and for specified time frames. Spot weather request data and forecasts will also be in the prescribed fire project file.

Required Fire Behavior Monitoring and Procedures

The below data must be collected for all days of ignition.

Ignition Date		Ignition Time/Start		Ignition Time/Stop	
Time	Temperature	Relative Humidity	Wind Speed	Wind Direction	Flame Length

Monitoring Required to Ensure That Prescribed Fire Plan Objectives Are Met

Fire effects/objective accomplishments will be documented with pre- and post-burn photos of the monitoring plots with an attached narrative discussing post objective estimates.

Required Smoke Dispersal Monitoring and Procedures

Smoke dispersal and transport will be monitored by the FEMO and Burn Boss during burn operations for compliance.

Date/Time	Direction of Smoke Movement	Approx. Mixing Height	Column Formation (weak or well formed)	Unique Characteristics of Smoke Behavior	Other

Element 21: Post-Burn Activities

Describe the post-burn activities that must be completed, including the person responsible for completing them and the timeframe for completion. Post-burn activities may include preparing a post-burn report, finalizing the project file, implementing safety mitigation measures, close-out of applicable pre-burn considerations, close-out of NEPA mitigations, and rehabilitation needs (IPFPIPG, 2014, p. 37).

Element 21: Post-Burn Activities	**Project Name: Crow Creek**	
	Ignition Unit Name: Red Bull	
Post-Burn Activities That Must Be Completed		
Post-Burn Activity	**Who Is Responsible**	**Timeframe**
Report Acres Burned	**ZFMO**	**Within 30 days of completion**
Compile Burn Documentation-submit to ZFMO	**Burn Boss**	**Within 5 days of completion**
Estimate Implementation Cost	**Burn Boss**	**Within 5 days of completion**

Appendices

Appendices A through E are required. Additional appendices can be included as needed (e.g., plastic sphere dispenser aviation safety plan, desired wind directions for project area, and so on).

A. Maps

- Required: Vicinity Map, Project or Ignition Unit Map
- Optional: smoke dispersal maps, additional project maps, fuel or fuel model maps, and maps of water or air quality monitoring sites

B. Technical Reviewer Checklist

C. Complexity Analysis

D. Agency-Specific Job Hazard Analysis or Risk Assessment

E. Fire Behavior Modeling Documentation or Empirical Documentation (unless it is included in the fire behavior narrative in Element 7, Prescription)

