NORTH DAKOTA
PETROLEUM
COUNCIL

FIRE PREVENTION
TASKFORCE

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Best Management Practices for Wildfire Risk Mitigation in Oil and Gas Operations

Introduction

Wildfires pose risks to oil and gas operations, particularly in regions that can be very dry at times of the year and prone to high winds, like western North Dakota. These Best Management Practices (BMP) are designed to help operators mitigate wildfire risks while maintaining operational safety and regulatory compliance. This document is intended to outline the industry best practices companies can adopt and implement in their plans as they fit their operation. While all regulatory requirements must be followed, this is not a regulatory document.

The BMP focuses on three key areas:

1. Risk Identification
2. Prevention Measures
3. Emergency Response Measures

Risk Identification

Identifying heightened risks of wildfires is critical for ensuring operational safety and minimizing potential incidents. Companies should actively assess environmental and site-specific conditions to recognize heightened risks and determine when modifications to standard operations are necessary. By focusing on factors like weather, proximity to vegetation, and daily changes in conditions, operators can proactively reduce vulnerabilities and enhance fire safety measures.

Recommendations:

1. **Environmental Monitoring:**
    - Use the North Dakota-specific Rangeland Fire Danger Index (RFDI) to assess localized fire risks and implement appropriate mitigation measures based on state-specific conditions.
    - Assess fire risk based on weather conditions such as wind speed, low humidity, high temperatures, and dry vegetation.
    - Employees should monitor conditions at operations sites for fire dangers and report them or take corrective action immediately if possible.
2. **Proximity and Placement:**
    - Evaluate the placement of flares and other ignition sources to ensure adequate distance from vegetation and other combustible materials.

- Factor in site topography and the potential heat radius of flares.

3. **Daily Risk Assessments:**

   - Incorporate daily reviews of environmental conditions into operational protocols.

   - Continually evaluate the risks of continued normal operations during elevated fire danger periods, and if warranted, modify operations to minimize risks. For example, suspending non-essential flaring operations during extremely high wind events when the fire danger index is high.

   - Consider shutdown of operations, such as high-pressure flaring or well site production, when midstream capabilities are disrupted, and consultation with leadership or regulators, like the North Dakota Department of Mineral Resources (DMR), advises such actions.

Prevention Measures

Wildfire risks in oil and gas operations can be mitigated by combining design and operational best practices and system improvements that address routine and high-risk situations. Effective prevention measures include vegetation management, careful design and maintenance of flare systems, and adjustments to operations during periods of heightened fire danger. Companies can proactively mitigate fire risks and protect their personnel and the environment by implementing adequate safety measures and developing effective monitoring and prevention programs.

Drilling, Completions, and Workover

Recommendations:

1. **Vegetation Management:**
   - Implement pre job weed spraying and mowing around well sites, access roads, and flare pads. Remove any highly combustible dead or dry vegetation after spraying or mowing.

   - Balance vegetation control with erosion prevention by maintaining limited vegetation outside perimeter berms.

2. **Flare System Design and Operation:**
   - **Flare Placement:**

     - Optimize flare height and placement based on ambient temperatures, production forecasts, and proximity to vegetation.

- **System Enhancements:**
    - Install knockout drums with protective structures upstream of flare systems to manage fluids effectively, preventing buildup in flare lines and ensuring efficient burning.
    - Evaluate pad layouts to allow for sufficient buffer areas between flares and nearby vegetation or grasslands.
- **Maintenance Protocols:**
    - Regularly inspect flame arrestors and perform maintenance as needed.
    - In flare service prone to liquid accumulation, use insulated or heat-traced flare lines to prevent freezing and liquid dropout.
- **Operational Adjustments:**
    - During high fire-risk periods, consider suspending non-critical flaring operations or deploying additional safeguards, such as water trucks.
    - In "extreme" fire danger situations, consider whether shutting in operations is warranted.

3. **Preventative Maintenance Programs:**
    - Include perimeter mowing and vegetation control around well sites, including near flare systems.
    - Between jobs consider conducting flare inspections and maintenance programs.
        - Power wash flare tips that are prone to soot accumulation periodically to remove debris and embers that could lead to inefficient burning or fire hazards.

Well Operations

Recommendations:

1. **Vegetation Management:**
    - Implement annual or biannual weed spraying and mowing programs around well sites, access roads, and flare pads. Remove any highly combustible dead or dry vegetation after spraying or mowing.

- Balance vegetation control with erosion prevention by maintaining limited vegetation outside perimeter berms.

2. **Flare System Design and Operation:**
    - **Flare Placement:**
        - Optimize flare height and placement based on ambient temperatures, production forecasts, and proximity to vegetation.
    - **System Enhancements:**
        - Install knockout drums with protective structures upstream of flare systems to manage condensates effectively, preventing buildup in flare lines and ensuring efficient burning.
        - Evaluate pad layouts to allow for sufficient buffer areas between flares and nearby vegetation or grasslands.
        - Explore the use of automated choke valves to regulate flow rates and flare operations during high-risk periods, integrating these systems where feasible.
            - Utilize knockout(s) in gas systems to handle condensate efficiently.
            - Design flare lines to slope toward knockout(s) to prevent condensate buildup.
            - Ensure liquids are effectively monitored and removed from liquid knockout(s).
    - **Maintenance Protocols:**
        - In flares prone to soot formation, conduct biannual flare tip cleaning to ensure operational efficiency and reduce soot emissions.
        - Regularly inspect flame arrestors and perform maintenance as needed.
        - In flare service prone to liquid accumulation, use insulated or heat-traced flare lines to prevent freezing and liquid dropout.

- **Operational Adjustments:**
    - During high fire-risk periods, consider suspending non-critical flaring operations or deploying additional safeguards, such as water trucks.
    - In "extreme" fire danger situations, consider whether shutting in operations is warranted.

3. **Preventative Maintenance Programs:**
    - Include perimeter mowing and vegetation control around well sites annually, including near flare systems.
    - Conduct annual flare inspections and maintenance programs.
        - Power wash flare tips that are prone to soot accumulation periodically to remove debris and embers that could lead to inefficient burning or fire hazards.
    - Empower field personnel to perform on-the-spot maintenance for flares showing operational issues.

Midstream and Processing Operations

Recommendations:

1. **Flare Management and Operations:**
    - Use third-party drones for regular flare stack inspections and cleaning, such as with high-pressure washers.
    - Implement flare designs that separate routine flaring to smaller, dedicated stacks while reserving larger flares for emergency relief use.
    - Utilize stopple bypasses for high-pressure pipeline connections to avoid blowing down to flare stacks during maintenance.
    - Install restriction orifice plates to reduce gas velocity to flare tips during high-pressure blowdowns.
    - During high wind conditions, postpone pigging activities to minimize flaring unless operationally critical.

2. **Coordination and Communication:**
    - Communicate planned outages in advance to producers and operational teams to enable coordinated flare management.
    - Develop flare practices to manage controlled releases of high-pressure gas and include flare watch protocols to ensure rapid response if issues arise.
3. **Maintenance Programs:**
    - Conduct vegetation control, such as mowing and rocking around flare areas, annually.
    - Collaborate with flare equipment manufacturers to improve efficiency and adapt systems to wind conditions to prevent back burning or soot accumulation.
    - Use proper flare sweeping techniques and upgrade regulators for enhanced flare efficiency.

Emergency Response Measures

Responding effectively to wildfire incidents is crucial for safeguarding personnel, equipment, and surrounding communities. Companies should establish clear communication protocols, ensure employees are adequately trained, and maintain access to essential firefighting equipment, such as fire extinguishers, to stop small fires before they get out of control. By preparing comprehensive response plans and coordinating closely with local emergency responders, operators can minimize the impact of wildfires and ensure swift, organized action during emergencies.

Recommendations:

1. **Notification Systems:**
    - Establish clear protocols for notifying local emergency responders immediately in the event of a fire.
    - Develop real-time alert systems to communicate wildfire risks to employees and stakeholders.
2. **Preparedness and Training:**
    - Train field personnel to recognize wildfire risks and respond appropriately.
    - Consider conducting joint drills or notification exercises with local fire departments to improve coordination during emergencies.
3. **Equipment Availability:**
    - Ensure adequate firefighting capability is readily available during high-risk periods.
    - Use radiant heat barriers where necessary to protect equipment from heat exposure.

4. **Incident Response Plans:**
    - Develop and maintain an Emergency Fire Response Plan that includes:
        - Evacuation procedures.
        - Steps for shutting down equipment safely.
        - Coordination protocols with local emergency services.

Stakeholder Communication and Public Outreach

It is a good idea to Engage with stakeholders to effectively communicate the wildfire risk mitigation efforts of the oil and gas industry. Proper outreach and government engagement are critical to fostering transparency and understanding about operational safety measures and ensuring adequately coordinated emergency response. Open communication strengthens relationships and ensures alignment between the industry and the communities in which it operates.

Recommendations:

1. **Government Engagement:**
    - Proactively communicate about wildfire prevention and operational safety measures with local and state government entities.
    - Ensure proper notification mechanisms and/or procedures are in place to notify emergency responders in the event of a fire.
    - Consider participating in notification drills and response exercises conducted by local responders.
    - Keep an up-to-date list of freshwater resources that can be shared during a wildfire emergency.
    - Coordinate with local emergency responders and planners annually to ensure proper coordination and up-to-date points of contact. Coordination activities should include the following entities:
        1. Local volunteer fire departments
        2. County emergency managers
        3. Local Emergency Planning Committees
        4. ND Department of Emergency Services
        5. Local county or city commissioners

Conclusion

The oil and gas industry is committed to operational safety and environmental stewardship. These BMPs provide a framework for wildfire risk mitigation that companies can adapt to their unique operations. The industry can reduce wildfire risks, ensure regulatory compliance, and maintain public trust by implementing these practices.

Resources

To support the implementation of these Best Management Practices, the following resources are recommended:

- North Dakota Rangeland Fire Danger Index (RFDI): ND Response Fire Danger Rating Map
- National Interagency Fire Center (NIFC): Wildfire Resources and Updates
- National Weather Service (NWS): Fire Weather Forecasts
- Bureau of Land Management (BLM): Guidelines for Vegetation Management
- North Dakota Department of Mineral Resources (NDDMR): Home | Department of Mineral Resources, North Dakota Oil and Gas Division | Department of Mineral Resources, North Dakota
- North Dakota Department of Environmental Quality (NDDEQ): North Dakota Department of Environmental Quality
- North Dakota Department of Emergency Services (NDDES): Home | Department of Emergency Services North Dakota State Radio - In Depth | Department of Emergency Services North Dakota
- North Dakota Fire Marshal: Home | North Dakota Fire Marshal