F. Smoke Management Plan and Smoke Modeling Documentation (Optional)

Appendix A: Maps

1. Vicinity Map

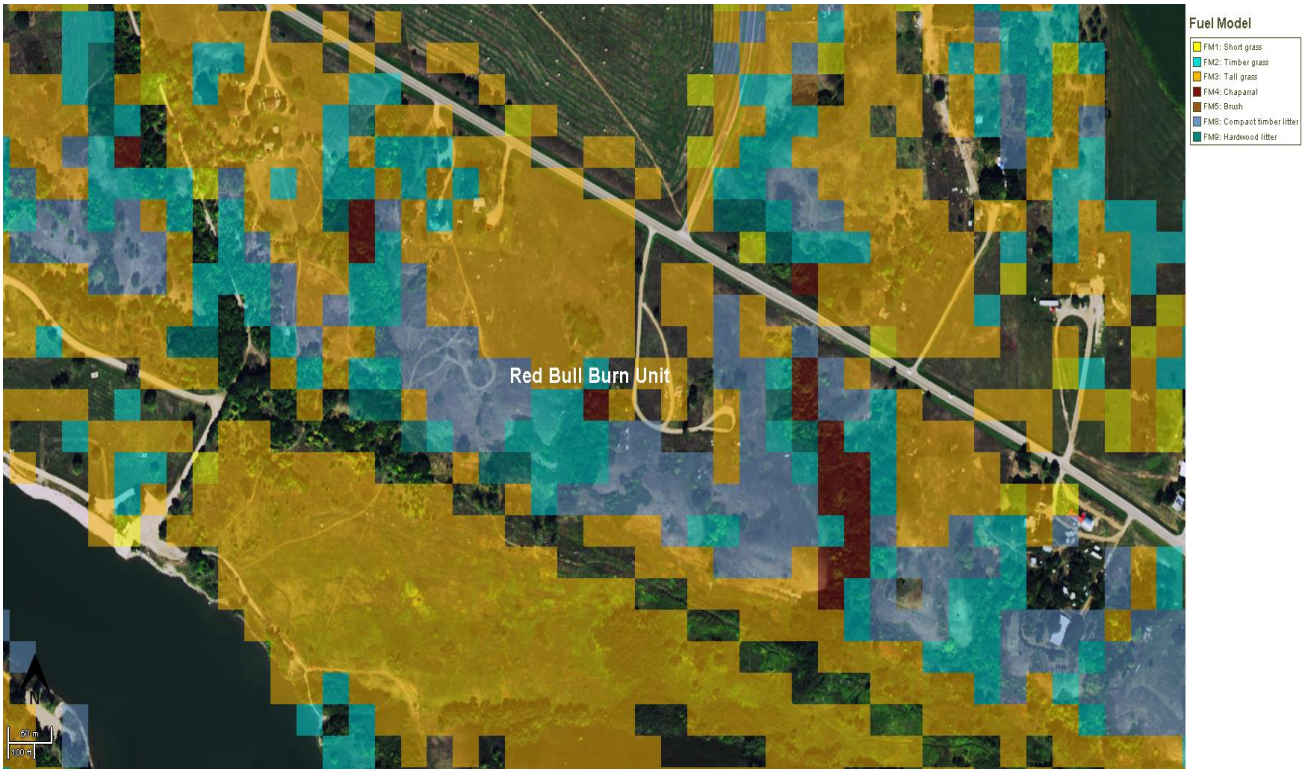
Name of Preparer(s):	IFTDSS
Date:	1/28/16
Project Name:	Crow Creek
Burn Unit Name:	Red Bull

2. Project Map

Name of Preparer(s):	IFTDSS
Date:	1/28/16
Project Name:	Crow Creek
Burn Unit Name:	Red Bull

3. Fuel Model Map

Name of Preparer(s):	IFTDSS
Date:	1/28/16
Project Name:	Crow Creek
Burn Unit Name:	Red Bull



Appendix B: Technical Reviewer Checklist

Prescribed Fire Plan Elements	S/U	Comments
1. Signature page	S	
2. GO/NO-GO Checklists	S	
3. Complexity Analysis Summary	S	
4. Description of the Prescribed Fire Area	S	
5. Objectives	S	See objective additions
6. Funding	S	
7. Prescription	S	Clarify questions in narrative
8. Scheduling	S	
9. Pre-burn Considerations and Weather	S	
10. Briefing	S	
11. Organization and Equipment	S	Clarify tender operation question
12. Communication	S	
13. Public and Personnel Safety, Medical	S	
14. Test Fire	S	See clarification
15. Ignition Plan	S	
16. Holding Plan	S	See clarification
17. Contingency Plan	S	
18. Wildfire Conversion	S	
19. Smoke Management and Air Quality	S	
20. Monitoring	S	
21. Post-burn Activities	S	
Appendix A: Maps	S	
Appendix B: Technical Reviewer Checklist	S	Subject to changes and answering comments-plan signed by each tech reviewer
Appendix C: Complexity Analysis	S	
Appendix D: Agency-Specific Job Hazard Analysis or Risk Assessment	S	
Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation	S	
Appendix F: Smoke Management Plan and Smoke Modeling Documentation (Optional)	S	
Other	S	

S = Satisfactory U = Unsatisfactory

Recommended for Approval: _____ Not Recommended for Approval: _____

_____ _____ _____

Technical Reviewer Qualification and currency (Y/N) Date

☐ **Approval is recommended subject to the completion of all requirements listed in the comments section, or in the Prescribed Fire Plan.**

Appendix C: Complexity Analysis

Instructions: This worksheet is designed to be used with the Prescribed Fire Complexity Rating descriptors on Page 6 of the Prescribed Fire Complexity Rating System Guide.

1. Potential for Escape

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Although holding forces have access around the entire unit, PI is at 60% at the hot end of the prescription
Final Rating: [*Low*] *Moderate* *High*	Ignition procedures won't create intense fire until adequate buffers are in place. Grass fuels will not hold fire longer than the day of ignition. Fire behavior calculations and procedures for ignition, holding, mopup and patrol are outlined in the burn plan.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* *Moderate* [*High*]	Potential for multiple simultaneous spot fires can propagate at moderate rates of spread but can be held by skilled and prompt holding actions. Contingency forces must be available on call-up commensurate with local wildfire standards.
Final Rating: *Low* [*Moderate*] *High*	Mow lines and wet lines will be constructed around the burn unit. Fire control resources will be placed at key locations on and adjacent to residential property. Lookouts will be placed at key locations to watch for slopovers and spot fires. Slow methodical backfiring techniques will be used along all burn unit boundaries to reduce the risk of escape. Engines will patrol the area after ignition to extinguish any remaining hot spots.
Technical Difficulty	**Rationale**
Preliminary Rating: [*Low*] *Moderate* *High*	Holding operations will be supervised at the Single Resource Boss level. The entire burn unit is accessible to holding resources. No abnormal weather is anticipated and all key implementation personnel will be from the local area or from within the Great Plains Region.
Final Rating: [*Low*] *Moderate* *High*	Ignition and holding procedures and organization are outlined in the burn plan.

2. The Number and Dependency of Activities

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Moderate to extreme rates of spread can be expected if fire escapes into the grass fuel outside the burn unit. To reduce the risk of escape, adequate blacklines must be prepared before any head firing can safely be accomplished. Failure to accomplish these activities will require a change in the planned ignition and holding methods. Onsite resources should be adequate to adjust.
Final Rating: *Low* [*Moderate*] *High*	Ignition and holding procedures are outlined in the burn plan.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Coordination is critical for the successful completion of this burn. A lack of coordination would result in increased risk of escape and a compromise of crew and public safety.
Final Rating: *Low* [*Moderate*] *High*	The ignition, holding, communications, escape contingency and mopup sections of the prescribed fire plan outline detailed methods and procedures for coordination.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Coordination activities require a moderate skill level. Continuous communication is necessary to manage the risk of escape, crew safety and to successfully complete the burn.
Final Rating: *Low* [*Moderate*] *High*	Communication procedures are identified in the burn plan.

3. Offsite Values

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Some of the East Housing community is immediately inside the burn unit. Some of the agricultural fields outside the burn unit may not be harvested and could sustain fire. BIA Route 4 is to the north of the burn.
Final Rating: *Low* [*Moderate*] *High*	Threat of escape has been mitigated by ignition and holding procedures outlined in the burn plan. See the description in the potential consequence blocks for item 1 "Potential for Escape" of this complexity analysis.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* *Moderate* [*High*]	Potential for multiple simultaneous spot fires that can propagate at moderate rates of spread, but can be held by skilled and prompt holding actions.
Final Rating: *Low* [*Moderate*] *High*	Mow lines and wet lines will be constructed between the burn unit and the housing development. Fire control resources will be placed at key locations on and adjacent to residential property. Lookouts will be placed at key locations to watch for slopovers and spot fires. Slow methodical backfiring techniques will be used along all burn unit boundaries to reduce the risk of escape. Engines will patrol the area after ignition to extinguish any remaining hot spots.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Protection of the East Housing homes and private property will require a moderate skill level and good team coordination.
Final Rating: *Low* [*Moderate*] *High*	The ignition, holding, communications, escape contingency and mopup sections of the prescribed fire plan outline detailed methods and procedures to reduce the risk of escape.

4. Onsite Values

Risk	Rationale
Preliminary Rating: *Low Moderate* [*High*]	Some areas of high value are located within the project area.
Final Rating: *Low* [*Moderate*] *High*	Special instructions will be given at the pre-burn briefing as to the treatment and mitigation of the structures.
Potential Consequences	**Rationale**
Preliminary Rating: *Low Moderate* [*High*]	There are three structures within the unit.
Final Rating: *Low* [*Moderate*] *High*	Special Instructions will be given during pre-burn briefing detailing the operations. The homeowner will provide an adequate mow line. Careful ignitions will be used to protect all structures within the burn unit.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Some pre-burn preparation work may be required.
Final Rating: *Low* [*Moderate*] *High*	No change.

5. Fire Behavior

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Single fuel model 3 is abundant throughout the burn unit. Fires are surface fires that move rapidly through the cured grass and associated material. Very little scrub or timber is present in the east and west draws, generally less than one-third of the area.
Final Rating: *Low* [*Moderate*] *High*	Fire behavior will be controlled by operating within prescribed conditions and following the ignition plan.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Fire behavior outside the unit would be the same as inside the unit in a similar fuel model (3). Fire behavior within the surrounding agricultural fields would be dictated by fuel loading, continuity and arrangement within the fields.
Final Rating: *Low* [*Moderate*] *High*	No change.
Technical Difficulty	**Rationale**
Preliminary Rating: [*Low*] *Moderate* *High*	Standard fire safety precautions are adequate to ensure crew safety. As previously stated, slopovers and spot fires will be minimal if ignition plan and prescription parameters are followed. Direct attack by onsite holding resources should control any fire outside the unit. Adjacent agricultural fields will serve as fuel breaks in the event of an escape. Fire behavior will be assessed, but no special calculations will be necessary.
Final Rating: [*Low*] *Moderate* *High*	No change.

6. Management Organization

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Two levels of supervision are needed to safely implement the burn. A qualified Burn Boss, FIRB and Holding Boss with igniters and holding crew is required. More than one position may be filled by a single (qualified) individual.
Final Rating: *Low* [*Moderate*] *High*	No change.
Potential Consequences	**Rationale**
Preliminary Rating: [*Low*] *Moderate High*	Problems related to supervision or communications are expected to be minimal. Supervisory crewmembers have worked together on many previous assignments and the entire burn unit is accessible on foot or by vehicle.
Final Rating: [*Low*] *Moderate High*	Agency/Tribal management meetings concerning the burn and a pre-burn briefing for all crewmembers will be held.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	At least one primary team member will need to come from outside of the local unit and may not be familiar with local factors.
Final Rating: *Low* [*Moderate*] *High*	The numbers of qualified personnel available on the local unit are limited.

7. Public and Political Interest

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	The prescribed fire is visible to some portions of the public and/or moderate in size.
Final Rating: *Low* [*Moderate*] *High*	The Agency will notify residents through the local newspaper and other postings.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Unexpected or adverse events would attract some local public and Tribal attention and may delay implementation of other treatments, but would not attract political or media attention unless a large escaped fire or serious loss of property or life occurred.
Final Rating: *Low* [*Moderate*] *High*	No change.
Technical Difficulty	**Rationale**
Preliminary Rating: [*Low*] *Moderate* *High*	No special fire information function is needed. Local notification will be handled by the Crow Creek Agency.
Final Rating: [*Low*] *Moderate* *High*	No change.

8. Fire Treatment Objectives

Risk	Rationale
Preliminary Rating: [*Low*] *Moderate* *High*	Fuel reduction objectives are easily achieved. The fire behavior needed to achieve them is easily created, managed and monitored.
Final Rating: [*Low*] *Moderate* *High*	Planned prescription parameters and ignition techniques will be followed.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Other opportunities to meet objectives will be available; however, the potential for wildfire exists throughout the fall and winter months. The longer the unit goes into the year without treatment, the higher the risk to community members.
Final Rating: *Low* [*Moderate*] *High*	No change.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Measures to achieve the objectives are easy to complete with few restrictions on techniques. The restrictions are related to ignition methods and are designed to mitigate the threat of escape. Only minor pre-burn monitoring will be required to determine if the unit is in prescription. Implementation monitoring can easily be achieved by the onsite resources.
Final Rating: *Low* [*Moderate*] *High*	Monitoring is built into the burn plan.

9. Constraints

Risk	Rationale
Preliminary Rating: [Low] *Moderate* *High*	Other than weather conditions required to meet prescribed conditions, there are no constraints.
Final Rating: [Low] *Moderate* *High*	Weather parameters outlined in the burn plan will be followed.
Potential Consequences	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	The burn can be implemented whenever it is in prescription.
Final Rating: [Low] *Moderate* *High*	No change.
Technical Difficulty	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	Constraints (weather parameters) do not increase the difficulty of completing this burn.
Final Rating: [Low] *Moderate* *High*	No change.

10. Safety

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Safety issues are easily identified and mitigated, yet detailed briefings are needed to raise safety consciousness of the crew due to the location of East Housing community and the potential for adverse impacts in the event of an escape. Fatigue and exposure to risks are limited.
Final Rating: *Low* [*Moderate*] *High*	Safety precautions are built into the burn plan.
Potential Consequences	**Rationale**
Preliminary Rating: *Low Moderate* [*High*]	There is potential for serious accidents or injury to firefighters or the public. Tires and combustible sharp objects are lying around through out the burn unit. There is uneven footing for igniters along slopes and throughout the unit.
Final Rating: *Low* [*Moderate*] *High*	Removal of tires and junk from the path of the igniters will be done prior to the day of the burn. Safety precautions are built into the burn plan.
Technical Difficulty	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Most of the safety concerns can be easily mitigated through LCES and following the Ignition Plan. A standard safety briefing will adequately cover them. Special emphasis is needed and caution will be taken to protect the East Housing community against escape; the project briefing will cover this. Limited mitigation is needed.
Final Rating: *Low* [*Moderate*] *High*	Safety precautions and mitigation measures are in the burn plan.

11. Ignition Procedures/Methods

Risk	Rationale
Preliminary Rating: *Low* [*Moderate*] *High*	Firing sequence and timing are important. The unit is a 37-acre grass field with 60% slopes in the southern regions of the unit.
Final Rating: *Low* [*Moderate*] *High*	Occasional alterations of planned ignition procedures are written into the burn plan to accommodate unforeseen site/time specific situations.
Potential Consequences	**Rationale**
Preliminary Rating: *Low* [*Moderate*] *High*	Firing methods and procedures must be coordinated to provide for safety, meet objectives and reduce the risk of escape.
Final Rating: *Low* [*Moderate*] *High*	Vehicle access and hose lays to the entire unit provides opportunities to alter or extinguish firing operations if necessary.
Technical Difficulty	**Rationale**
Preliminary Rating: [*Low*] *Moderate* *High*	No special firing equipment, techniques or patterns are needed. Procedures are simple, the ignition team is small and only one type of ignition device is needed. The ignition pattern requires minimal supervision of the igniters to achieve objectives and manage safety concerns.
Final Rating: [*Low*] *Moderate* *High*	Ignitions have been done the same in the past to this unit. Personnel are experienced and have local knowledge of the unit.

12. Interagency Coordination

Risk	Rationale
Preliminary Rating: [Low] *Moderate* *High*	Lower Brule Agency and Crow Creek have done business for many years and the equipment is universal. National and regional preparedness levels are expected to be at PL3 or less at the time the burn is conducted.
Final Rating: [Low] *Moderate* *High*	No change.
Potential Consequences	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	The burn can be completed as planned.
Final Rating: [Low] *Moderate* *High*	No change.
Technical Difficulty	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	No interagency issues. No communication or coordination issues. No special agreements needed. Due to the time of year this burn will be conducted, adequate interagency resources will be available if needed.
Final Rating: [Low] *Moderate* *High*	No change.

13. Project Logistics

Risk	Rationale
Low [*Moderate*] *High*	Some logistic support will be needed for the amount of time needed to complete this burn.
Final Rating: *Low* [*Moderate*] *High*	All required equipment and supplies are readily available and there are no special transportation, storage or communication needs. Ignition and mopup are expected to be completed in one day with rapid burnout of grass fuels.
Potential Consequences	**Rationale**
Preliminary Rating: *Low Moderate* [*High*]	Problems related to logistics will increase the risk of escape or affect the safe completion of the burn.
Final Rating: *Low* [*Moderate*] *High*	If ignition sequences are followed, this burn should only take one day to complete.
Technical Difficulty	**Rationale**
Preliminary Rating: [*Low*] *Moderate High*	No logistical support operation anticipated.
Final Rating: [*Low*] *Moderate High*	No change.

14. Smoke Management

Risk	Rationale
Preliminary Rating: [Low] *Moderate* *High*	The Crow Creek Agency has indicated that area residents are more concerned about reduction of hazardous fuels than the short-term smoke this burn will produce. No negative health or safety issues related to smoke amounts or exposure are anticipated.
Final Rating: [Low] *Moderate* *High*	Smoke management is addressed in the burn plan.
Potential Consequences	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	Minor short-term impacts to the East Housing community and area roads are anticipated. Road monitors and/or traffic control personnel will be utilized if conditions dictate. Crew and public exposure to smoke is expected to be minimal and not cause health or safety concerns.
Final Rating: [Low] *Moderate* *High*	Smoke management is addressed in the burn plan.
Technical Difficulty	**Rationale**
Preliminary Rating: [Low] *Moderate* *High*	No special operational procedures are required due to community support of hazardous fuel reduction at the expense of short-term smoke exposure.
Final Rating: [Low] *Moderate* *High*	The smoke management section of the burn plan indicates that a southerly wind is preferred, but is not a limiting factor for ignition.

Complexity Rating Summary

RISK	Overall Rating: Moderate
POTENTIAL CONSEQUENCES	Overall Rating: Moderate
TECHNICAL DIFFICULTY	Overall Rating: Moderate
SUMMARY COMPLEXITY RATING:	Moderate

Rationale:
This burn rates as a moderate complexity due to the homes and structures within the burn unit and the fact that slow and deliberate ignition procedures are required using highly mobile holding resources on constructed control lines. Even though this type of ignition is common in Indian Country and considered standard operating procedure for most of our agency fire personnel, the consequences of failure are great. Care must be taken to complete the burn successfully to ensure public and crew safety. Safety and escaped fire risk have been mitigated by:
-requiring the use of qualified personnel in all positions
-timing of the burn (both time of year and time of day)
-prescribing conservative prescription parameters
-requiring careful ignition methods to achieve desired fire behavior and adequate buffers before completing the burn by head-firing
-the capability to halt burning virtually at any time during the operation.

Prepared by: _____ Date: _____

Approved by: _____ Date: _____
(Agency Administrator)

Appendix D: Agency-Specific Job Hazard Analysis or Risk Assessment

JOB/ACTIVITY: Prescribed Burning	AGENCY NAME: Crow Creek	NAME OF ANALYST: Xxxxx Xxxxxxx
JOB TITLE OF ANALYST: Ign. Spec./ Burn Boss Trainee	DATE PREPARED: 3/10/2004	NAME OF RX-BURN: Red Bull Prescribed Burn
TASK	**HAZARDS**	**ABATEMENT ACTIONS**
Vehicle travel to, on and from the worksite.	Poor driving; mechanical malfunctions; slippery road surfaces; soft shoulders; unimproved or narrow roadways; inclement weather; improper backing or parking; obstructed visibility from crooked roads, heavy vegetation, time-of-day or smoke.	Drive defensively. Use seat belts and headlights. Identify road conditions prior to travel and during briefings. Post road guards. Mark hazards. Perform pre-use inspections on all vehicles. Scout ahead to identify vehicle turnouts. Maintain communication. Provide road system maps. Use backers and spotters. Leave keys in the ignition and park vehicles where and how they are most easily driven out in an emergency.
Pre-burn briefing.	Lack of communications; reluctance to ask questions.	Conduct a thorough pre-burn briefing to clarify safety concerns, burn objectives, position assignments and responsibilities, expected weather and fire behavior.
Functioning as qualified in any position on a prescribed burn.	Injury due to lack of experience and/or qualifications.	Employees must meet the physical and qualification requirements for their respective positions as established in Wildland and Prescribed Fire Qualification System Guide, PMS 310-1.
Preparing drip torch fuel.	"Hot Mix" burns from improper fuel mixture ratio or unwanted ignitions; Fuel-saturated clothing from spills.	Use approved containers and pour spouts. Mix and fill on the ground in secure locations. Avoid fuel contact with skin, clothing and boots. Mix 4 parts diesel to 1 part gasoline. No smoking or cell phone use within 25 ft. of mixing and fueling area.

Project operations including pre-burn prep, lighting, holding, mopup and patrol. Continued to next page: Project operations including pre-burn prep, lighting, holding, mopup and patrol.	Burns from radiant heat, flame, firebrands, burning material, embers, hot ash or equipment exhaust; Cuts from sharp objects; Pulled muscles or strains from heavy lifting, twisting, turning, slips or falls; Severe allergic reaction to bee stings, insect bites, snake bites or poison ivy, oak or sumac; Eye irritation or injury from exposure to smoke and ash or contact with foreign materials directly or from high-pressure water use; Compromised breathing from inhalation of smoke and ash; Lacerations, contusions or broken bones from rolling material, falling trees, slips, falls or vehicle accidents; Sickness or fatigue from heat stress, dehydration or carbon monoxide poisoning; Hearing impairment from over exposure to equipment noise; Potential death from many of the above listed hazards.	Apply common sense principles. Look Up, Look Down, Look Around. Adhere to the 10 Standard Fire Orders, 18 Situations that Shout Watch Out, LCES and NWCG Fire Qualification Standards as established in PMS 310-1. Follow safety policy and guidelines established within the BIA Fire Use Handbook, BIA "Blue Book", Incident Response Pocket Guide and the Common Denominator Pamphlet. While on the burn site, wear all required PPE including: fire shelter, nomex pants/shirt, leather boots with 8" tops and lug soles, leather gloves that meet NFPA-1978 standard, hard hat with full nomex shroud, safety glasses, cotton undergarments, hearing protection around pumps, chainsaws and heavy equipment. Identify and flag hazards and make them known to all personnel. Drink plenty of water. Use fire/smoke warning signs/lights on roadways. Periodically rotate personnel from smoky areas to areas of less or no smoke.
Emergency evacuation	Not following proper procedures.	Follow emergency procedures identified in the Burn Plan. Notify Burn Boss immediately. Do not mention the name of injured personnel over the radio. Request medical response. Communicate number of personnel ill or injured, type of illness/injury, location and access. Identify EMTs and available medical equipment.
APPROVED BY:	**TITLE:**	**DATE APPROVED:**

Appendix E: Fire Behavior Modeling Documentation or Empirical Documentation

Table 1. Surface Fire Behavior inputs and outputs.

	Parameters	Low	High	Optimal	Maximum	Units
Outputs	Head Fire Spread Rate	41.63	322.78	101.99	574.16	chains/h
	Backing Fire Spread Rate	4.11	5.95	5.61	6.65	chains/h
	Flanking Fire Spread Rate	7.48	11.69	10.64	13.14	chains/h
	Heat Per Unit Area	635.18	742.42	688.94	835.12	Btu/ft^2
	Head Fire Fireline Intensity	484.76	4,393.37	1,288.23	8,790.60	Btu/ft/s
	Backing Fire Fireline Intensity	47.84	81.05	70.88	101.76	Btu/ft/s
	Flanking Fire Fireline Intensity	87.09	159.17	134.37	201.18	Btu/ft/s
	Head Fire Flame Length	7.74	21.33	12.13	29.34	ft
	Backing Fire Flame Length	2.67	3.4	3.19	3.77	ft
	Flanking Fire Flame Length	3.51	4.64	4.29	5.16	ft
	Reaction Intensity	2,481.15	2,900.07	2,691.17	3,262.17	Btu/ft^2/min
	Head Fire Spread Direction	110	110	110	107	deg
	Backing Fire Spread Direction	290	290	290	287	deg
	Flanking Fire Spread Direction	200	200	200	197	deg
	Head Fire Spread Distance	41.63	322.78	101.99	574.15	chains
	Backing Fire Spread Distance	4.11	5.95	5.61	6.65	chains
	Flanking Fire Spread Distance	7.48	11.69	10.64	13.14	chains
	Residence Time	0.26	0.26	0.26	0.26	min
	Effective Wind Speed	2.99	11	5	14.8	mi/h
Inputs	Fire Behavior Fuel Model	FM3: Tall grass	FM3: Tall grass	FM3: Tall grass	FM3: Tall grass	
	1-hr Fuel Moisture	14	6	8	4	percent
	10-hr Fuel Moisture	16	8	10	6	percent
	100-hr Fuel Moisture	20	12	14	8	percent
	Live Herbaceous Fuel Moisture	100	90	90	80	percent
	Live Woody Fuel Moisture	180	170	170	160	percent
	Midflame Wind Speed	3	11	5	15	mi/h
	Wind Direction (from North)	290	290	290	290	deg
	Slope	5	5	5	40	percent
	Aspect	180	180	180	180	deg
	Flanking Fire Direction	90 degrees	90 degrees	90 degrees	90 degrees	
	Elapsed Time	1	1	1	1	h

Appendix F: Smoke Management Plan and Smoke Modeling Documentation (Optional)